

IMAGING ATLAS OF HUMAN ANATOMY

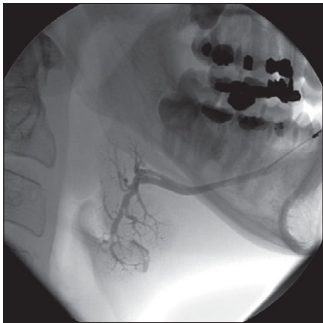
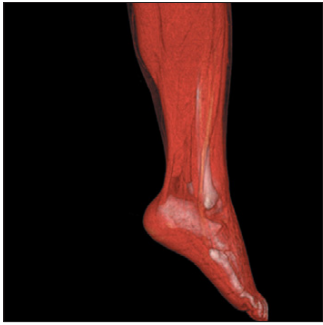
FOURTH
EDITION

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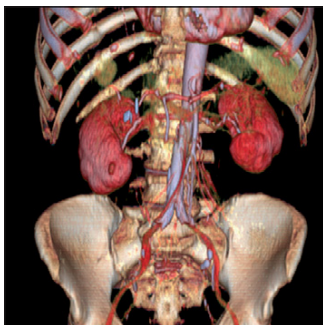
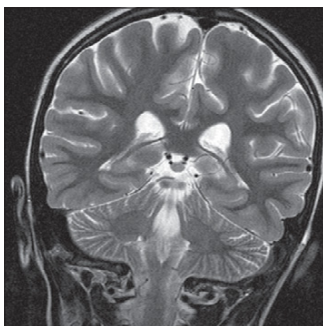
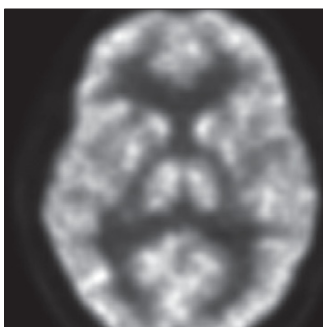
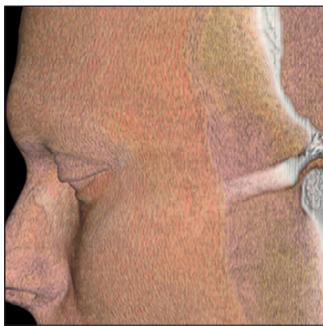




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FOURTH
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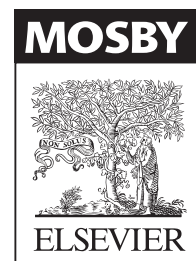
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Preface to the fourth edition

There is increasing importance placed on the interpretation of radiological anatomy in a world that has seen considerable changes in medical student training programmes over the last decade, combined with the reduction in cadaver dissection.

We have updated and revised this atlas, by the addition of new images and techniques, to reflect these trends. The 'Author' team has also changed. We wish to record our sincere thanks to Drs Hourihan, Belli, Moore and Owen for their previous contributions and introduce you to our two new co-authors, Dr Jonathan Spratt from Durham, UK and Dr Lonie Salkowski from Madison, WI, USA. Both are radiological anatomists of high repute and most of the new material emanates from their work.

The format for this fourth edition remains the same but the layout of the chapters on the abdomen and pelvis has been revised to reflect current radiological and anatomical practice; the new chapters being cross-sectional imaging of the abdomen and pelvis and non cross-sectional imaging of the abdomen and pelvis.

A new section on nuclear medicine, by Dr Salkowski, has also been added.

We are adding for the first time, a website of pathology to complement this radiological atlas. It consists of a series of 34 PowerPoint tutorials related to the eight anatomical chapters and based on nine 'concepts'. These 'concepts' have been designed to help you understand the relationship between normal anatomy and altered, abnormal anatomy that is the discipline of pathology. This material has been produced with the help of Dr Jennifer Allison who started this project as a medical student. A selection of these tutorials is available free with

the atlas (please see inside front cover for access details) and the remainder will be available for a small charge from the same site.

The nine concepts are as follows:

1. 'things pushed'
2. 'things pulled'
3. 'things added'
4. 'things missing'
5. 'things larger than normal'
6. 'things smaller than normal'
7. 'things that have an abnormal structure, either locally or diffusely'
8. 'things that have an abnormal shape, either locally or generally'
9. 'things you cannot see despite knowing they are present pathologically, i.e. you are either using the wrong imaging technique or you will never see any abnormality because the disease is only microscopic and has not induced any visible anatomical (or physiological) change'.

Further explanations together with numerous examples to demonstrate these 'concepts' are on the website. We believe the ongoing reliance placed by clinicians on the imaging of pathological processes will be facilitated by this novel and exciting approach and the addition of pathology combined with this extensively revised radiological anatomy text will enhance the understanding of imaging to the benefit of both you, the reader, and your patient. As this book and accompanying website are for you, the student, we encourage and welcome corrections or suggestions and ideas for future editions.

Jamie Weir, Peter H Abrahams, Jonathan Spratt and Lonie Salkowski
January 2010

Preface to the first edition

Imaging methods used to display normal human anatomy have improved dramatically over the last few decades. The ability to demonstrate the soft tissues by using the modern technologies of magnetic resonance imaging, X-ray computed tomography, and ultrasound has greatly facilitated our understanding of the link between anatomy as shown in the dissecting room and that necessary for clinical practice. This atlas has been produced because of the new technology and the fundamental changes that are occurring in the teaching of anatomy. It enables the preclinical medical student to relate to basic anatomy while, at the same time, providing a comprehensive study guide for the clinical interpretation of imaging, applicable for all undergraduate and postgraduate levels.

Several distinguished authors, experts in their fields of imaging, have contributed to this book, which has benefited from editorial integration to ensure balance and cohesion. The atlas is designed to complement and supplement the *McMinn's Clinical Atlas of Human Anatomy* 6th edition.

Duplication of images occurs only where it is necessary to demonstrate anatomical points of interest or difficulty. Similarly, examples of different imaging modalities of the same anatomical region are only included if they contribute to a better understanding of the region shown. Radiographs that show important landmarks in limb ossification centre development, together with examples of some common congenital anomalies, are also documented. In certain sections, notably MR and CT, the legends may cover more than one page, so that a specific structure can be followed in continuity through various levels and planes.

Human anatomy does not alter, but our methods of demonstrating it have changed significantly. Modern imaging allows certain structures and their relationships to be seen for the first time, and this has aided us in their interpretation. Knowledge and understanding of radiological anatomy are fundamental to all those involved in patient care, from the nurse and the paramedic to medical students and clinicians.

Jamie Weir and Peter H Abrahams
February 1992

Acknowledgements

Thank you to all of our previous contributors of images to the previous editions of this atlas and to Dr Alison Murray who has kindly granted permission for use of images used in the online pathology tutorials. New material and labelling have been added by Dr Richard Wellings,

University Hospital, Coventry and Warwickshire and Dr Andrew Hine, N.W. London Hospitals and we are very grateful for their help. The two images in the introduction, the body MRA and the MR tractography, were kindly supplied by Toshiba Medical Systems.

Dedication

To our students – past, present and future

Introduction

Guide to ossification tables

Ossification tables, such as the one shown on the right, appear throughout this book.

The key to these tables is as follows:

(c) = cartilage
(m) = membrane
miu = months of intrauterine life
wiu = weeks of intrauterine life
mths = months
yrs = years

And the rule to remember is: girls before boys.

Magnetic resonance imaging

Magnetic resonance imaging (MRI) produces images by magnetising the patient in the bore of a powerful magnet and broadcasting short pulses of radiofrequency (RF) energy at 46 MHz to resonate mobile protons (hydrogen nuclei) in fat, protein and water. The protons produce RF echoes when their resonant energy is released and their density and location can be exactly correlated by complex mathematical algorithms into an image matrix.

The spinning proton of the hydrogen nucleus acts like a tiny bar magnet, aligning either with or against the magnetic field producing a small net magnetic vector. RF energy is used to generate a second magnetic field, perpendicular to the static magnetic field, which rotate or 'flip' the protons away from the static magnetic field. Once the RF pulse is switched off, the protons flip back to their original position of equilibrium ('relaxation'), emitting the RF energy they had acquired into the antenna around the patient, which is then digitised, amplified and, finally, spatially encoded by the array processor.

MRI systems are graded according to the strength of the magnetic field they produce. Routine high-field systems are those capable of producing a magnetic field strength of 1.5–3 T (Tesla) using a superconducting electromagnet immersed in liquid helium. Open magnets for claustrophobic patients and limb scanners use permanent magnets between 0.2 and 0.75 T. For comparison, earth's magnetic field varies from 30 to 60 μ T. MRI does not present any recognised biological hazard. Patients who have any form of pacemaker or implanted electro-inductive device must not be examined. Other prohibited items include ferromagnetic intracranial aneurysm clips, certain types of cardiac valve replacement and intra-ocular metallic foreign bodies. Many extra cranial vascular clips and orthopaedic prostheses are now 'MRI friendly', but these may cause local artefacts. Loose metal items must be excluded from the examination room – pillows containing metallic coiled springs have been known to near suffocate patients!

Although beyond the remit of the current edition of this book, new methods of analysing normal and pathologic brain anatomy are now

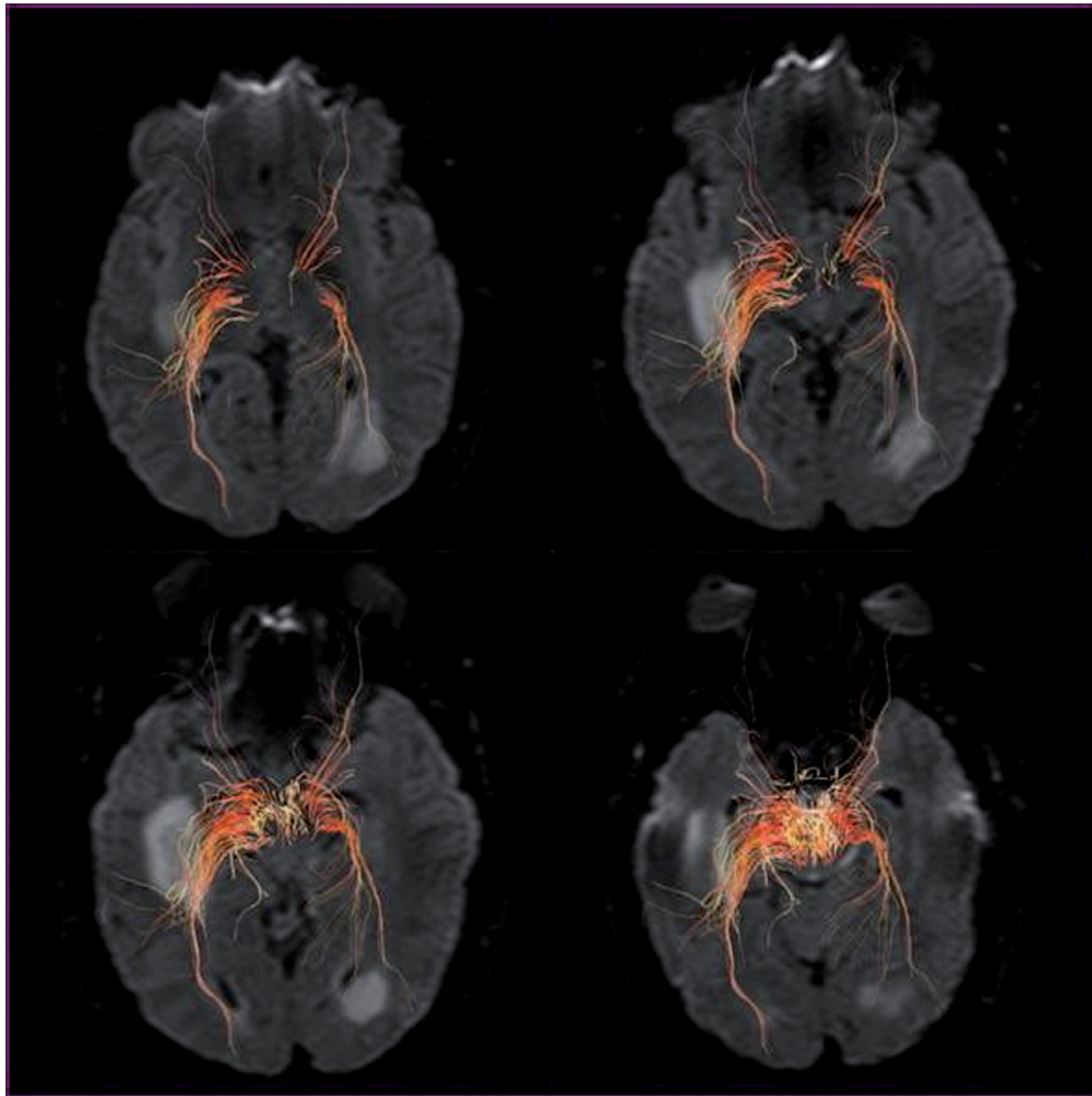
CLAVICLE (m)	Appears	Fused
Lateral end	5 wiu	20+ yrs
Medial end	15 yrs	20+ yrs
SCAPULA (c)		
Body	8 wiu	15 yrs
Coracoid	<1 yr	20 yrs
Coracoid base	Puberty	15–20 yrs
Acromion	Puberty	15–20 yrs

at the forefront of research, namely MRS, fMRI and mMRI, the latter taking on a new direction since the description of the human genome.

Magnetic resonance spectroscopic imaging (MRS) assesses function within the living brain. MRS takes advantage of the fact that protons



Body MRA.



MR tractography.

residing in differing chemical environments possess slightly different resonant properties (chemical shift). For a given volume of brain the distribution of these proton resonances can be displayed as a spectrum. Discernible peaks can be seen for certain neurotransmitters: *N*-acetylaspartate varies in multiple sclerosis, stroke and schizophrenia while choline and lactate levels have been used to evaluate certain brain tumours.

Functional MRI (fMRI) depends on the fact that haemoglobin is diamagnetic when oxygenated but paramagnetic when deoxygenated. These different signals can be weighted to the smaller vessels, and hence closer to the active neurons, by using larger magnetic fields. In molecular imaging (mMRI) biomarkers interact chemically with their surroundings and alter the image according to molecular changes occurring within the area of interest, potentially enabling early detection and treatment of disease and basic pharmaceutical development, also allowing for quantitative testing.

High-field-strength magnets of course give significant improvement in spatial resolution and contrast. MR images have been acquired

at 8 T of the microvasculature of the live human brain allowing close comparison to histology, having significant implications in the treatment of reperfusion injury and in the physiology of solid tumours and angiogenesis. There is every reason to believe that continued efforts to push the envelope of high-field-strength applications will open new vistas in what appears to be a never-ending array of potential clinical applications.

Ultrasound

In contrast with the other images in this book, ultrasound images do not depend on the use of electromagnetic wave forms. It is the properties of high-frequency sound waves (longitudinal waves) and their interaction with biological tissues that go to form these 'echograms'.

A sound wave of appropriate frequency (diagnostic range 3.5–20 MHz) is produced by piezo-electric principles, namely that certain crystals can change their shape and produce a voltage potential, and vice versa. As the beam passes through tissues, two important effects determine image production: attenuation and reflection. Attenuation is caused by the loss of energy due to absorption, reflection, refraction

out of the capture of the receiver with resulting reduction in signal intensity. Reflection of sound waves within the range of the receiver produces the image, the texture of which is dependent upon tiny differences in acoustic impedance between different tissues. Blood flow and velocity can be measured (using the Doppler principle) in duplex mode.

Techniques such as harmonic imaging and the use of ultrasound contrast agents (stabilised microbubbles) have enabled non-invasive determination of myocardial perfusion to be recently discovered. These contrast agents clearly improve the detection of metastases in the liver and spleen. Ultrasound is the most common medical imaging technique for producing elastograms in which stiffness or strain images of soft tissue are used to detect or classify tumours. Cancer is 5–28 times stiffer than the background of normal soft tissue. When a mechanical compression or vibration is applied, the tumour deforms less than the surrounding tissue. Elastography can be used for example to measure the stiffness of the liver in vivo or in the detection of breast or thyroid tumours. A correlation between liver elasticity and the cirrhosis score has been shown.

Only a handful of key ultrasound images have been included in the book to illustrate a particular point or area, as the real-time nature of ultrasound precludes further coverage. Interpretation of the anatomy from static ultrasound images is more difficult than that from other imaging modalities because the technique is highly operator-dependent and provides information on tissue structure and form different from that of other imaging techniques.

Nuclear medicine

Historically the field of nuclear medicine began in 1946 when radioactive iodine was administered as an 'atomic cocktail' to treat thyroid cancer. Since that time, nuclear medicine has advanced and was recognized by the American Medical Association as a medical specialty in 1971.

Diagnostic radiology creates an image by passing radiation through the body from an external source. Nuclear medicine, unlike diagnostic radiology, creates an image by measuring the radiation emitted from tracers taken internally. Thus the image is created from the radiation emitted from the patient. Overall the radiation dosages are comparable and vary depending on the examination.

Nuclear medicine also differs from most other imaging modalities in that the tests demonstrate the physiological function of a specific area of the body. In some instances this physiological information can be fused with more anatomical imaging of CT or MRI thus combining the strengths of anatomy and function for diagnosis.

Rather than a contrast media for imaging, nuclear medicine uses radiopharmaceuticals, which are pharmaceuticals that have been labelled with a radionuclide. These radiopharmaceuticals are administered to patients by intravenous injection, ingestion, or inhalation. The method of administration depends on the type of examination and the organ or organ process to be imaged. By definition, all these radiopharmaceuticals emit radiation. This emitted radiation is detected and imaged with specialised equipment such as gamma cameras, positron emission tomography (PET), and single

photon emission computed tomography (SPECT). Radiation in certain tests can be measured from parts of the body by the use of probes, or samples can be taken from patients and measured in counters.

The premise of nuclear medicine imaging involves functional biology, thereby not only can studies be done to image a disease process but they can also be used to treat diseases. Radiopharmaceuticals that are used for imaging emit a gamma ray (γ) and those used for treatment emit a beta (β) particle. Gamma rays are of higher energy to pass through the body and be detected by a detection camera, whereas beta particles travel only short distances and emit their radiation dose to the target organ. For example, technetium-99m or iodine-123 may be used to detect thyroid disease, but certain thyroid diseases or thyroid cancer may be treated solely or in part by treatment with iodine-131. The difference in the agent used depends on the type and energy levels of the radiation particle that the radioisotope emits.

Radionuclides, or the radioactive particle, used in nuclear medicine are often chemically bound to a complex called a tracer so that when administered it acts in a characteristic way in the body. The way the body handles this tracer can differ in disease or pathologic processes and thus demonstrate images different from normal in disease states. For example, the tracer used in bone imaging is methylene-diphosphonate (MDP). MDP is bound to technetium-99m for bone imaging. MDP attaches to hydroxyapatite in the bone. If there is a physiological change in the bone from a fracture, metastatic bone disease or arthritic change, there will be an increase in bone activity and thus more accumulation of the tracer in this region compared with the normal bone. This will result in a focal 'hot spot' of the radiopharmaceutical on a bone scan.

Technetium-99m is the major workhorse radioisotope of nuclear medicine. It can be eluted from a molybdenum/technetium generator stored within a nuclear medicine department allowing for easy access. It has a short half-life (6-hours), which allows for ease of medical imaging and disposal. Its pharmacological properties allow it to be easily bound to various tracers and it emits gamma rays that are of suitable energy for medical imaging.

In addition to technetium-99m, the most common intravenous radionuclides used in nuclear medicine are iodine-123 and 131, thallium-201, gallium-67, 18-fluorodeoxyglucose (FDG) and indium-111 labeled leukocytes. The most common gaseous/aerosol radionuclides used are xenon-133, krypton-81m, technetium-99m (Technegas) and technetium-99m DTPA.

The images obtained from nuclear medicine imaging can be in the form of one or many images. Image sets can be represented as time sequence imaging (e.g. cine) such as dynamic imaging or cardiac gated sequences, or by spatial sequence imaging where the gamma camera is moved relative to the patient such as in SPECT imaging. Spatial sequence imaging allows the images to be presented as a slice-stack of images much like CT or MRI images are displayed. Spatial sequence imaging can also be fused with concomitant CT or MR imaging to provide combined physiologic and anatomical imaging. Time and spatial sequence imaging offer a unique perspective and information of physiological processes in the body.

A PET (positron emission tomography) scan is a specialised type of nuclear medicine imaging that measures important body functions, such as blood flow, oxygen use, and sugar (glucose) metabolism to evaluate how well organs and tissues are functioning. PET imaging involves short-lived radioactive tracer isotopes that are chemically incorporated into biologically active molecules. The most common molecule used is fluorodeoxyglucose (FDG), which is a sugar. After injection into the body, these active molecules become concentrated into the tissues of interest. After this waiting time, which is about an hour for FDG, imaging can proceed. Imaging of FDG occurs as the isotope decays. The isotope undergoes positron emission decay. As the positron is emitted, it travels only a few millimeters and annihilates with an electron and in so doing produce a pair of gamma photons moving in opposite directions. The PET scan detectors process only those photon pairs that are detected simultaneously (coincident detection). This data is then processed to create an image of tissue activity with respect to that particular isotope. These images can then be fused with CT or MR images.

A limitation of PET imaging is the short half-life of the isotopes. Thus close access to a cyclotron for generation of the isotopes plays an important role in the feasible location of PET imaging. Typical isotopes used in medical imaging and their half-lives are: carbon-11 (~20 min), nitrogen-13 (~10 min), oxygen-13 (~2 min) and fluorine-18 (~110 min).

Angiography/Interventional radiology

Angiographic imaging began in 1927 by Egas Moniz, a physician and neurologist, with the introduction of contrast X-ray cerebral angiography. In 1949 he was awarded the Nobel Prize for his work. The field of angiography however was revolutionised with the advent of the Seldinger technique in 1953, in which no sharp needles remained inside the vascular lumen during imaging.

Although the field of angiography began with X-ray and fluoroscopic imaging of blood vessels and organs of the body by injecting radio-opaque contrast agents in to the blood, it has evolved to so much more. Many of the procedures performed by angiography can be diagnostic, as newer techniques arose, it has allowed for the advent of minimally invasive procedures performed with image guidance and thus the name change of the discipline to Interventional radiology (or vascular and interventional radiology).

Angiograms are typically performed by gaining access to the blood vessels, whether this is through the femoral artery, femoral vein or jugular vein depends on the area of interest to be imaged. Angiograms can be obtained of the brain as cerebral angiograms, of the heart as coronary angiograms, of the lungs as pulmonary angiograms, and so on. Imaging of the arterial and venous circulation of the arms and legs can demonstrate peripheral vascular disease. Once vascular access is made, then catheters are directed to the specific location to be imaged in the body by the use of guide wires. Contrast agents are injected through these catheters to visualise the vessels or the organ with X-ray imaging.

In addition to diagnostic imaging, treatment and/or interventions can often be performed through similar catheter based examinations. Such procedures might involve angioplasties where a balloon mechanism is placed across an area of narrowing, or stenosis, in a vessel or lumen.

With controlled inflation of the balloon, the area of narrowing can be widened. Often to keep these areas from narrowing again, stents can be placed within the lumen of the vessel or even in the trachea or oesophagus.

Imaging in diagnostic or interventional procedures can be still images or motion (cine) images. The technique often used is called digital subtraction angiography (DSA). In this type of imaging, images are taken at 2–30 frames per second to allow imaging of the flow of blood through vessels. A preliminary image of the area is taken before the contrast is injected. This ‘mask’ image is then electronically subtracted from all the images leaving behind only the vessels filled with contrast. This technique requires the patient to remain motionless for optimal subtraction.

Angiograms can be performed of the heart to visualise the size and contractility of the chambers and anatomy of the coronary vessels. The thorax can also be studied to evaluate the pulmonary arteries and veins for vascular malformations, blood clots and possible origins of hemoptysis. The neck is often imaged to visualise the vessels that supply the brain as they arise from the aortic arch to the cerebral vessels, in the investigation of atherosclerotic disease, vascular malformations and tumoral blood supplies. Renal artery imaging can elucidate the cause of hypertension in selected patients, as can imaging of the mesenteric vessels discover the origin of gastrointestinal bleeding or mesenteric angina.

In addition to angiograms and venograms, the field of interventional radiology also performs such procedures as coil-embolisation of aneurysms and vascular malformations, balloon angioplasty and stent placement, chemoembolisation directly into tumours, drainage catheter insertions, embolisations (e.g. uterine artery embolisation for treatment of uterine fibroids), thrombolysis to dissolve blood clots, tissue biopsy (percutaneous or transvascular), radiofrequency ablation and cryoablation of tumours, line insertions for specialised vascular access, inferior vena cava filter placements, vertebroplasty, nephrostomy placement, gastrostomy tube placement for feeding, dialysis access, TIPS (transjugular intrahepatic porto-systemic shunt) placement, biliary interventions, and, most recently, endovenous laser ablation of varicose veins.

Computed tomography

The limitation of all plain radiographic techniques is the two dimensional representation of three dimensional structures: the linear attenuation co-efficient of all the tissues in the path of the X-ray beam form the image.

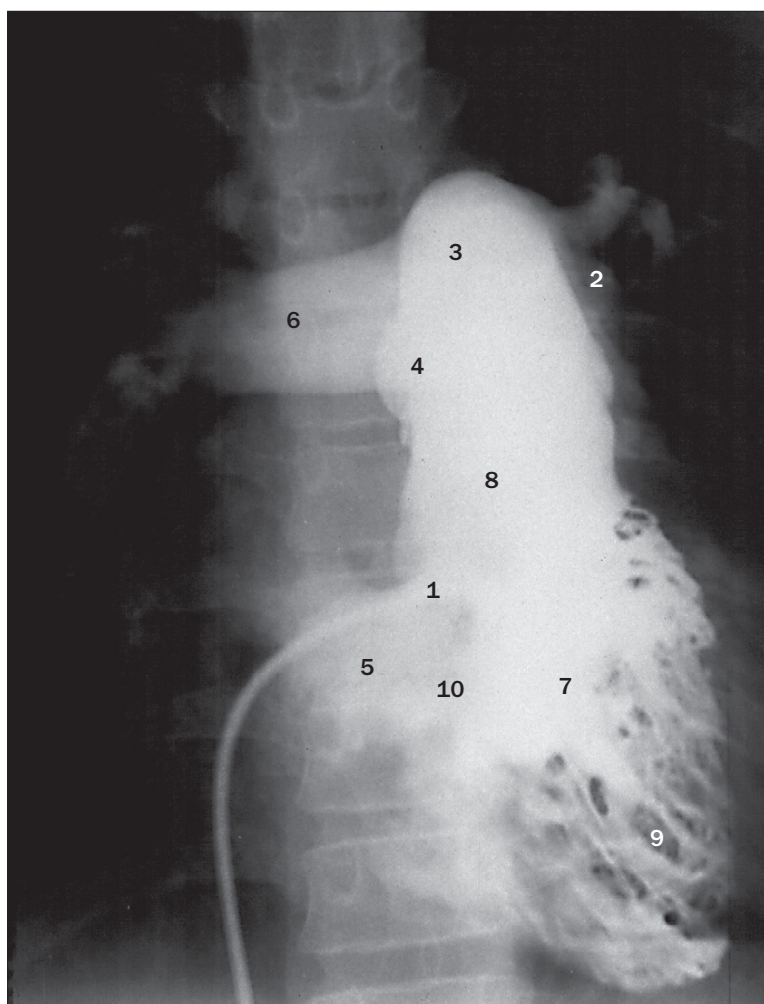
Computed tomography (CT) obtains a series of different angular X-ray projections that are processed by a computer to give a section of specified thickness. The CT image comprises a regular matrix of picture elements (pixels). All of the tissues contained within the pixel attenuate the X-ray projections and result in a mean attenuation value for the pixel. This value is compared with the attenuation value of water and is displayed on a scale (the Hounsfield Scale). Water is said to have an attenuation of 0 Hounsfield units (HU); air typically has an HU number of –1000; fat is approximately –100 HU; soft tissues are in the range +20 to +70 HU; and bone is usually greater than +400 HU.

Modern multislice helical CT scanners can obtain images in sub-second times and imaging of the whole body from the top of the head to the thighs can take as little as a single breath hold of only a few seconds. The fast scan times allow dynamic imaging of arteries and veins at different times after the injection of intravenous contrast agents. The continuous acquisition of data from a helical CT scanner allows reconstruction of an image in any plane, commonly sagittal and coronal, as displayed in many of the forthcoming chapters. This orthogonal imaging greatly improves the understanding of the three dimensional aspects of radiological anatomy and now forms part of the standard practice of assessing disease.

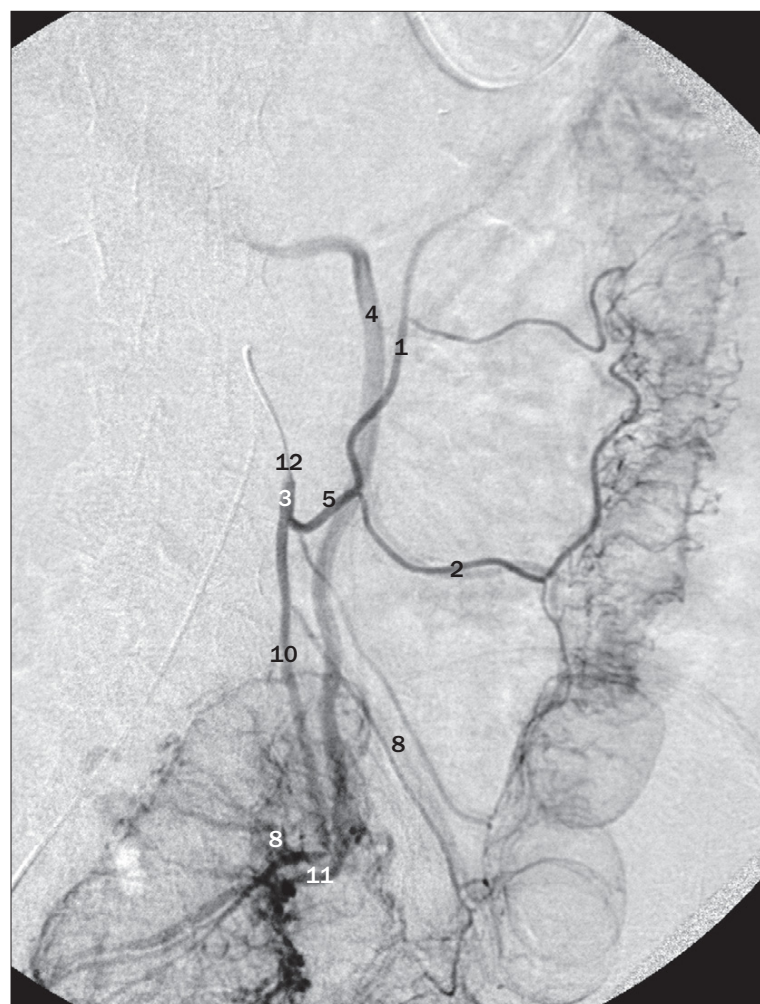
Digital images are stored in an archive and form part of an electronic storage record that is becoming commonplace throughout the world, namely a PACS (Picture Archiving and Communication System). PACS allows interrogation of images via an electronic network so that those images (and reports) may be visualised at a distance, for example, on the wards or at another hospital. The Electronic Patient Record (EPR), where all patient information is stored, is developing rapidly and gaining acceptance allowing a marked improvement in data handling.

No specific preparation is required for CT examinations of the brain, spine or musculoskeletal system. Studies of the chest, abdomen and pelvis usually require intravenous contrast medium that contains iodine, so enhancing the arteries and veins and defining their relationships to a greater extent. Opacification of the bowel in CT studies of the abdomen and pelvis can be accomplished by oral ingestion of a water-soluble contrast medium from 24 hours prior to the examination to show the colon, combined with further oral intake 0–60 minutes prior to the scan, for outlining the stomach and small bowel. Occasionally, direct insertion of rectal contrast to show the distal large bowel may be required.

Generally all studies are performed with the patient supine and images are obtained in the transverse or axial plane. Modern CT scanners allow up to 25 degrees of gantry angulation, which is particularly valuable in spinal imaging. Occasionally, direct coronal images are obtained in the investigation of cranial and maxillofacial abnormalities; in these cases the patient lies prone with the neck extended and the gantry appropriately angled, but this technique has largely been superseded by the orthogonal imaging described above.



Right ventricular angiogram (p. 112).

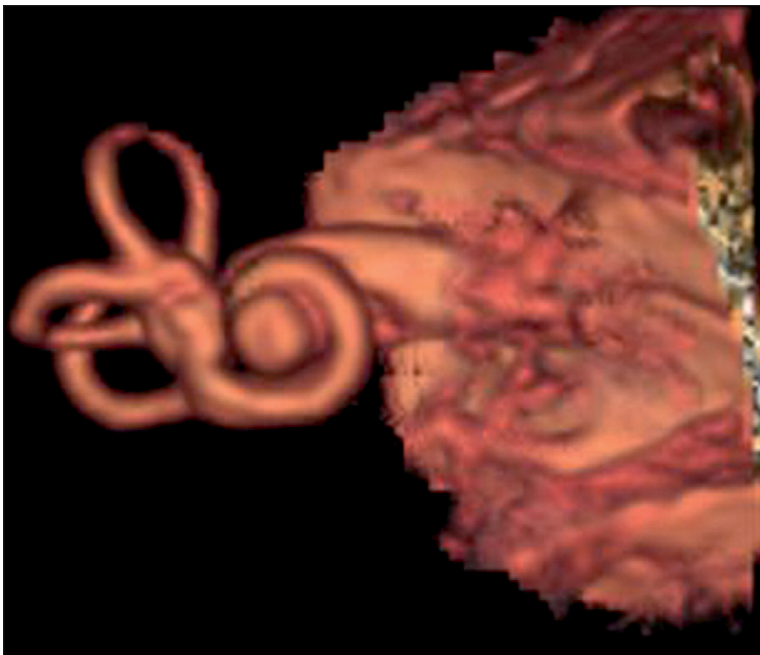
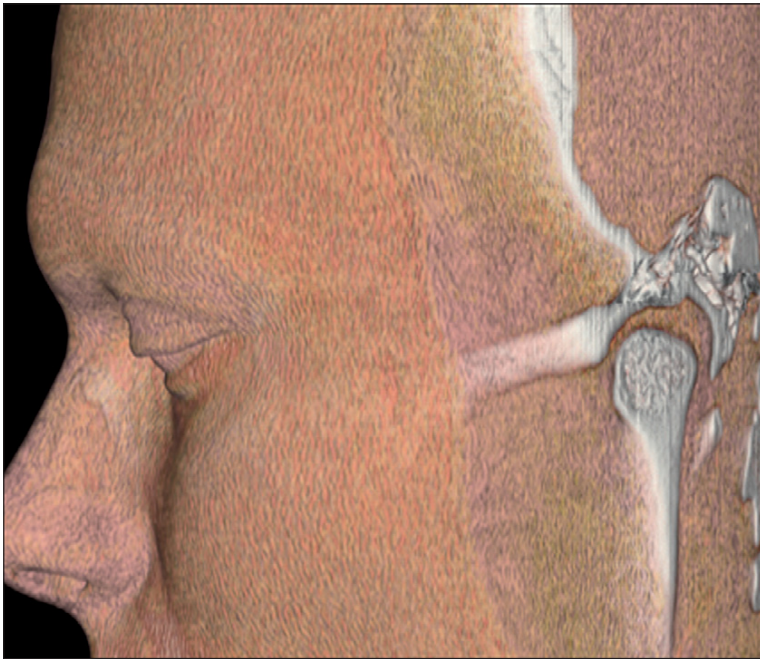


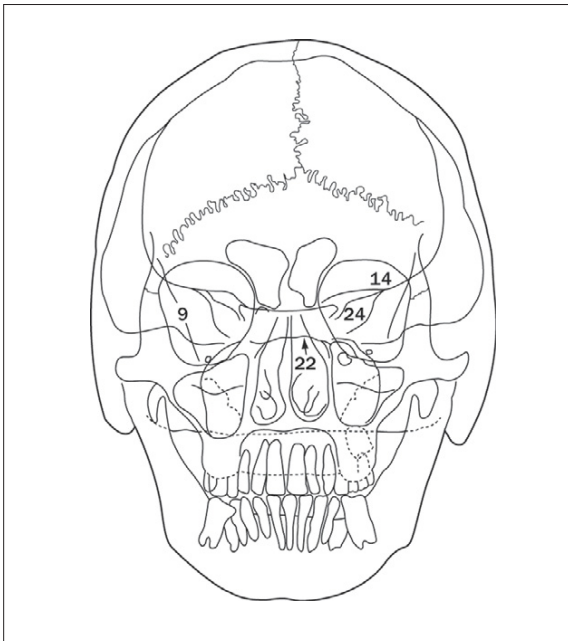
Inferior mesenteric arteriogram (p. 186).

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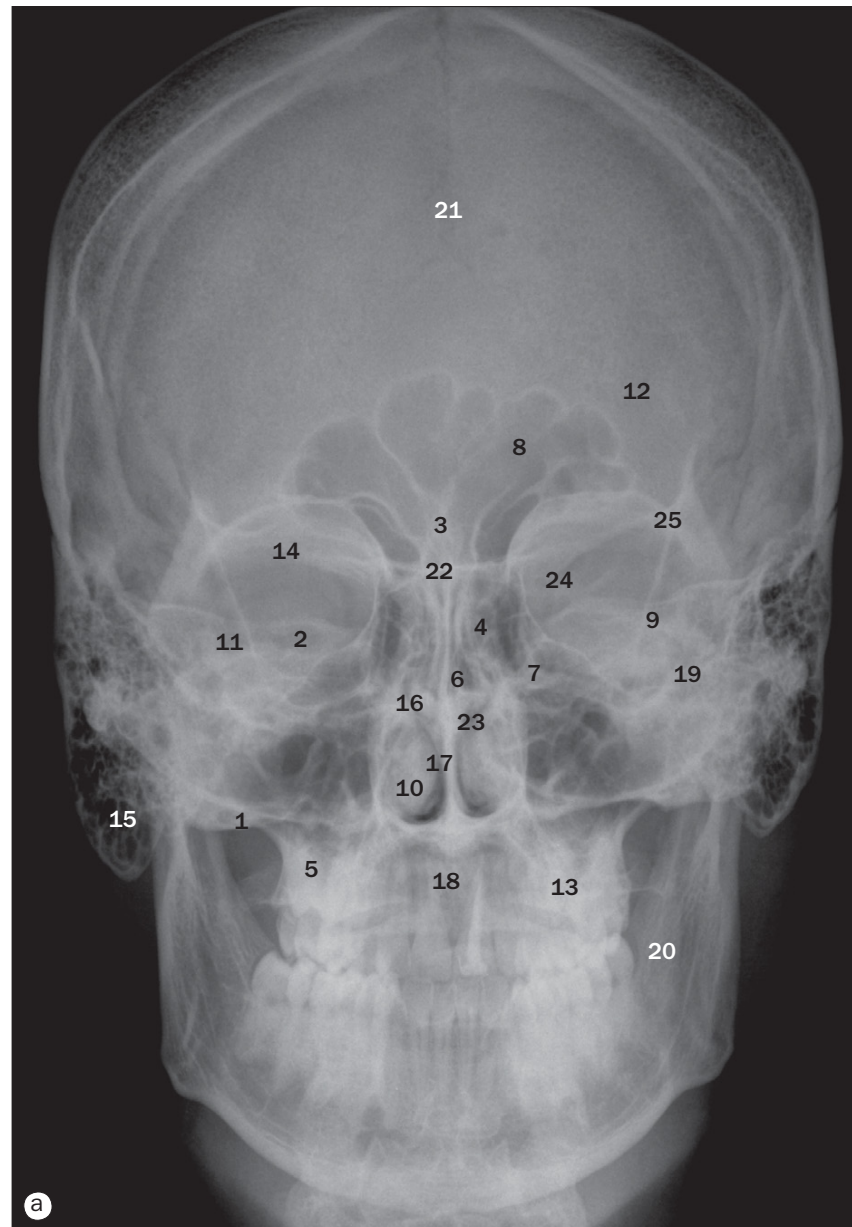
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Head, neck and brain

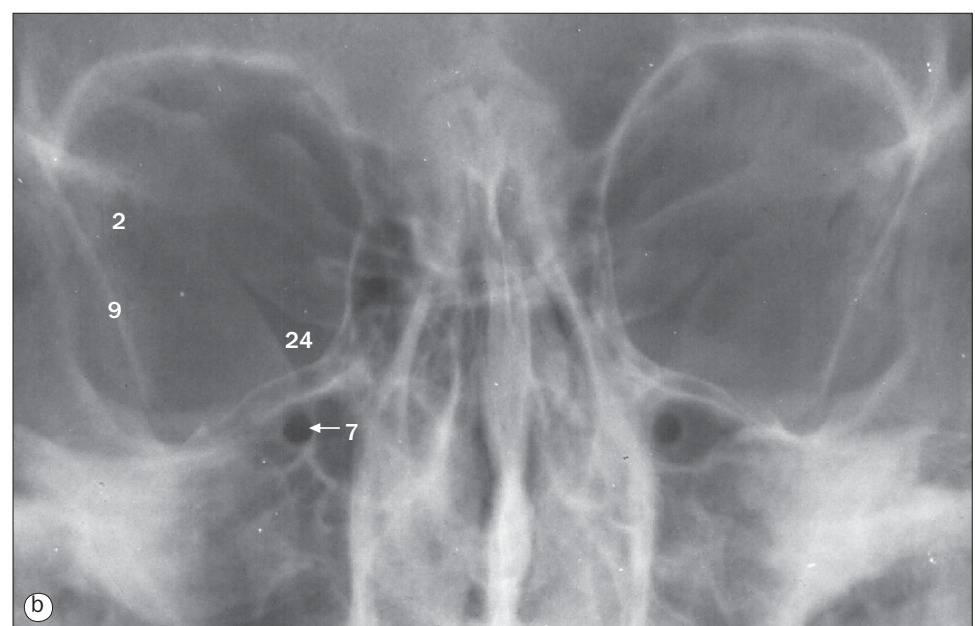


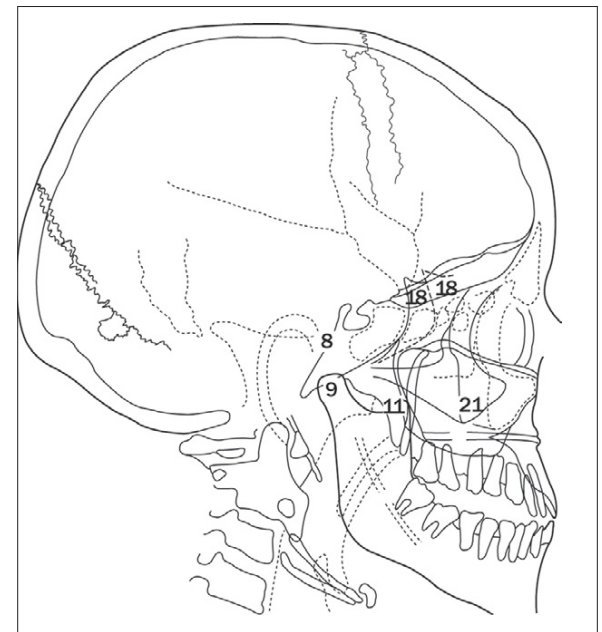
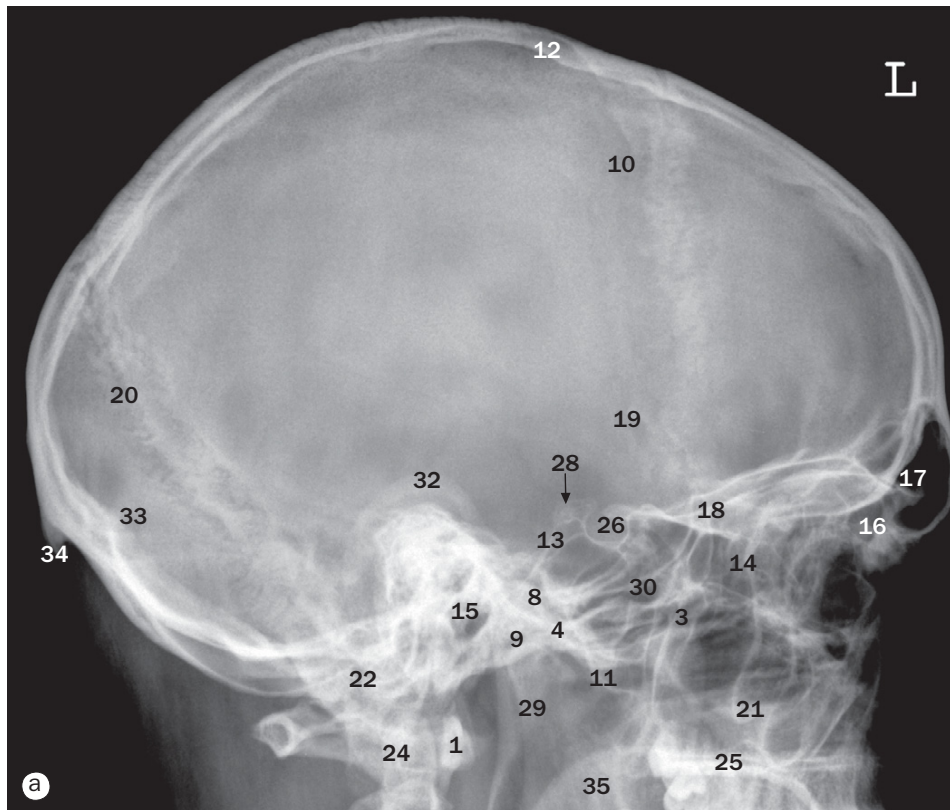


(a) Skull, occipitofrontal projection.
 (b) Skull, demonstrating the foramina rotunda, occipitofrontal projection.



- 1 Basi-occiput
- 2 Body of sphenoid
- 3 Crista galli
- 4 Ethmoidal air cells
- 5 Floor of maxillary sinus (antrum)
- 6 Floor of pituitary fossa
- 7 Foramen rotundum
- 8 Frontal sinus
- 9 Greater wing of sphenoid
- 10 Inferior turbinate
- 11 Internal acoustic meatus
- 12 Lambdoid suture
- 13 Lateral mass of atlas (first cervical vertebra)
- 14 Lesser wing of sphenoid
- 15 Mastoid process
- 16 Middle turbinate
- 17 Nasal septum
- 18 Odontoid process (dens) of axis (second cervical vertebra)
- 19 Petrous part of temporal bone
- 20 Ramus of mandible
- 21 Sagittal suture
- 22 Planum sphenoidale
- 23 Sphenoid air sinus
- 24 Superior orbital fissure
- 25 Temporal surface of greater wing of sphenoid





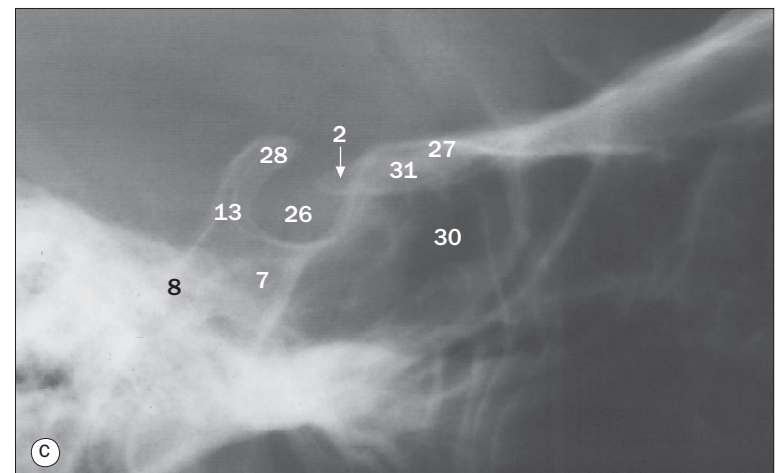
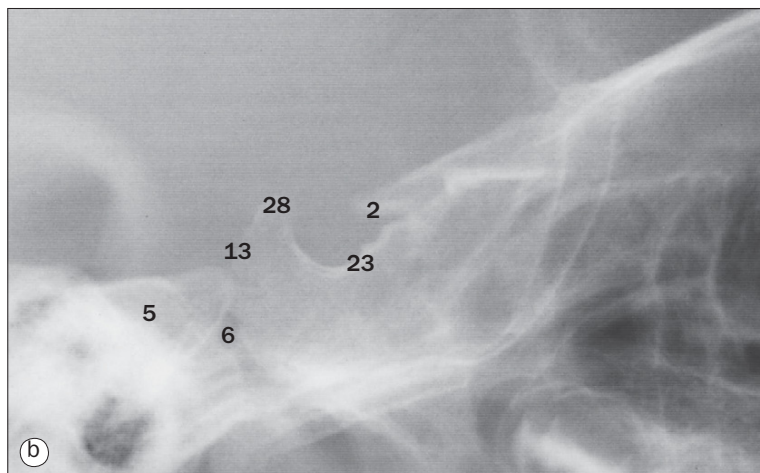
(a) Skull, lateral projection.

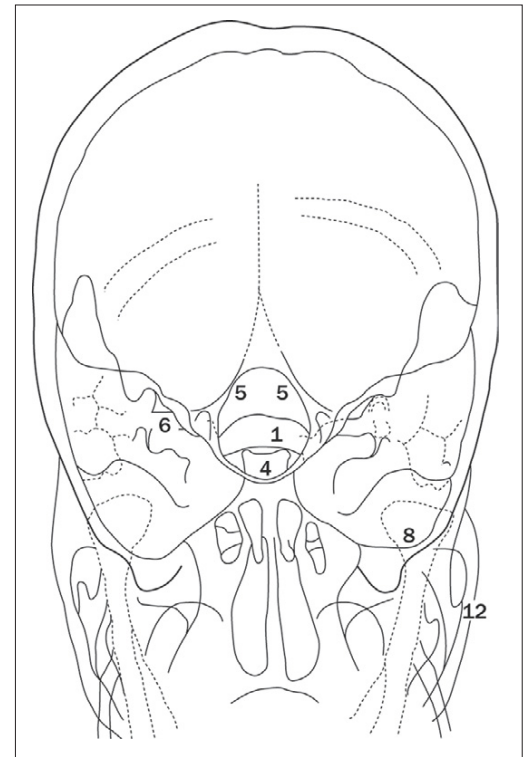
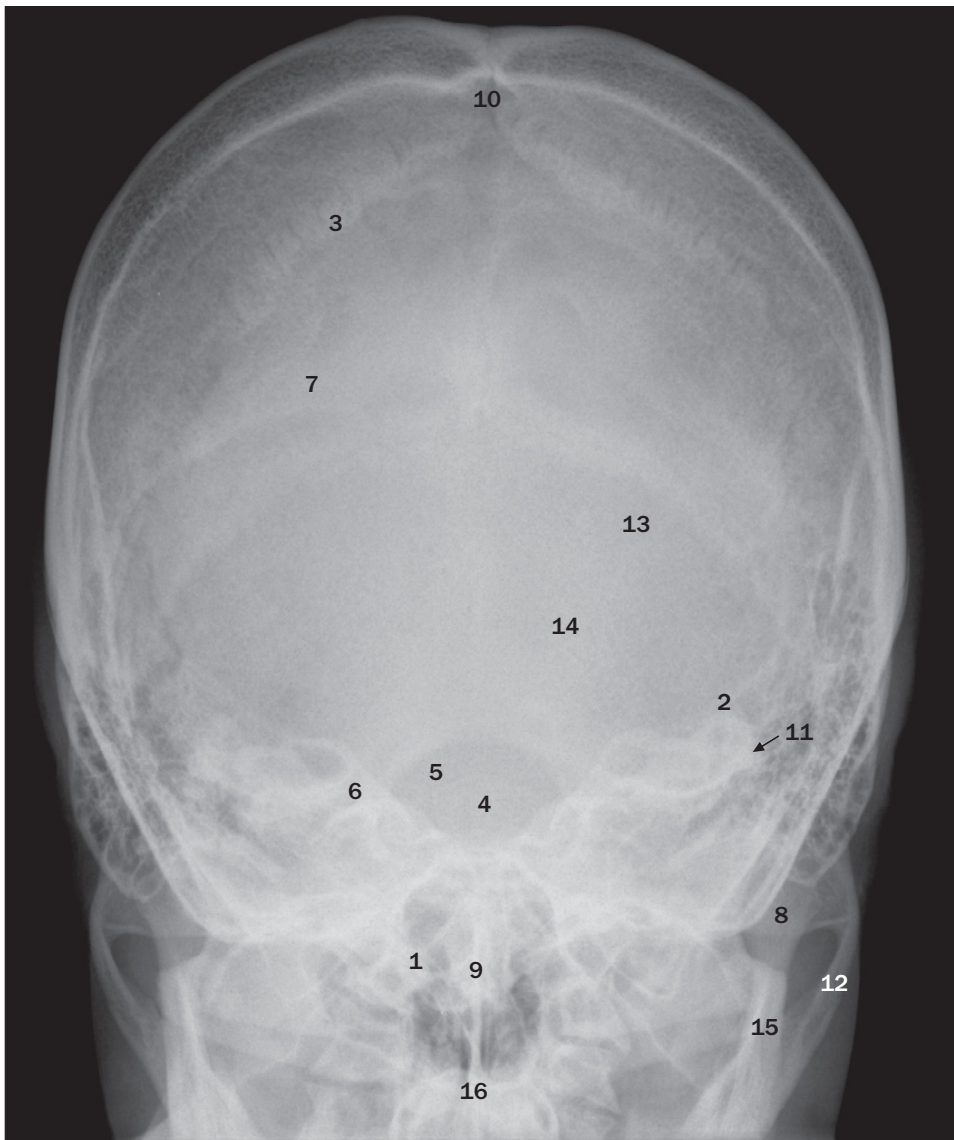
Pituitary fossa (sella turcica), (b) of a 7-year-old child, (c) of a 23-year-old woman, lateral projections.

- 1 Anterior arch of atlas (first cervical vertebra)
- 2 Anterior clinoid process
- 3 Arch of zygoma
- 4 Articular tubercle for temporomandibular joint
- 5 Basilar part of occipital bone
- 6 Basisphenoid/basi-occiput synchondrosis
- 7 Carotid sulcus
- 8 Clivus
- 9 Condyle of mandible
- 10 Coronal suture
- 11 Coronoid process of mandible

- 12 Diploë
- 13 Dorsum sellae
- 14 Ethmoidal air cells
- 15 External acoustic meatus
- 16 Frontal process of zygoma
- 17 Frontal sinus
- 18 Greater wing of sphenoid
- 19 Grooves for middle meningeal vessels
- 20 Lambdoid suture
- 21 Malar process of maxilla
- 22 Mastoid air cells
- 23 Middle clinoid process

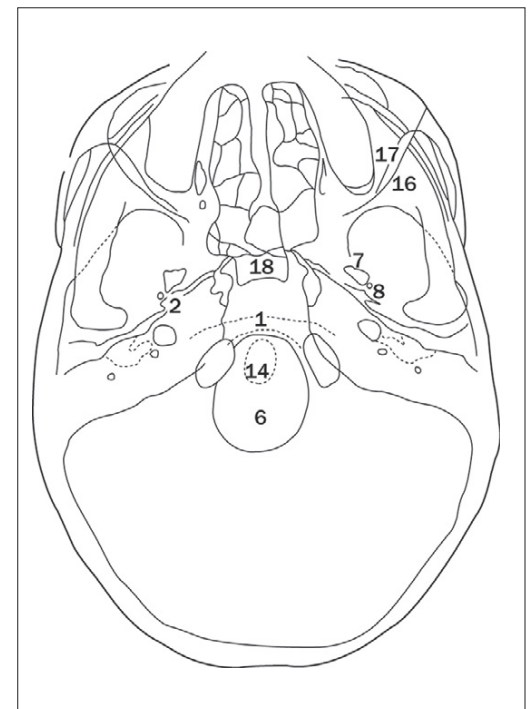
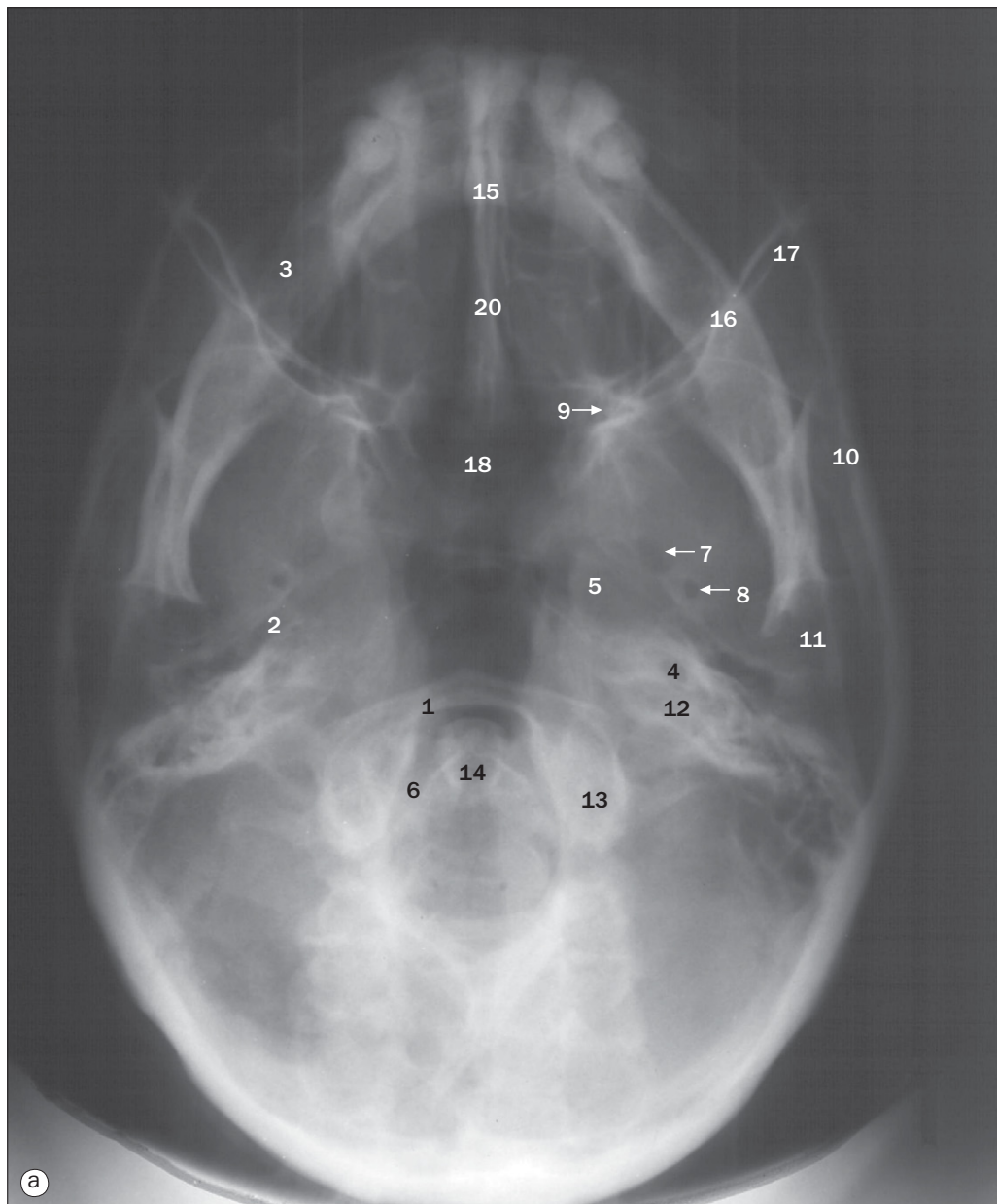
- 24 Odontoid process (dens) of axis (second cervical vertebra)
- 25 Palatine process of maxilla
- 26 Pituitary fossa (sella turcica)
- 27 Planum sphenoidale
- 28 Posterior clinoid process
- 29 Ramus of mandible
- 30 Sphenoidal sinus
- 31 Tuberculum sellae
- 32 Pinna of ear
- 33 Inion
- 34 External occipital protuberance
- 35 Soft palate



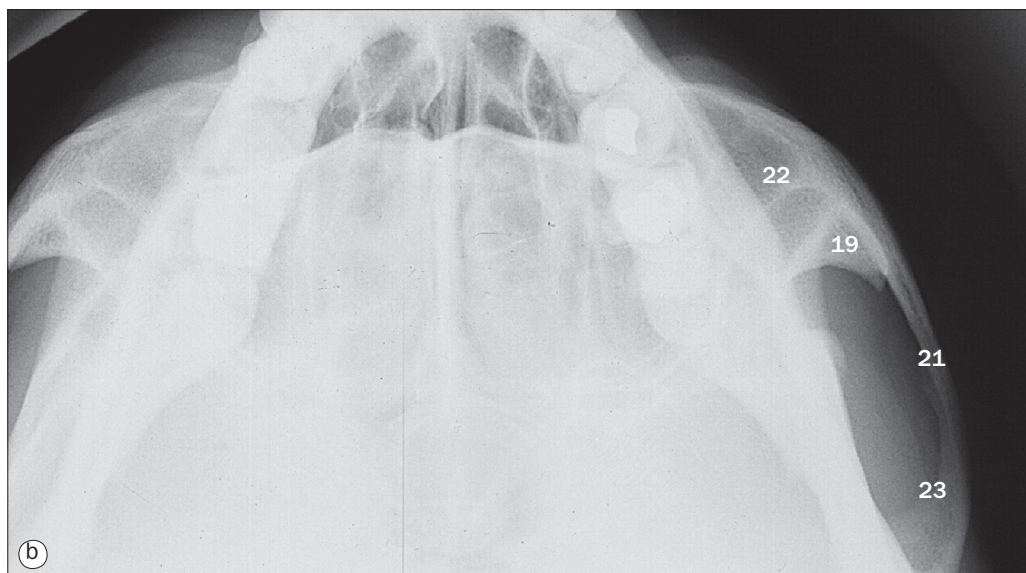


Skull, 30° fronto-occipital (Townes') projection.

- 1 Arch of atlas (first cervical vertebra)
- 2 Arcuate eminence of temporal bone
- 3 Coronal suture
- 4 Dorsum sellae
- 5 Foramen magnum
- 6 Internal acoustic meatus
- 7 Lambdoid suture
- 8 Mandibular condyle
- 9 Odontoid process (dens) of axis (second cervical vertebra)
- 10 Sagittal suture
- 11 Superior semicircular canal
- 12 Zygomatic arch
- 13 Groove for transverse sinus
- 14 Squamous occipital bone
- 15 Mandible
- 16 Nasal septum



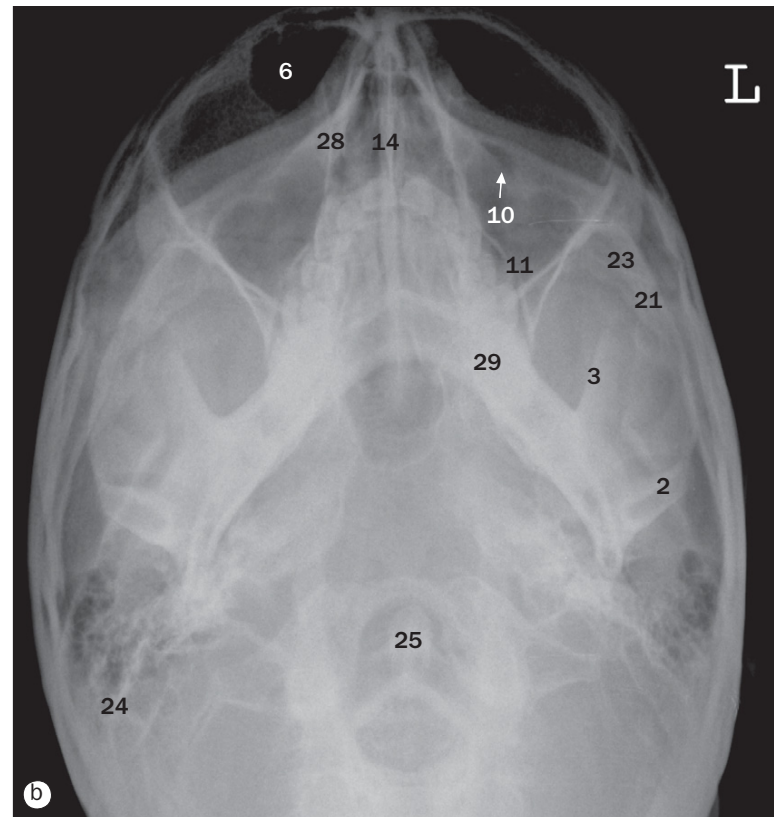
(a) Skull, submentovertical projection.
 (b) Skull, with additional angulation for zygomatic arches, submentovertical projection.



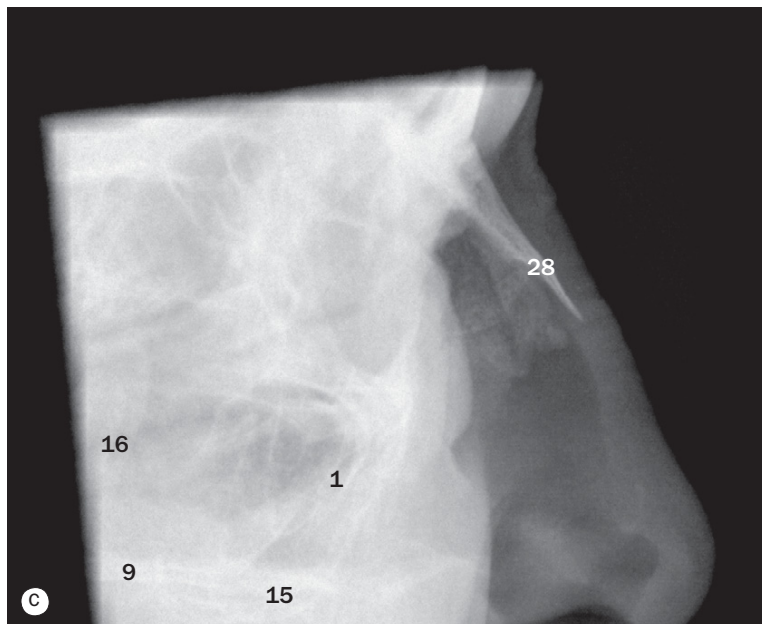
- 1 Anterior arch of atlas (first cervical vertebra)
- 2 Auditory (Eustachian) tube
- 3 Body of mandible
- 4 Carotid canal
- 5 Foramen lacerum
- 6 Foramen magnum
- 7 Foramen ovale
- 8 Foramen spinosum
- 9 Greater palatine foramen
- 10 Greater wing of sphenoid
- 11 Head of mandible
- 12 Jugular foramen
- 13 Occipital condyle
- 14 Odontoid process (dens) of axis (second cervical vertebra)
- 15 Perpendicular plate of ethmoid
- 16 Posterior margin of orbit
- 17 Posterior wall of maxillary sinus (antrum)
- 18 Sphenoidal sinus
- 19 Temporal process of zygomatic bone
- 20 Vomer
- 21 Zygomatic arch
- 22 Zygomatic bone
- 23 Zygomatic process of temporal bone



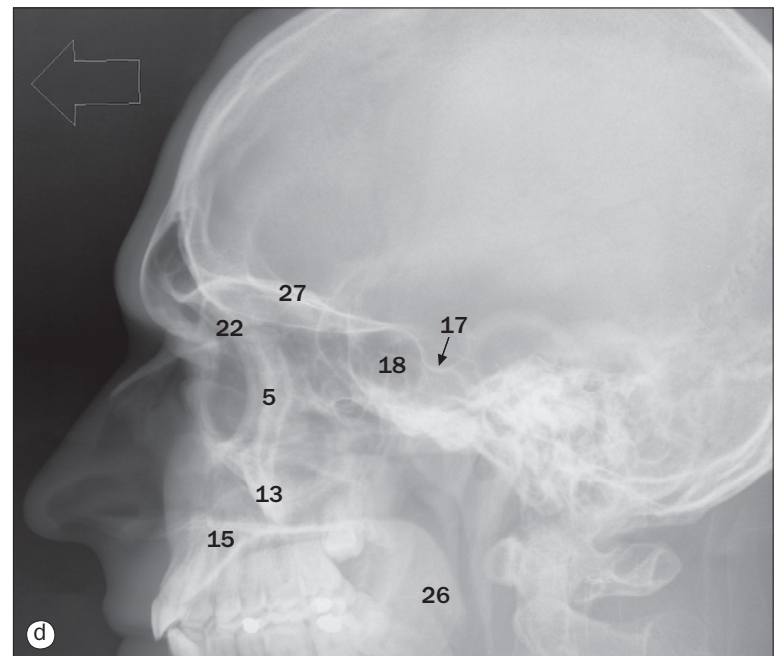
(a) Modified occipito frontal projection.



(b) Occipito mental projection.

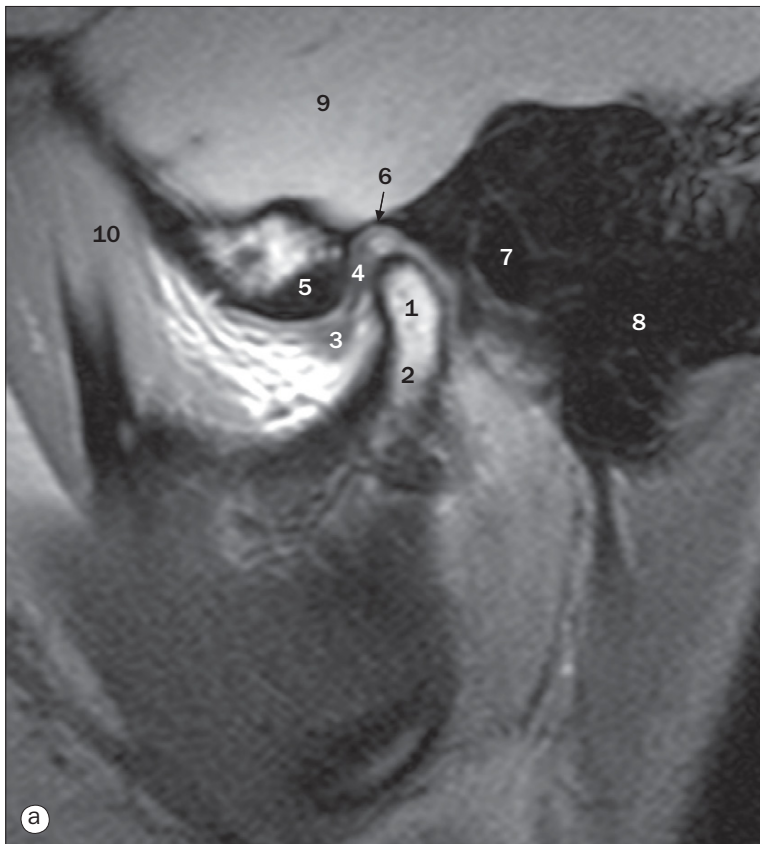


(c) Lateral nasal bones projection.

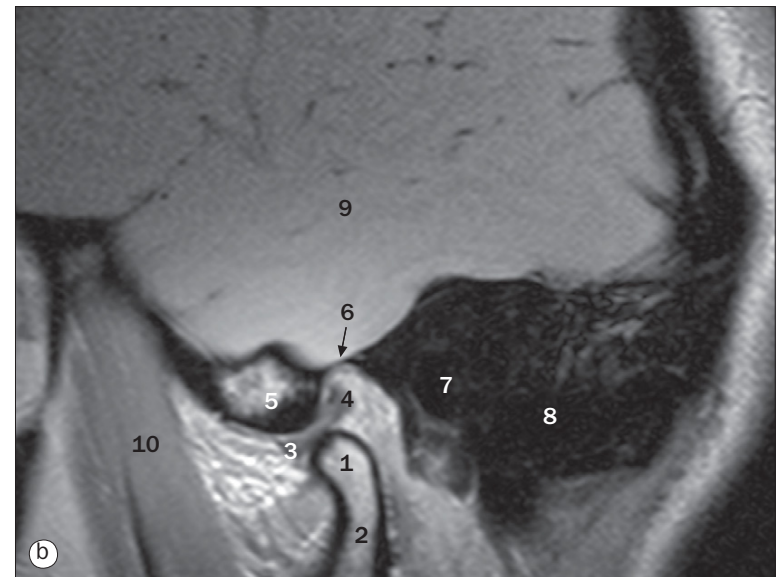


(d) Lateral sinus projection.

- | | | |
|---|---|---------------------------------------|
| 1 Anterior wall of maxillary sinus (antrum) | 11 Left maxillary sinus (antrum) | 21 Zygomatic arch |
| 2 Condyle of mandible | 12 Lesser wing of sphenoid | 22 Zygomatic process of frontal bone |
| 3 Coronoid process of mandible | 13 Malar process of maxilla | 23 Zygomatic process of temporal bone |
| 4 Ethmoidal sinuses | 14 Nasal septum | 24 Mastoid process |
| 5 Frontal process of zygomatic bone | 15 Palatine process of maxilla | 25 Odontoid peg |
| 6 Frontal sinuses | 16 Posterior wall of maxillary sinus (antrum) | 26 Soft palate |
| 7 Frontozygomatic suture | 17 Sella turcica | 27 Floor of anterior cranial fossa |
| 8 Greater wing of sphenoid | 18 Sphenoidal sinus | 28 Nasal bones |
| 9 Horizontal plate of palatine bone | 19 Superior orbital fissure | 29 Mandible |
| 10 Infra-orbital foramen | 20 Temporal process of zygomatic bone | |

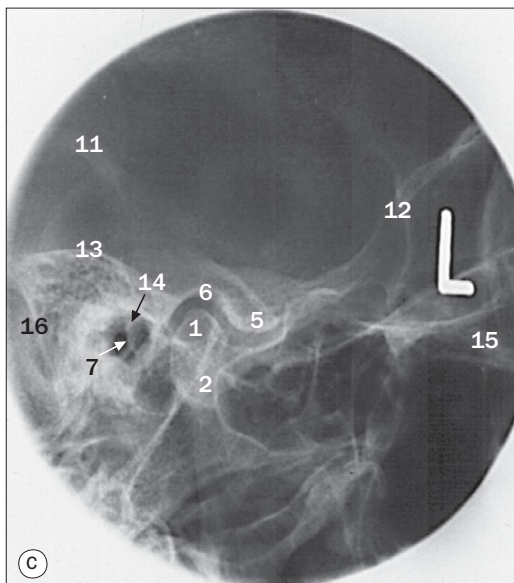


(a) Temporomandibular joint MR: closed.



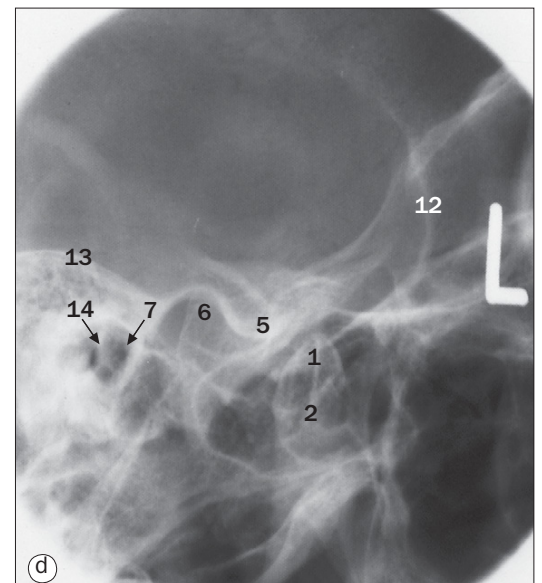
(b) Temporomandibular joint MR: open.

MR of the temporomandibular joint with the subject looking to the left.



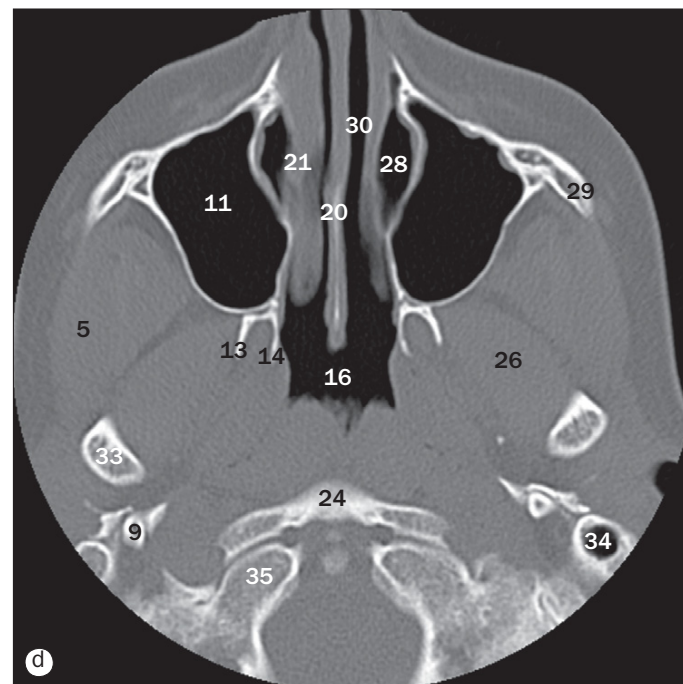
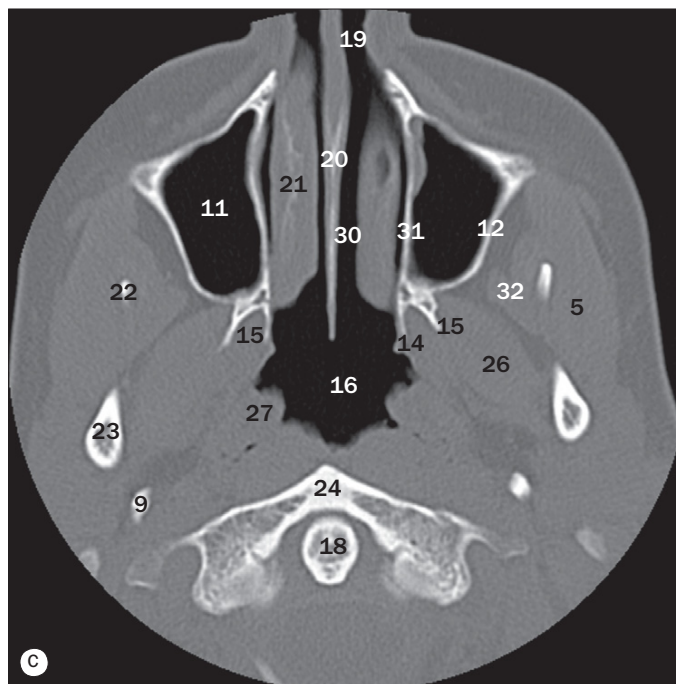
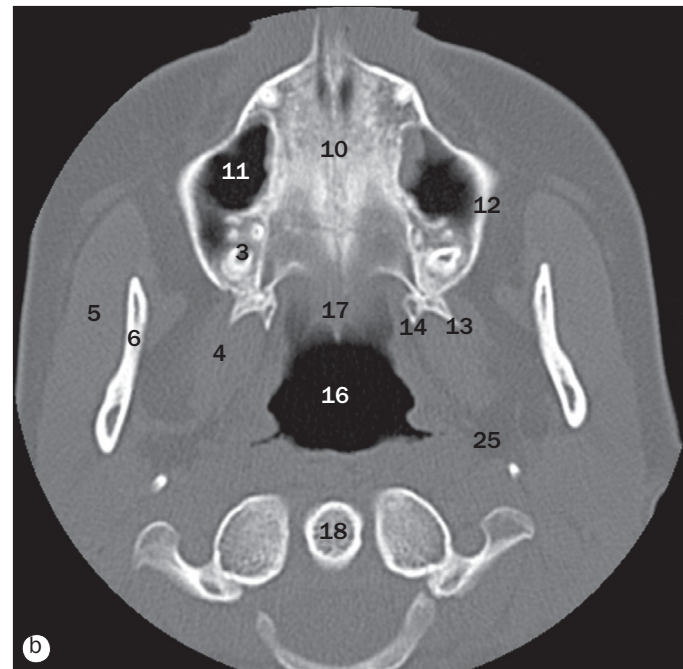
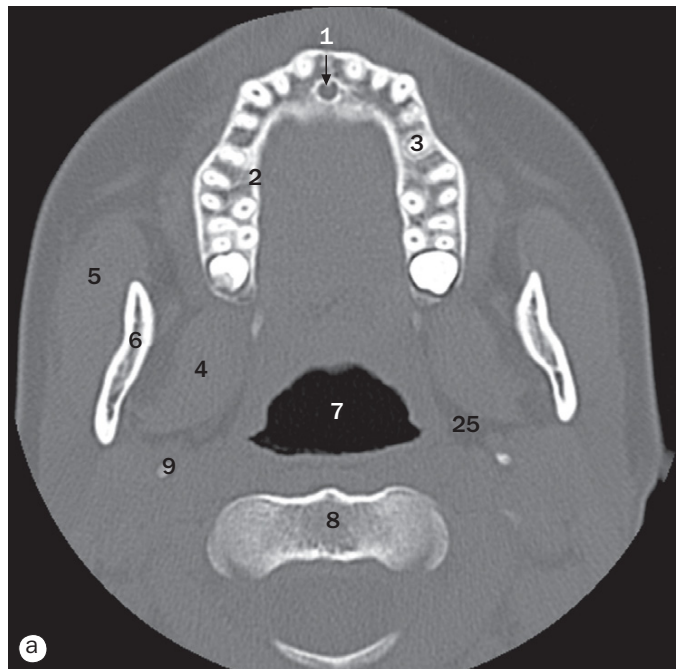
(c) Radiograph of temporomandibular joint: closed.

- 1 Condylar head
- 2 Condylar neck
- 3 Anterior band of disc
- 4 Posterior band of disc
- 5 Articular eminence
- 6 Mandibular fossa
- 7 External auditory canal
- 8 Mastoid process of temporal bone
- 9 Temporal lobe of brain
- 10 Temporalis muscle
- 11 Pinna of ear
- 12 Greater wing of sphenoid
- 13 Tegmen tympani
- 14 Malleus
- 15 Zygomatic process of temporal bone
- 16 Sinus plate



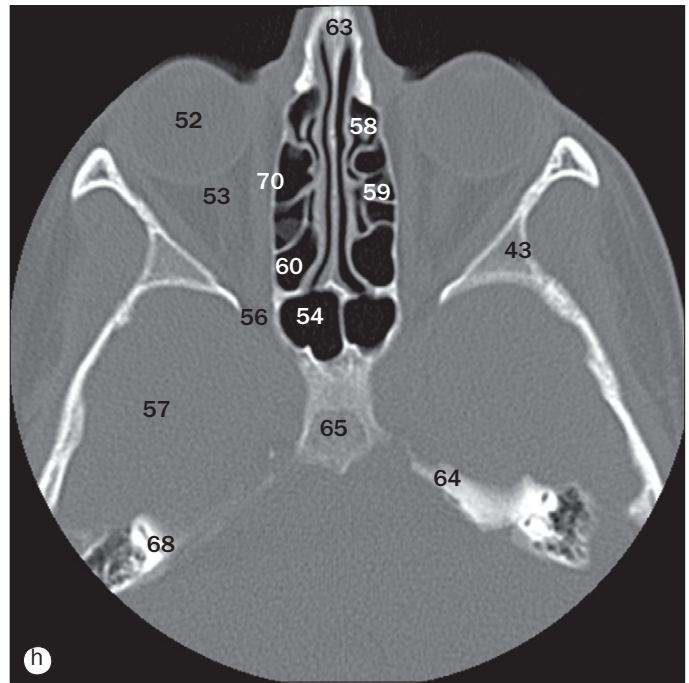
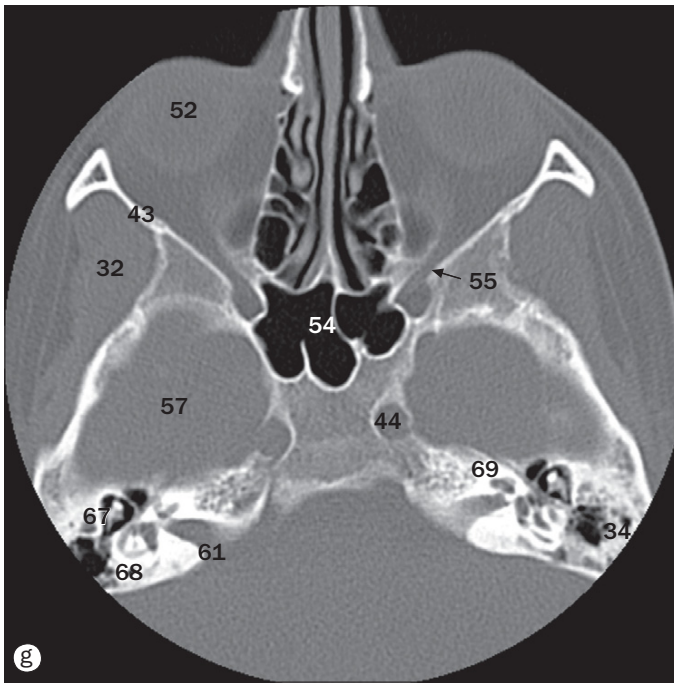
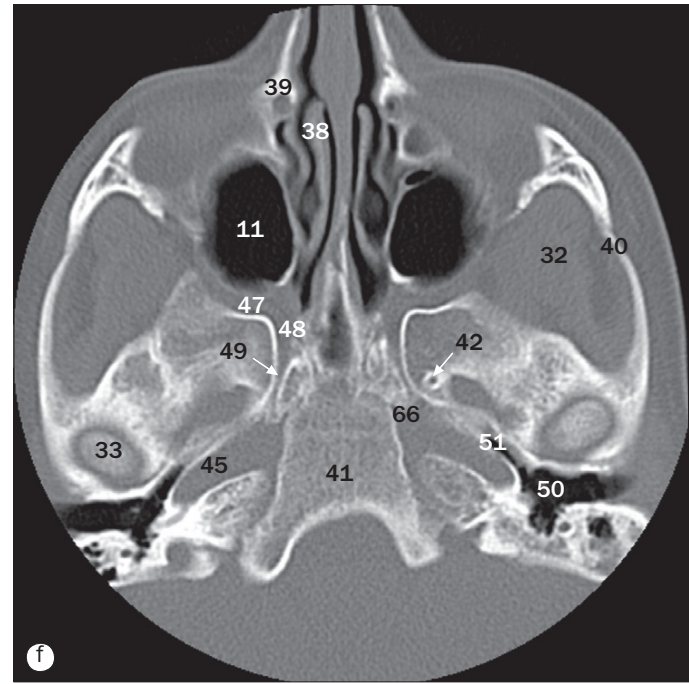
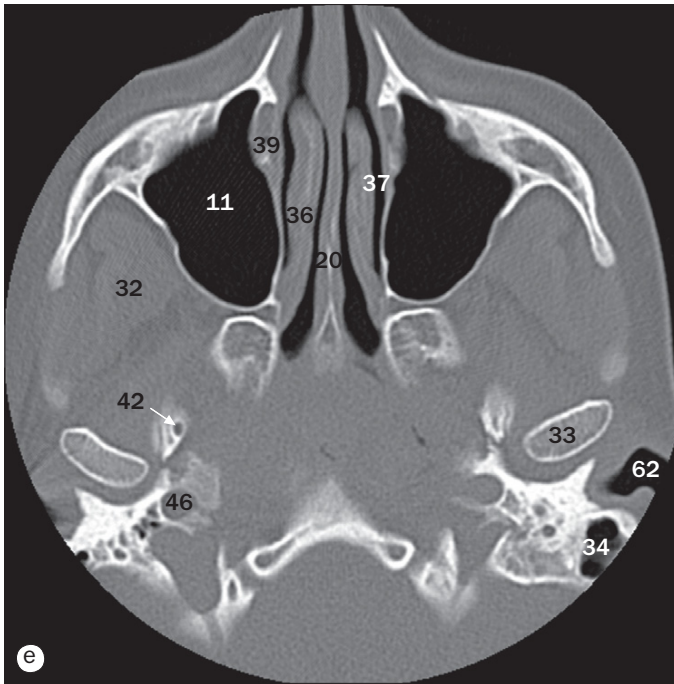
(d) Radiograph of temporomandibular joint: open.

Radiographs of the temporomandibular joint with the subject looking to the right.



Facial bones and paranasal sinuses, axial CT images demonstrated at the following levels: (a) alveolar process of the maxilla, (b) hard palate, (c) nares, (d) maxillary sinus, (e) middle turbinate, (f) zygomatic arch, (g) sphenoid sinus, (h) ethmoid sinus.

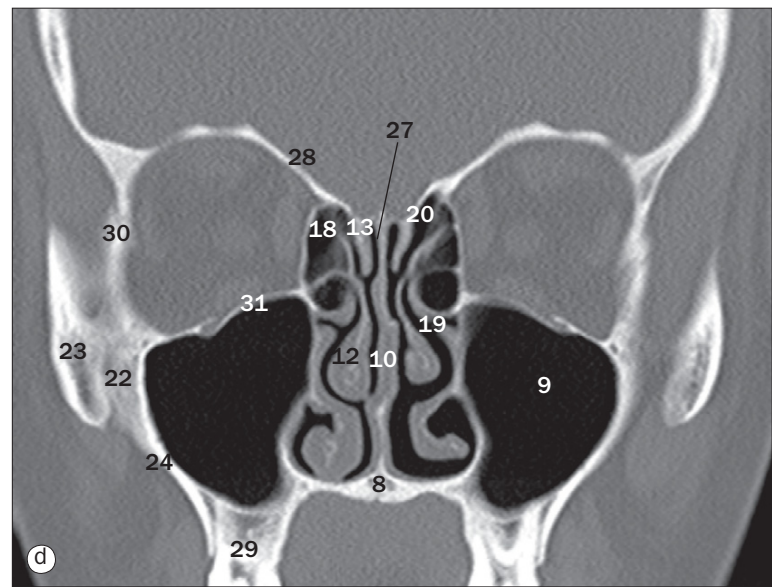
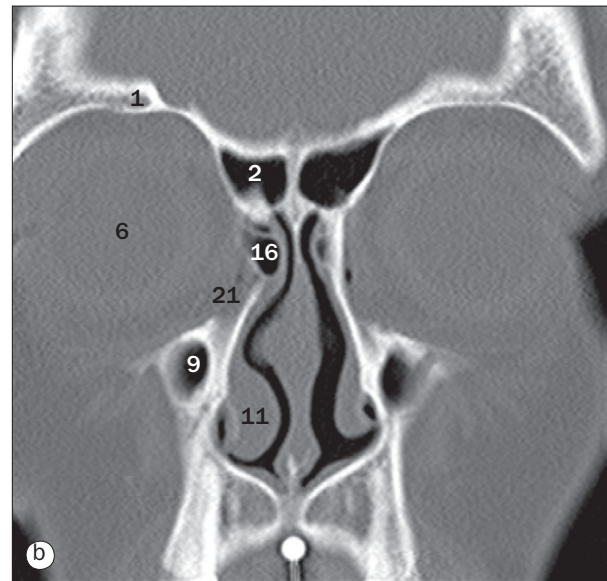
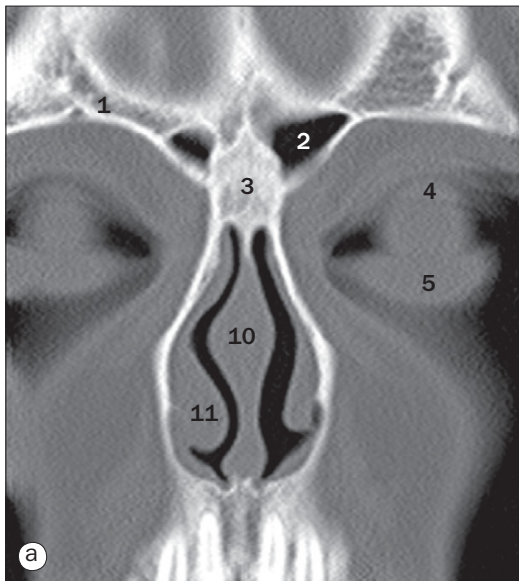
- | | | |
|---|---|--|
| 1 Incisive canal | 14 Medial pterygoid plate | 26 Lateral pterygoid muscle |
| 2 Alveolar rim | 15 Pterygoid fossa | 27 Torus tubarius |
| 3 Alveolar recess | 16 Nasopharynx | 28 Inferior meatus (at location of nasolacrimal opening) |
| 4 Medial pterygoid muscle | 17 Vomer | 29 Zygoma |
| 5 Masseter muscle | 18 Odontoid process (dens) | 30 Nasal cavity |
| 6 Ramus of mandible | 19 Nares | 31 Medial wall of maxillary sinus (antrum) |
| 7 Oropharynx | 20 Nasal septum | 32 Temporalis muscle |
| 8 Body of C2 | 21 Inferior turbinate | 33 Condylar head of mandible |
| 9 Styloid process | 22 Coronoid process of mandible | 34 Mastoid air cells |
| 10 Hard palate | 23 Condylar neck of mandible | 35 Occipital condyle |
| 11 Maxillary sinus (antrum) | 24 Anterior arch of atlas (first cervical vertebra) | 36 Middle turbinate |
| 12 Lateral wall of maxillary sinus (antrum) | 25 Parapharyngeal space | 37 Middle meatus |
| 13 Lateral pterygoid plate | | |



38 Superior turbinate
 39 Nasolacrimal duct
 40 Zygomatic arch
 41 Clivus
 42 Foramen spinosum
 43 Greater wing of sphenoid
 44 Cavernous internal carotid artery
 45 Horizontal petrous internal carotid artery canal
 46 Vertical petrous internal carotid artery canal
 47 Pterygopalatine fossa

48 Foramen rotundum
 49 Vidian canal
 50 Middle ear cavity
 51 Eustachian tube
 52 Globe of eye
 53 Optic nerve
 54 Sphenoid sinus (antrum)
 55 Inferior orbital fissure
 56 Superior orbital fissure
 57 Temporal lobe
 58 Anterior ethmoidal air cells
 59 Middle ethmoidal air cells

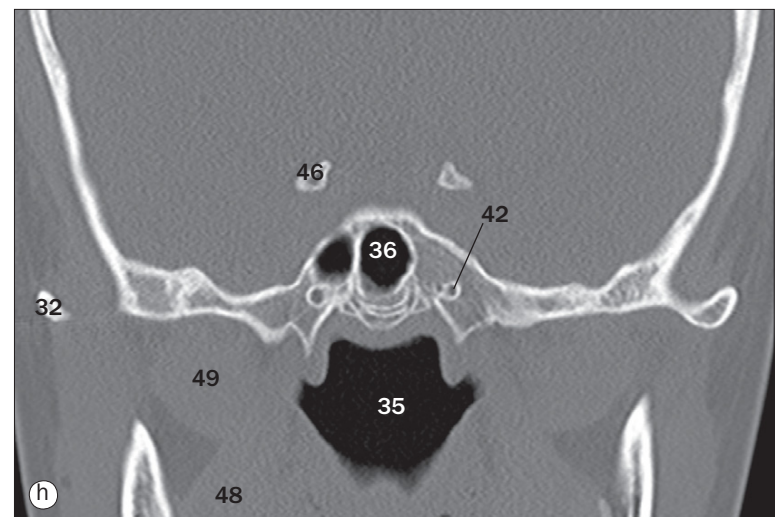
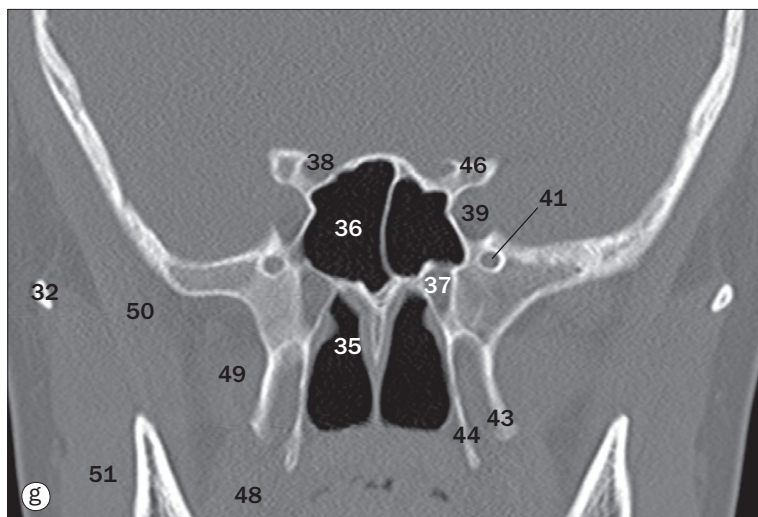
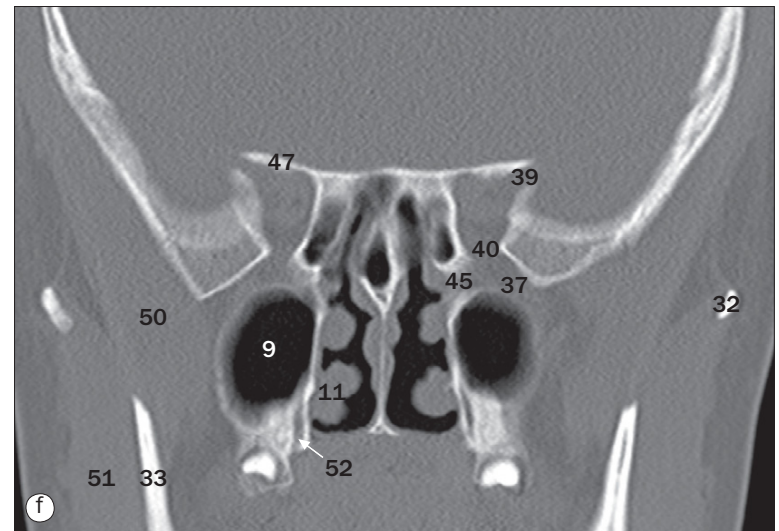
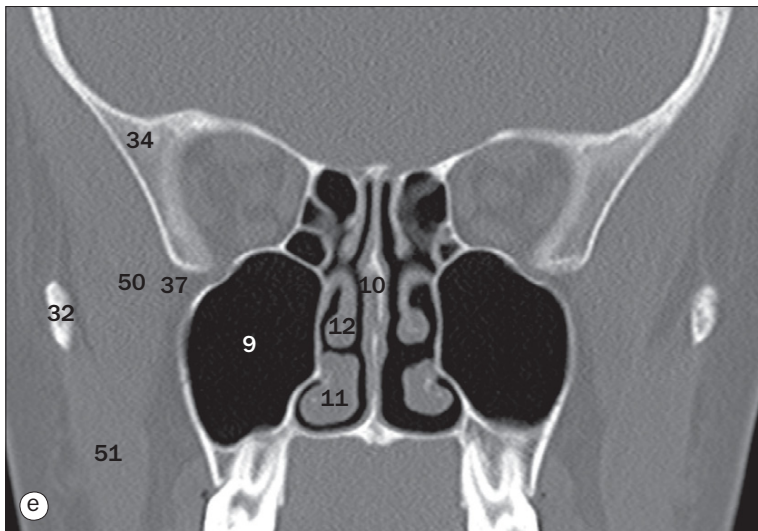
60 Posterior ethmoidal air cells
 61 Internal auditory canal
 62 External auditory canal
 63 Nasal bone
 64 Petrous apex
 65 Floor of sella
 66 Foramen lacerum
 67 Ossicles of middle ear (incus and malleus)
 68 Semicircular canals of inner ear
 69 Cochlea of inner ear
 70 Lamina papyracea



Paranasal sinuses, coronal CT images demonstrated at the following levels: (a) frontal sinuses, (b) nasolacrimal duct, (c) cribriform plate, (d) anterior ethmoids, (e) middle ethmoids, (f) pterygopalatine fossa, (g) sphenoid sinus, (h) nasopharynx.

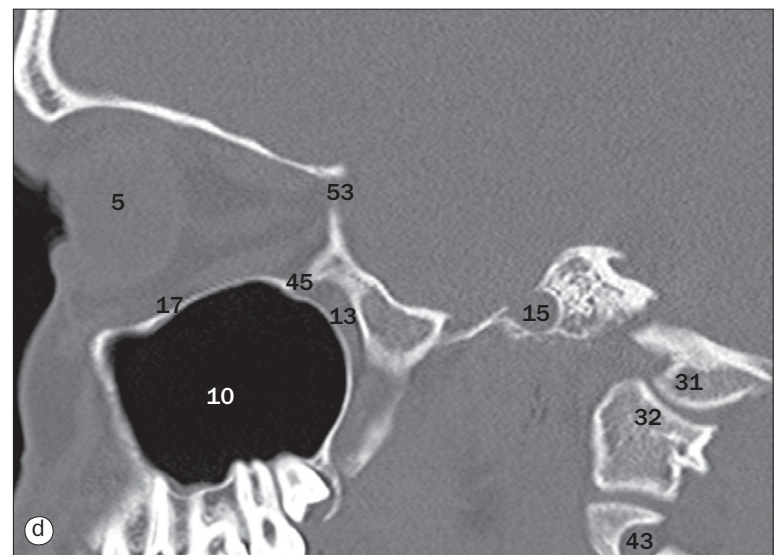
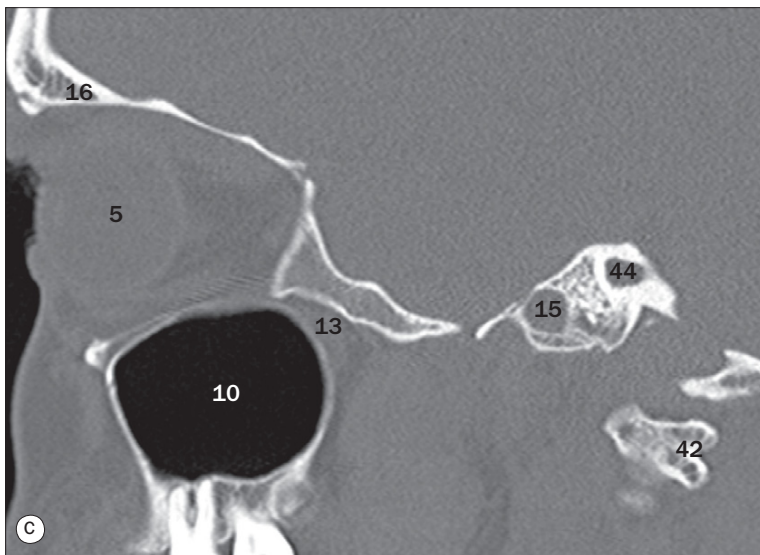
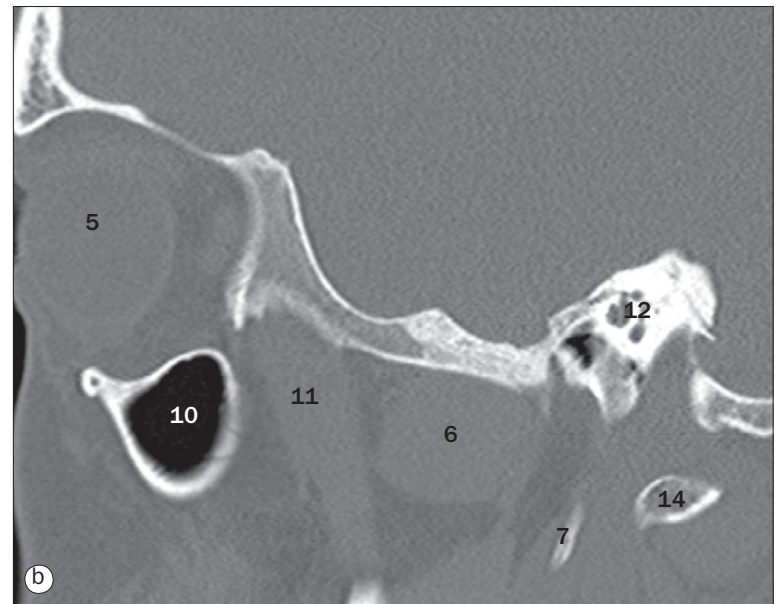
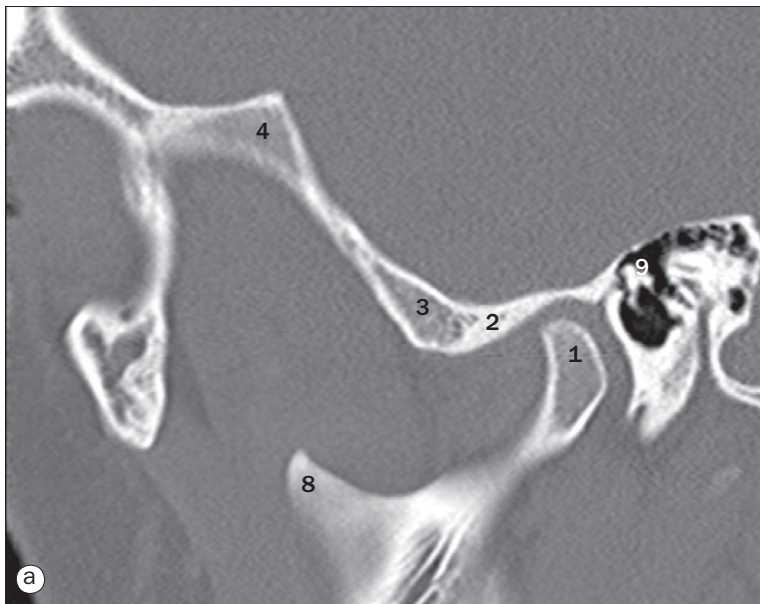
- 1 Frontal bone
- 2 Frontal sinus (antrum)
- 3 Nasal bone
- 4 Upper eyelid
- 5 Lower eyelid
- 6 Globe of eye
- 7 Crista galli
- 8 Hard palate
- 9 Maxillary sinus (antrum)
- 10 Nasal septum

- 11 Inferior turbinate (concha)
- 12 Middle turbinate (concha)
- 13 Superior turbinate (concha)
- 14 Inferior meatus
- 15 Lamina papyracea
- 16 Air in nasolacrimal sac
- 17 Inferior orbital canal
- 18 Anterior ethmoid air cells
- 19 Middle meatus
- 20 Superior meatus



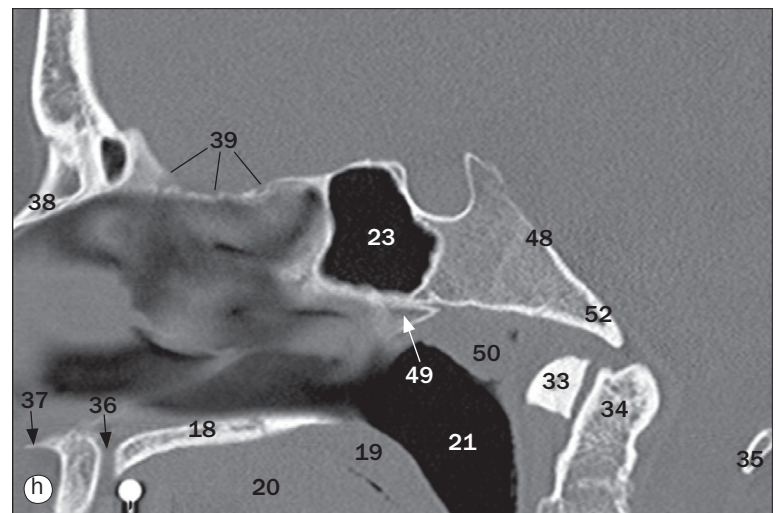
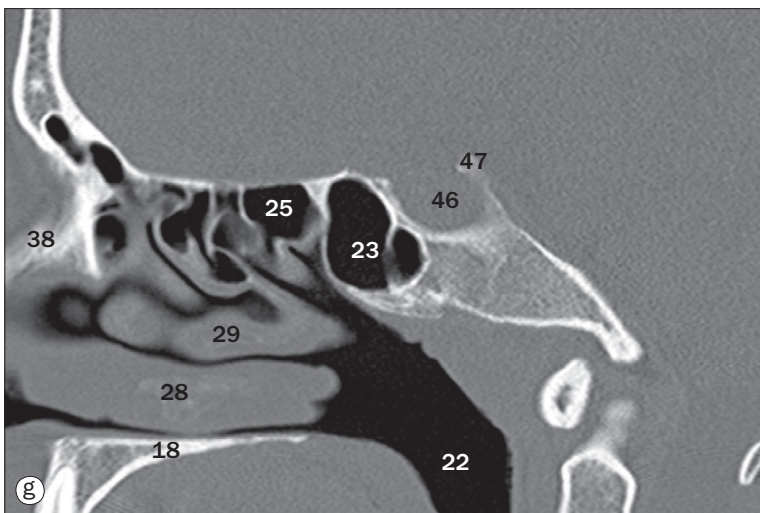
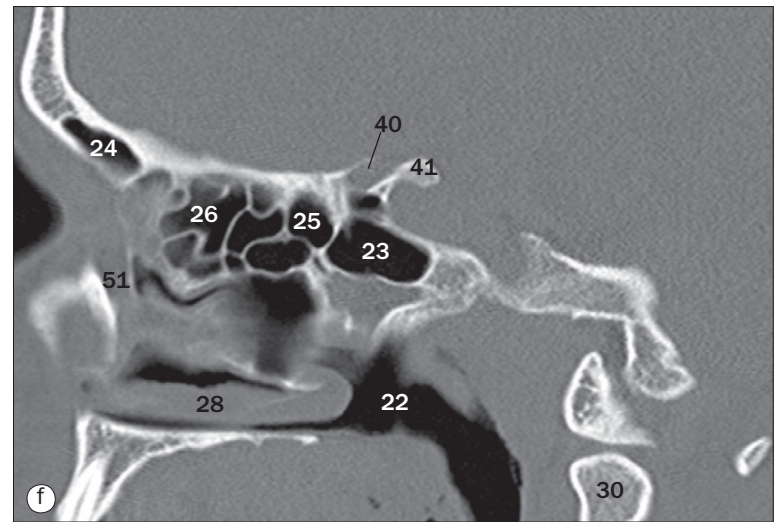
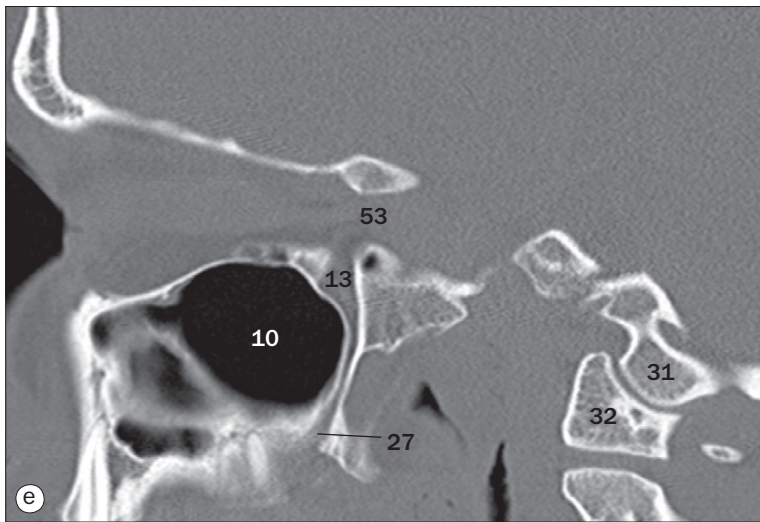
Paranasal sinuses, coronal CT images demonstrated at the following levels: (a) frontal sinuses, (b) nasolacrimal duct, (c) cribriform plate, (d) anterior ethmoids, (e) middle ethmoids, (f) pterygopalatine fossa, (g) sphenoid sinus, (h) nasopharynx.

- | | | |
|---|-----------------------------|-----------------------------|
| 21 Nasolacrimal duct | 32 Zygomatic arch | 43 Lateral pterygoid plate |
| 22 Maxilla | 33 Ramus of mandible | 44 Medial pterygoid plate |
| 23 Zygoma | 34 Greater wing of sphenoid | 45 Sphenopalatine foramen |
| 24 Lateral wall of maxillary sinus | 35 Nasopharynx | 46 Anterior clinoid process |
| 25 Orbital roof, frontal bone | 36 Sphenoid sinus (antrum) | 47 Lesser wing of sphenoid |
| 26 Cribriform plate, ethmoid bone | 37 Pterygopalatine fossa | 48 Medial pterygoid muscle |
| 27 Perpendicular plate, ethmoid bone | 38 Optic canal | 49 Lateral pterygoid muscle |
| 28 Fovea ethmoidalis, frontal bone | 39 Superior orbital fissure | 50 Temporalis muscle |
| 29 Upper alveolar ridge of maxilla | 40 Inferior orbital fissure | 51 Masseter muscle |
| 30 Lateral orbital wall, zygomatic bone | 41 Foramen rotundum | 52 Greater palatine foramen |
| 31 Orbital floor, maxillary bone | 42 Vidian canal | |



(a)–(h) Paranasal sinuses, sagittal CT images, from lateral to midline.

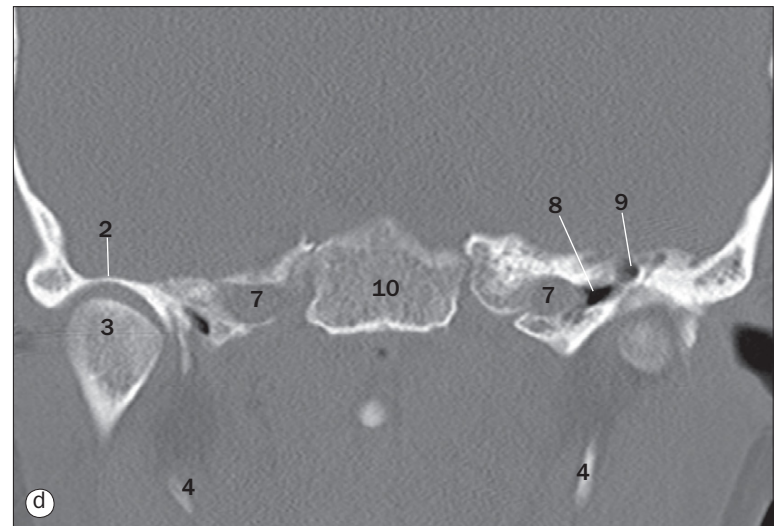
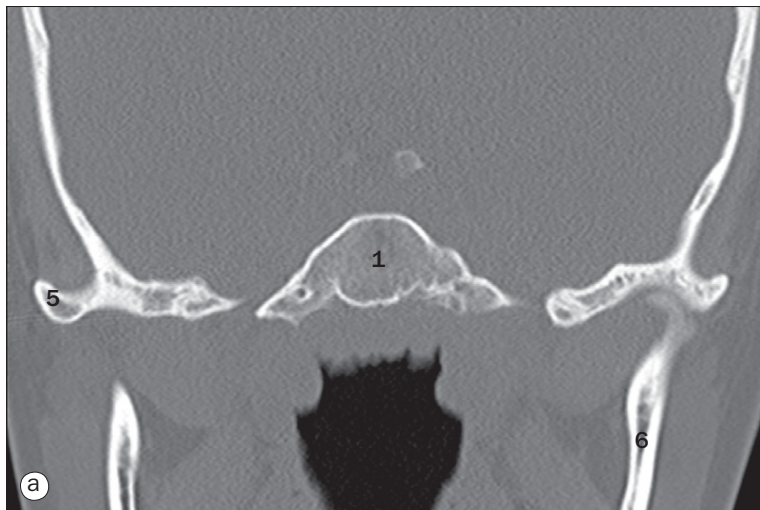
- | | |
|--------------------------------|---|
| 1 Condyle of mandible | 15 Horizontal petrous internal carotid artery canal |
| 2 Articular eminence | 16 Frontal bone, orbital roof |
| 3 Zygomatic arch | 17 Maxillary bone, orbital floor |
| 4 Zygoma | 18 Hard palate |
| 5 Globe of eye | 19 Soft palate |
| 6 Lateral pterygoid muscle | 20 Tongue |
| 7 Styloid process | 21 Oropharynx |
| 8 Coronoid process of mandible | 22 Nasopharynx |
| 9 Middle ear | 23 Sphenoid sinus (antrum) |
| 10 Maxillary sinus (antrum) | 24 Frontal sinus (antrum) |
| 11 Masseter muscle | 25 Posterior ethmoid air cells |
| 12 Inner ear | 26 Anterior ethmoid air cells |
| 13 Pterygopalatine fossa | 27 Greater palatine foramen |
| 14 Transverse process of C1 | 28 Inferior turbinate (concha) |



(a)–(h) Paranasal sinuses, sagittal CT images, from lateral to midline.

29 Middle turbinate (concha)
 30 Base of C2
 31 Occipital condyle
 32 Lateral mass of C1
 33 Anterior arch of C1
 34 Dens (odontoid process)
 35 Posterior arch of C1
 36 Incisive foramen (contains nasopalatine nerve – V2 sensory branch)
 37 Anterior nasal spine of maxillae
 38 Nasal bone
 39 Cribriform plate
 40 Optic canal

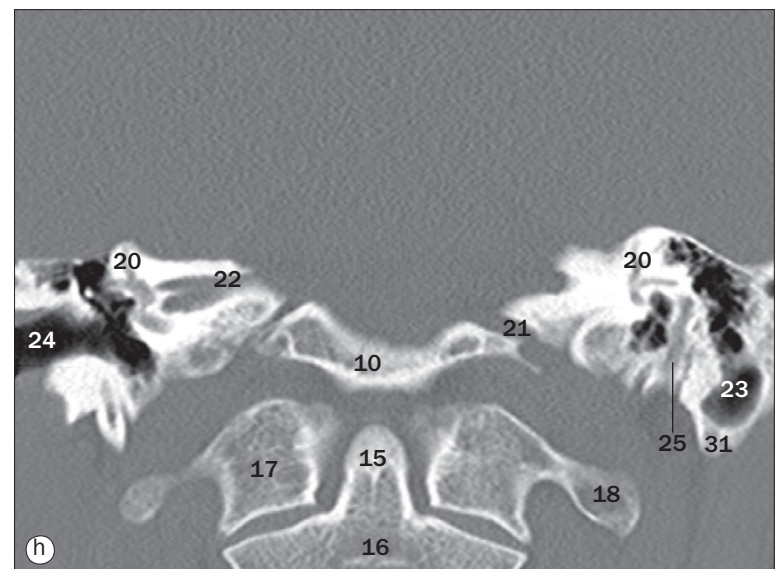
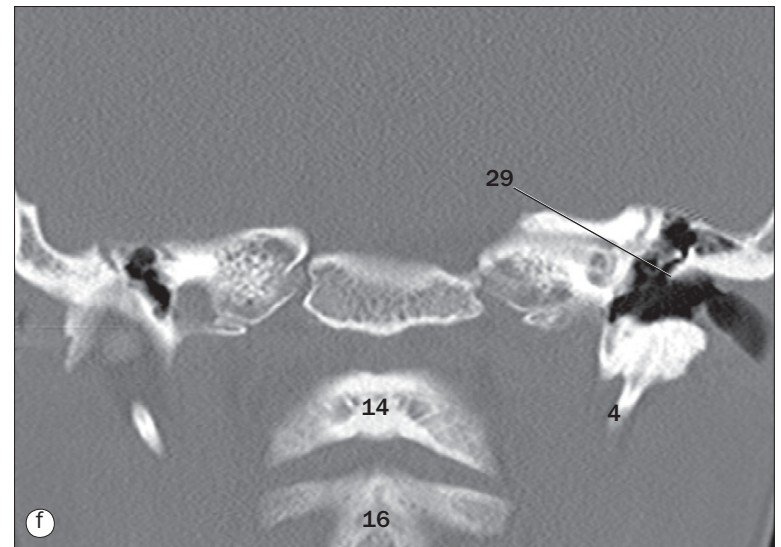
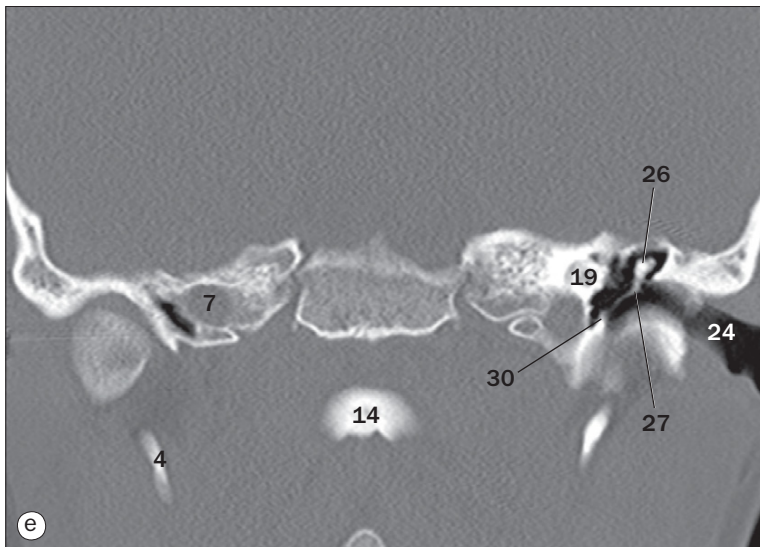
41 Anterior clinoid
 42 Tubercles of transverse process of C1
 43 Transverse foramen of C2
 44 Internal auditory canal
 45 Inferior orbital fissure
 46 Hypophyseal fossa
 47 Dorsum sellae
 48 Clivus
 49 Vomer
 50 Pharyngeal tonsil
 51 Nasolacrimal duct
 52 Basion
 53 Superior orbital fissure



(a)–(h) Coronal CT images, from anterior to posterior.

- 1 Sphenoid body
- 2 Condylar fossa of temporomandibular joint
- 3 Mandibular condyle head
- 4 Styloid process
- 5 Zygomatic arch
- 6 Mandibular ramus
- 7 Horizontal petrous internal carotid artery
- 8 Hypotympanum

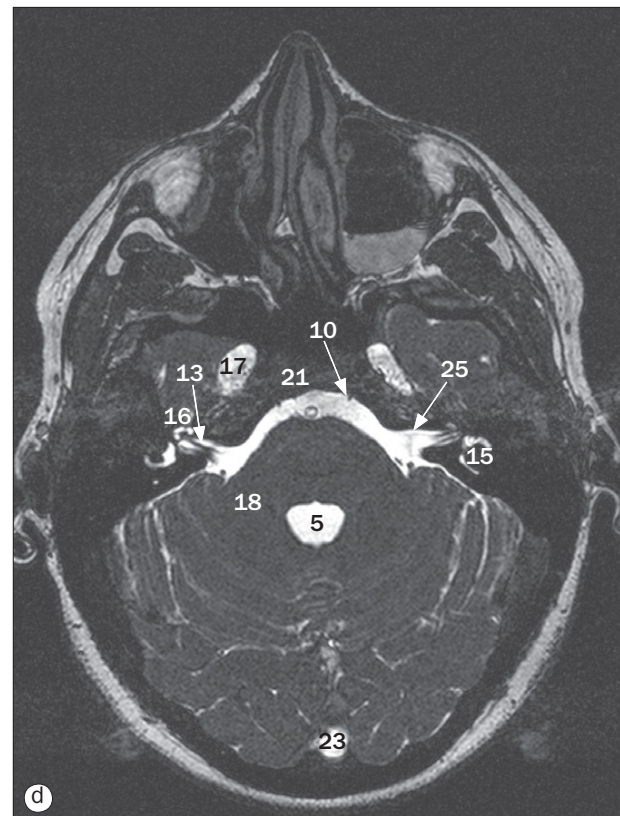
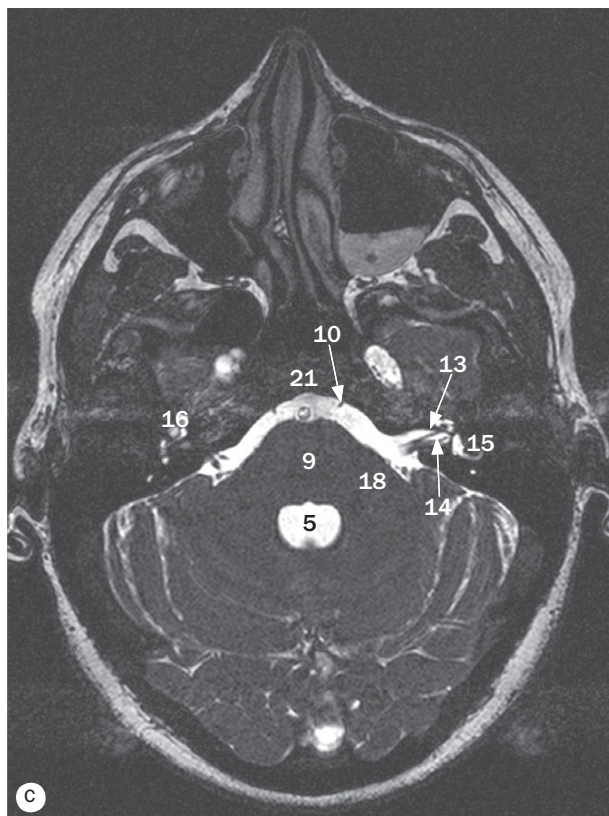
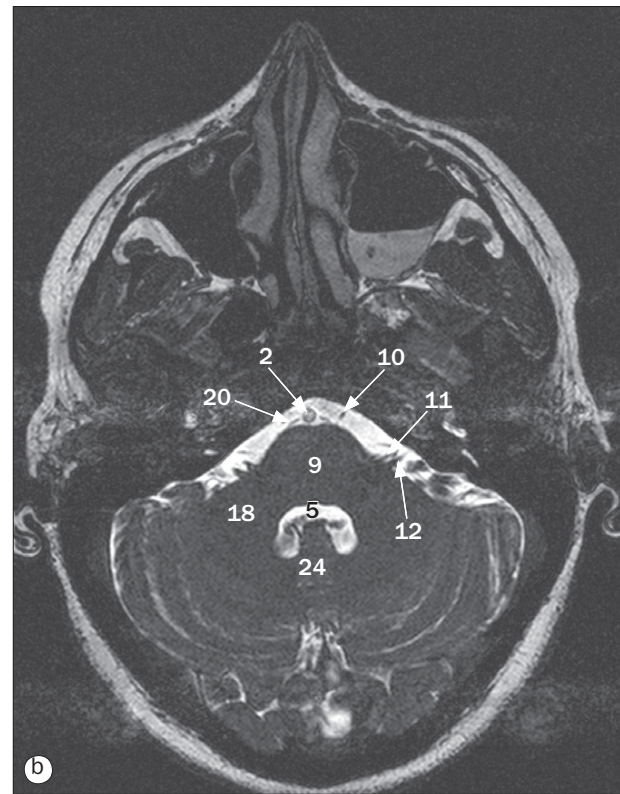
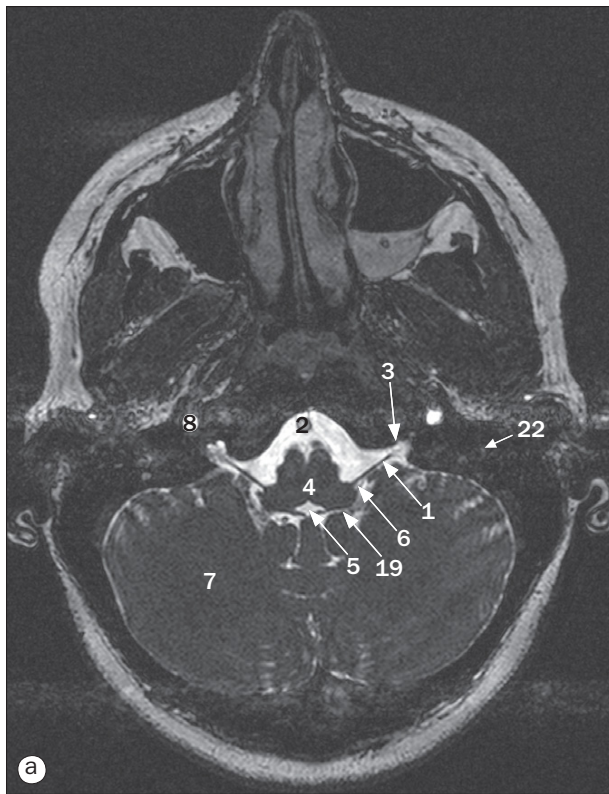
- 9 Epitympanum
- 10 Basi-occiput (lower clivus)
- 11 Dorsum sellae
- 12 Foramen lacerum
- 13 Location of vertical portion of internal carotid artery
- 14 Anterior arch of C1
- 15 Dens (odontoid process)
- 16 Body of C2



(a)–(h) Coronal CT images, from anterior to posterior.

- 17 Transverse process of C1
- 18 Lateral mass of C1
- 19 Cochlea
- 20 Semicircular canal
- 21 Jugular foramen
- 22 Internal acoustic canal
- 23 Mastoid air cells
- 24 External auditory canal

- 25 Stylomastoid foramen (location of mastoid segment of CN7)
- 26 Incus
- 27 Malleus
- 28 Tendon of tensor tympani muscle
- 29 Scutum
- 30 Tympanic annulus
- 31 Mastoid tip



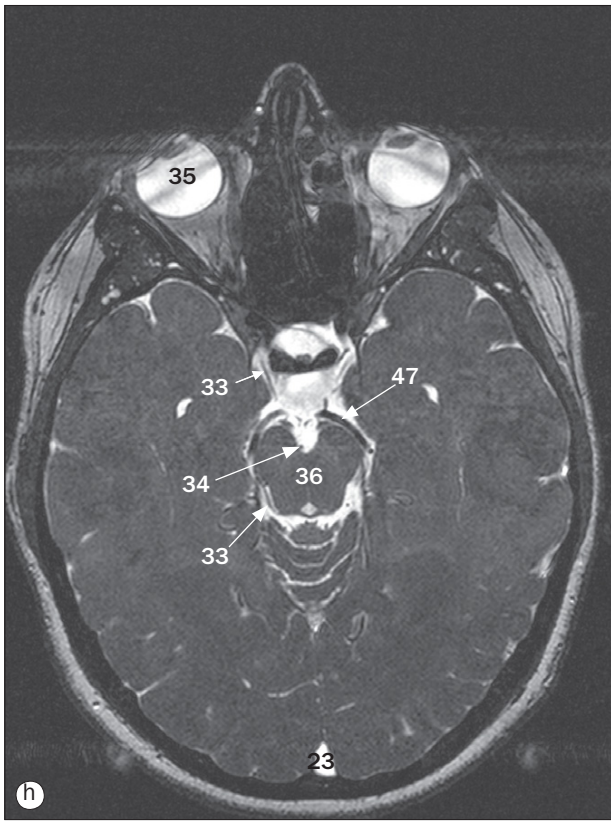
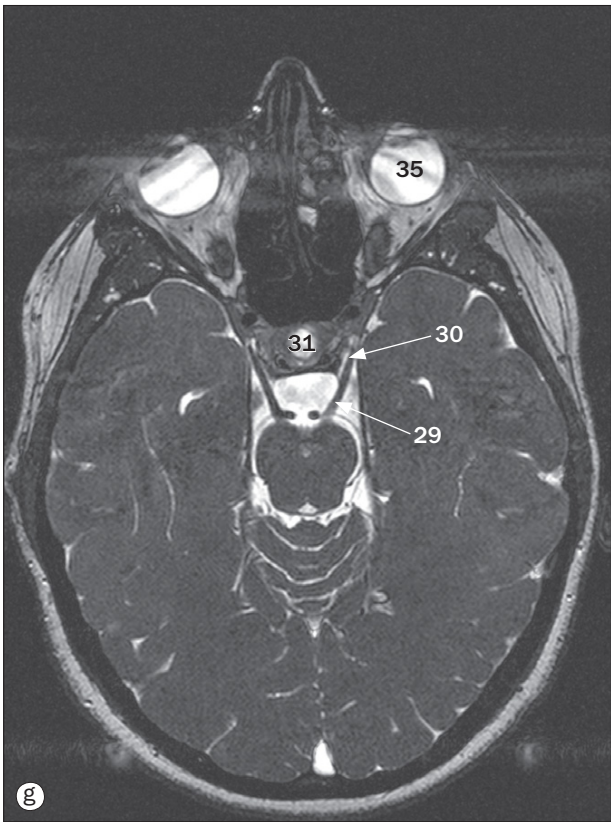
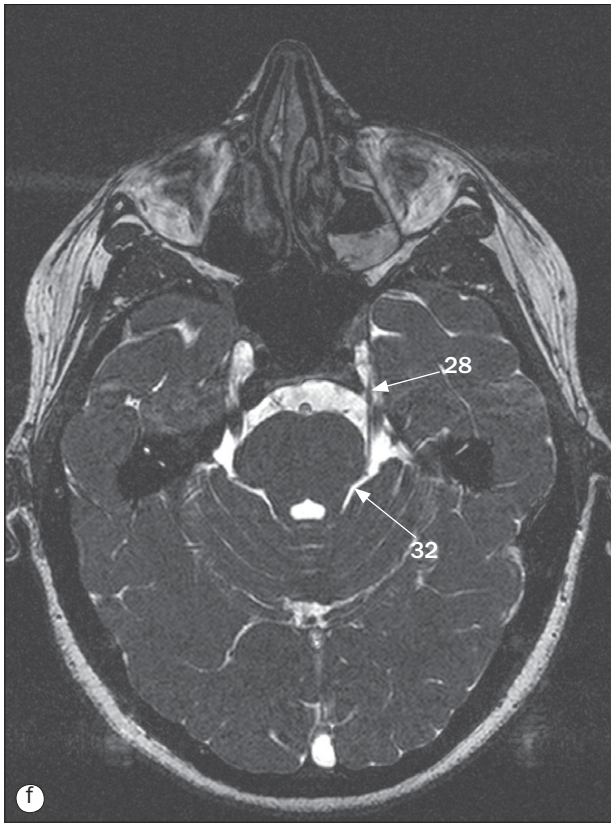
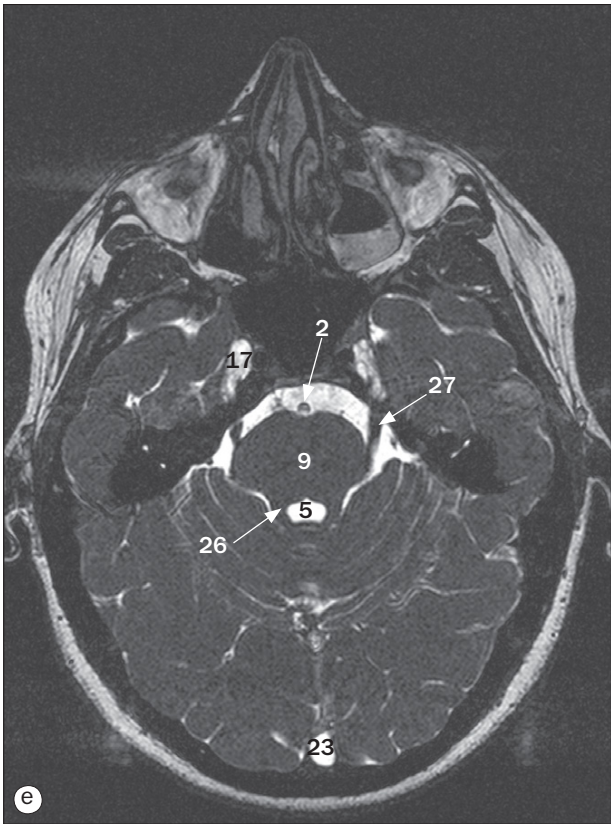
(a)–(h) Axial MR images, from inferior to superior.

1 Glossopharyngeal nerve (CN9)
2 Basilar artery
3 Jugular foramen
4 Medulla

5 Fourth ventricle
6 Vagus nerve (CN10)
7 Cerebellar hemisphere
8 Internal carotid artery

9 Pons
10 Abducens nerve (CN6)
11 Facial nerve (CN7)
12 Vestibulocochlear nerve (CN8)

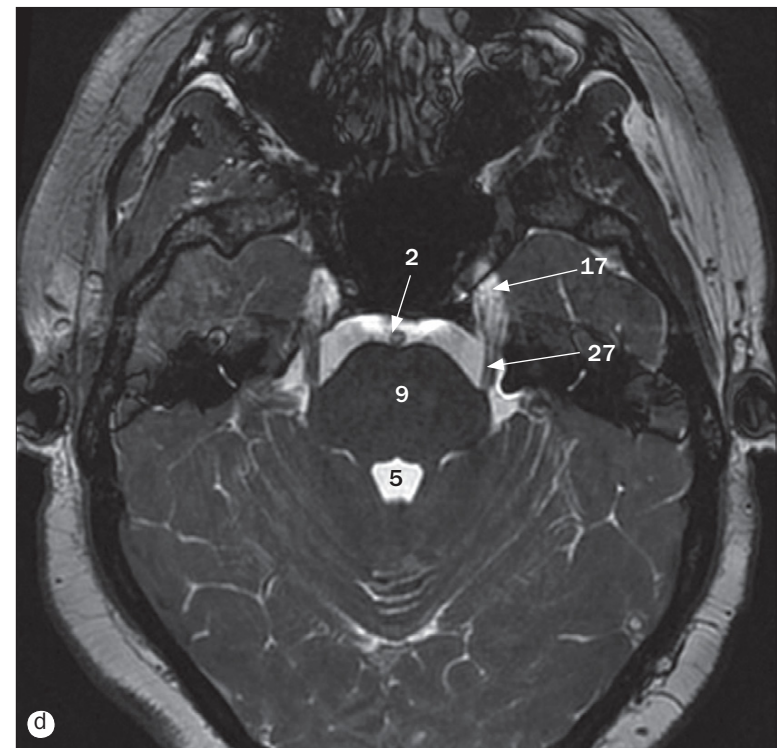
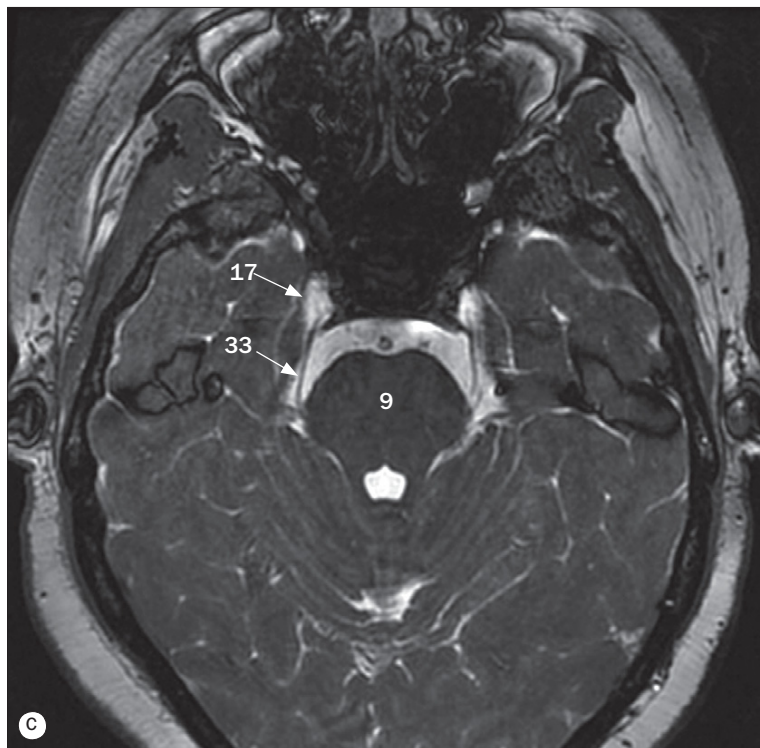
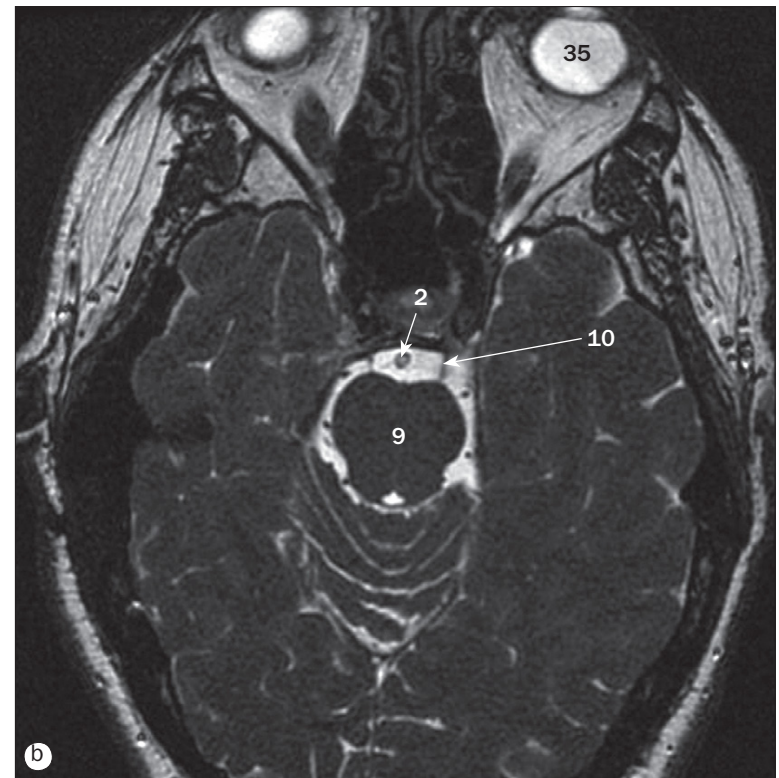
The legends for pages 16–19 are common for all 4 pages.



(a)–(h) Axial MR images, from inferior to superior.

- | | | |
|------------------------|--|---|
| 13 Cochlear nerve | 17 Meckel's cave | 21 Clivus |
| 14 Vestibular nerve | 18 Middle cerebellar peduncle | 22 Facial nerve in stylomastoid foramen |
| 15 Semicircular canals | 19 Foramen of Luschka | 23 Superior sagittal sinus |
| 16 Cochlea | 20 Anterior inferior cerebellar artery | 24 Vermis |

The legends for pages 16–19 are common for all 4 pages.

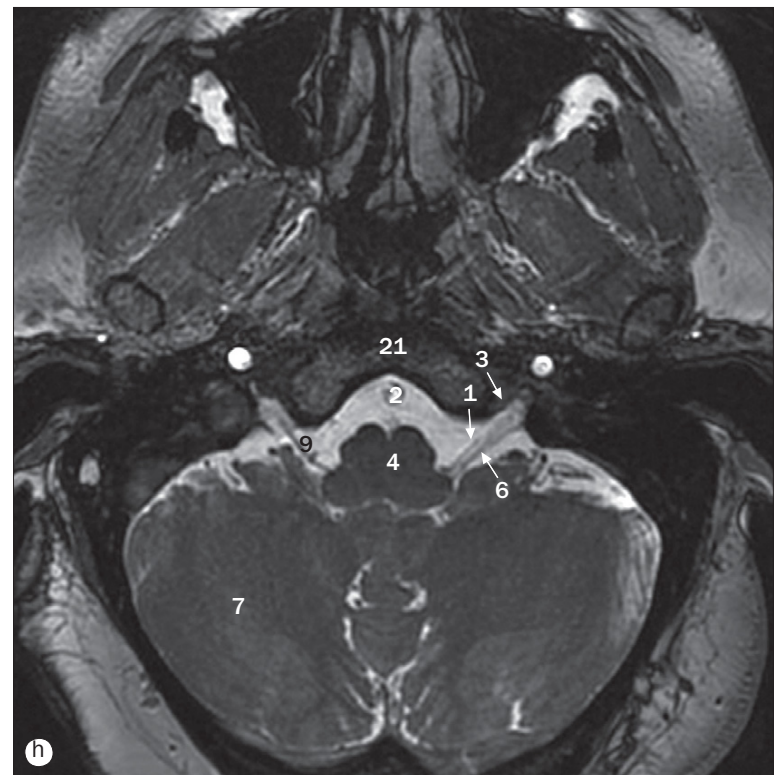
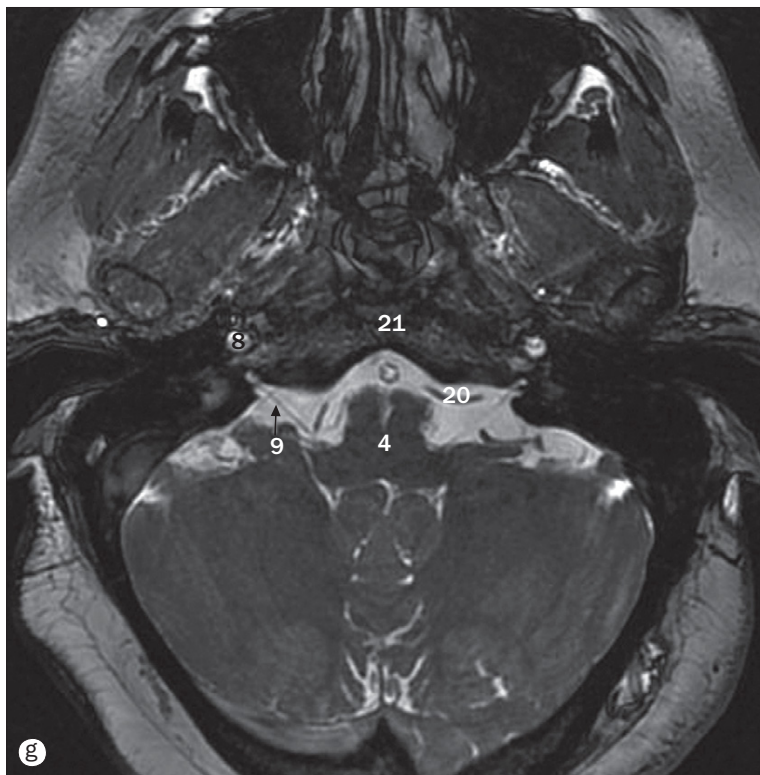
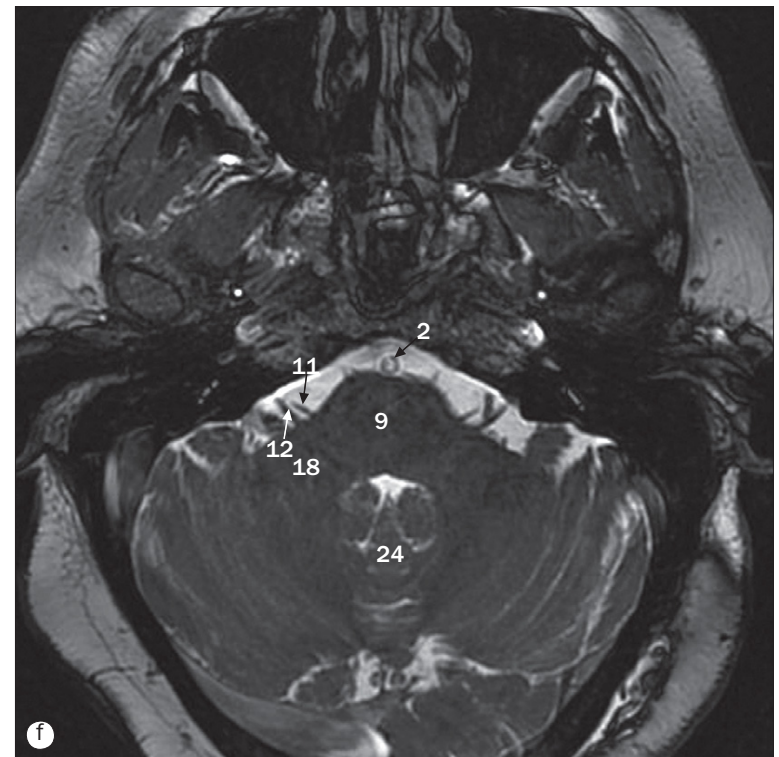
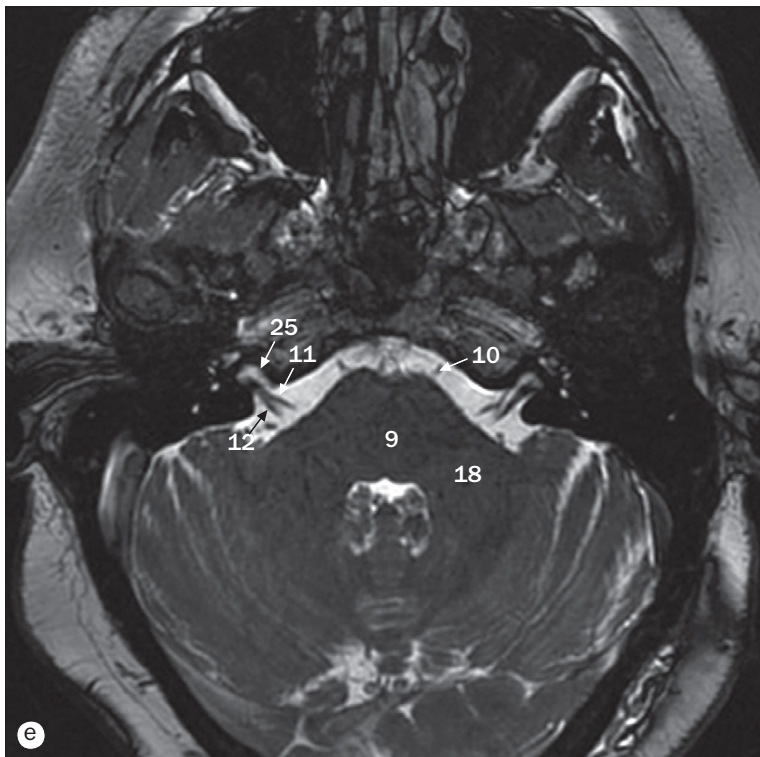


Cranial nerves, MR images of (a) olfactory and optic nerves, (b) oculomotor nerve, (c) trochlear nerve, (d) trigeminal nerve, (e) and (f) abducens, facial and auditory nerves, (g) glossopharyngeal nerve, (h) hypoglossal nerve.

25 Internal auditory canal
26 Superior cerebellar peduncle
27 Preganglionic segment of CN5 (trigeminal)
28 CN5 enters Meckel's cave
29 Oculomotor nerve (CN3)
30 CN3 in oculomotor cistern

31 Pituitary
32 Ambient cistern
33 Trochlear nerve (CN4)
34 Interpenduncular cistern
35 Globe of eye
36 Midbrain

The legends for pages 16–19 are common for all 4 pages.

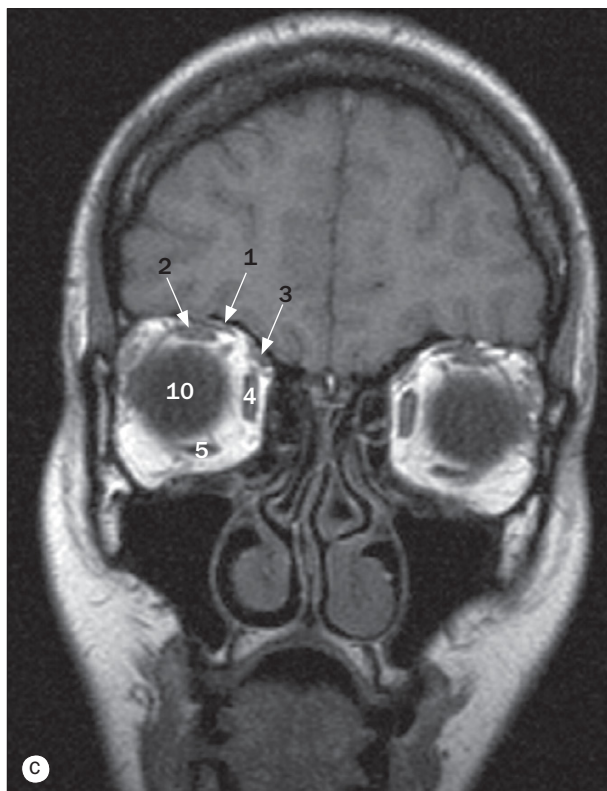
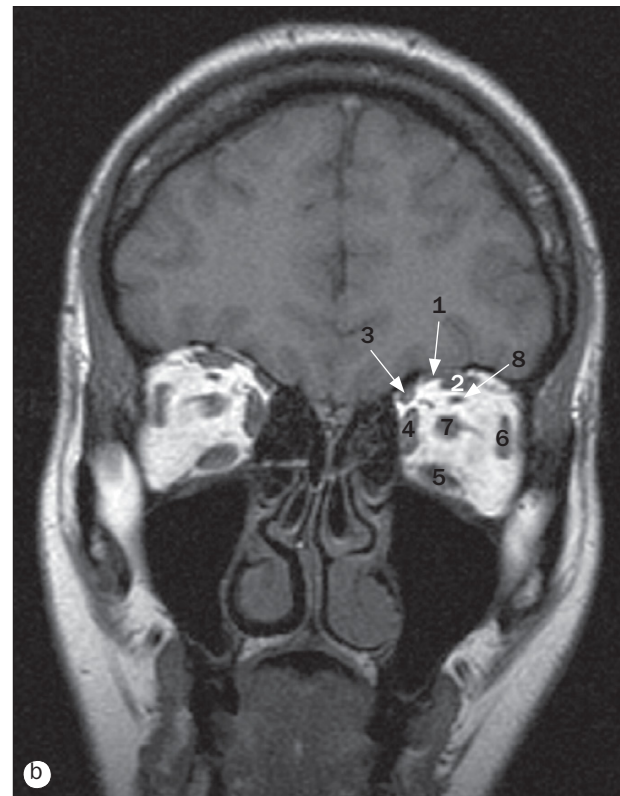
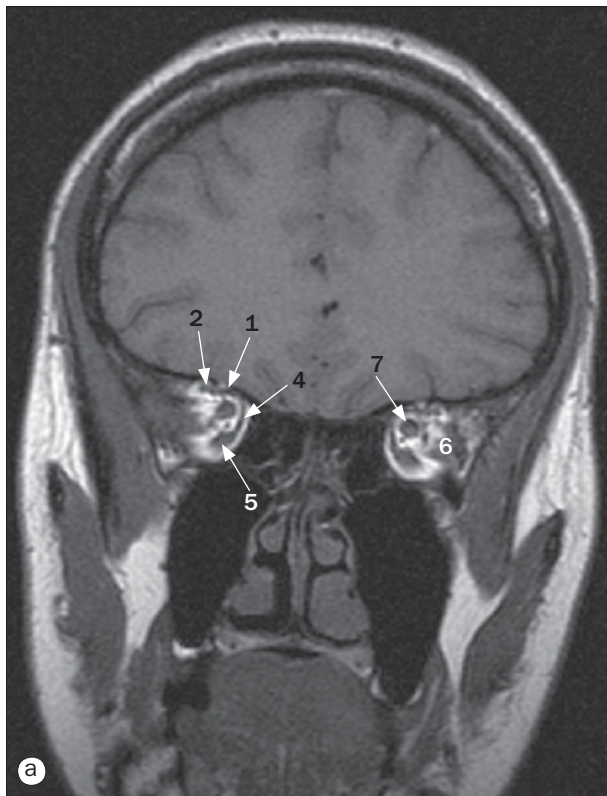


Cranial nerves, MR images of (a) olfactory and optic nerves, (b) oculomotor nerve, (c) trochlear nerve, (d) trigeminal nerve, (e) and (f) abducens, facial and auditory nerves, (g) glossopharyngeal nerve, (h) hypoglossal nerve.

37 Mammillary body
38 Infundibulum
39 Optic chiasm
40 Optic nerve, intracranial portion
41 Optic nerve, intra-ocular segment
42 Optic nerve, intracanalicular segment

43 Red nucleus of midbrain
44 Substantia nigra
45 Cerebral peduncle
46 Olfactory tract and bulb (CN1)
47 Posterior cerebral artery

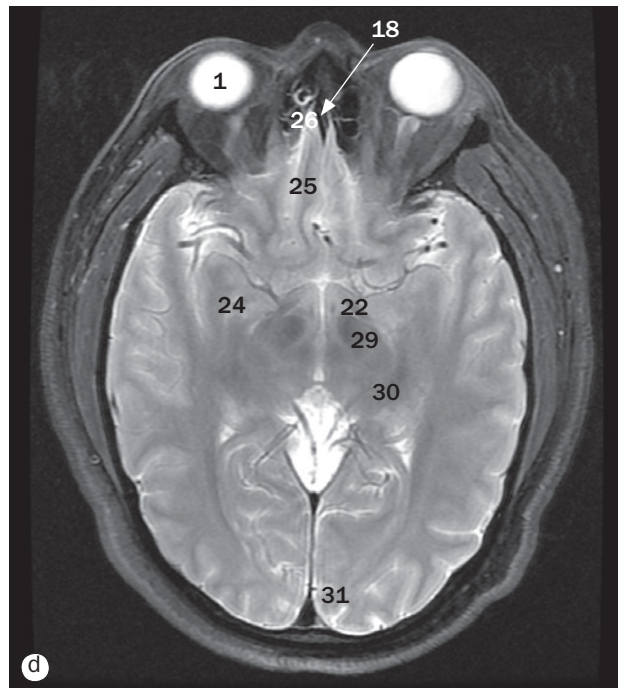
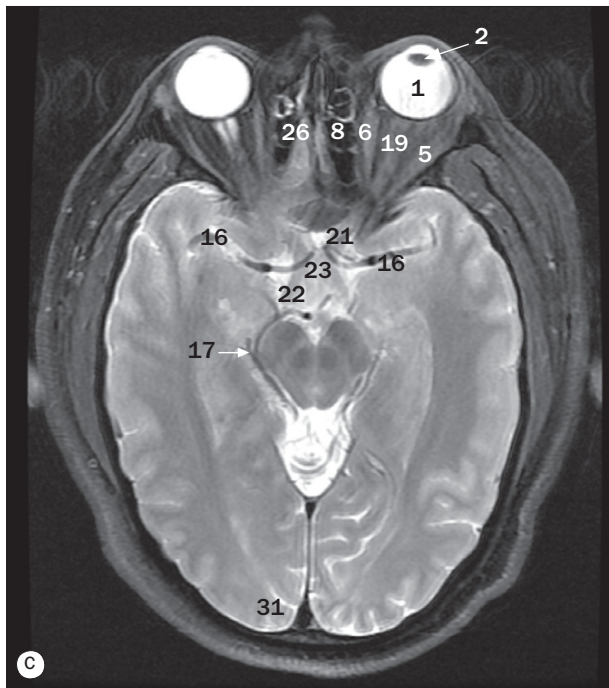
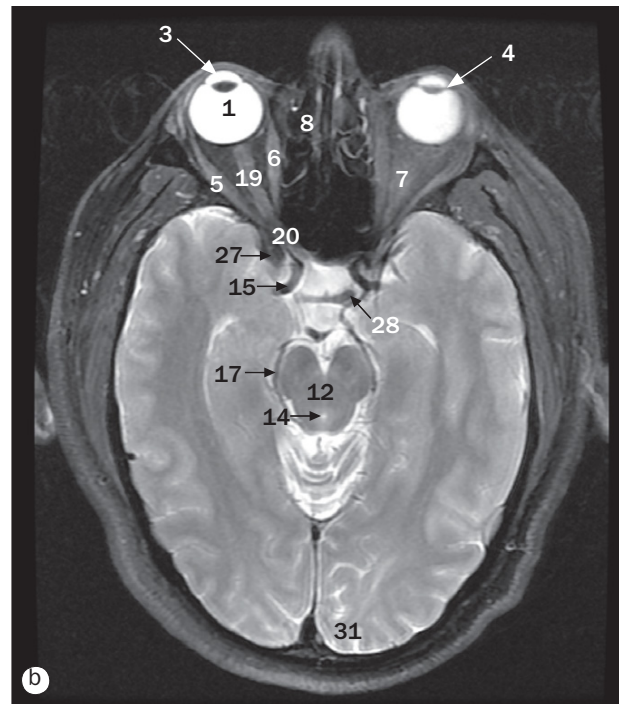
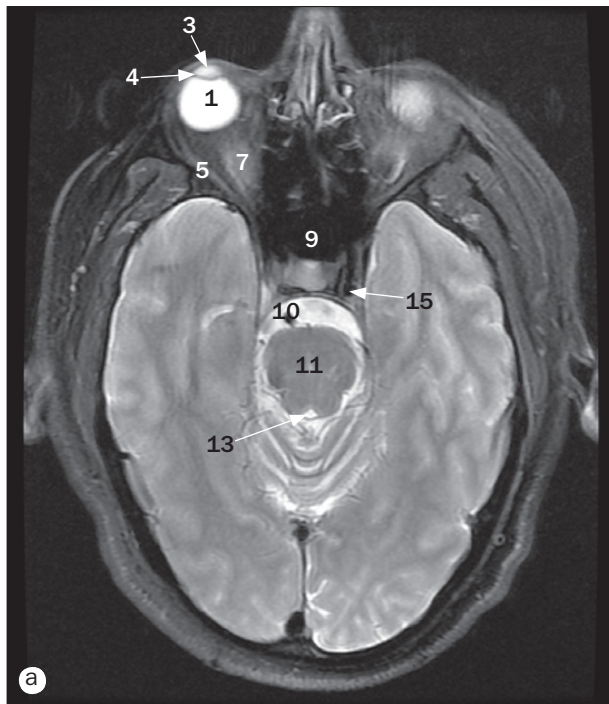
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(a)–(d) Coronal MR images, from posterior to anterior.

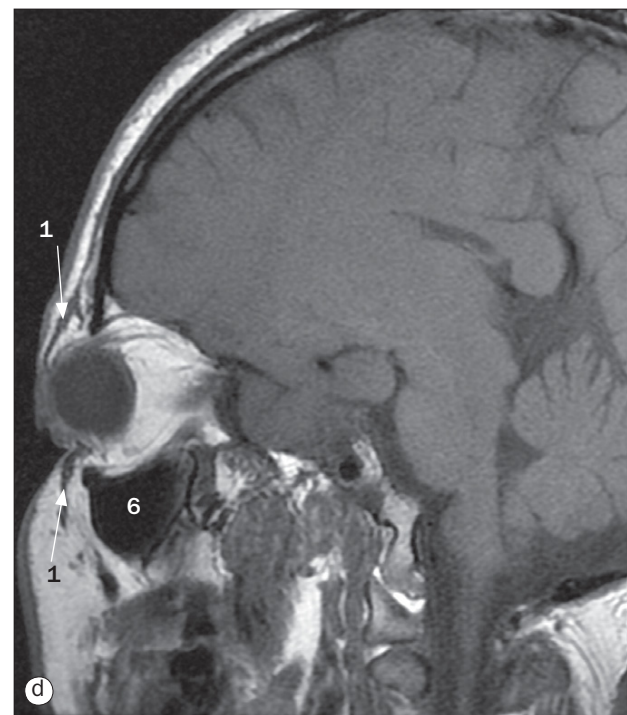
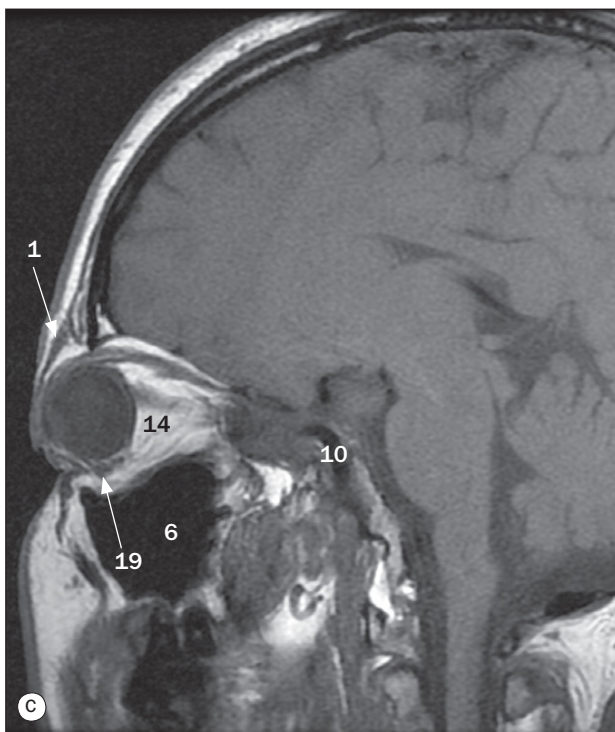
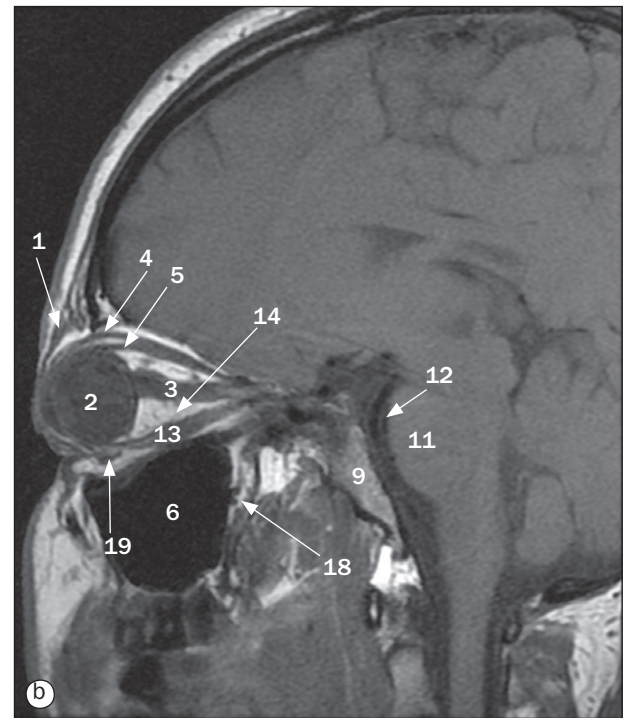
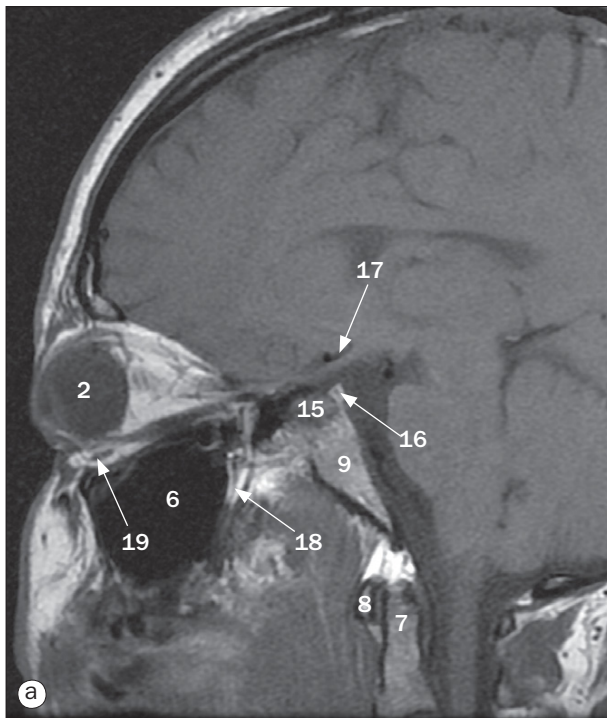
- 1 Levator palpebrae superioris muscle
- 2 Superior rectus muscle
- 3 Superior oblique muscle
- 4 Medial rectus muscle
- 5 Inferior rectus muscle

- 6 Lateral rectus muscle
- 7 Optic nerve/sheath complex
- 8 Superior ophthalmic vein
- 9 Lacrimal gland
- 10 Globe of eye



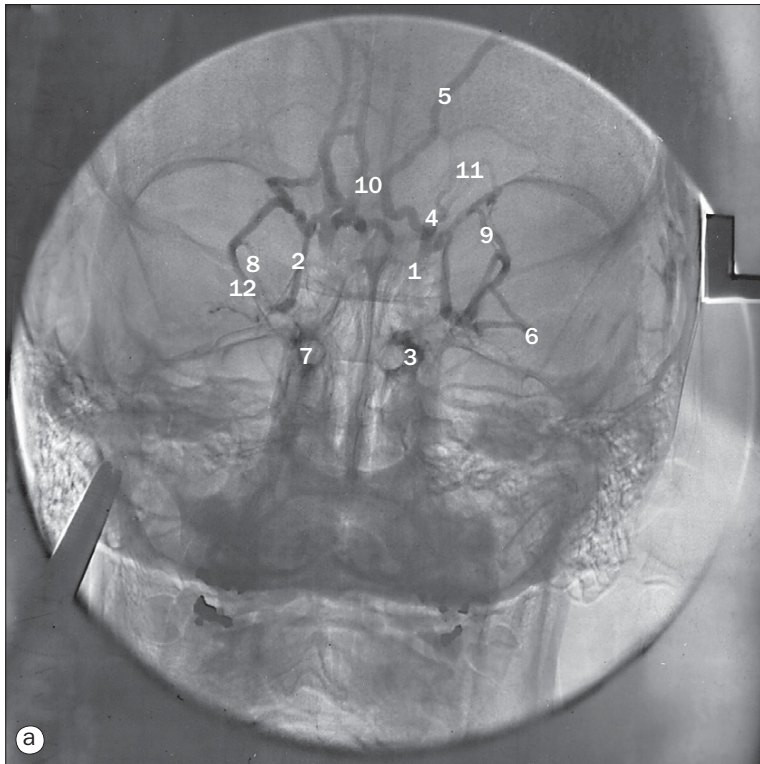
(a)–(d) Orbit, axial MR images, from inferior to superior.

- | | | |
|-----------------------------|--|---|
| 1 Vitreous chamber of globe | 12 Midbrain | 23 Optic chiasm |
| 2 Lens | 13 Superior recess fourth ventricle | 24 Anterior commissure |
| 3 Anterior chamber of globe | 14 Cerebral aqueduct | 25 Gyrus rectus |
| 4 Ciliary body | 15 Internal carotid artery | 26 Olfactory nerve (CN1) |
| 5 Lateral rectus muscle | 16 Middle cerebral artery | 27 Anterior clinoid process |
| 6 Medial rectus muscle | 17 Posterior cerebral artery | 28 Dorsum sellae |
| 7 Superior rectus muscle | 18 Crista galli | 29 Cerebral peduncle |
| 8 Ethmoid air cells | 19 Optic nerve (intra-orbital segment) | 30 Medial and lateral geniculate bodies |
| 9 Sphenoid sinus (antrum) | 20 Optic nerve (intra-canalicular segment) | 31 Visual (calcarine) cortex |
| 10 Basilar artery | 21 Optic nerve (intra-cranial segment) | |
| 11 Pons | 22 Optic tract | |



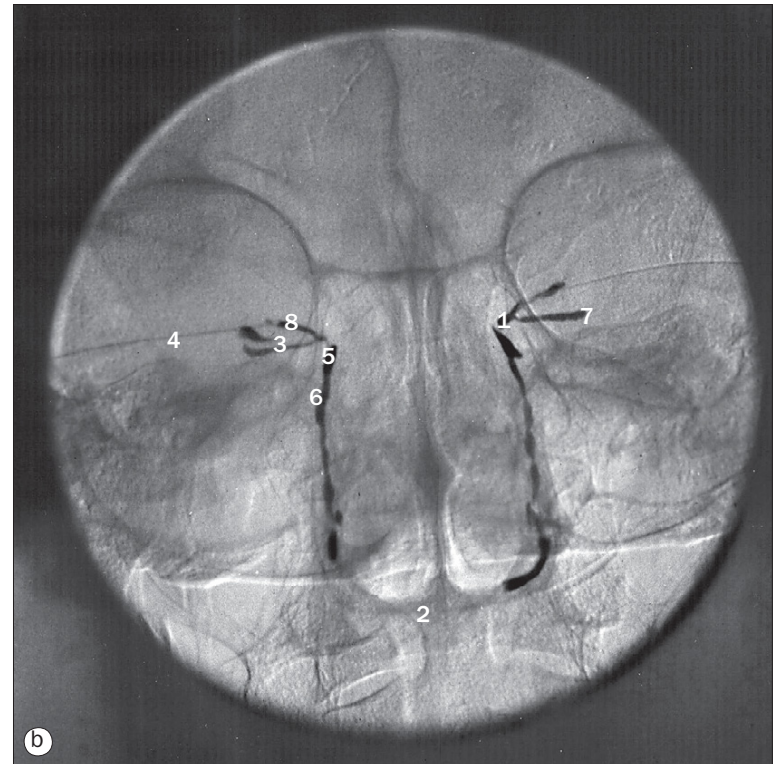
(a)–(d) Orbit, sagittal MR images, from medial to lateral.

- | | |
|------------------------------------|--------------------------------------|
| 1 Orbicularis oculi muscle | 11 Pons |
| 2 Globe | 12 Basilar artery |
| 3 Optic nerve, intraocular segment | 13 Inferior rectus muscle |
| 4 Levator palpebrae superioris | 14 Retrobulbar fat |
| 5 Superior rectus muscle | 15 Sella turcica/pituitary |
| 6 Maxillary sinus (antrum) | 16 Dorsum sellae |
| 7 Dens (odontoid process) | 17 Optic nerve, intracranial segment |
| 8 Anterior arch of C1 | 18 Pterygopalatine fossa |
| 9 Clivus | 19 Inferior oblique muscle |
| 10 Internal carotid artery | |



(a) Orbital venogram.

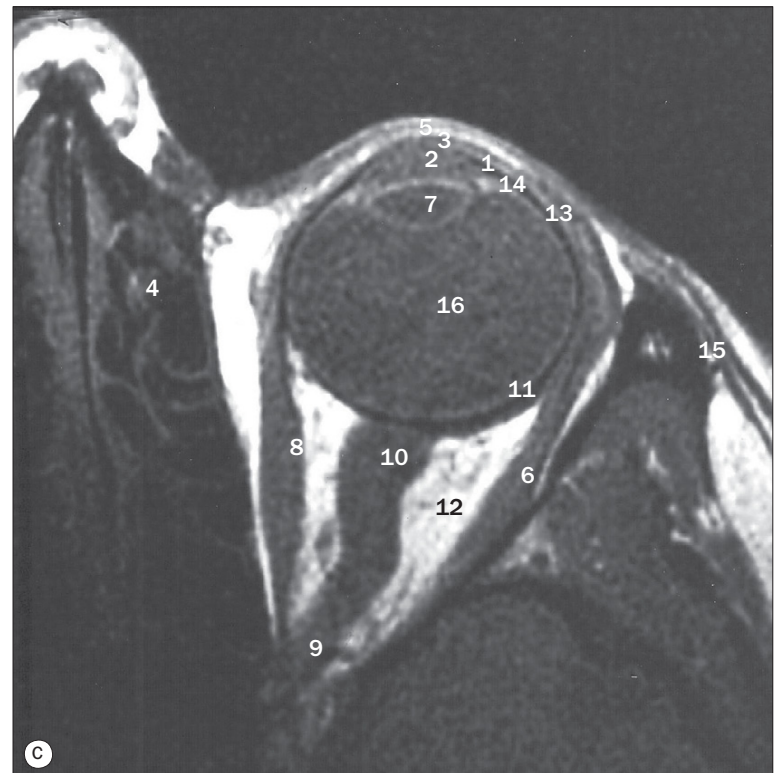
- 1 Angular veins
- 2 Anterior collateral vein
- 3 Cavernous sinus
- 4 First part of superior ophthalmic vein
- 5 Frontal veins
- 6 Inferior ophthalmic vein
- 7 Internal carotid artery
- 8 Medial collateral vein
- 9 Second part of superior ophthalmic vein
- 10 Superficial connecting vein
- 11 Supraorbital vein
- 12 Third part of superior ophthalmic vein



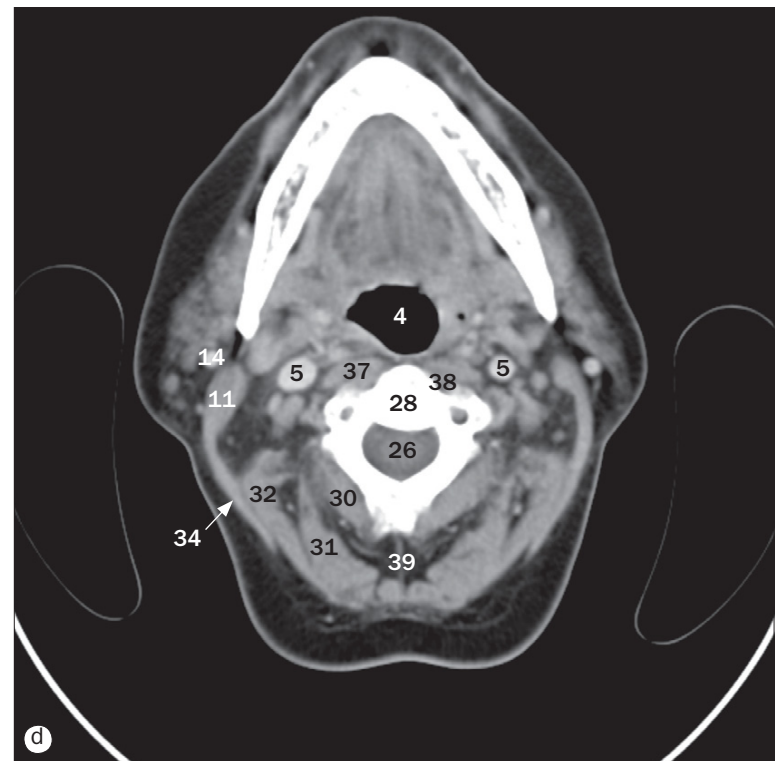
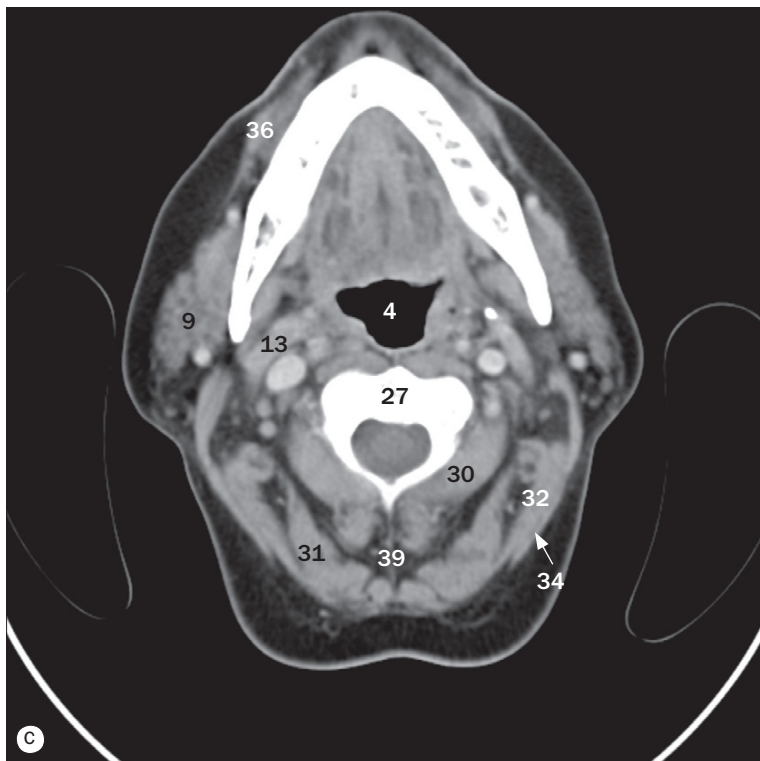
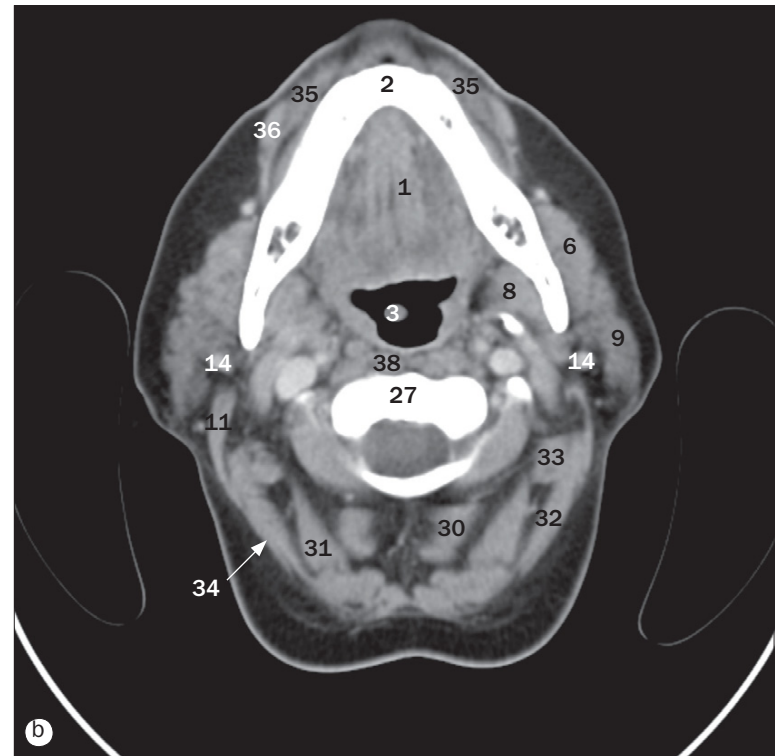
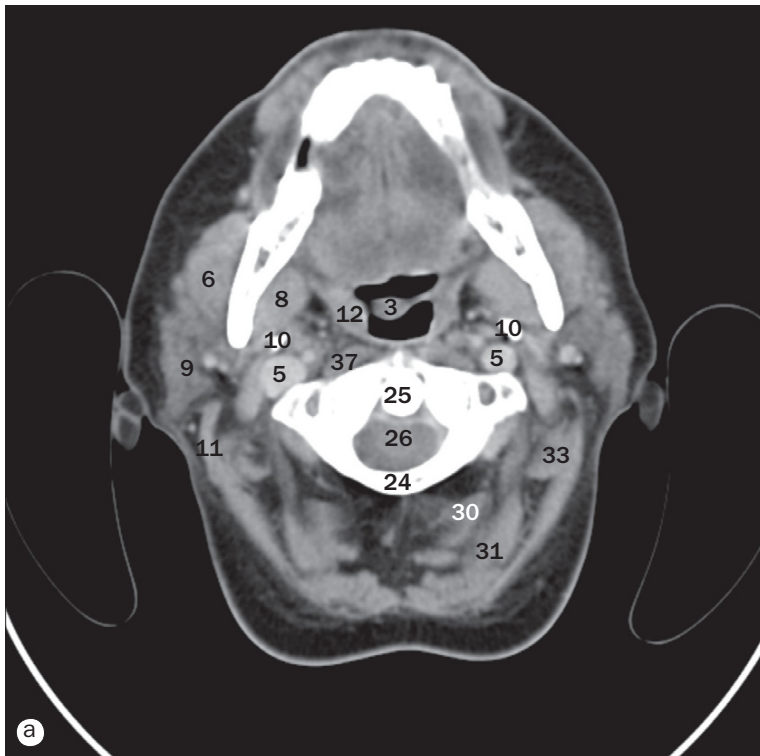
(b) Macrodacryocystogram.

- 1 Common canaliculus
- 2 Hard palate
- 3 Inferior canaliculus
- 4 Lacrimal catheters
- 5 Lacrimal sac
- 6 Nasolacrimal duct
- 7 Site of lacrimal punctum
- 8 Superior canaliculus

- 1 Anterior chamber
- 2 Aqueous humour
- 3 Cornea
- 4 Ethmoidal sinuses
- 5 Eyelid
- 6 Lateral rectus muscle
- 7 Lens
- 8 Medial rectus muscle
- 9 Ophthalmic artery
- 10 Optic nerve
- 11 Retina and choroid
- 12 Retro-orbital fat
- 13 Sclera
- 14 Suspensory ligament of the lens
- 15 Temporalis muscle
- 16 Vitreous

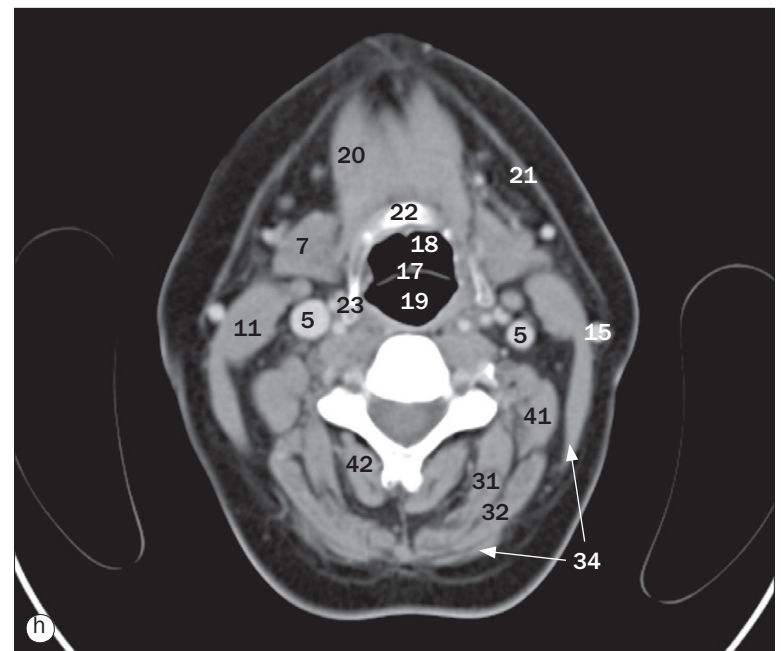
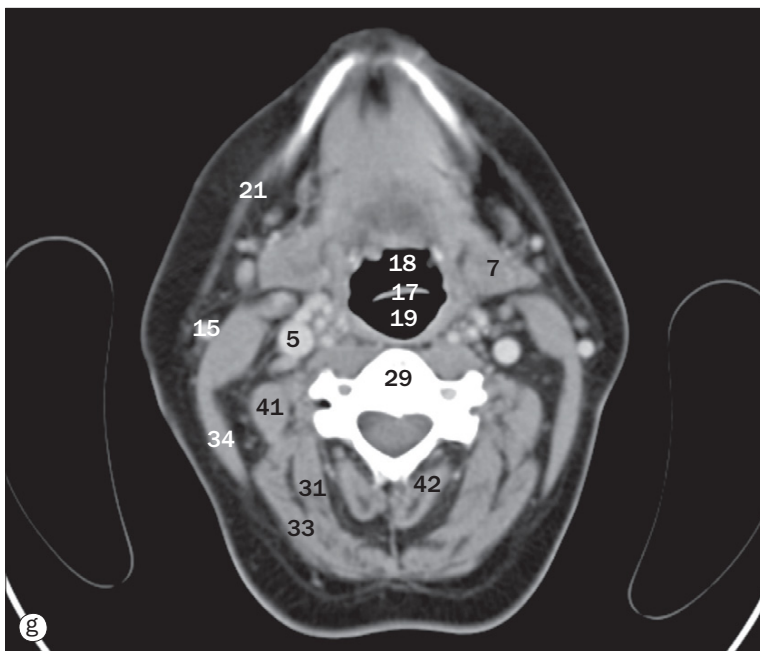
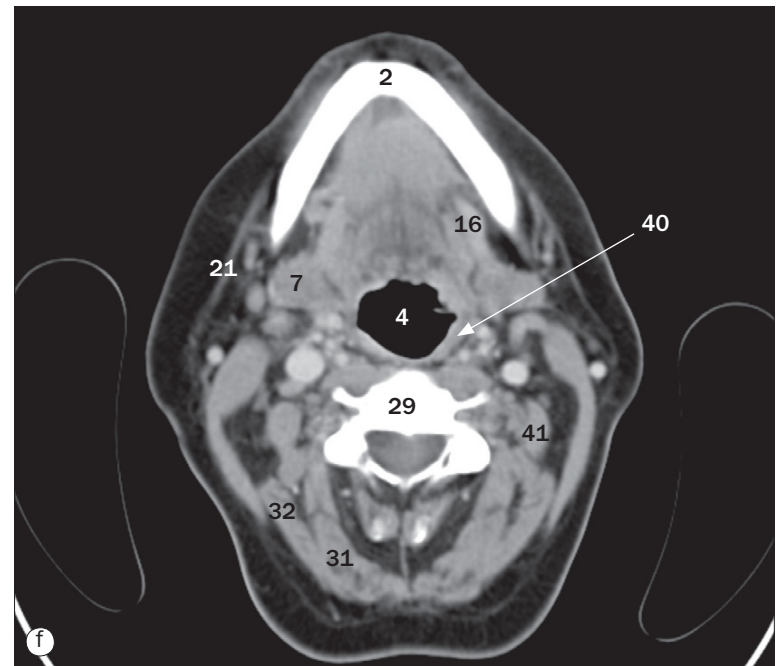
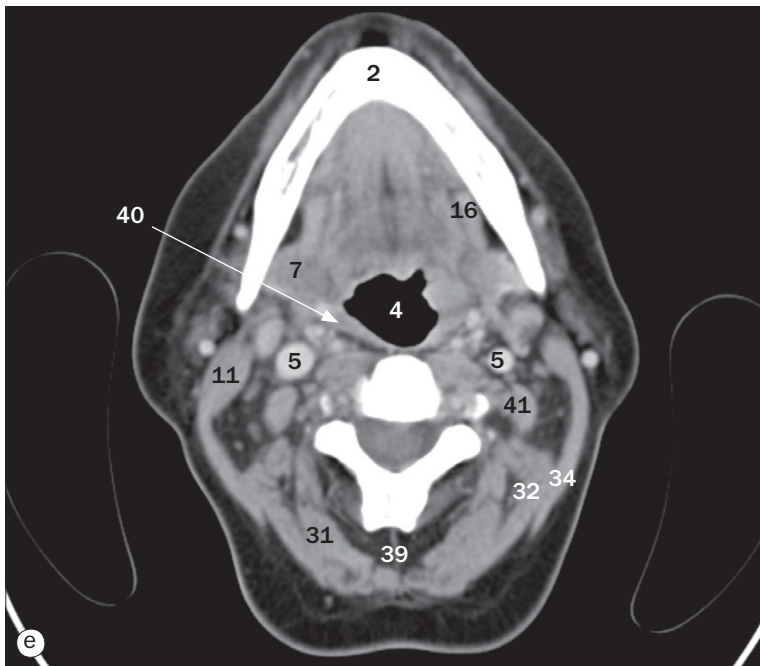


(c) Globe, axial MR image.



(a)–(h) Nasopharynx and oropharynx, axial CT images.

- | | | |
|-------------------------|--|---------------------------------------|
| 1 Genioglossus muscle | 8 Medial pterygoid muscle | 15 External jugular vein |
| 2 Body of mandible | 9 Parotid gland | 16 Anterior belly of digastric muscle |
| 3 Uvula | 10 Styloid process | 17 Epiglottis |
| 4 Oropharynx | 11 Sternocleidomastoid muscle | 18 Vallecula |
| 5 Internal jugular vein | 12 Palatine tonsil | 19 Hypopharynx |
| 6 Masseter muscle | 13 Posterior belly of digastric muscle | 20 Mylohyoid muscle |
| 7 Submandibular gland | 14 Retromandibular vein | 21 Platysma muscle |

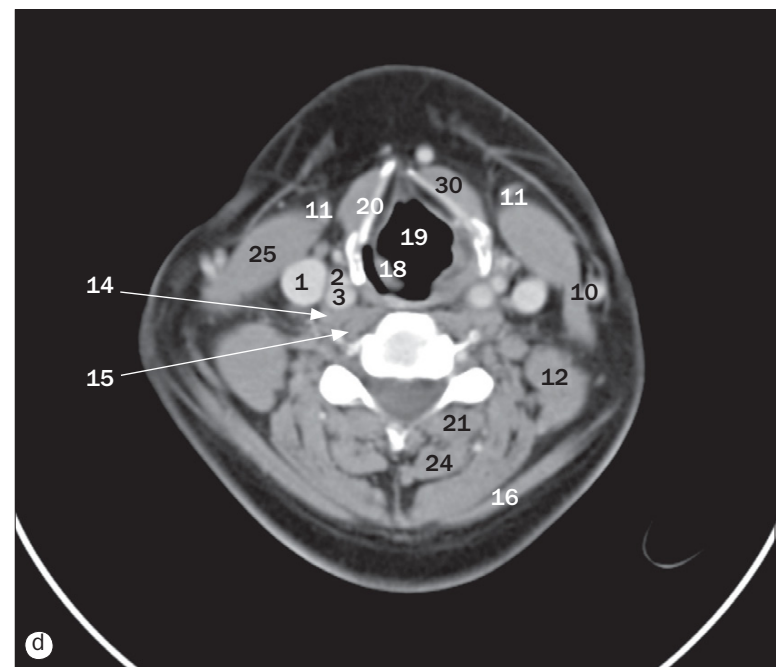
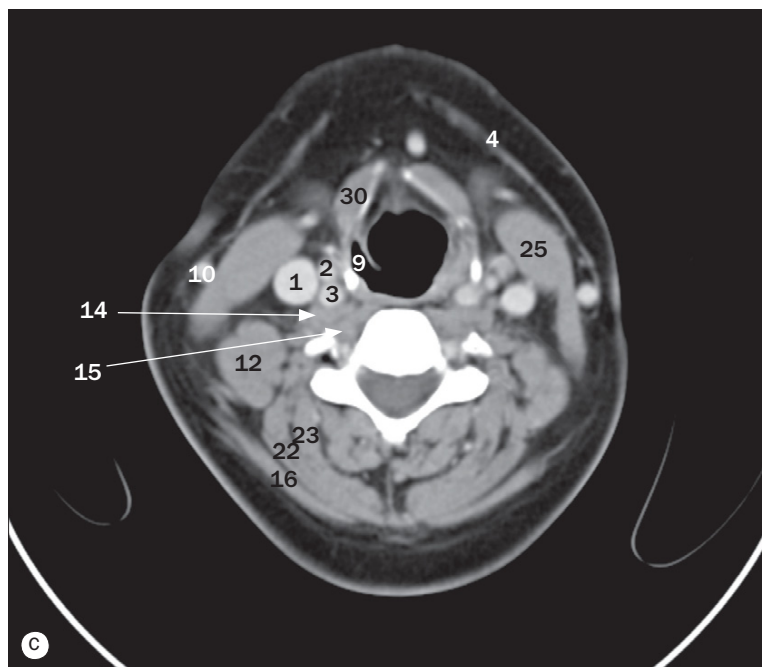
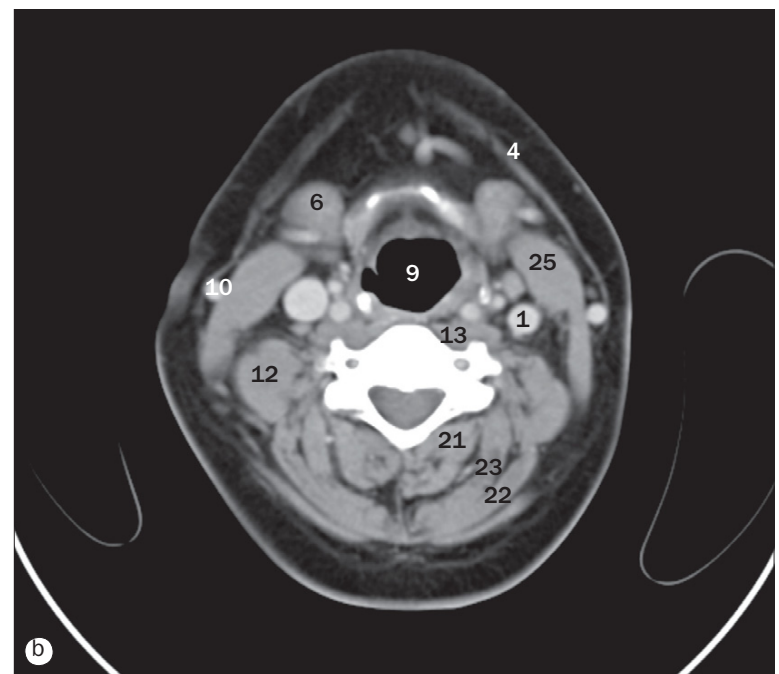
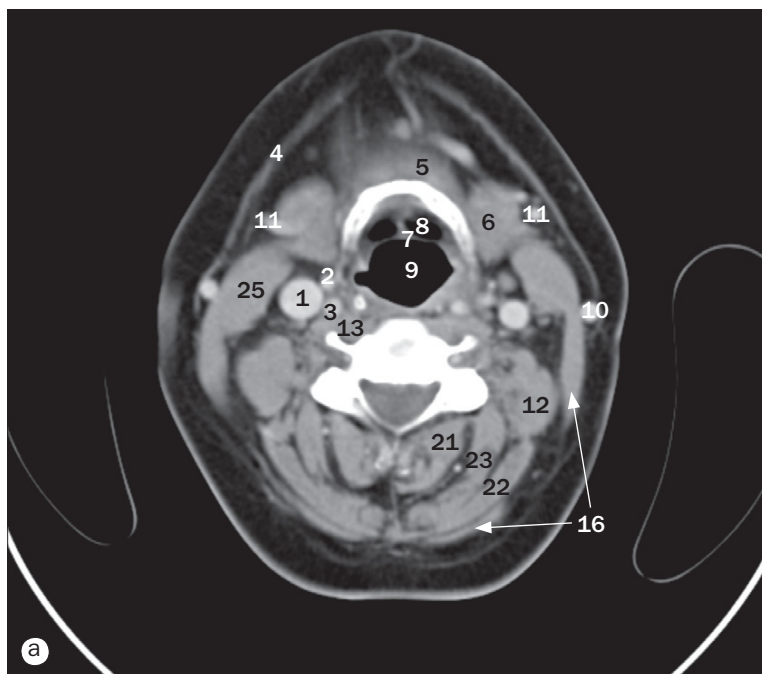


(a)–(h) Nasopharynx and oropharynx, axial CT images.

22 Hyoid body
23 Greater horn of hyoid
24 Posterior arch of C1
25 Dens (odontoid process)
26 Spinal cord
27 Body of C2
28 Body of C3
29 Body of C4

30 Obliquus capitis inferior muscle
31 Semispinalis capitis muscle
32 Splenius capitis muscle
33 Longissimus capitis muscle
34 Trapezius muscle
35 Orbicularis oris muscle
36 Levator anguli oris muscle
37 Longus capitis muscle

38 Longus colli muscle
39 Nuchal ligament
40 Superior constrictor muscle of pharynx
41 Levator scapulae muscle
42 Spinalis capitis muscle and multifidus muscle

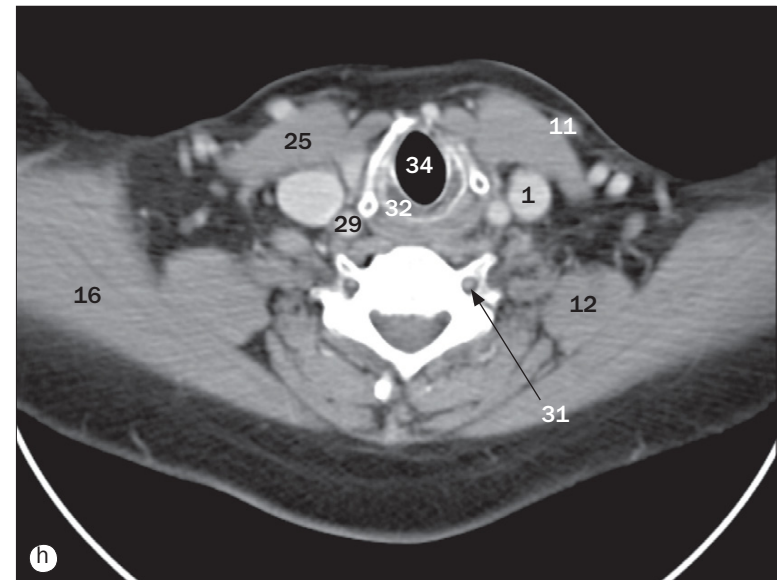
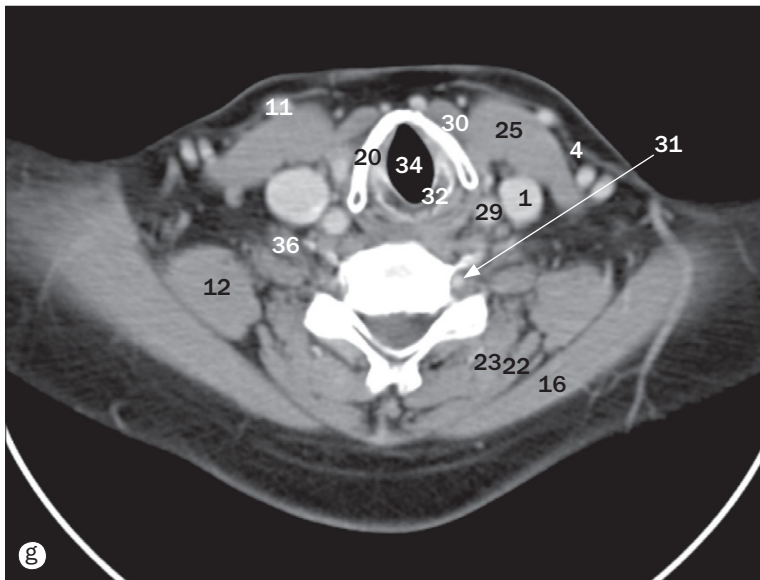
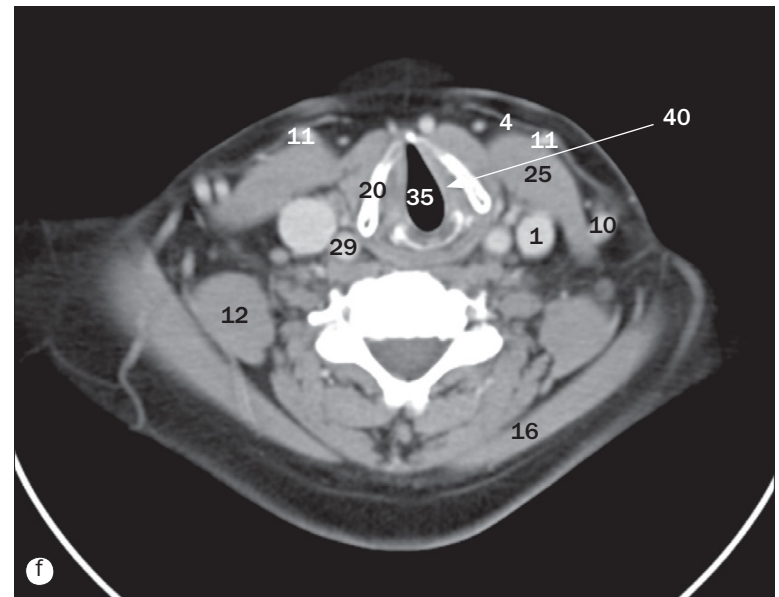
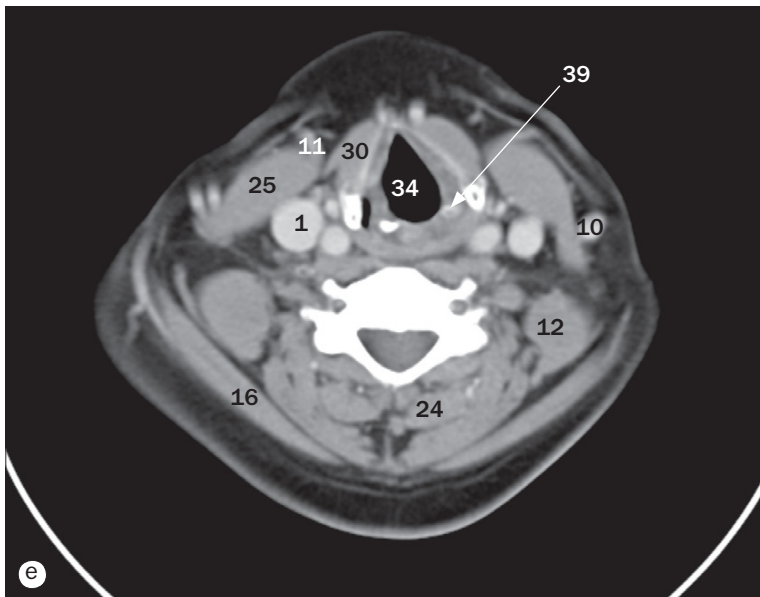


(a)–(d) Larynx and hypopharynx, axial CT images.

- 1 Internal jugular vein
- 2 External carotid artery
- 3 Internal carotid artery
- 4 Platysma muscle
- 5 Geniohyoid muscle
- 6 Submandibular gland
- 7 Epiglottis

- 8 Vallecula
- 9 Hypopharynx
- 10 External jugular vein
- 11 Anterior jugular vein
- 12 Levator scapulae muscle
- 13 Longus capitus and colli muscles
- 14 Longus capitus muscle

The legends for pages 26–28 are common for all 3 pages.

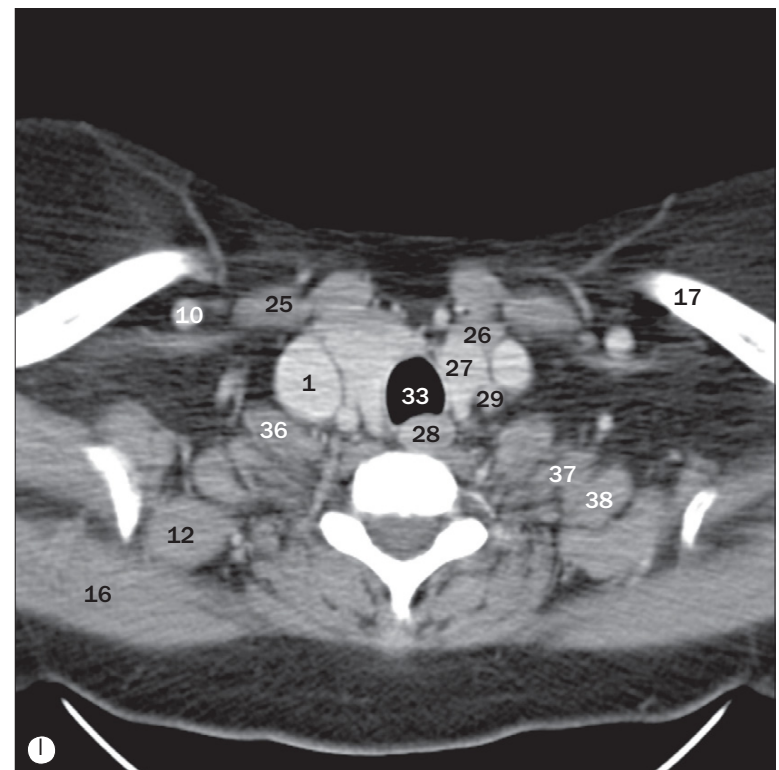
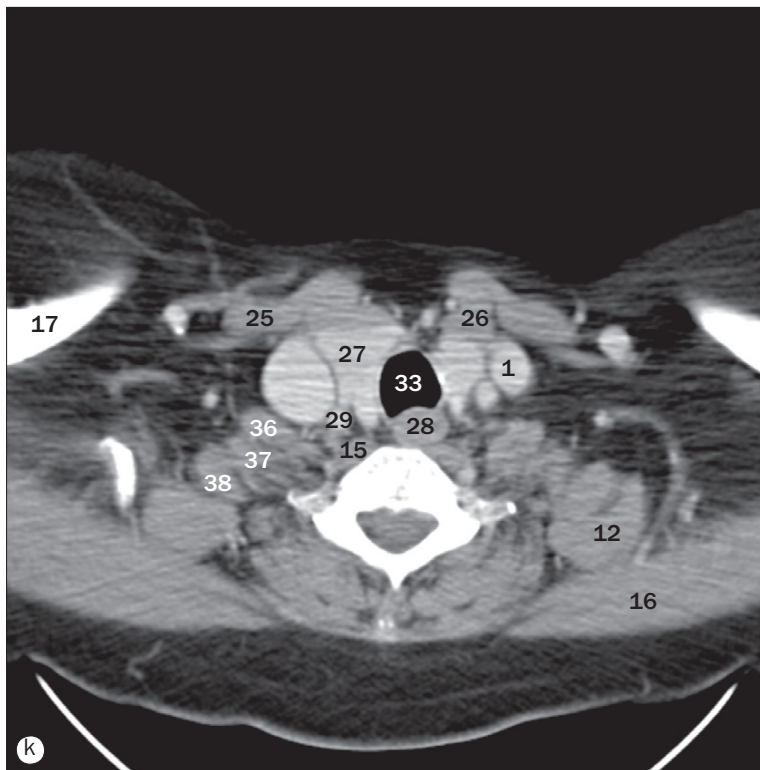
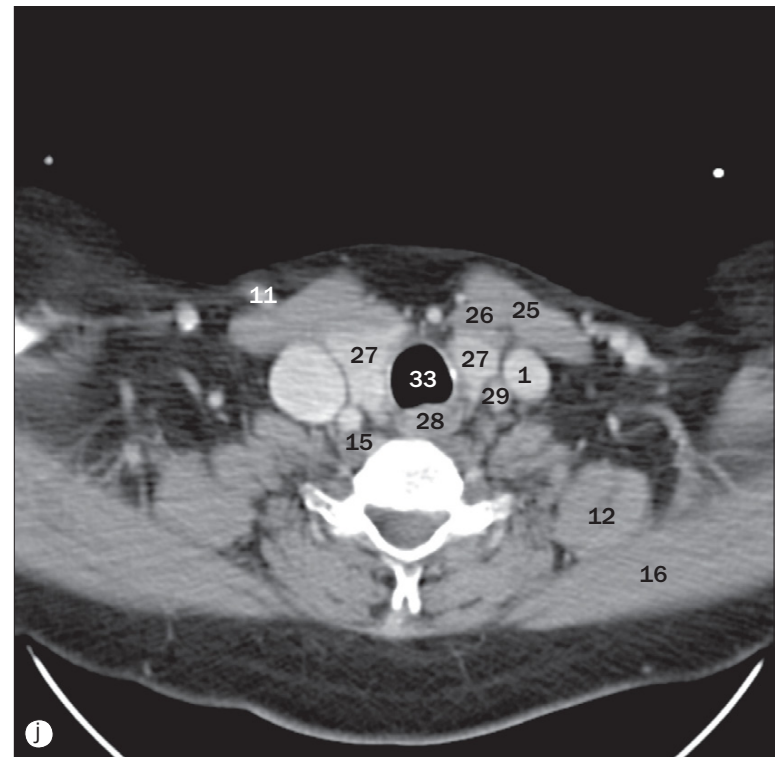
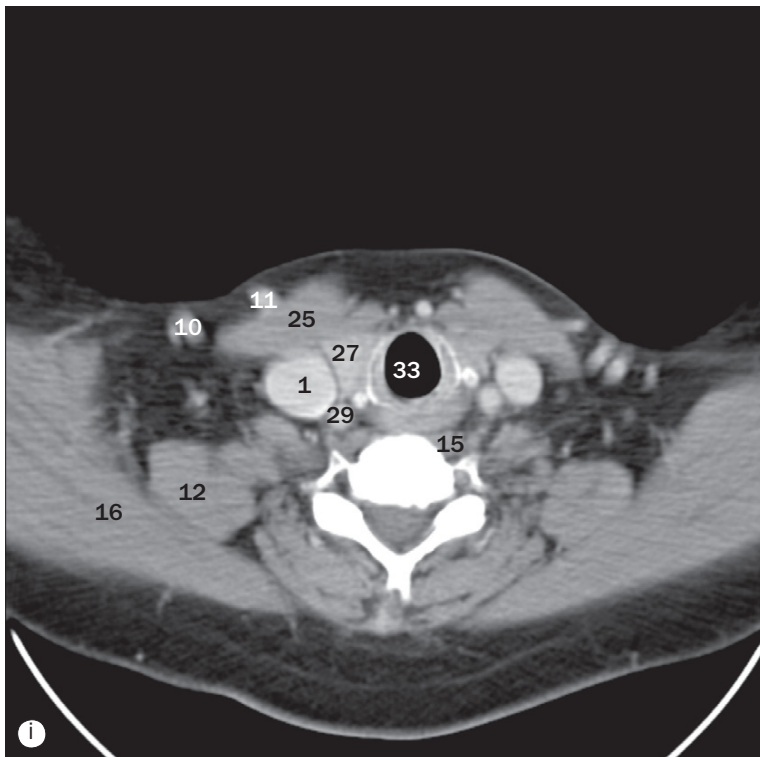


(a)–(l) Larynx and hypopharynx, axial CT images.

15 Longus colli muscle
16 Trapezius muscle
17 Clavicle
18 Aryepiglottic fold
19 Laryngeal vestibule
20 Thyroid cartilage lamina
21 Spinalis cervicis muscle

22 Splenius capitis muscle
23 Semispinalis capitis muscle
24 Semispinalis cervicis muscle
25 Sternocleidomastoid muscle
26 Sternohyoid muscle
27 Thyroid gland
28 Oesophagus

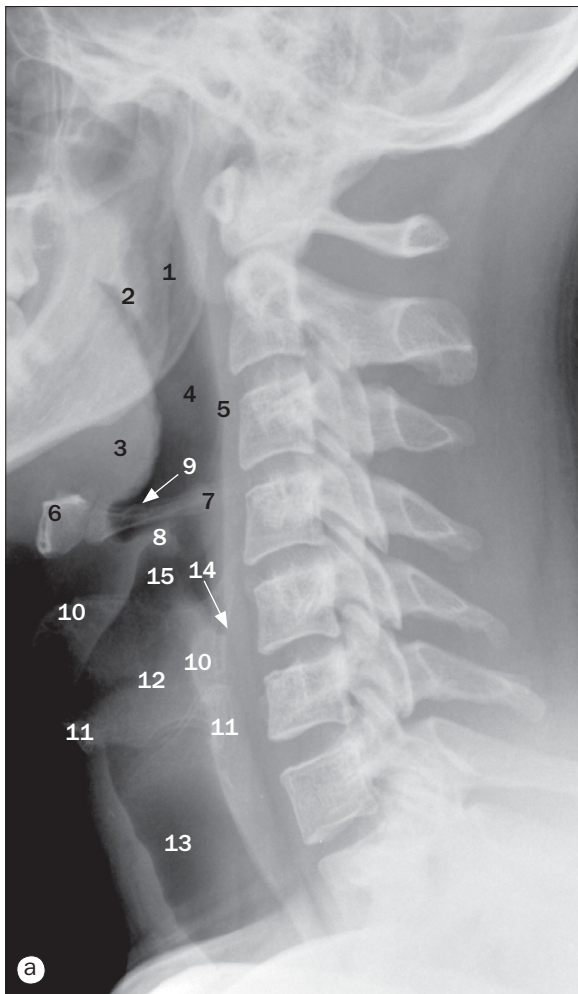
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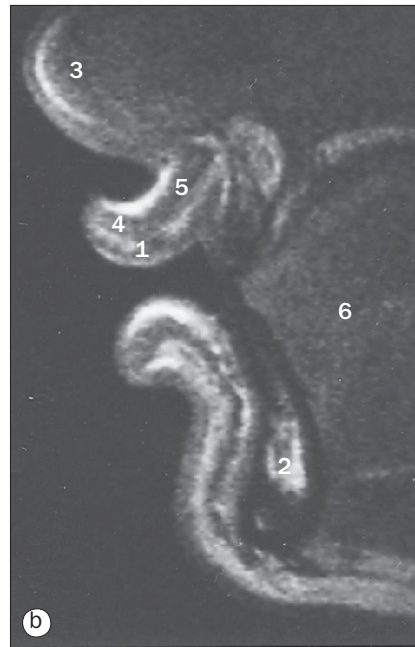
(a)–(l) Larynx and hypopharynx, axial CT images.

29 Common carotid artery
30 Infrahyoid strap muscle
31 Vertebral artery
32 Cricoid cartilage
33 Trachea
34 Larynx

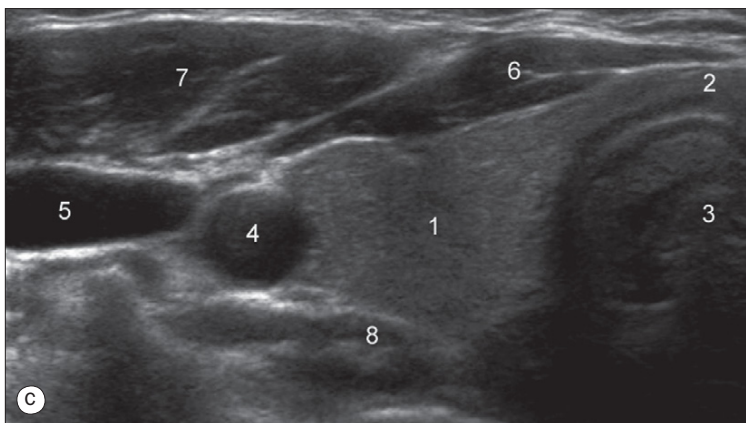
35 Glottis
36 Anterior scalene muscle
37 Middle scalene muscle
38 Posterior scalene muscle
39 Arytenoid cartilage
40 Vocalis muscle



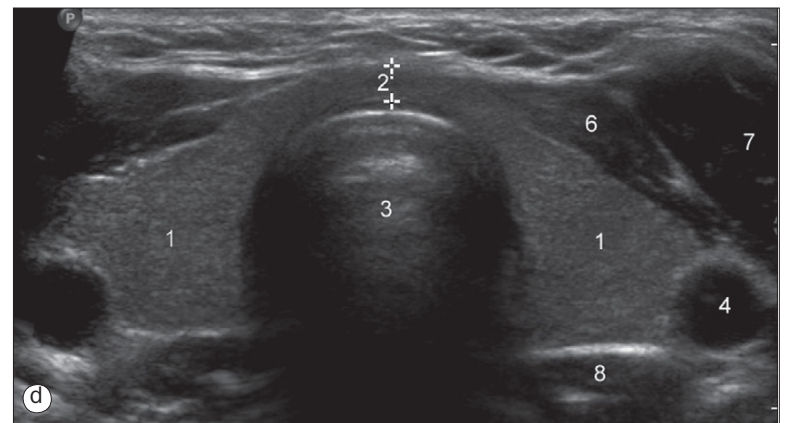
(a) Soft tissues of the neck, lateral projection.



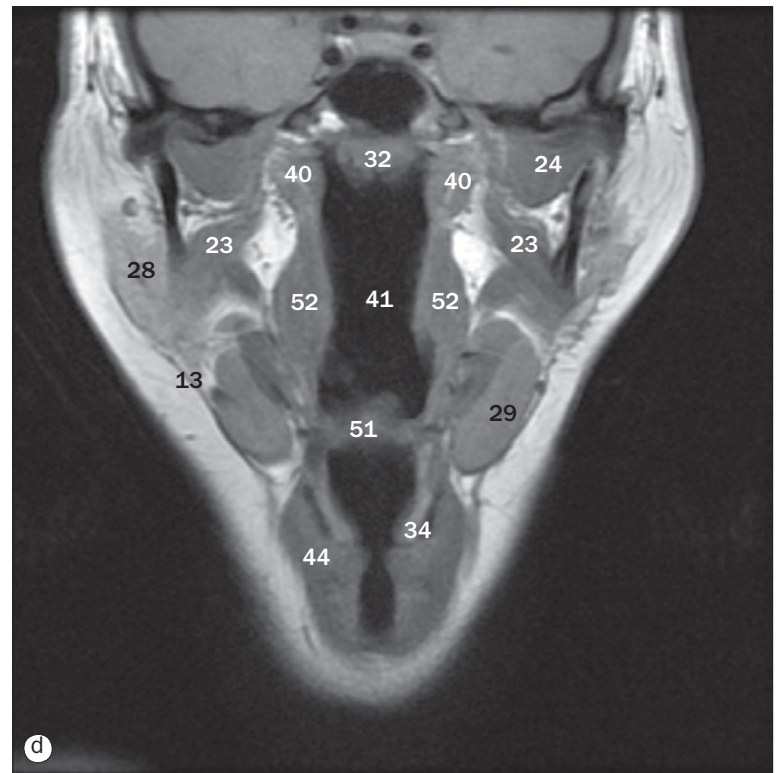
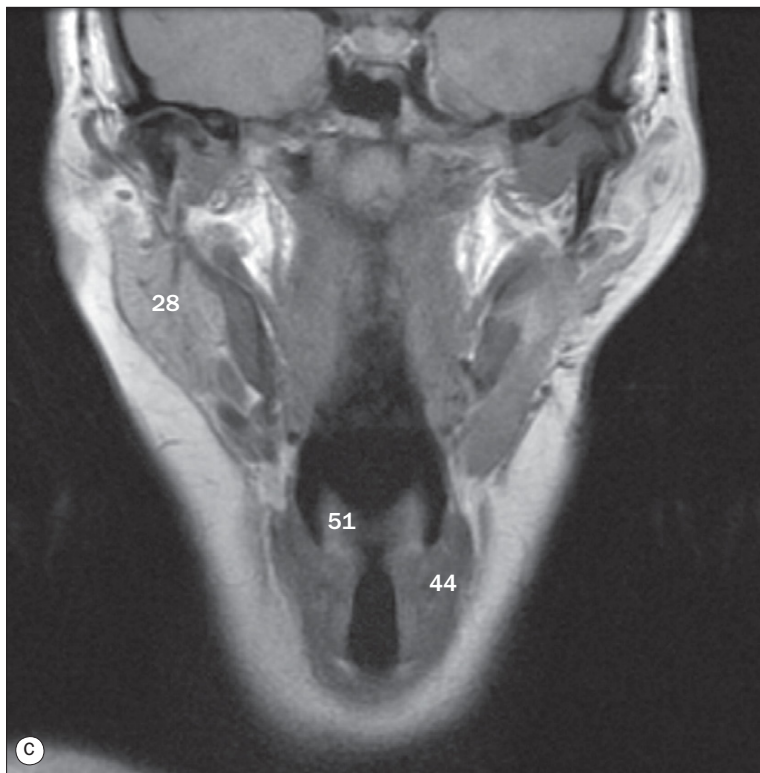
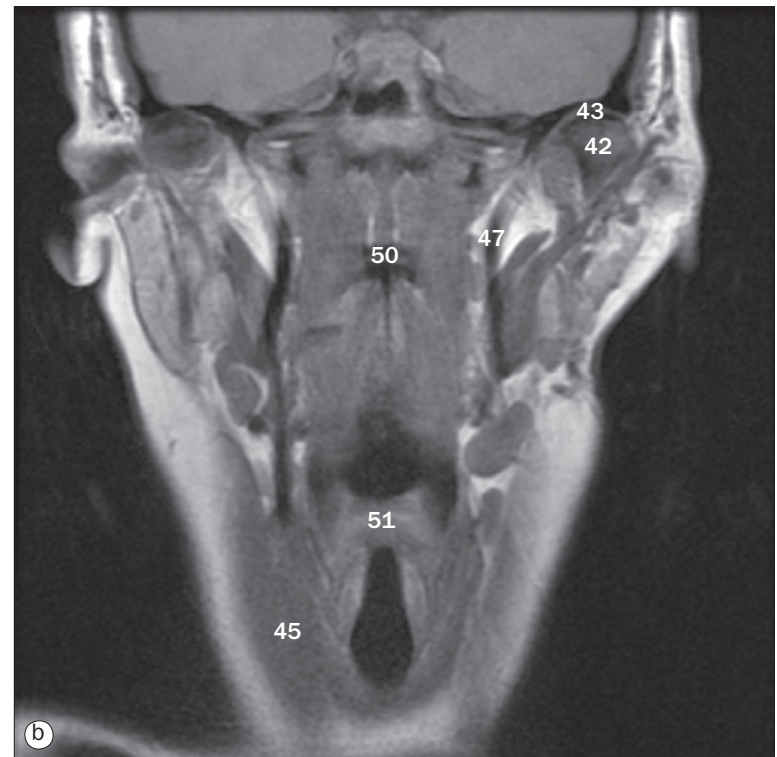
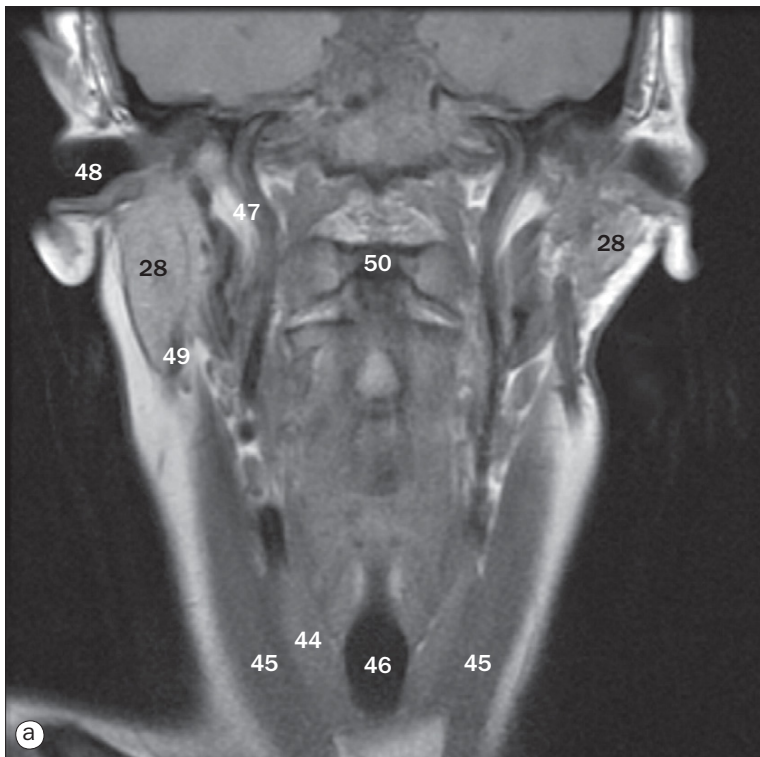
(b) The kiss, sagittal MR image.



(c) and (d) Thyroid ultrasound, axial projection.



- 1 Thyroid gland lobe
- 2 Thyroid gland isthmus
- 3 Trachea
- 4 Common carotid artery
- 5 Internal jugular vein
- 6 Infrahyoid strap muscle
- 7 Sternocleidomastoid muscle
- 8 Prevertebral muscle

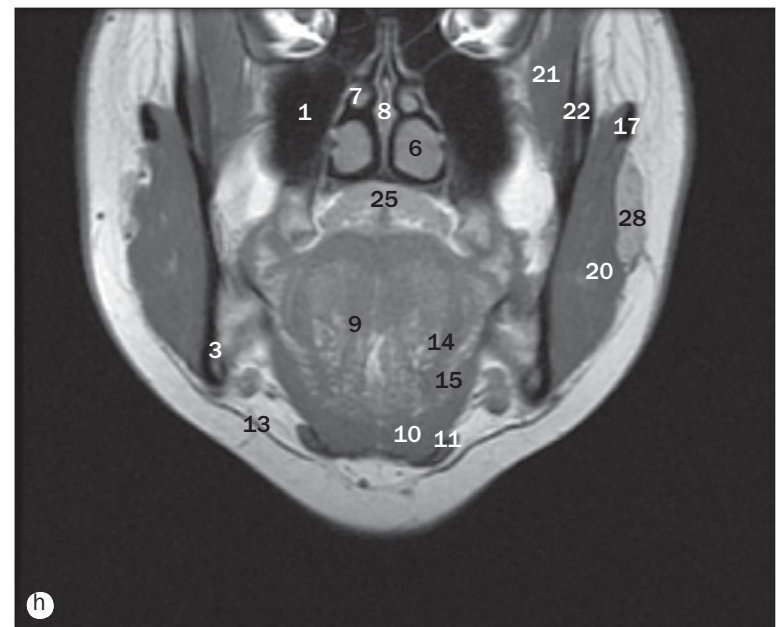
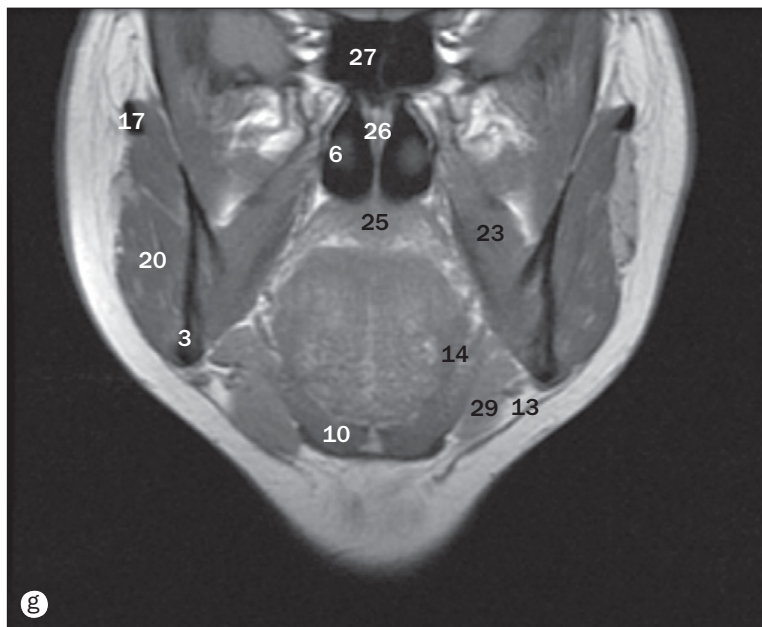
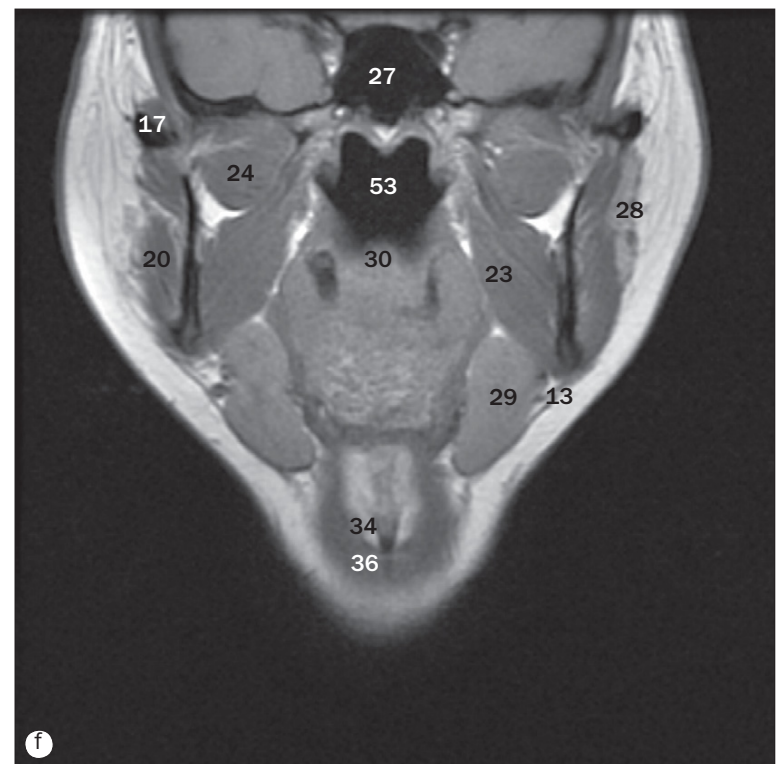
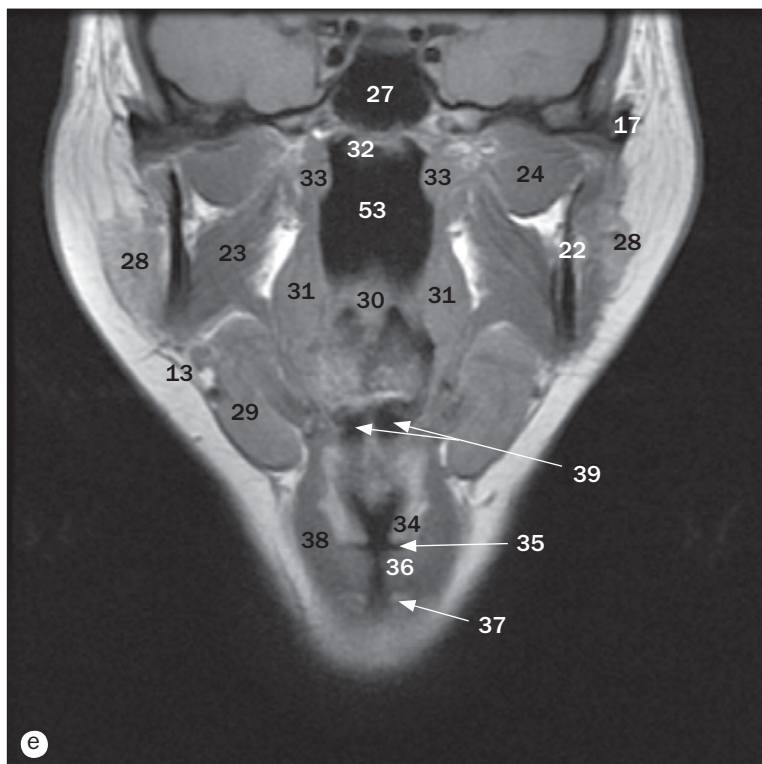


(a)–(d) Coronal MR images of pharynx, from posterior to anterior.

- 1 Maxillary sinus (antrum)
- 2 Hard palate
- 3 Mandible
- 4 Alveolar ridge of maxilla
- 5 Oral cavity
- 6 Inferior turbinate
- 7 Middle turbinate

- 8 Nasal septum
- 9 Genioglossus muscle
- 10 Geniohyoid muscle
- 11 Anterior belly of digastric muscle
- 12 Lingual septum
- 13 Platysmus muscle
- 14 Hypoglossus muscle

The legends for pages 30–32 are common for all 3 pages.

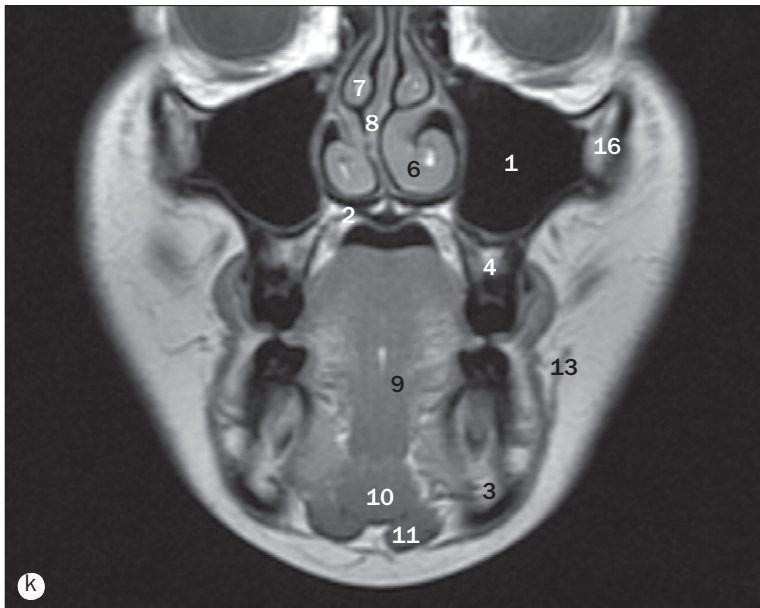
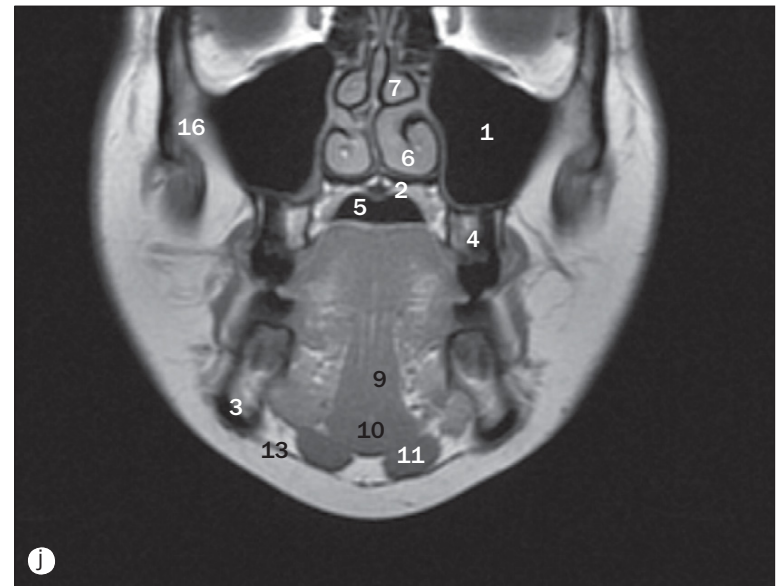
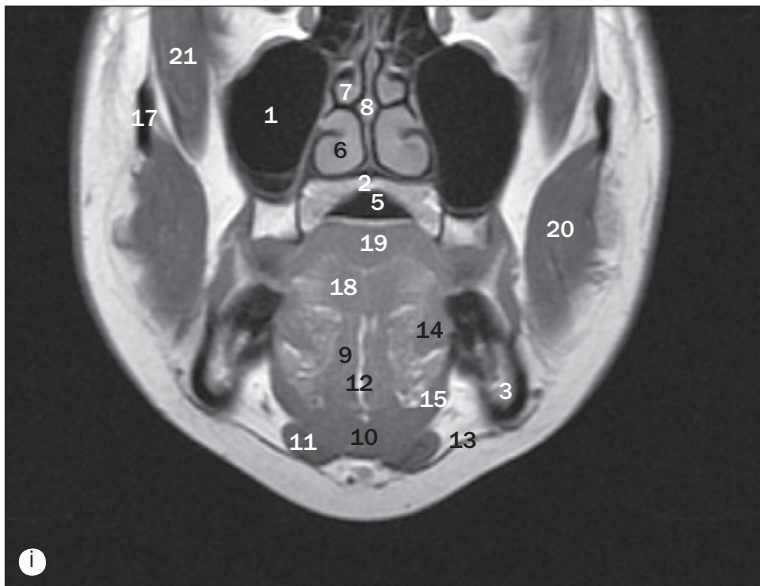


(a)–(l) Coronal MR images of pharynx, from posterior to anterior.

15 Mylohyoid muscle
16 Zygomatic bone
17 Zygomatic arch
18 Transverse muscle of tongue
19 Longitudinal muscle of tongue
20 Masseter muscle
21 Temporal muscle
22 Ramus of mandible
23 Medial pterygoid muscle

24 Lateral pterygoid muscle
25 Soft palate
26 Vomer
27 Sphenoid sinus (antrum)
28 Parotid gland
29 Submandibular gland
30 Uvula
31 Palatopharyngeus muscle
32 Pharyngeal tonsils

The legends for pages 30–32 are common for all 3 pages.

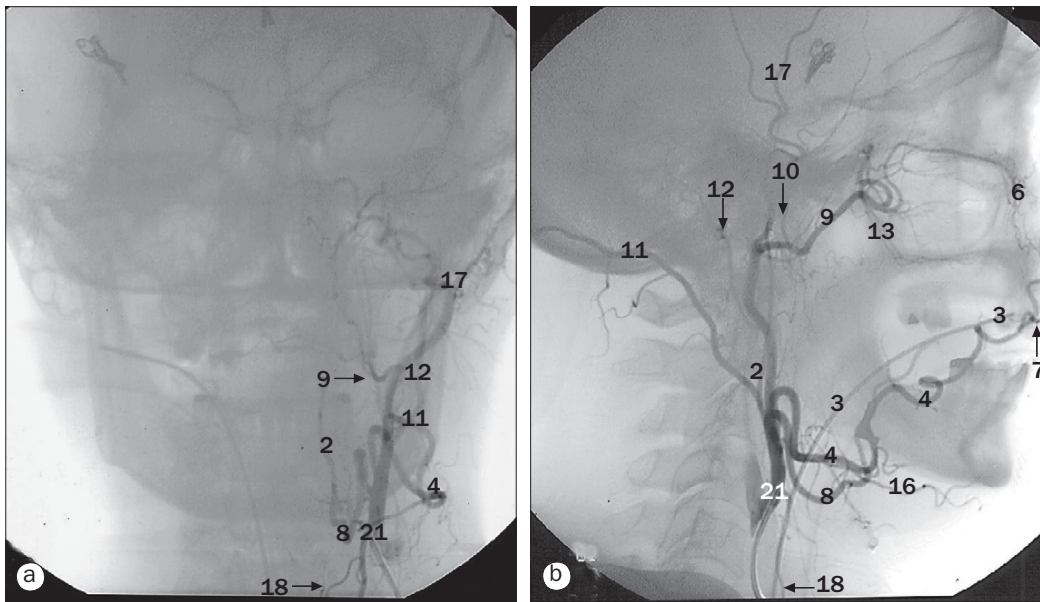


(a)–(l) Coronal MR images of pharynx, from posterior to anterior.

33 Levator veli palatini muscle
34 Vestibular fold
35 Laryngeal ventricle
36 Vocalis muscle
37 Cricoid cartilage
38 Thyrohyoid muscle
39 Vallecule
40 Eustachian tubes
41 Oropharynx
42 Mandibular condyles
43 Temporomandibular joint

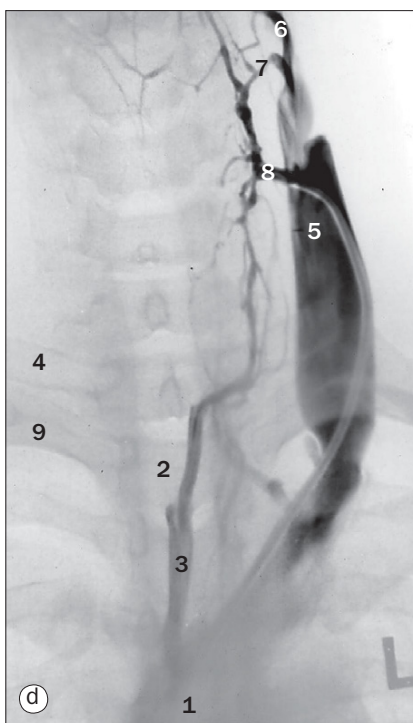
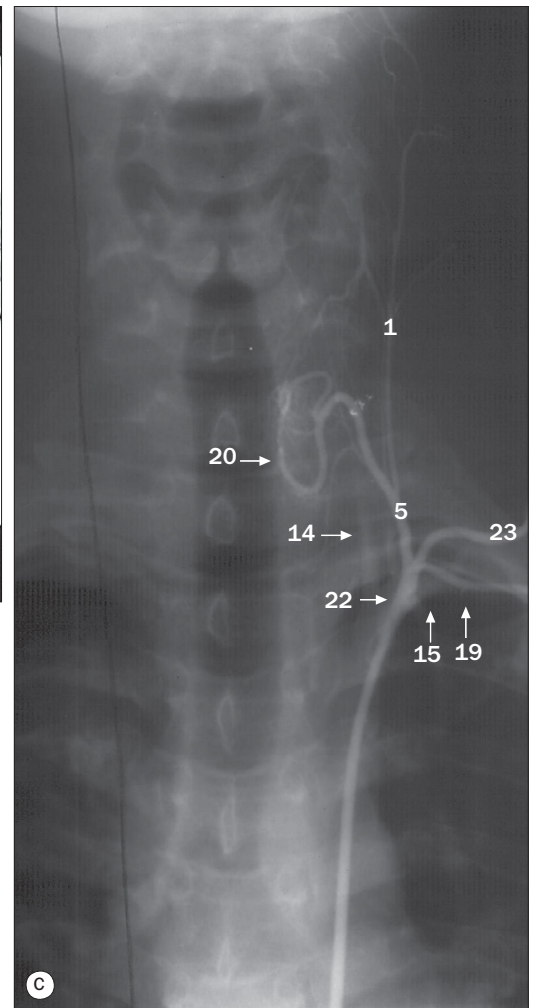
44 Thyroid gland
45 Sternocleidomastoid muscle
46 Trachea
47 Internal carotid artery
48 External auditory canal
49 Retromandibular vein
50 Anterior arch of C1
51 Epiglottis
52 Palatine tonsils
53 Nasopharynx

The legends for pages 30–32 are common for all 3 pages.



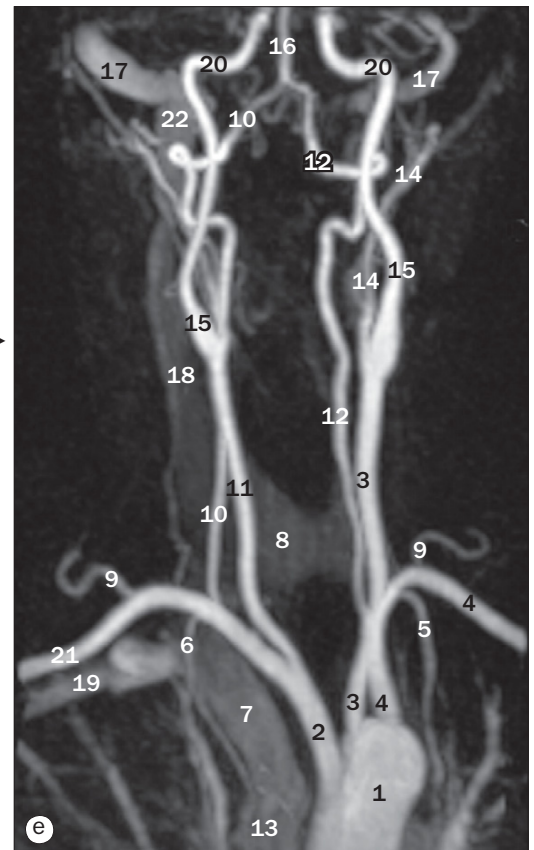
Digitally subtracted arteriograms of the external carotid artery, (a) anteroposterior projection, (b) lateral projection. (c) Thyroid arteriogram.

- | | | |
|----------------------------------|---|--|
| 1 Ascending cervical artery | 10 Middle meningeal artery | 18 Superior thyroid artery |
| 2 Ascending pharyngeal artery | 11 Occipital artery | 19 Suprascapular artery |
| 3 Endotracheal tube | 12 Posterior auricular artery | 20 Thyroid branches of inferior thyroid artery |
| 4 Facial artery | 13 Posterior superior alveolar artery | 21 Tip of catheter in external carotid artery |
| 5 Inferior thyroid artery | 14 Reflux of contrast into vertebral artery | 22 Tip of catheter in thyrocervical trunk |
| 6 Infra-orbital artery | 15 Subclavian artery | 23 Transverse cervical artery |
| 7 Labial branch of facial artery | 16 Submental artery | |
| 8 Lingual artery | 17 Superficial temporal artery | |
| 9 Maxillary artery | | |

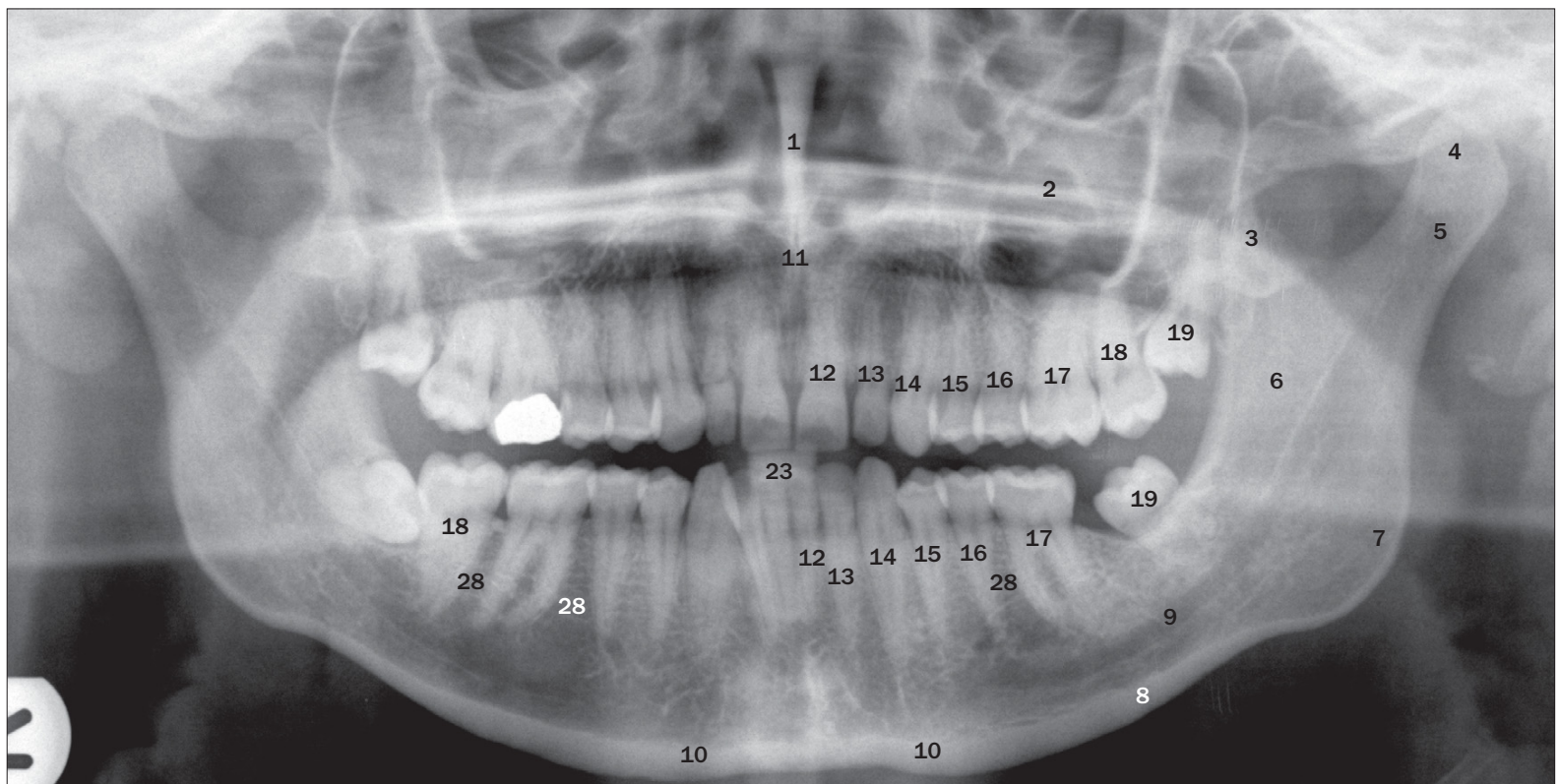
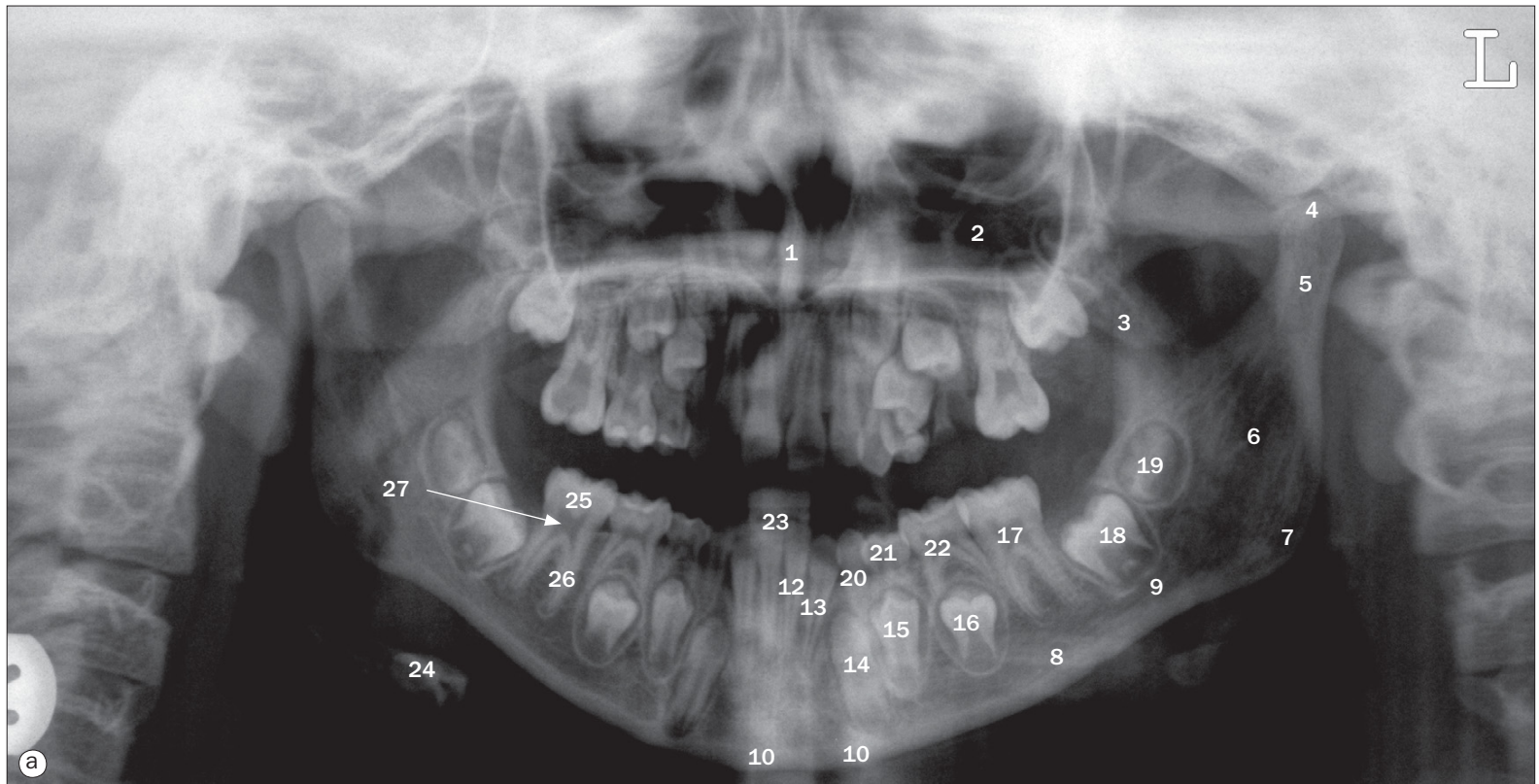


- | | |
|-----------------------------|--|
| 1 Left brachiocephalic vein | 5 Internal jugular vein |
| 2 Trachea | 6 Lingual vein |
| 3 Inferior thyroid vein | 7 Superior thyroid vein |
| 4 Transverse process of C7 | 8 Tip of catheter in middle thyroid vein |
| | 9 Right first rib |

- | | |
|-----------------------------------|---|
| 1 Aortic arch | 11 Right common carotid artery |
| 2 Brachiocephalic artery | 12 Left vertebral artery |
| 3 Left common carotid artery | 13 Superior vena cava |
| 4 Left subclavian artery | 14 External carotid artery |
| 5 Left internal thoracic artery | 15 Internal carotid artery |
| 6 Right internal thoracic artery | 16 Basilar artery |
| 7 Right brachiocephalic vein | 17 Sigmoid sinus |
| 8 Right lobe of the thyroid gland | 18 Internal jugular vein |
| 9 Costocervical trunk | 19 Right subclavian vein |
| 10 Right vertebral artery | 20 Petrous portion of the internal carotid artery |
| | 21 Right subclavian artery |
| | 22 Jugular bulb |

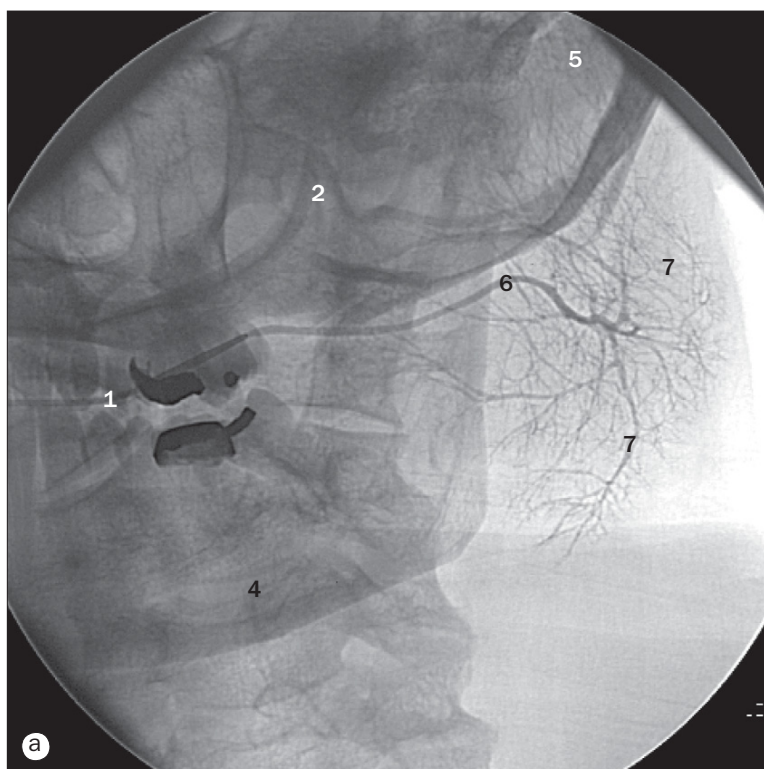


(d) Neck venogram.
(e) MR angiogram of neck vessels.

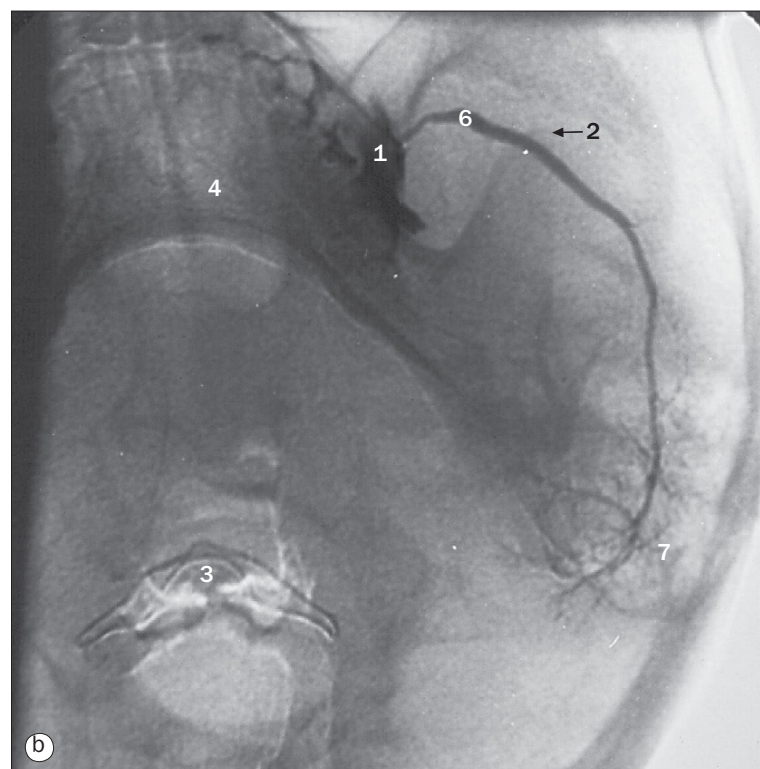


Dental panoramic tomogram (orthopantomogram) of (a) a 6-year-old child, (b) an adult.

- | | | | |
|--------------------------------|-------------------------|--------------------------------|---------------------------------|
| 1 Nasal septum | 8 Mandibular body | 15 Anterior premolar | 22 Deciduous posterior premolar |
| 2 Maxillary sinus (antrum) | 9 Mandibular canal | 16 Posterior premolar | 23 Bite block |
| 3 Coronoid process of mandible | 10 Mental tubercle | 17 First molar | 24 Hyoid bone |
| 4 Mandibular condylar head | 11 Anterior nasal spine | 18 Second molar | 25 Crown of tooth |
| 5 Mandibular condylar neck | 12 Medial incisor | 19 Third molar (wisdom tooth) | 26 Root of tooth |
| 6 Mandibular ramus | 13 Lateral incisor | 20 Deciduous canine tooth | 27 Pulp chamber of tooth |
| 7 Angle of mandible | 14 Canine tooth | 21 Deciduous anterior premolar | 28 Alveolar bone |



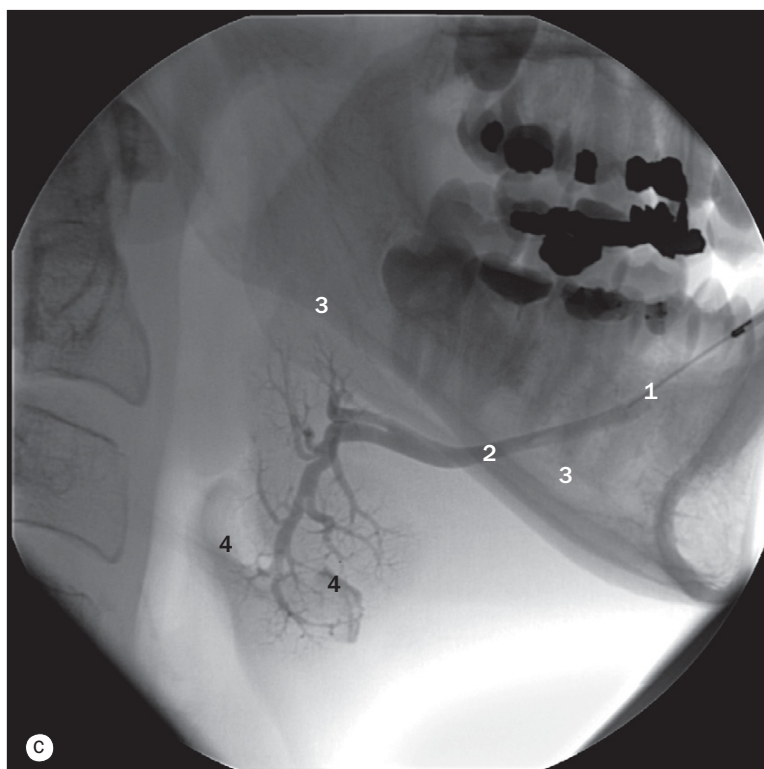
(a) Parotid sialogram.



(b) Parotid sialogram, submentovertical projection.

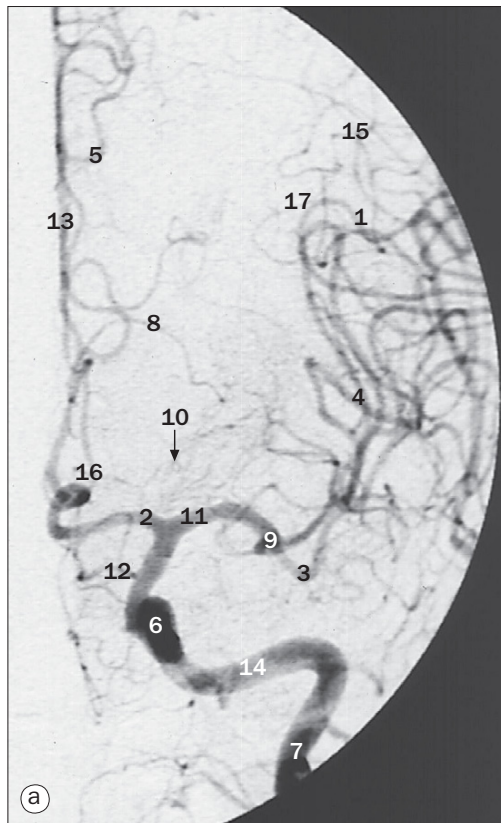
- 1 Catheter
- 2 Coronoid process of mandible
- 3 Hyoid bone
- 4 Mandible

- 5 Mastoid process
- 6 Parotid (Stensen's) duct
- 7 Secondary ductules



(c) Submandibular sialogram.

- 1 Catheter
- 2 Main submandibular (Wharton's) duct
- 3 Mandible
- 4 Secondary ductules

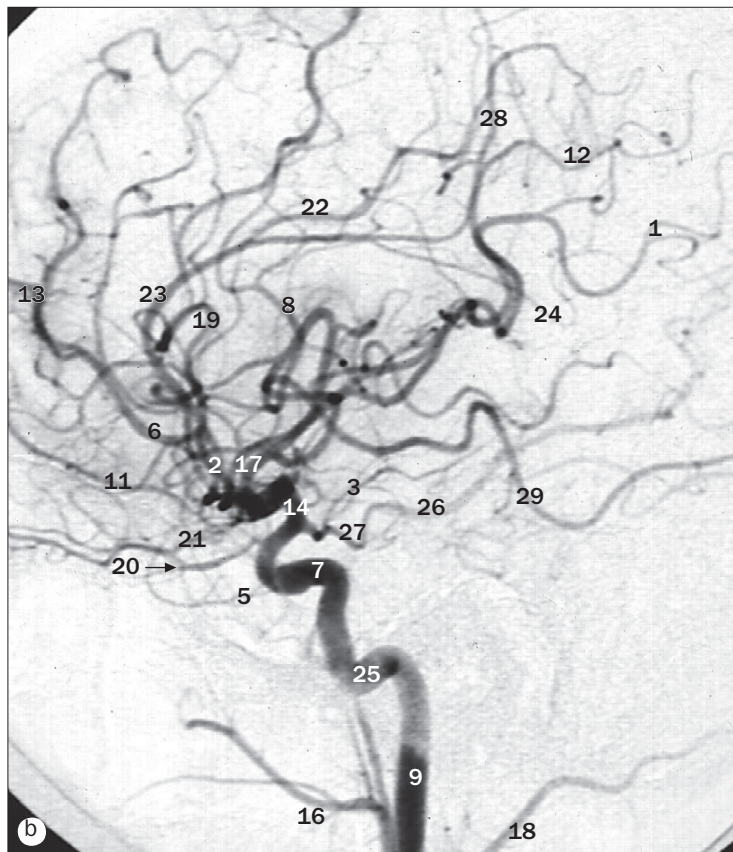


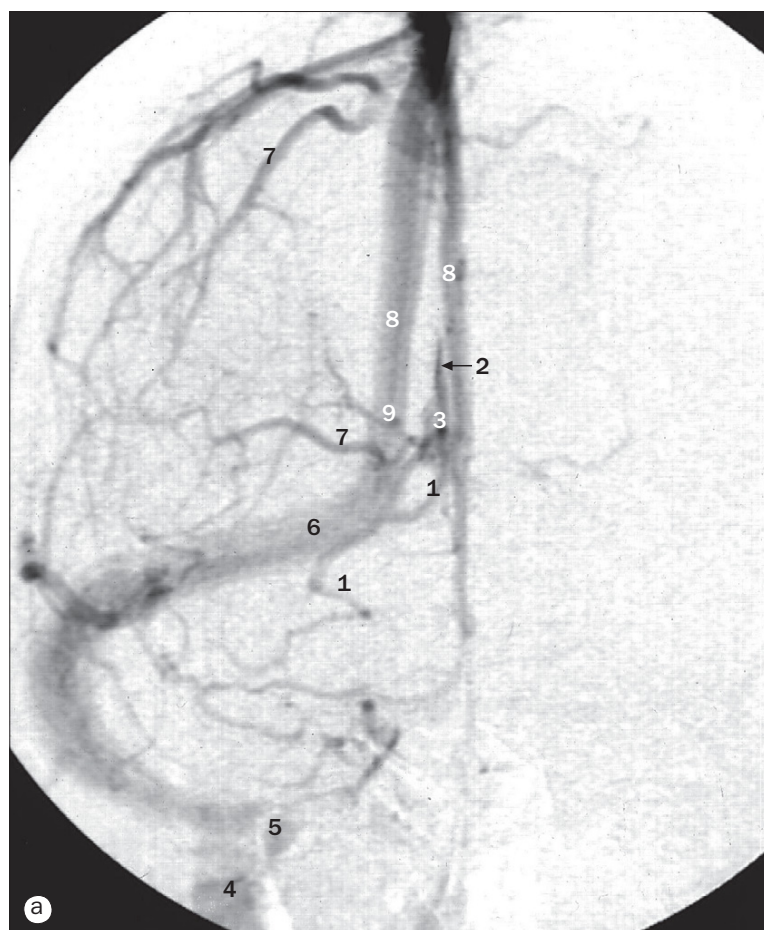
- 1 Angular branches of middle cerebral artery
- 2 Anterior cerebral artery
- 3 Anterior temporal branches of middle cerebral artery
- 4 Branches (in insula) of middle cerebral artery
- 5 Callosomarginal artery
- 6 Cavernous portion of internal carotid artery
- 7 Cervical portion of internal carotid artery
- 8 Frontopolar artery
- 9 Genu of middle cerebral artery
- 10 Lenticulostriate arteries
- 11 Middle cerebral artery
- 12 Orbitofrontal branch of pericallosal artery
- 13 Pericallosal artery
- 14 Petrous portion of internal carotid artery
- 15 Posterior parietal branches of middle cerebral artery
- 16 Recurrent artery of Heubner
- 17 Sylvian point

Digitally subtracted arterial phase of carotid arteriograms, (a) anteroposterior projection, (b) lateral projection, (c) oblique projection.



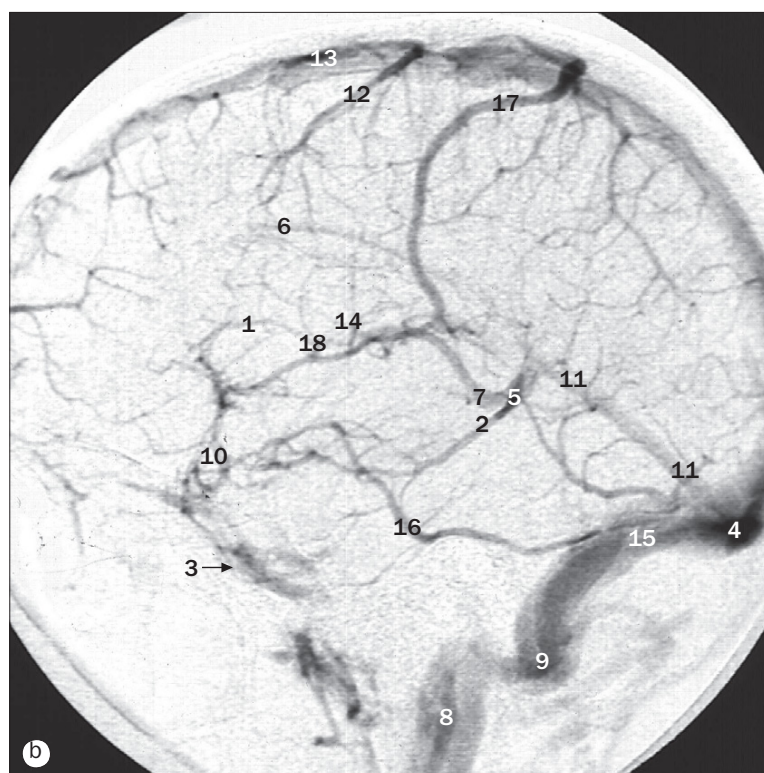
- | | |
|--|---|
| 1 Angular artery | 15 Lenticulostriate artery |
| 2 Anterior cerebral artery | 16 Maxillary artery |
| 3 Anterior choroidal artery | 17 Middle cerebral artery |
| 4 Anterior communicating artery | 18 Occipital artery |
| 5 Anterior temporal artery | 19 Operculofrontal artery |
| 6 Callosomarginal artery | 20 Ophthalmic artery |
| 7 Cavernous portion of internal carotid artery | 21 Orbitofrontal artery |
| 8 Central sulcus artery | 22 Paracentral artery |
| 9 Cervical portion of internal carotid artery | 23 Pericallosal artery |
| 10 Ethmoidal branch of ophthalmic artery | 24 Pericallosal artery extending around corpus callosum |
| 11 Frontopolar artery | 25 Petrous portion of internal carotid artery |
| 12 Inferior internal parietal artery | 26 Posterior cerebral artery |
| 13 Internal frontal branch of anterior cerebral artery | 27 Posterior communicating artery |
| 14 Intracranial (supraclinoid) internal carotid artery | 28 Posterior parietal artery |
| | 29 Posterior temporal artery |
| | 30 Recurrent artery of Heubner |





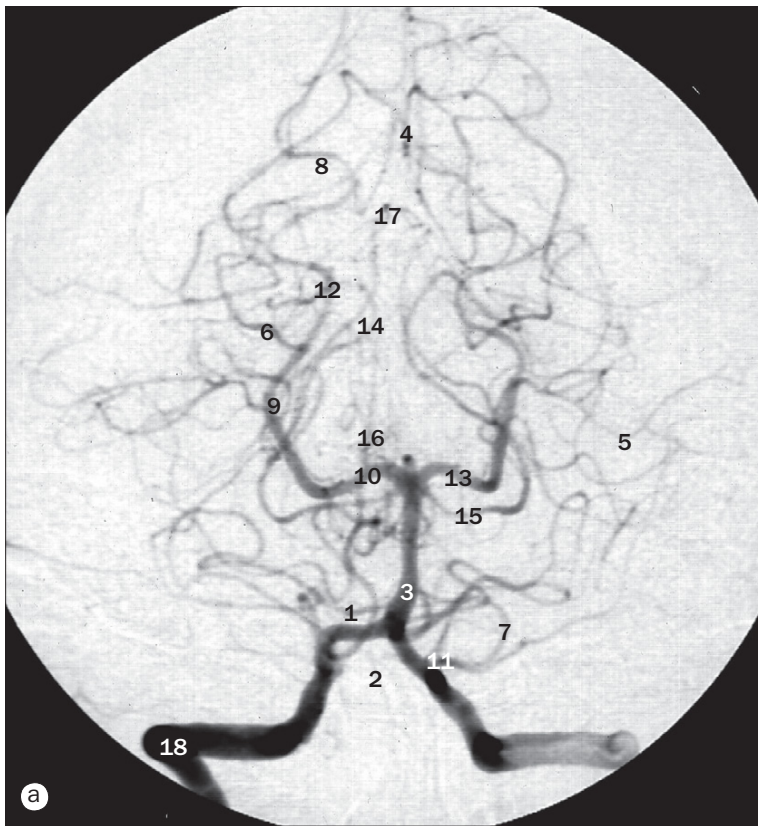
(a) Digitally subtracted venous phase of carotid arteriogram, anteroposterior projection.

- 1 Basal vein of Rosenthal
- 2 Inferior sagittal sinus
- 3 Internal cerebral vein
- 4 Internal jugular vein
- 5 Jugular bulb
- 6 Right transverse sinus
- 7 Superficial cortical veins
- 8 Superior sagittal sinus
- 9 Thalamostriate vein



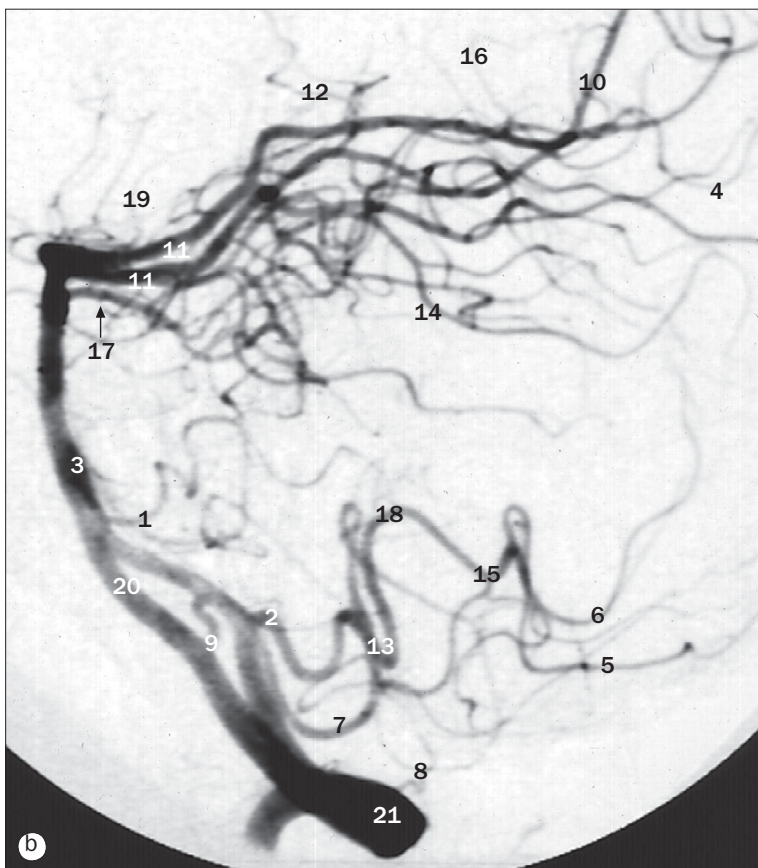
(b) Digitally subtracted venous phase of carotid arteriogram, lateral projection.

- 1 Anterior caudate vein
- 2 Basal vein of Rosenthal
- 3 Cavernous sinus
- 4 Confluence of venous sinuses (torcular Herophili)
- 5 Great cerebral vein of Galen
- 6 Inferior sagittal sinus
- 7 Internal cerebral vein
- 8 Internal jugular vein
- 9 Sigmoid sinus
- 10 Sphenoparietal sinus
- 11 Straight sinus
- 12 Superficial cerebral veins
- 13 Superior sagittal sinus
- 14 Thalamostriate vein
- 15 Transverse sinus
- 16 Vein of Labbé
- 17 Vein of Trolard
- 18 Venous angle



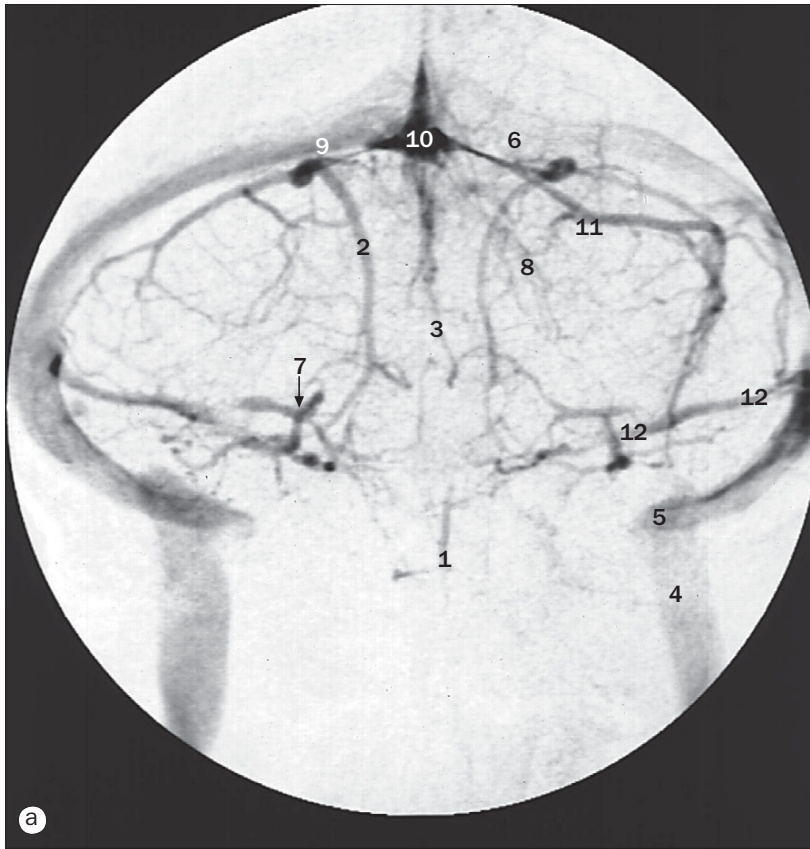
(a) Digitally subtracted arterial phase of vertebral arteriogram, anteroposterior projection.

- 1 Anterior inferior cerebellar artery
- 2 Anterior spinal artery
- 3 Basilar artery
- 4 Calcarine artery
- 5 Hemispheric branch of superior cerebellar artery
- 6 Inferior temporal artery
- 7 Medullary segment of posterior inferior cerebellar artery
- 8 Parieto-occipital artery
- 9 Posterior cerebral artery in ambient cistern
- 10 Posterior cerebral artery in interpeduncular cistern
- 11 Posterior inferior cerebellar artery
- 12 Quadrigeminal portion of posterior cerebral artery
- 13 Site of junction with posterior communicating artery
- 14 Superior cerebellar arteries behind brainstem
- 15 Superior cerebellar artery
- 16 Thalamoperforating branches of superior cerebellar artery
- 17 Vermian branch of superior cerebellar artery
- 18 Vertebral artery exiting transverse foramen of atlas (first cervical vertebra)



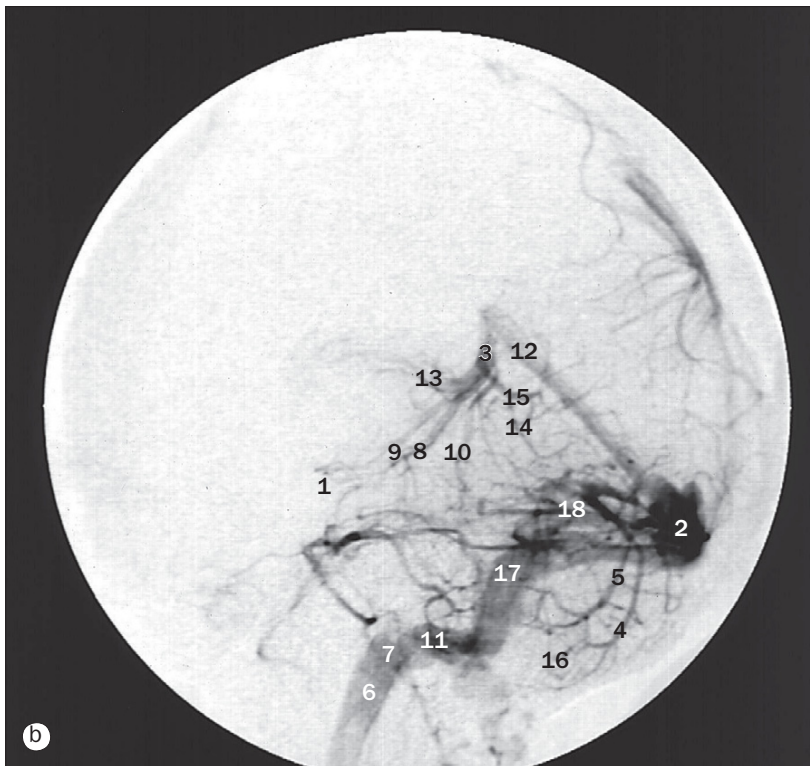
(b) Digitally subtracted arterial phase of vertebral arteriogram, lateral projection.

- 1 Anterior inferior cerebellar artery
- 2 Anterior medullary segment of posterior inferior cerebellar artery
- 3 Basilar artery
- 4 Calcarine artery
- 5 Hemispheric branches of posterior inferior cerebellar artery
- 6 Inferior vermian segment of posterior inferior cerebellar artery
- 7 Lateral medullary segment of posterior inferior cerebellar artery
- 8 Meningeal branch of vertebral artery
- 9 Origin of posterior inferior cerebellar artery
- 10 Parieto-occipital artery
- 11 Posterior cerebral artery
- 12 Posterior choroidal branches of posterior cerebral artery
- 13 Posterior medullary segment of posterior inferior cerebellar artery
- 14 Posterior temporal artery
- 15 Retrotentorial segment of posterior inferior cerebellar artery
- 16 Splenic branches of posterior cerebral artery
- 17 Superior cerebellar artery
- 18 Supratentorial segment of posterior inferior cerebellar artery
- 19 Thalamoperforate branches of posterior cerebral artery
- 20 Vertebral artery
- 21 Vertebral artery exiting transverse foramen of atlas (first cervical vertebra)



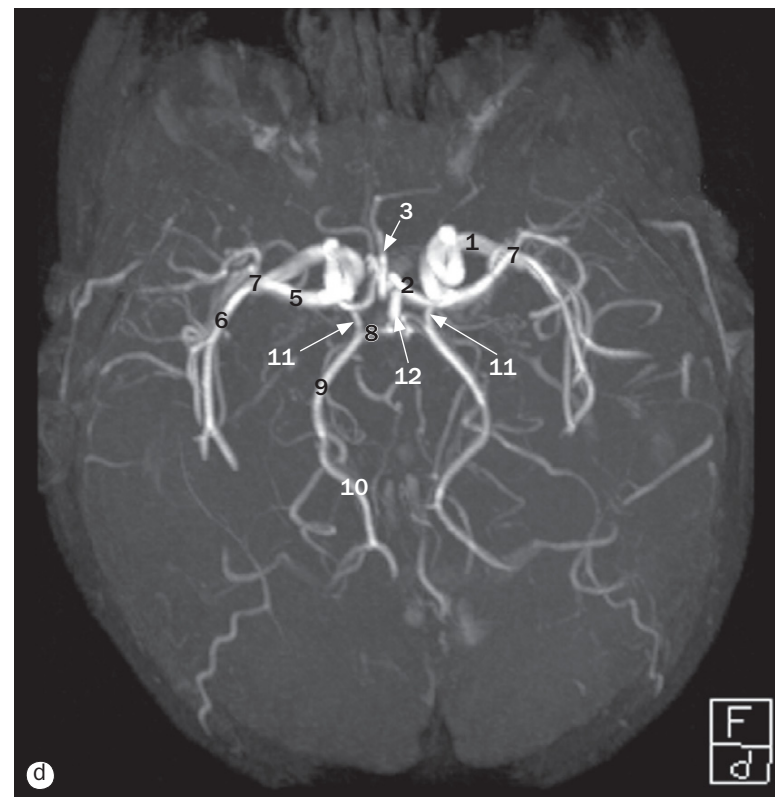
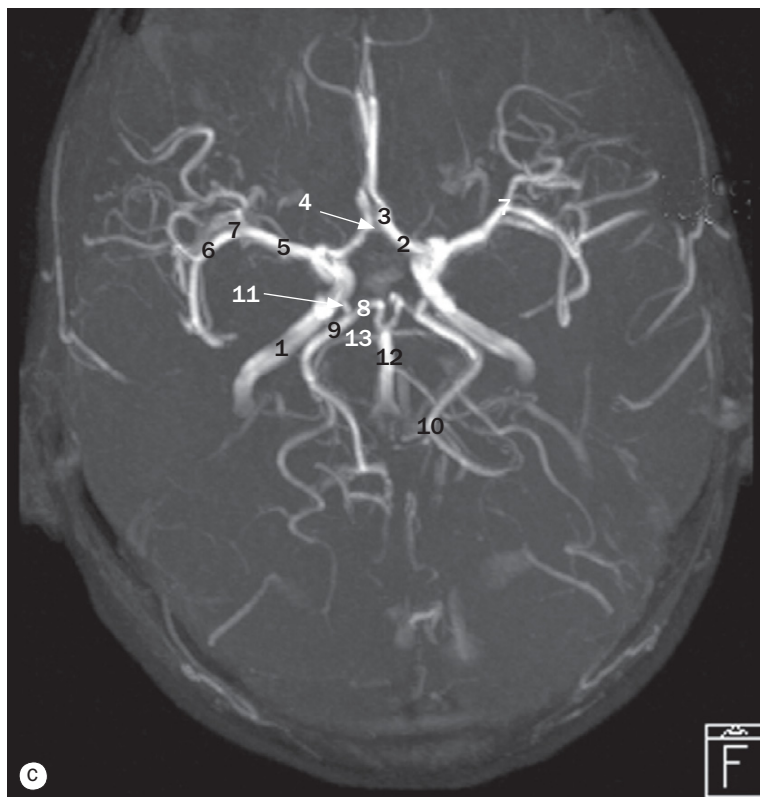
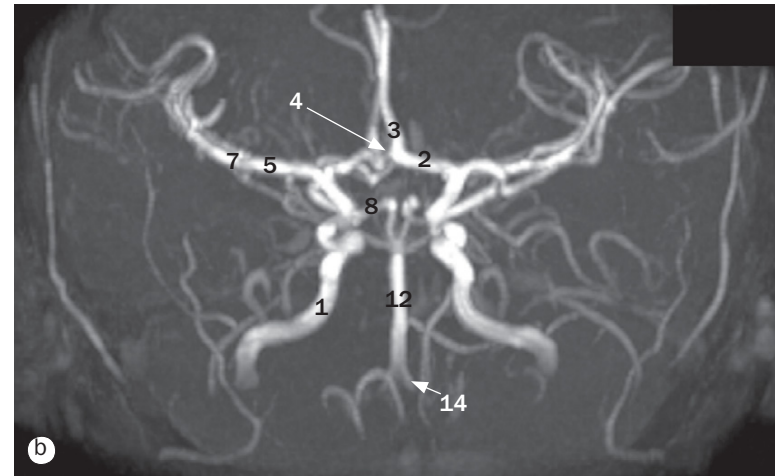
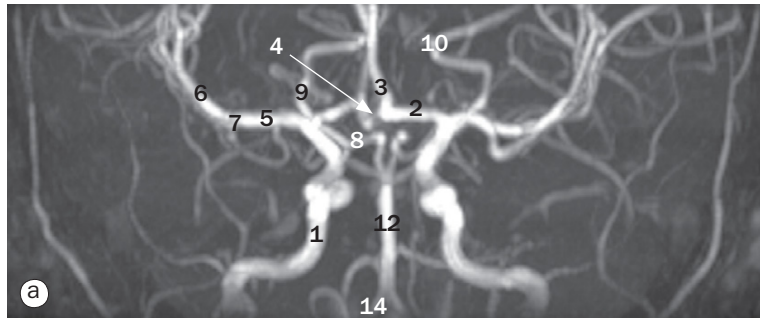
(a) Digitally subtracted venous phase of vertebral arteriogram, anteroposterior projection.

- 1 Anterior pontomesencephalic vein
- 2 Inferior hemispheric vein
- 3 Inferior vermian vein
- 4 Internal jugular vein
- 5 Jugular bulb
- 6 Left transverse sinus
- 7 Petrosal vein
- 8 Posterior mesencephalic vein
- 9 Right transverse sinus
- 10 Straight sinus
- 11 Superior hemispheric vein
- 12 Superior petrosal sinus



(b) Digitally subtracted venous phase of vertebral arteriogram, lateral projection.

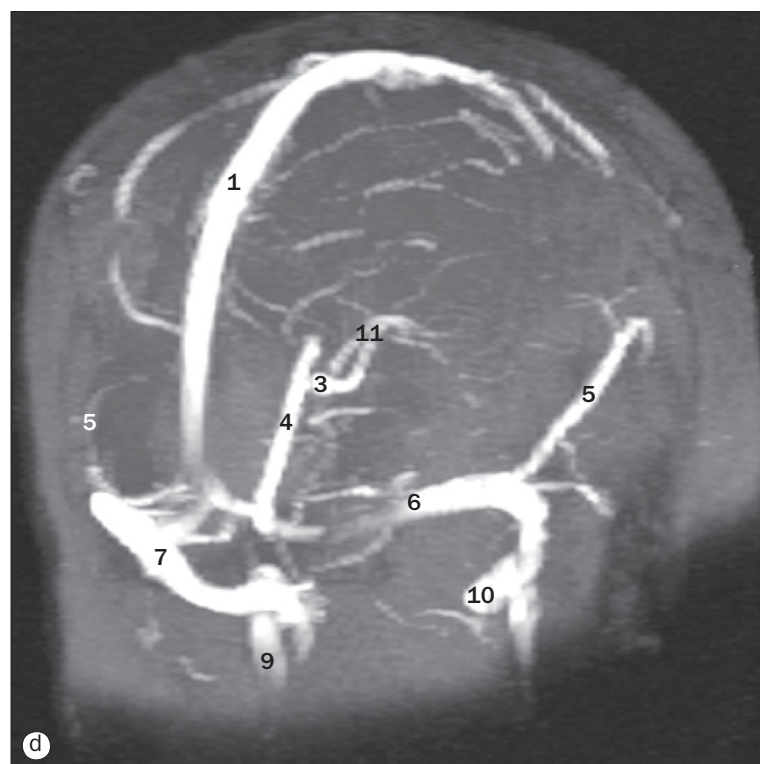
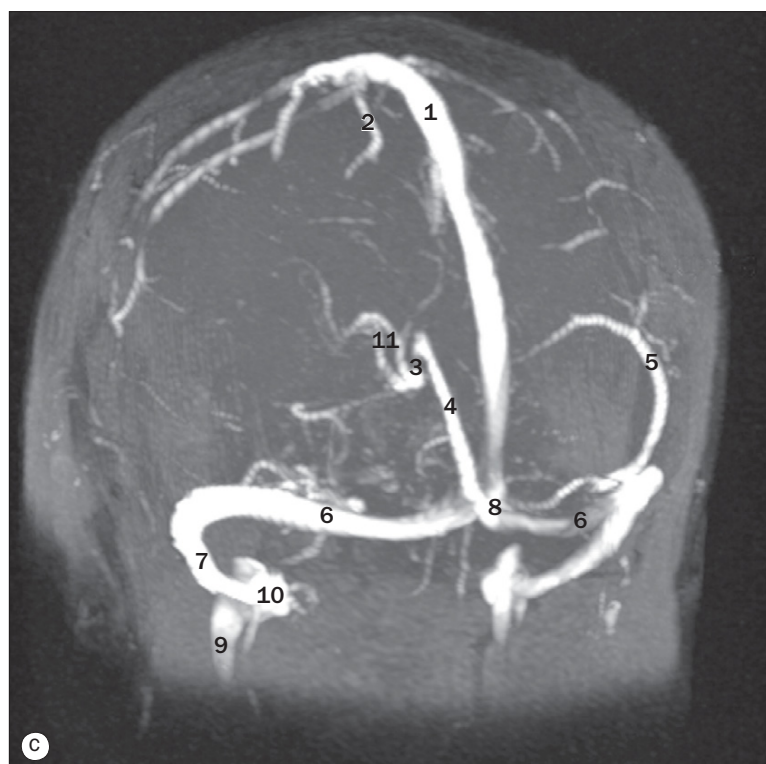
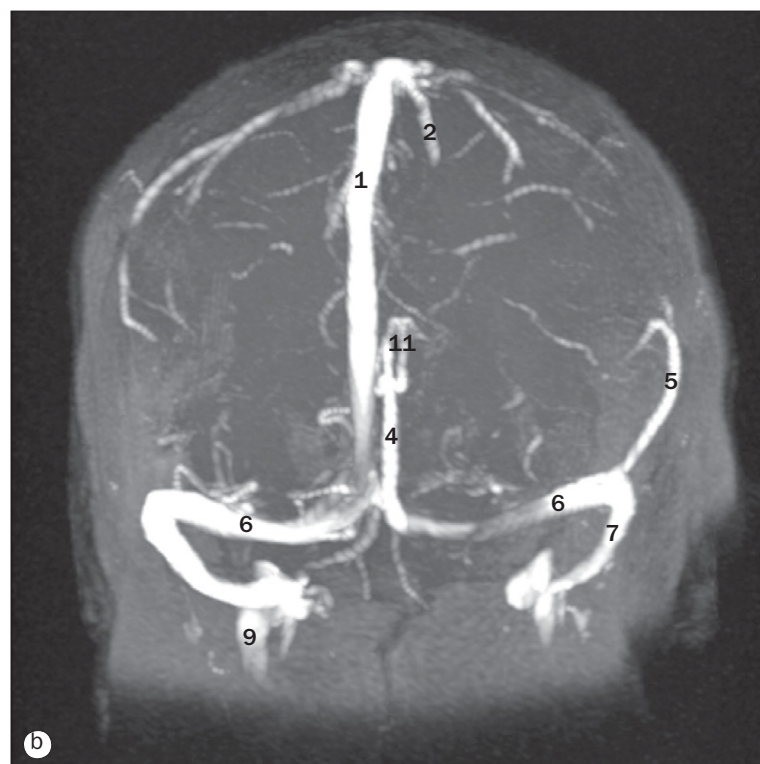
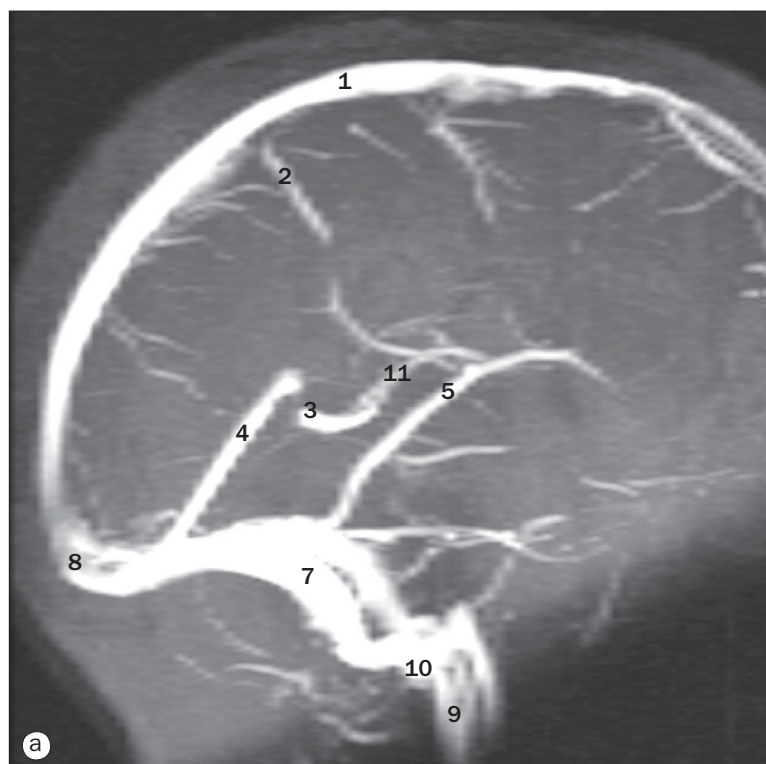
- 1 Anterior pontomesencephalic vein
- 2 Confluence of venous sinuses (torcular Herophili)
- 3 Great cerebral vein of Galen
- 4 Inferior hemispheric vein
- 5 Inferior vermian vein
- 6 Internal jugular vein
- 7 Jugular bulb
- 8 Lateral mesencephalic vein
- 9 Posterior mesencephalic vein
- 10 Precentral cerebellar vein
- 11 Sigmoid sinus
- 12 Straight sinus
- 13 Superior choroidal vein
- 14 Superior hemispheric vein
- 15 Superior vermian vein
- 16 Tonsillar vein
- 17 Transverse sinus
- 18 Vein of the great horizontal fissure



MR angiograms of the Circle of Willis, (a) and (b) coronal, (c) and (d) axial.

- 1 Internal carotid artery
- 2 Horizontal (A1) anterior cerebral artery (ACA) segment
- 3 Vertical (A2) ACA segment
- 4 Anterior communicating artery
- 5 Horizontal (M1) middle cerebral artery (MCA) segment
- 6 Insular (M2) MCA segment
- 7 MCA genu (bifurcation)

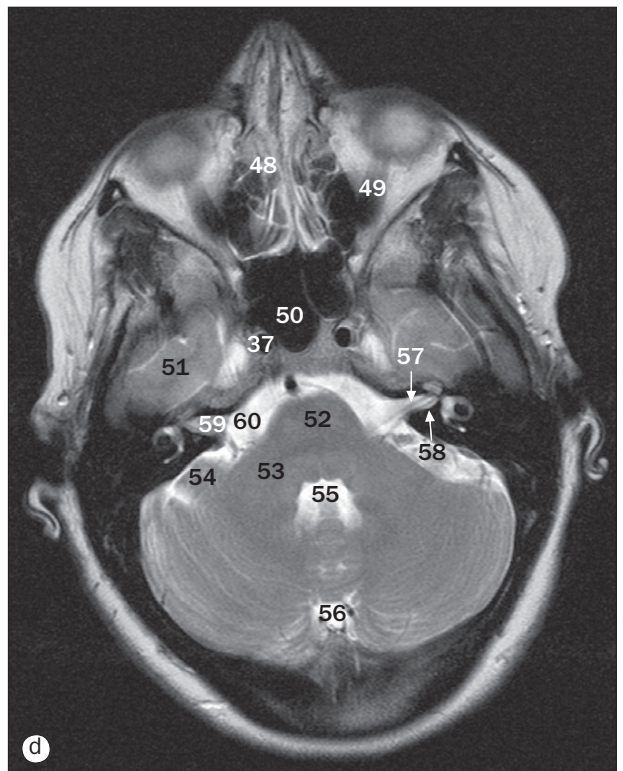
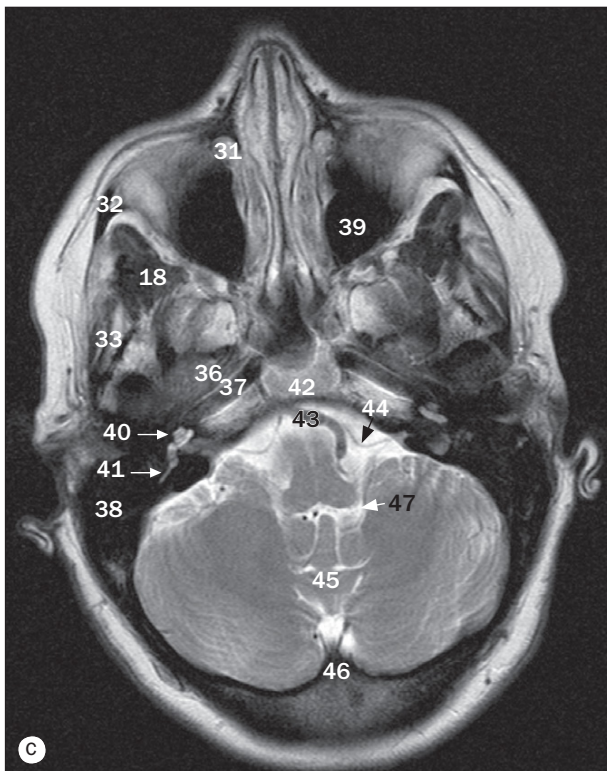
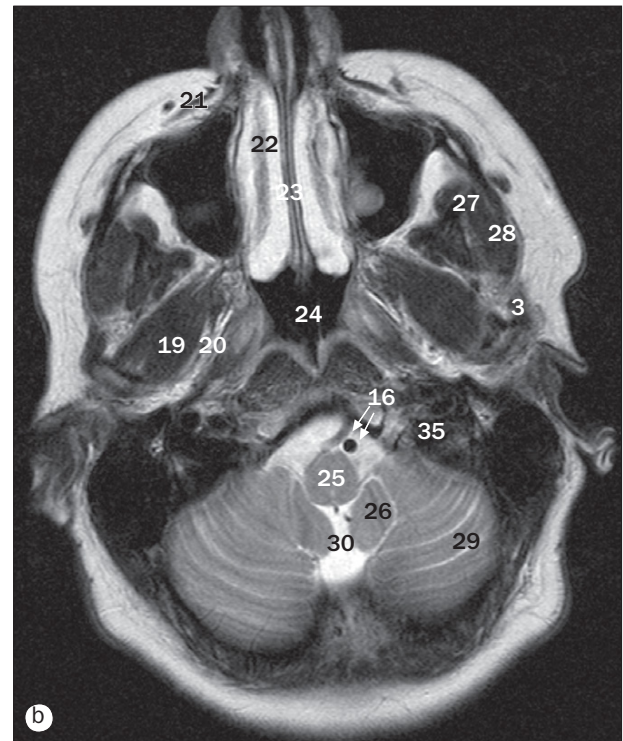
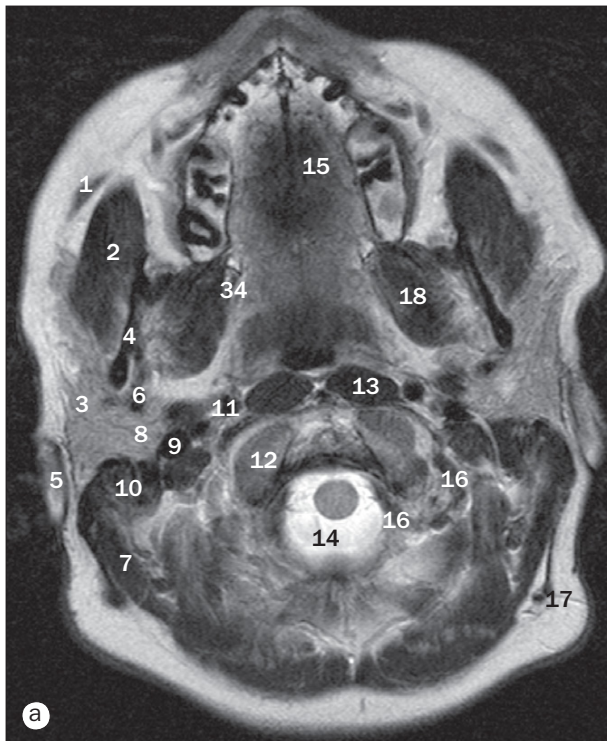
- 8 Precommunicating (P1) posterior cerebral artery (PCA) segment
- 9 Ambient (P2) PCA segment
- 10 Quadrigeminal (P3) PCA segment
- 11 Posterior communicating artery
- 12 Basilar artery
- 13 Superior cerebellar artery
- 14 Vertebral artery



MR images of the venous circulation, (a) lateral view, (b) frontal view, (c) left posterior oblique view, (d) right posterior oblique view.

- 1 Superior sagittal sinus
- 2 Superficial cerebral veins
- 3 Vein of Galen
- 4 Straight sinus
- 5 Vein of Labbe'
- 6 Transverse sinus

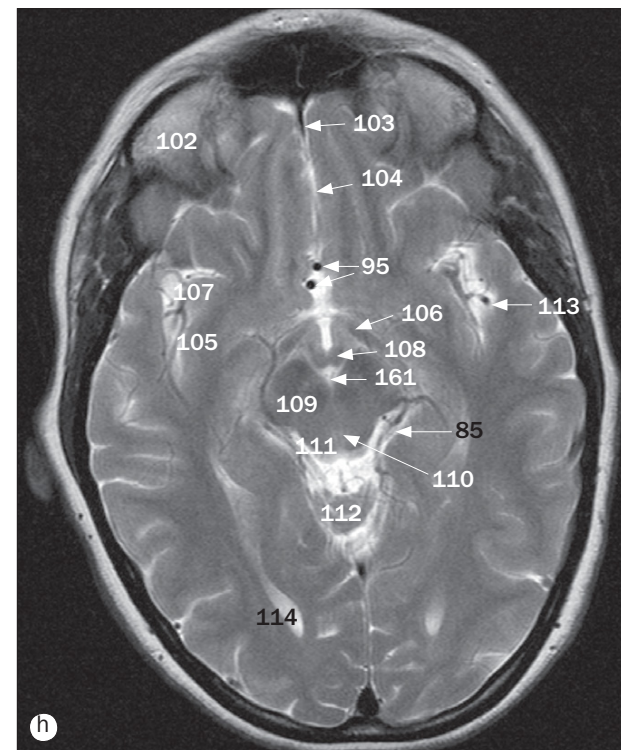
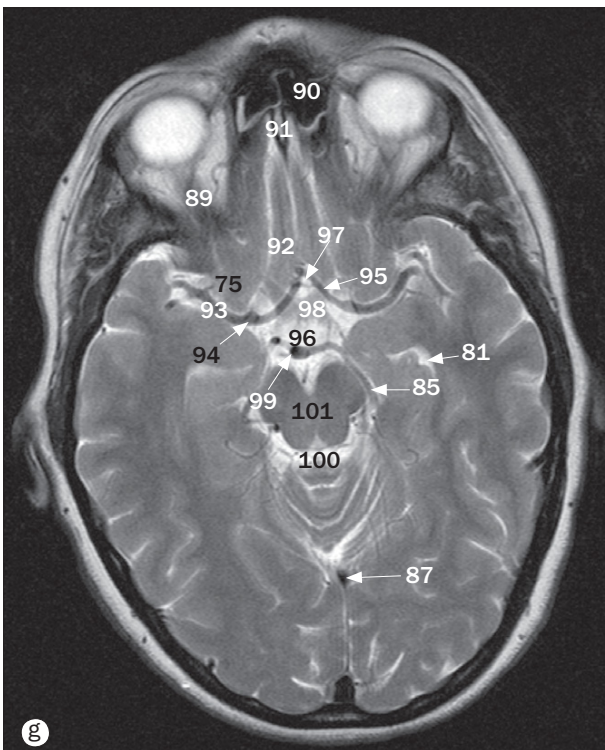
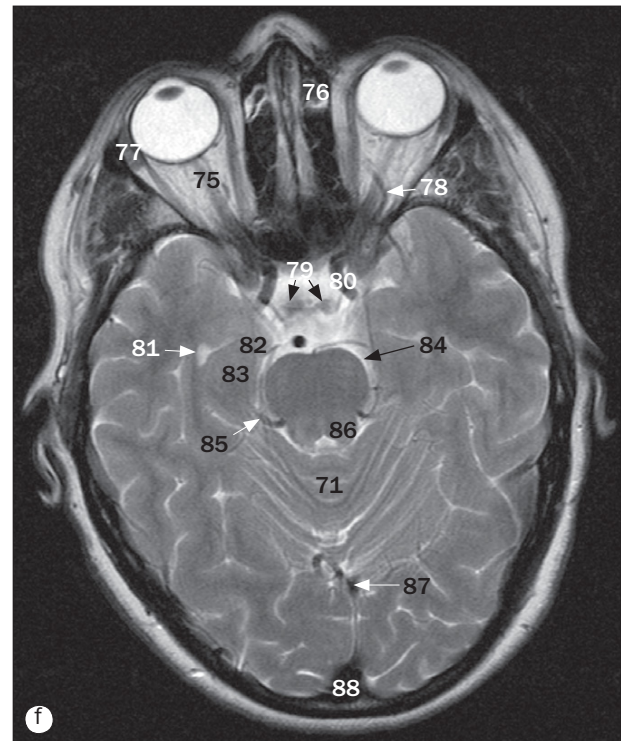
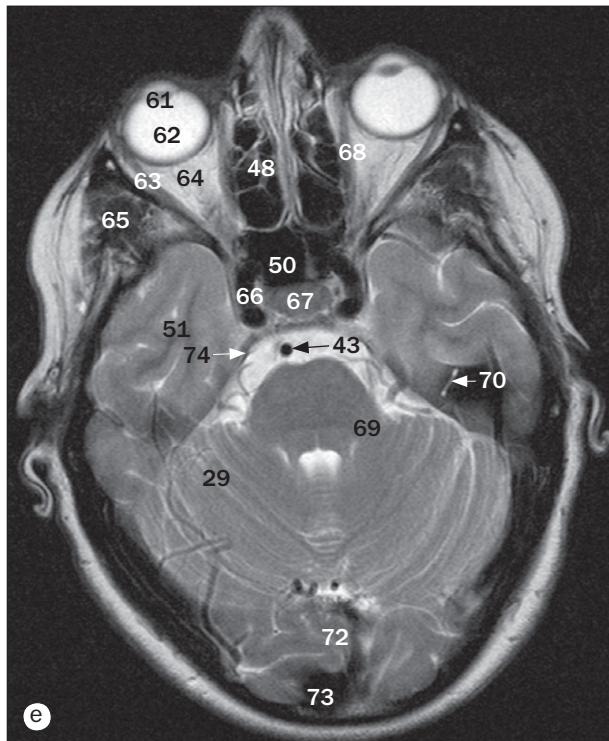
- 7 Sigmoid sinus
- 8 Sinus confluence (torcular Herophilli)
- 9 Internal jugular vein
- 10 Jugular bulb
- 11 Internal cerebral vein



(a)–(n) Brain axial T2 images, from inferior to superior.

- | | | | |
|------------------------------------|----------------------------|-----------------------------|-----------------------------------|
| 1 Parotid duct | 9 Internal jugular vein | 17 Occipital vessels | 24 Nasopharynx |
| 2 Masseter muscle | 10 Mastoid process | 18 Medial pterygoid muscle | 25 Medulla oblongata |
| 3 Parotid gland (superficial lobe) | 11 Internal carotid artery | 19 Lateral pterygoid muscle | 26 Cerebellar tonsil |
| 4 Ramus of mandible | 12 Occipital condyle | 20 Lateral pterygoid plate | 27 Coronoid process of mandible |
| 5 Pinna of ear | 13 Longus capitis muscle | 21 Levator labii superioris | 28 Temporalis muscle |
| 6 Retromandibular vein | 14 Foramen magnum | alaeque nasi muscle | 29 Folia of cerebellar hemisphere |
| 7 Sternocleidomastoid muscle | 15 Hard palate | 22 Inferior turbinate | 30 Foramen of Magendie |
| 8 Parotid gland (deep lobe) | 16 Vertebral artery | 23 Nasal septum | |

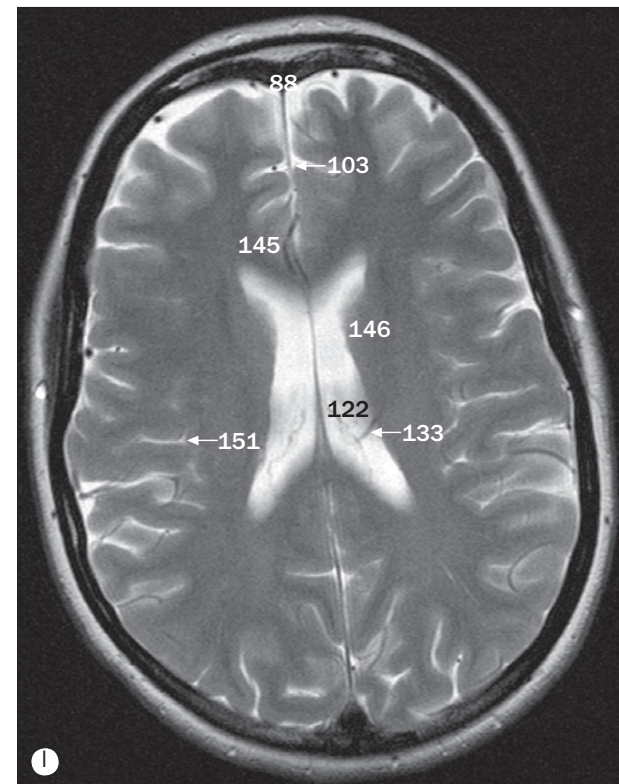
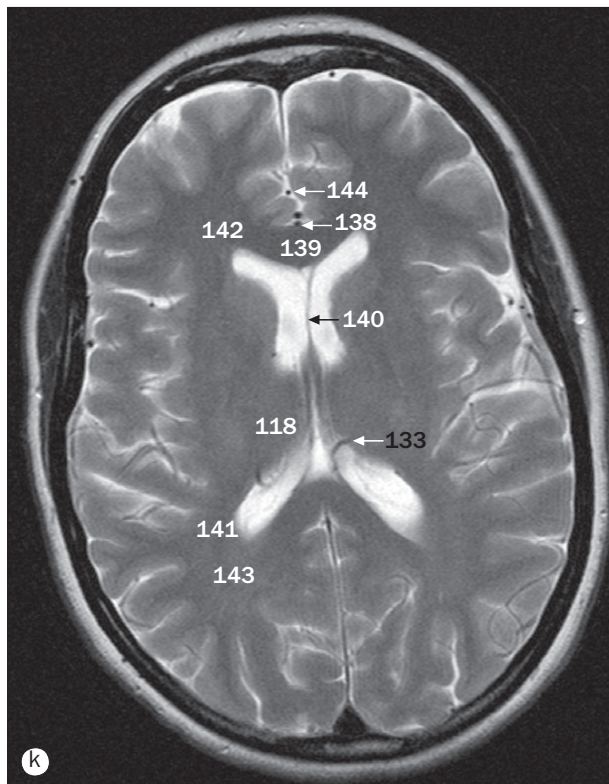
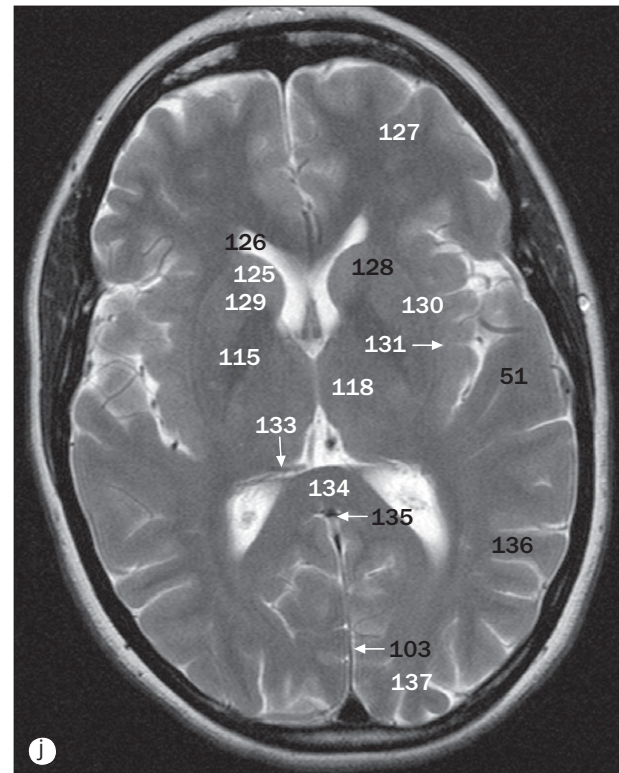
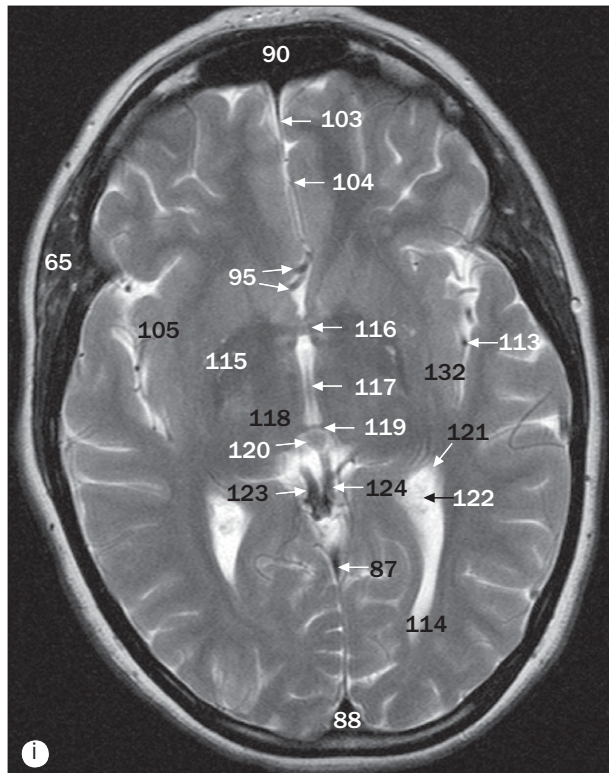
Numbers 1–161 are common to pages 42–45.



(a)–(n) Brain axial T2 images, from inferior to superior.

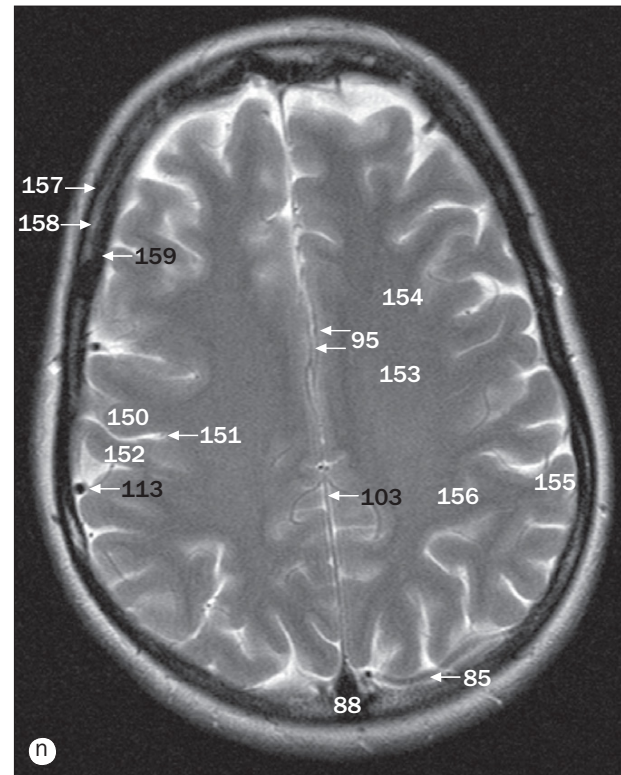
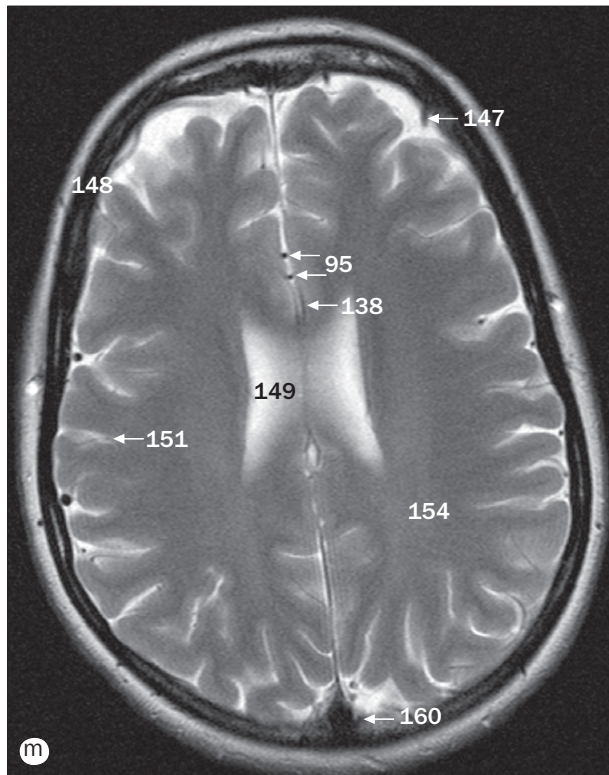
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|-----------------------------|--|---------------------------------------|---|
| 31 Nasolacrimal duct | 40 Cochlear | 48 Ethmoid air cells | 56 Cisterna magna |
| 32 Zygomatic arch | 41 Posterior semicircular canal | 49 Inferior rectus muscle | 57 Facial nerve (seventh cranial nerve) |
| 33 Head of mandible | 42 Clivus | 50 Sphenoid sinus | 58 Vestibulocochlear nerve (eighth cranial nerve) |
| 34 Medial pterygoid plate | 43 Basilar artery | 51 Temporal lobe | 59 Internal auditory meatus |
| 35 Jugular foramen | 44 Labyrinthine artery | 52 Pons | 60 Cerebellopontine angle |
| 36 Petrous temporal bone | 45 Inferior cerebellar vermis | 53 Middle cerebellar peduncle | |
| 37 Internal carotid artery | 46 Inion (internal occipital protuberance) | 54 Flocculonodular lobe of cerebellum | |
| 38 Mastoid air cells | 47 Foramen of Lushka | 55 Fourth ventricle | |
| 39 Maxillary sinus (antrum) | | | |

Numbers 1–161 are common to pages 42–45.



(a)–(n) Brain axial T2 images, from inferior to superior.

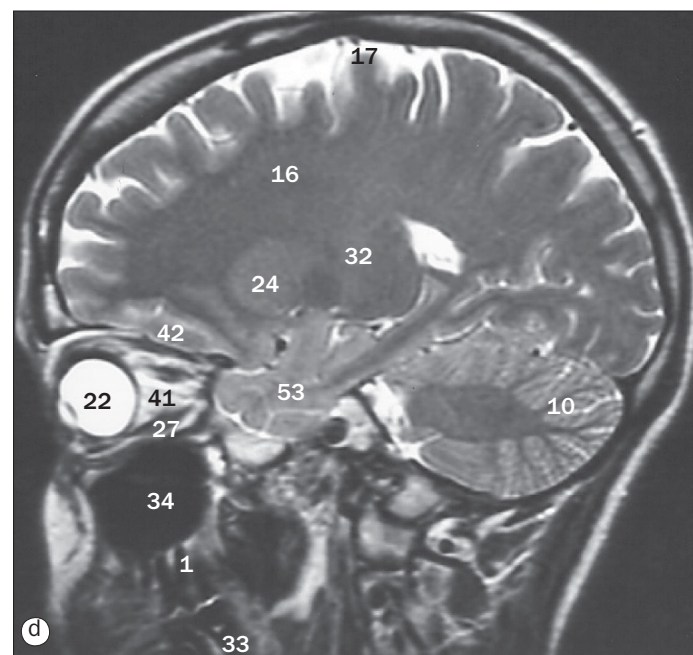
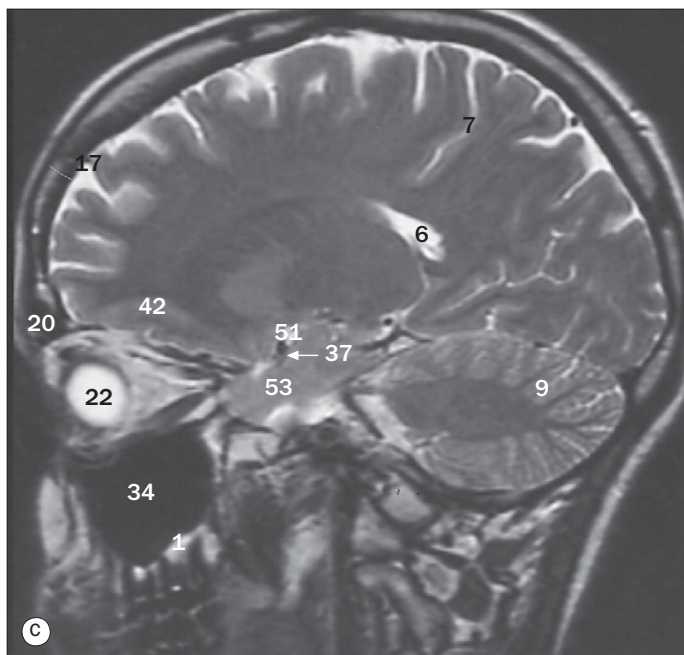
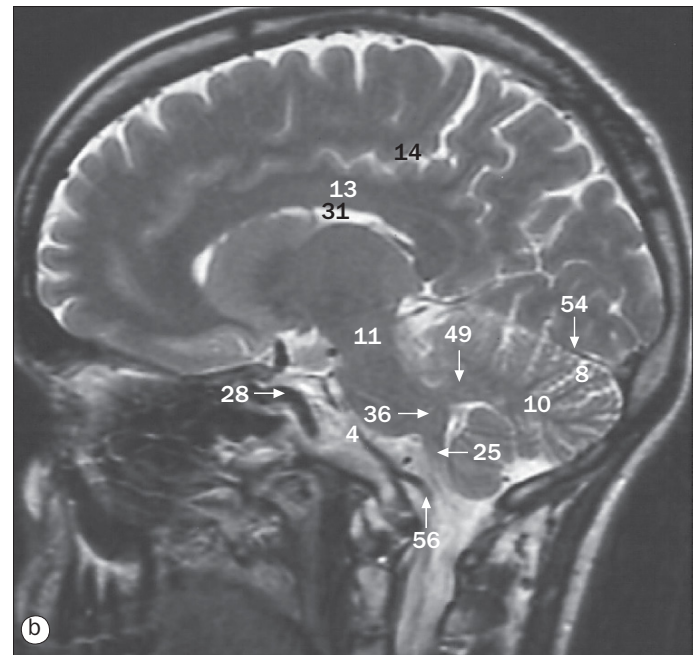
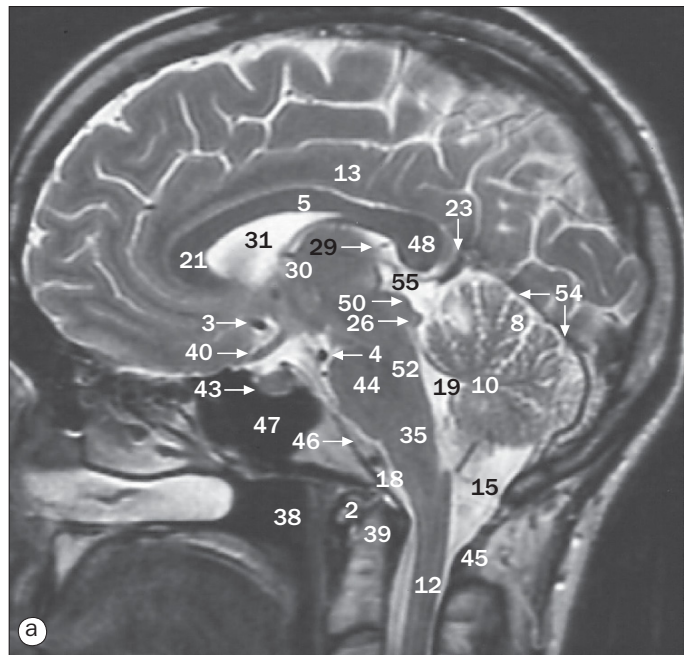
- | | | | |
|---|---------------------------------------|---|--|
| 61 Lens | 67 Body of sphenoid | 73 Torcula herophili (confluence of venous sinuses) | 78 Superior ophthalmic vein |
| 62 Vitreous humour | 68 Medial rectus muscle | 74 Petroclinoid ligament | 79 Pituitary gland |
| 63 Lateral rectus muscle | 69 Superior cerebellar peduncle | 75 Optic nerve (second cranial nerve) | 80 Internal carotid artery (supraclinoid part) |
| 64 Retro-orbital fat | 70 Superior semicircular canal | 76 Infundibulum of frontal sinus | 81 Temporal horn of lateral ventricle |
| 65 Temporalis muscle | 71 Superior cerebellar vermis | 77 Lacrimal gland | 82 Uncus of temporal lobe |
| 66 Internal carotid artery (cavernous part) | 72 Calcarine cortex of occipital lobe | | |



(a)–(n) Brain axial T2 images, from inferior to superior.

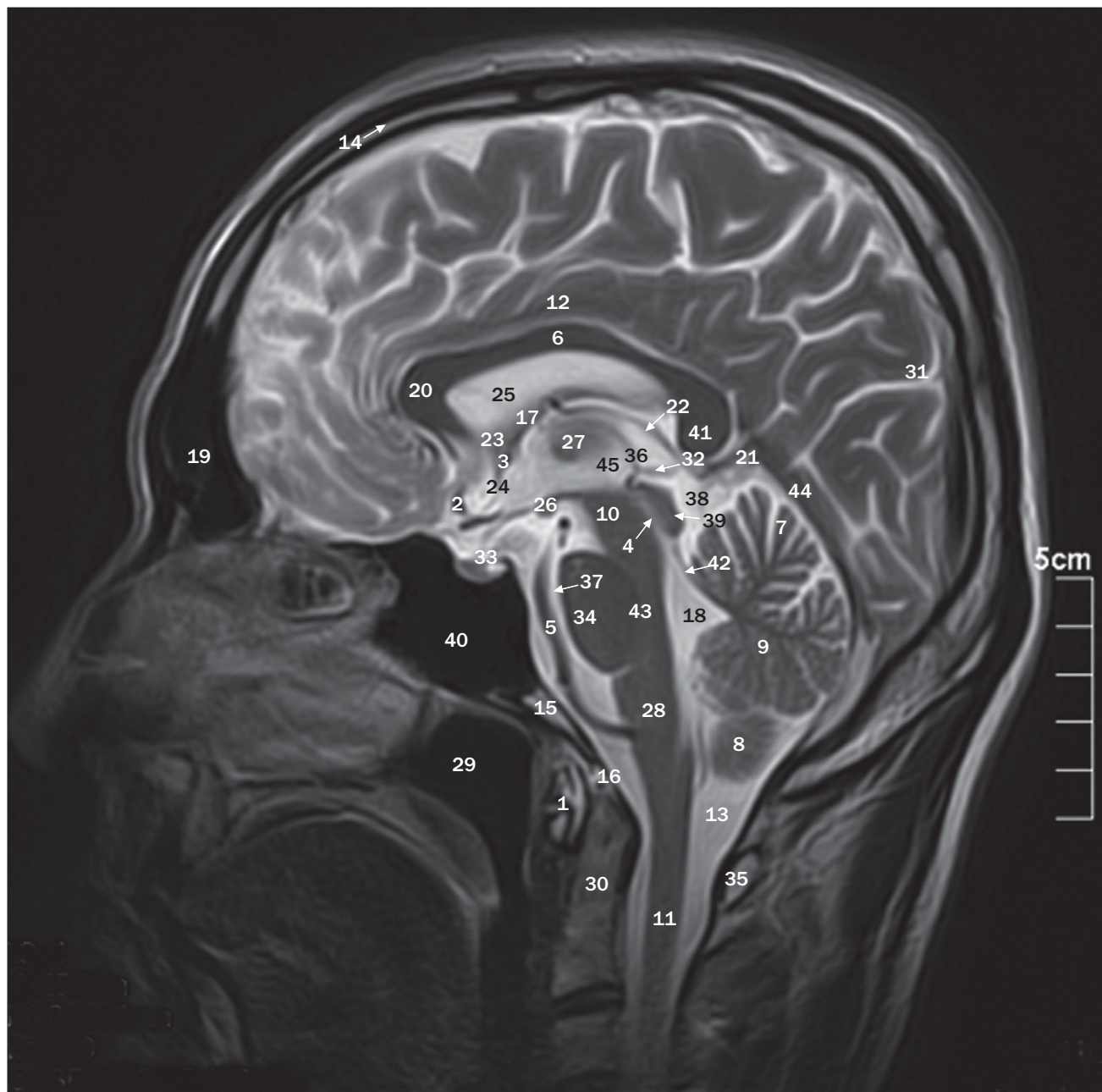
- | | | | |
|---|--|---------------------------------------|--|
| 83 Hippocampus | 103 Falx cerebri | 121 Trigone of lateral ventricle | 140 Septum pellucidum |
| 84 Ambient cistern | 104 Interhemispheric fissure | 122 Choroid plexus | 141 Optic radiation |
| 85 Posterior cerebral artery | 105 Insular gyri | 123 Basal vein (of Rosenthal) | 142 Forceps minor |
| 86 Inferior colliculus | 106 Optic tract | 124 Internal cerebral vein (of Galen) | 143 Forceps major |
| 87 Straight sinus | 107 Sylvian fissure (lateral sulcus) | 125 Head of caudate nucleus | 144 Frontopolar artery |
| 88 Superior sagittal sinus | 108 Mamillary body (of hypothalamus) | 126 Frontal horn of lateral ventricle | 145 Cingulate gyrus |
| 89 Superior rectus muscle | 109 Cerebral peduncle | 127 Frontal lobe | 146 Body of caudate nucleus |
| 90 Frontal sinus | 110 Aqueduct of Sylvius | 128 Anterior limb of internal capsule | 147 Cortical vein |
| 91 Crista galli | 111 Superior colliculus | 129 Globus pallidus | 148 Calvarium of skull |
| 92 Olfactory nerve (first cranial nerve) | 112 Folia of cerebellum | 130 Putamen | 149 Body (atrium) of lateral ventricle |
| 93 Middle cerebral artery | 113 Middle cerebral artery (second order branch) | 131 External capsule | 150 Precentral gyrus |
| 94 Bifurcation of internal carotid artery | 114 Occipital horn of lateral ventricle | 132 Claustrum | 151 Central sulcus of Rolando |
| 95 Anterior cerebral artery | 115 Posterior limb of internal capsule | 133 Choroidal vessels | 152 Post central gyrus |
| 96 Suprasellar cistern | 116 Anterior commissure | 134 Splenium of corpus callosum | 153 Centrum semiovale |
| 97 Anterior communicating artery | 117 Third ventricle | 135 Inferior sagittal sinus | 154 Corona radiata |
| 98 Optic chiasma | 118 Thalamus | 136 Parietal lobe | 155 Grey matter |
| 99 Basilar artery bifurcation | 119 Posterior commissure | 137 Occipital lobe | 156 White matter |
| 100 Quadrigeminal cistern | 120 Pineal gland | 138 Callosomarginal artery | 157 Outer table of calvarium |
| 101 Midbrain (mesencephalon) | | 139 Genu of corpus callosum | 158 Diploe |
| 102 Orbital plate of frontal bone | | | 159 Inner table of calvarium |
| | | | 160 Arachnoid granulation |
| | | | 161 Interpeduncular cistern |

Numbers 1–161 are common to pages 42–45.



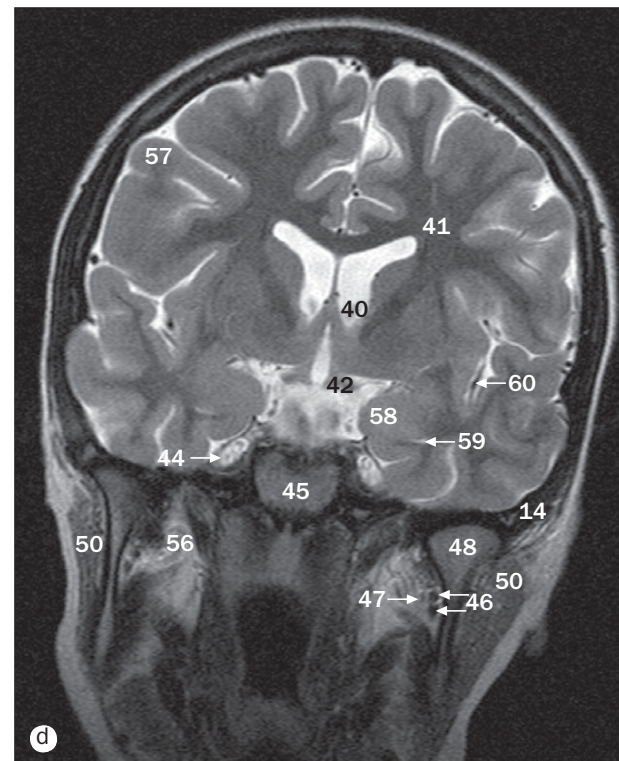
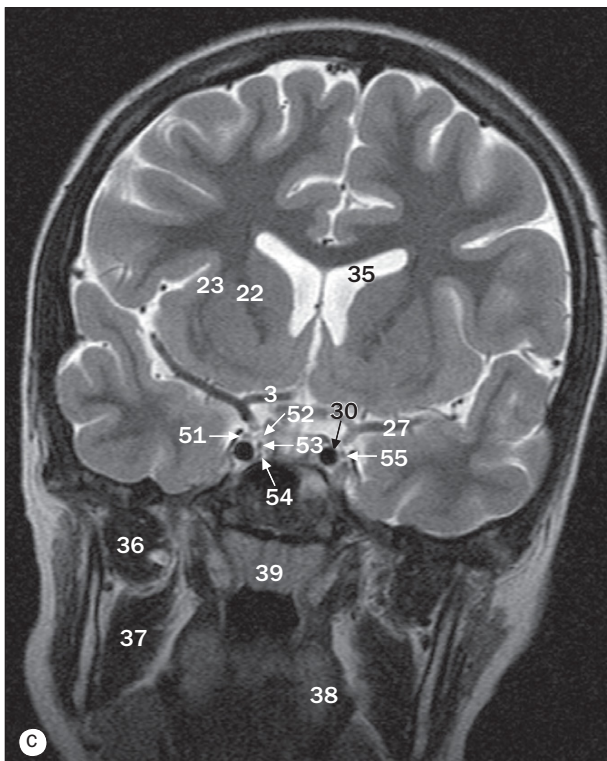
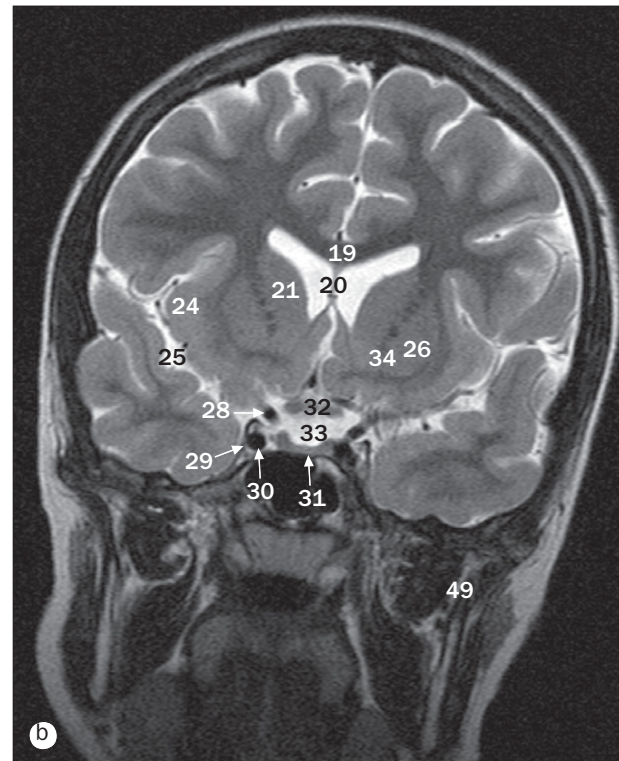
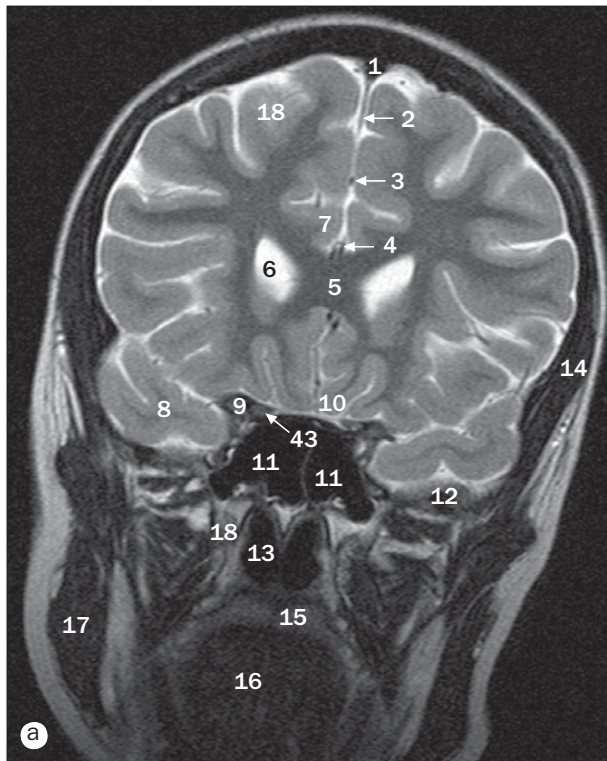
(a)–(d) Brain, sagittal MR images.

- | | | | |
|--|---|---|-----------------------------------|
| 1 Alveolar ridge | 15 Cisterna magna | 29 Internal cerebral vein | 42 Orbital cortex of frontal lobe |
| 2 Anterior arch of atlas (first cervical vertebra) | 16 Corona radiata | 30 Interventricular foramen of Monro | 43 Pituitary gland |
| 3 Anterior cerebral artery | 17 Cortical vein | 31 Lateral ventricle | 44 Pons |
| 4 Basilar artery | 18 Foramen magnum | 32 Lentiform nucleus | 45 Posterior arch of atlas |
| 5 Body of corpus callosum | 19 Fourth ventricle | 33 Mandible | 46 Prepontine cistern |
| 6 Body of lateral ventricle | 20 Frontal sinus | 34 Maxillary sinus (antrum) | 47 Sphenoidal sinus |
| 7 Central sulcus of Rolando | 21 Genu of corpus callosum | 35 Medulla oblongata | 48 Splenium of corpus callosum |
| 8 Cerebellar folia | 22 Globe | 36 Middle cerebellar peduncle | 49 Superior cerebellar peduncle |
| 9 Cerebellar hemisphere | 23 Great cerebral vein of Galen | 37 Middle cerebral artery | 50 Superior colliculus |
| 10 Cerebellum | 24 Head of caudate nucleus | 38 Nasopharynx | 51 Sylvian fissure |
| 11 Cerebral peduncle | 25 Inferior cerebellar peduncle | 39 Odontoid process (dens) | 52 Tegmentum of pons |
| 12 Cervical spinal cord | 26 Inferior colliculus | 40 Optic chiasma in suprasellar cistern | 53 Temporal lobe of brain |
| 13 Cingulate gyrus | 27 Inferior rectus muscle | 41 Optic nerve | 54 Tentorium cerebelli |
| 14 Cingulate sulcus | 28 Internal carotid artery (in cavernous sinus) | | 55 Pineal gland |
| | | | 56 Vertebral artery |



Brain, sagittal MR midline image.

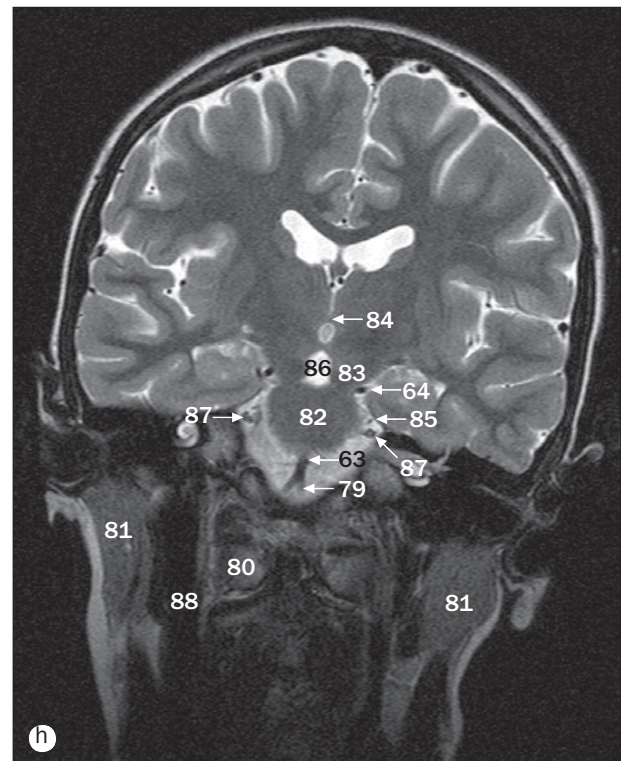
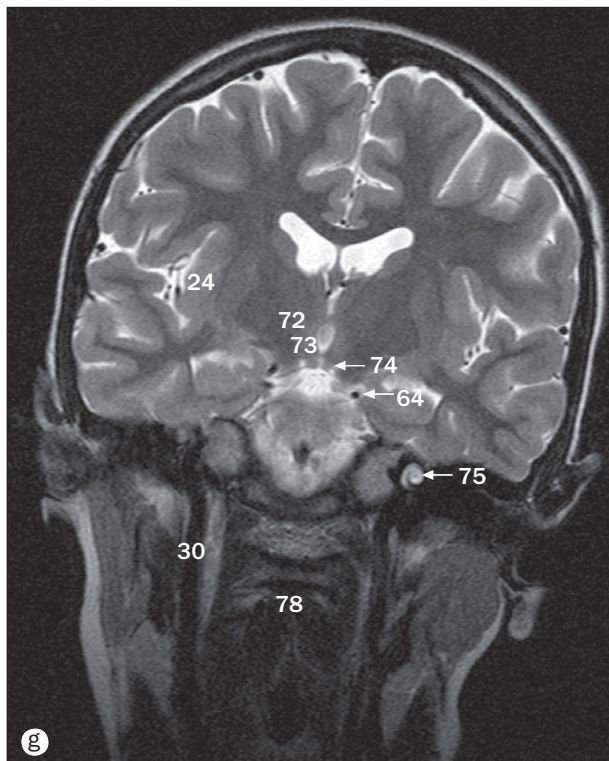
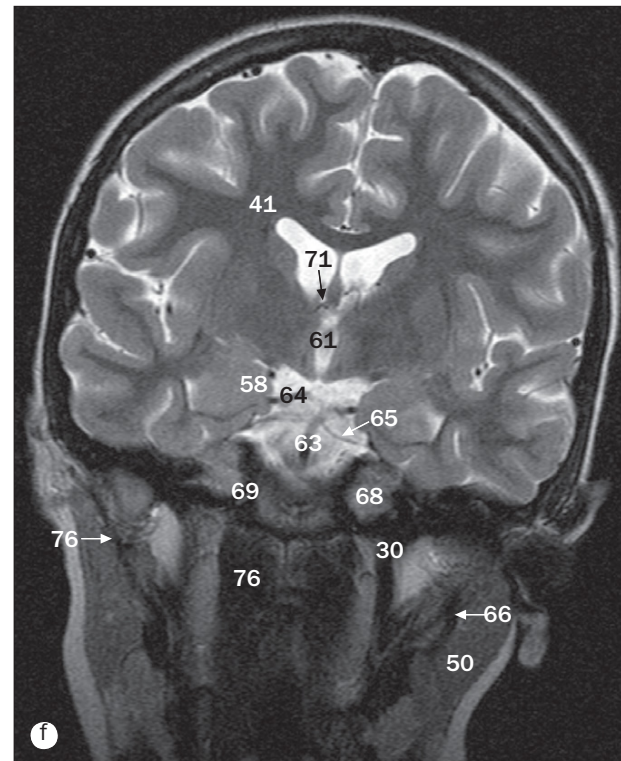
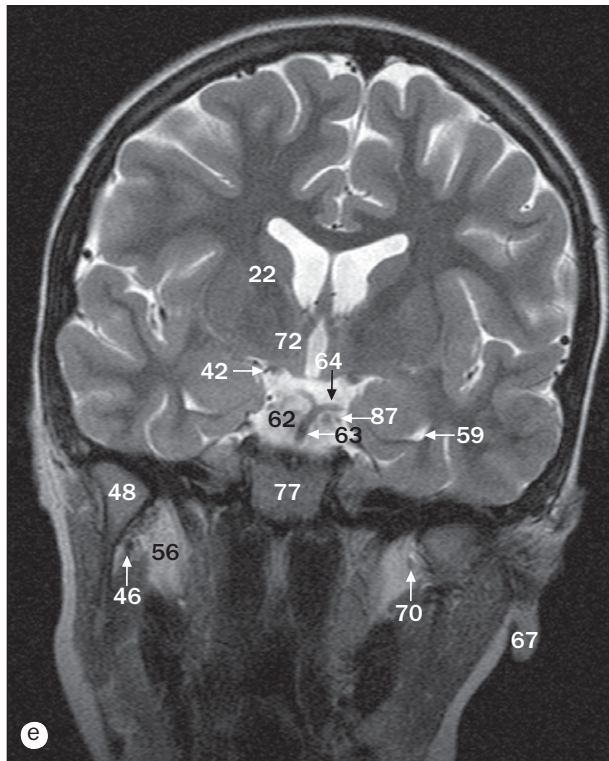
- | | | |
|--|--------------------------------------|---|
| 1 Anterior arch of atlas (first cervical vertebra) | 15 Fat in marrow of clivus | 31 Parieto-occipital fissure |
| 2 Anterior cerebral artery | 16 Foramen magnum | 32 Pineal gland |
| 3 Anterior commissure | 17 Fornix | 33 Pituitary gland |
| 4 Aqueduct of Sylvius | 18 Fourth ventricle | 34 Pons |
| 5 Basilar artery | 19 Frontal sinus | 35 Posterior arch of atlas |
| 6 Body of corpus callosum | 20 Genu of corpus callosum | 36 Posterior commissure |
| 7 Cerebellar folia | 21 Great cerebral vein of Galen | 37 Prepontine cistern |
| 8 Cerebellar tonsil | 22 Internal cerebral vein | 38 Quadrigeminal cistern |
| 9 Cerebellum | 23 Interventricular foramen of Monro | 39 Quadrigeminal plate (tectum) of midbrain |
| 10 Cerebral peduncle of midbrain | 24 Lamina terminalis | 40 Sphenoidal sinus |
| 11 Cervical spinal cord | 25 Lateral ventricle | 41 Splenium of corpus callosum |
| 12 Cingulate gyrus | 26 Mammillary body | 42 Superior medullary velum |
| 13 Cisterna magna (cerebellomedullary cistern) | 27 Massa intermedia of thalamus | 43 Tegmentum of pons |
| 14 Diploe of calvarium | 28 Medulla oblongata | 44 Tentorium cerebelli |
| | 29 Nasopharynx | 45 Third ventricle |
| | 30 Odontoid process (dens) | |



(a)–(p) Brain, coronal T2w MR images, from anterior to posterior.

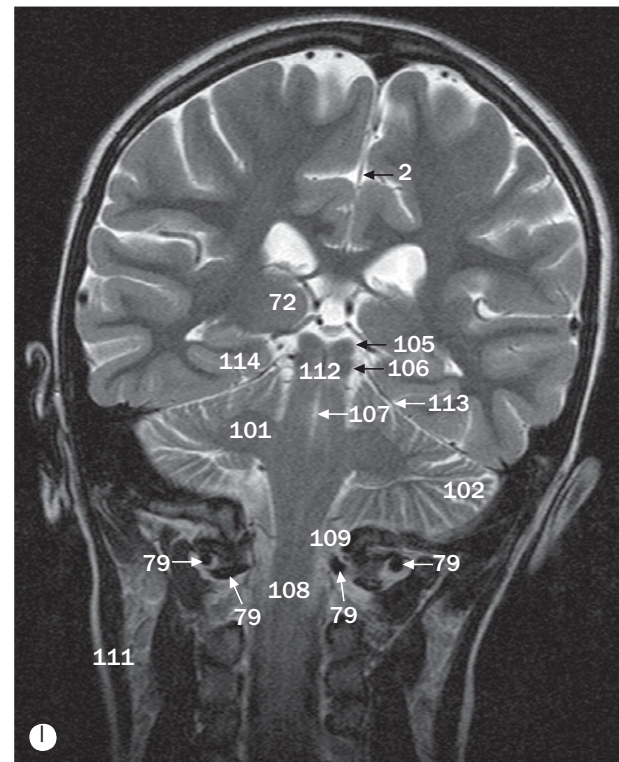
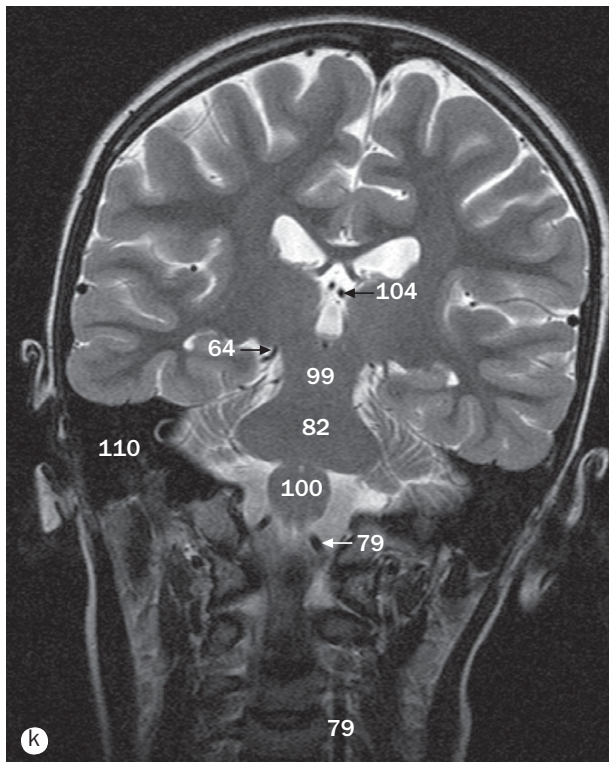
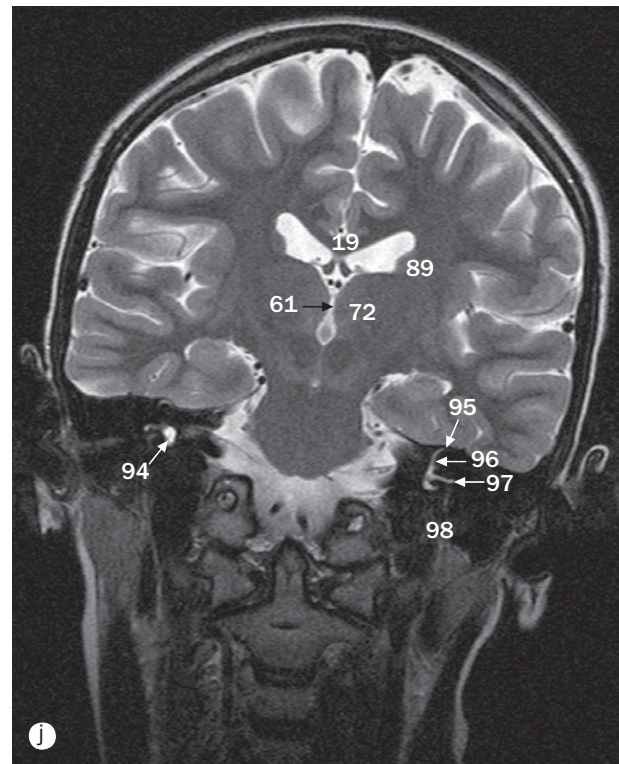
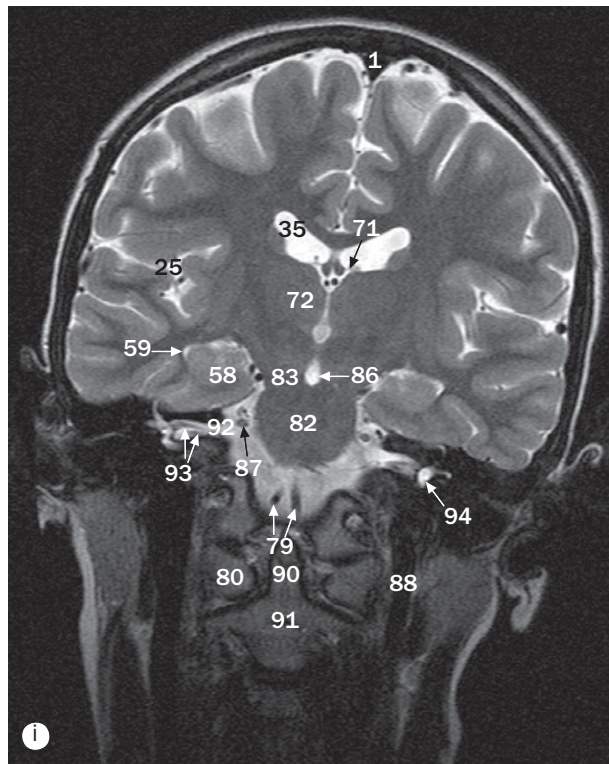
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|-------------------------------------|-----------------------------|--------------------------------------|---|
| 1 Superior sagittal sinus | 9 Anterior clinoid process | 18 Frontal lobe | 26 Putamen |
| 2 Falx cerebri | 10 Olfactory cortex | 19 Body of corpus callosum | 27 Middle cerebral artery |
| 3 Anterior cerebral artery | 11 Sphenoidal sinus | 20 Septum pellucidum | 28 Supraclinoid part of internal carotid artery |
| 4 Callosomarginal artery | 12 Greater wing of sphenoid | 21 Head of caudate nucleus | 29 Dural lateral wall of cavernous sinus |
| 5 Genu of corpus callosum | 13 Nasopharynx | 22 Anterior limb of internal capsule | 30 Internal carotid artery |
| 6 Frontal horn of lateral ventricle | 14 Temporalis muscle | 23 External capsule | 31 Pituitary gland |
| 7 Cingulate gyrus | 15 Hard palate | 24 Insula gyrus | 32 Optic chiasma |
| 8 Temporal lobe | 16 Oropharynx | 25 Sylvian fissure (lateral sulcus) | |
| | 17 Masseter muscle | | |

Numbers 1–130 are common to pages 48–51.



(a)–(p) Brain, coronal T2w MR images, from anterior to posterior.

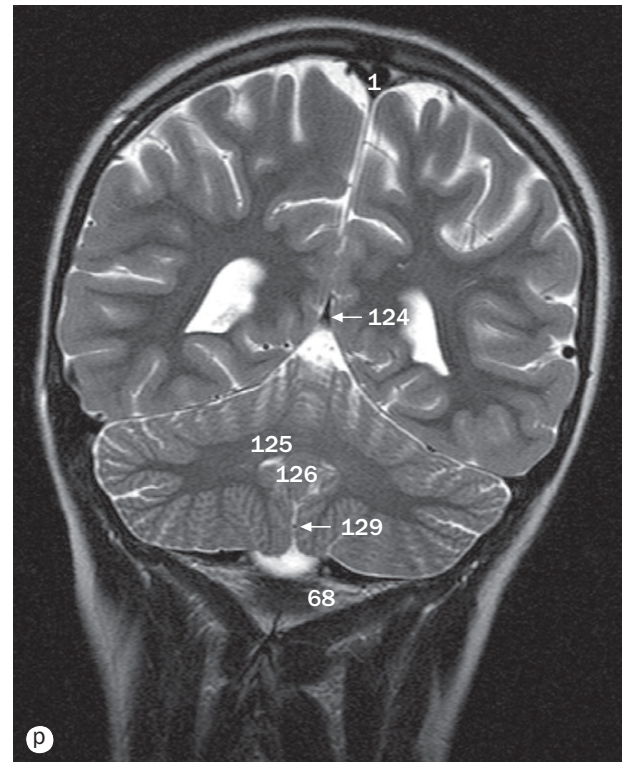
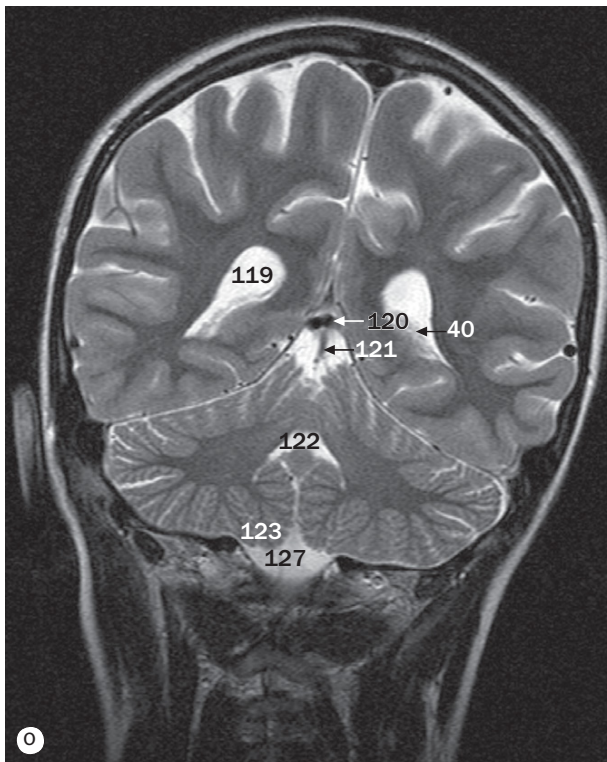
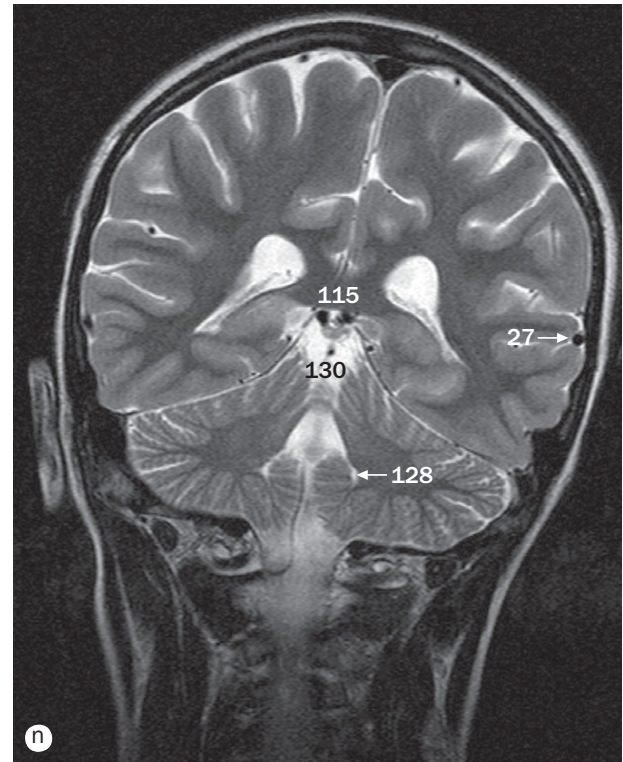
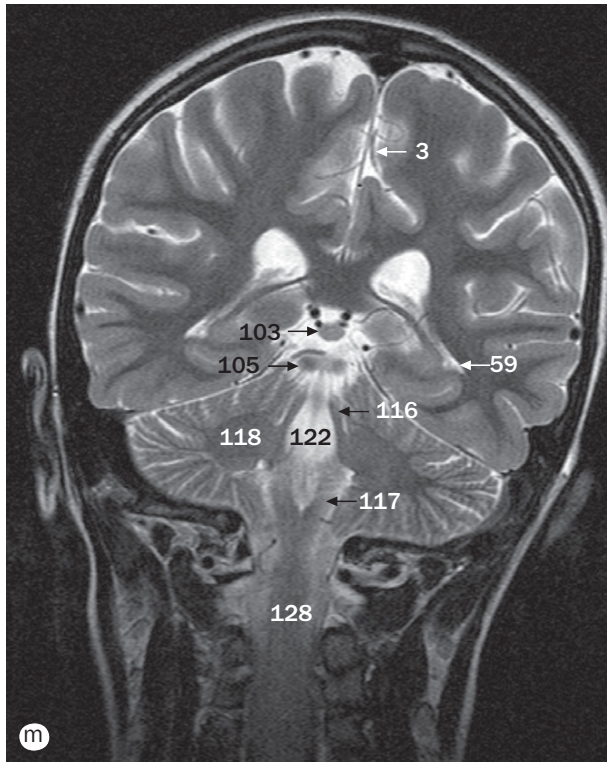
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|---------------------------------------|---|---|---|
| 33 Suprasellar cistern | 42 Optic tract | 50 Parotid gland | 55 Abducens nerve (sixth cranial nerve) |
| 34 Globus pallidus | 43 Optic nerve (second cranial nerve) | 51 Oculomotor nerve (third cranial nerve) | 56 Infratemporal fossa |
| 35 Body (atrium) of lateral ventricle | 44 Trigeminal ganglion in Meckel's cave | 52 Trochlear nerve (fourth cranial nerve) | 57 Parietal lobe |
| 36 Lateral pterygoid muscle | 45 Body of sphenoid | 53 Ophthalmic nerve (fifth cranial nerve, first division) | 58 Hippocampus |
| 37 Medial pterygoid muscle | 46 Inferior alveolar vessels | 54 Maxillary nerve (fifth cranial nerve, second division) | 59 Temporal horn of lateral ventricle |
| 38 Tongue | 47 Inferior alveolar nerve | | 60 Middle cerebral artery (second order branch) |
| 39 Soft palate | 48 Head of mandible | | 61 Third ventricle |
| 40 Choroid plexus | 49 Coronoid process of mandible | | |
| 41 Corona radiata | | | |



(a)–(p) Brain, coronal T2w MR images, from anterior to posterior.

62 Prepontine cistern	72 Thalamus	82 Pons	90 Odontoid peg of C2
63 Basilar artery	73 Hypothalamus	83 Cerebral peduncle	91 Body of C2
64 Posterior cerebral artery	74 Mamillary body (of hypothalamus)	84 Massa intermedia of thalamus	92 Internal auditory meatus
65 Superior cerebellar artery	75 Cochlea	85 Abducens nerve (sixth cranial nerve) in ambient cistern	93 Facial (seventh) and vestibulocochlear (eighth) nerves
66 Retromandibular vein	76 Pharyngobasilar raphe	86 Interpeduncular cistern	94 Vestibule of vestibular apparatus
67 Tragus of external ear	77 Basisphenoid	87 Trigeminal nerve (fifth cranial nerve)	95 Arcuate eminence of petrous temporal bone
68 Basiocciput	78 Anterior arch of C1	88 Internal jugular vein	96 Superior semicircular canal
69 Spheno-occipital synchondrosis	79 Vertebral artery	89 Body of caudate nucleus	
70 Auriculotemporal nerve	80 Lateral mass of C1		
71 Foramen of Monro	81 Sternocleidomastoid muscle		

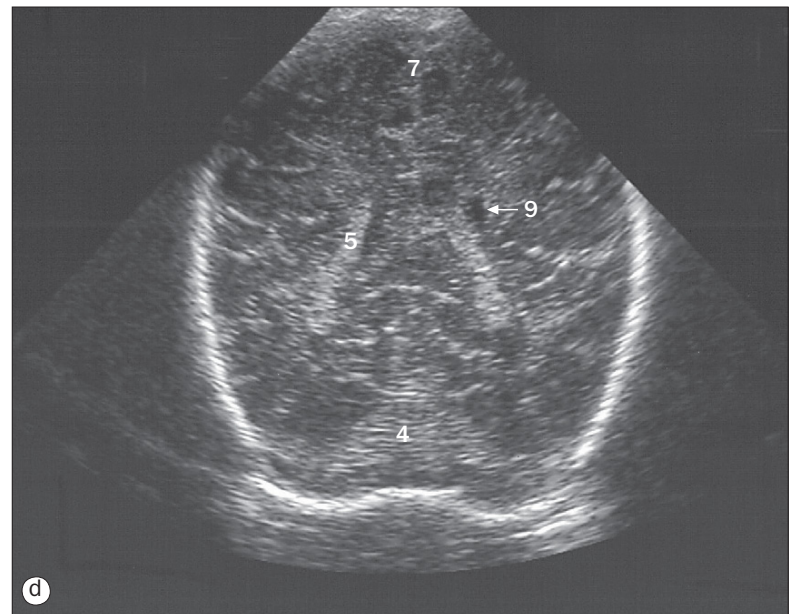
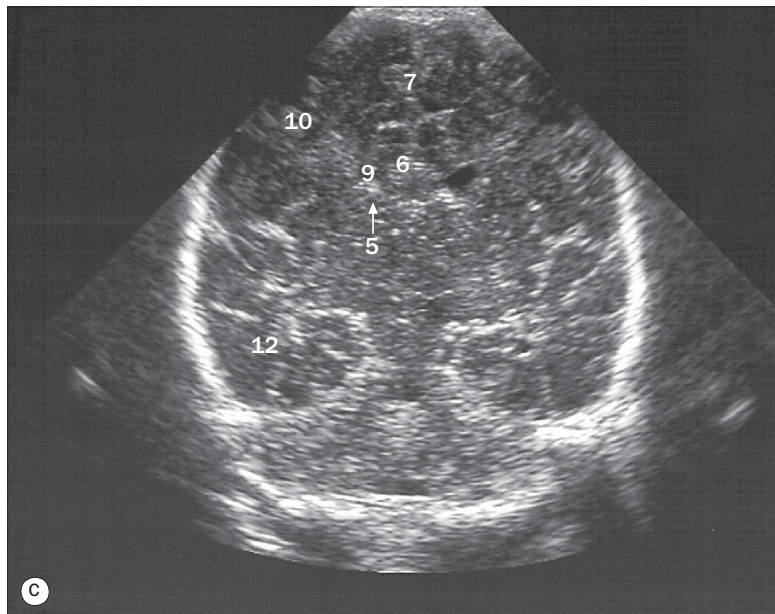
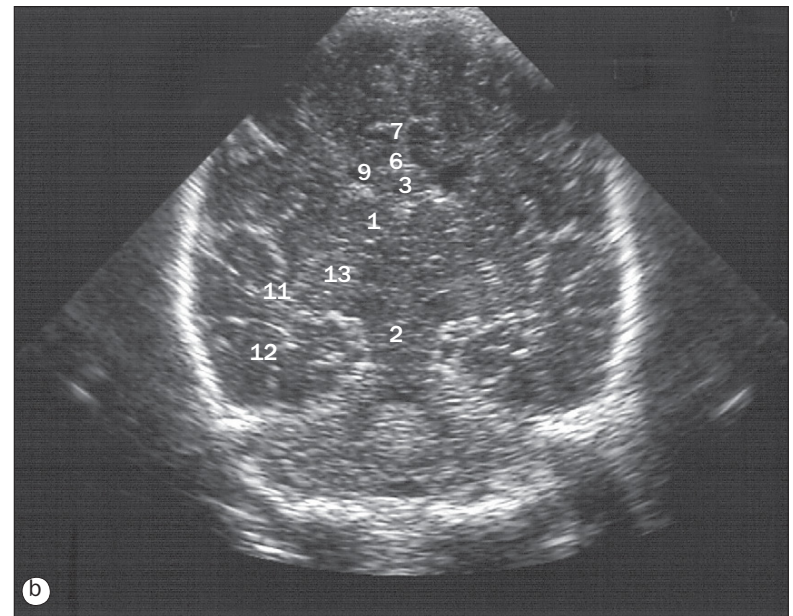
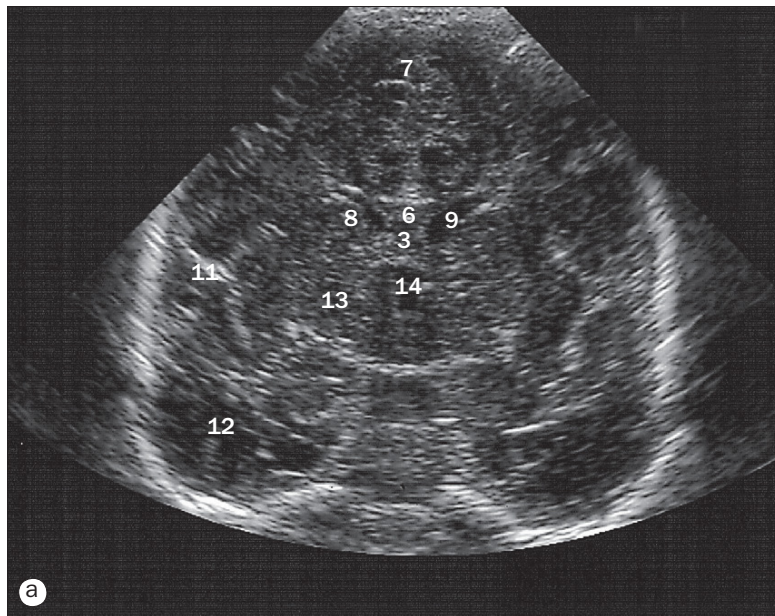
Numbers 1–130 are common to pages 48–51.



(a)–(p) Brain, coronal T2w MR images, from anterior to posterior.

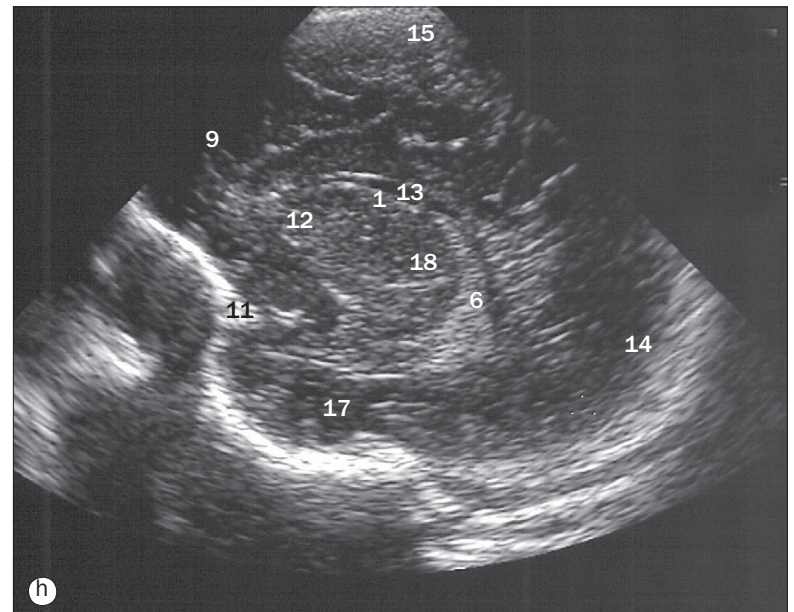
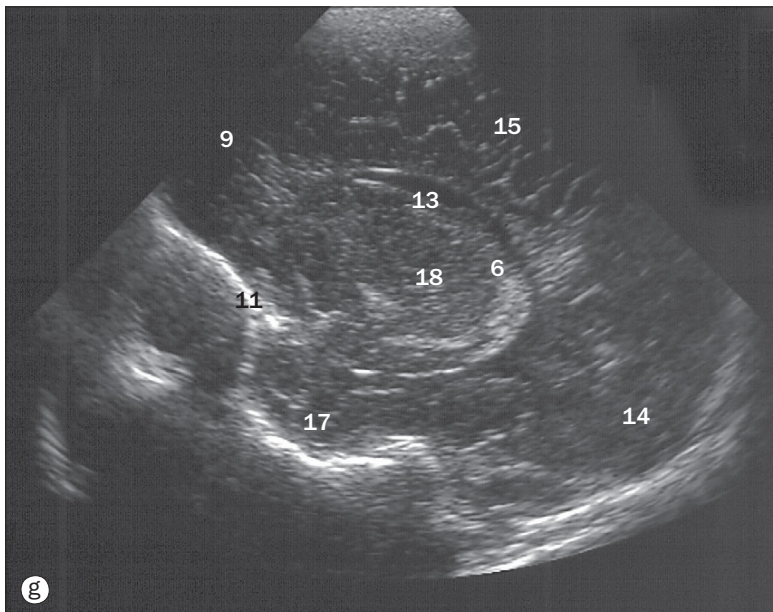
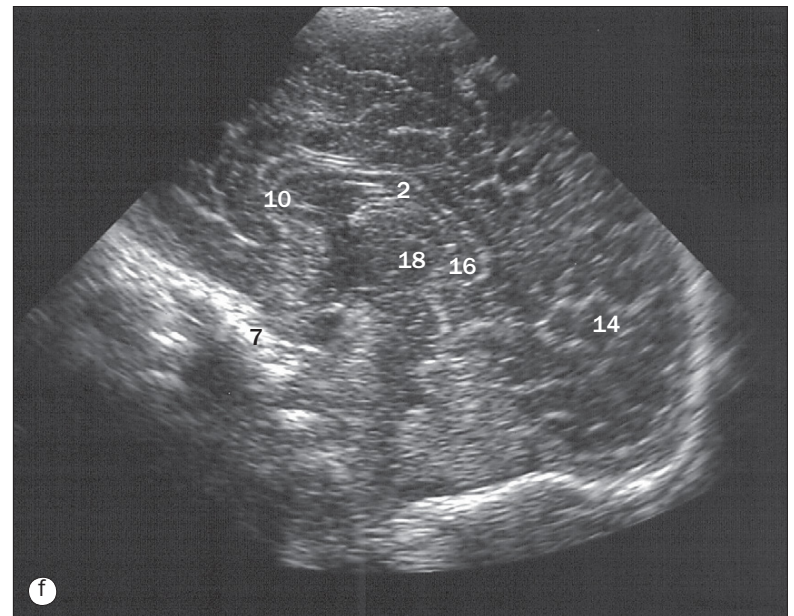
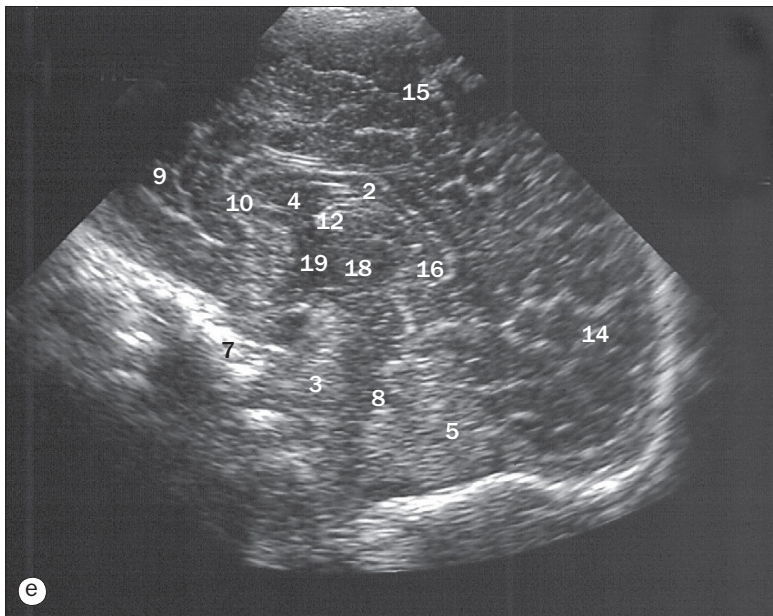
97 Horizontal (lateral) semicircular canal	106 Inferior colliculus	115 Splenum of corpus callosum	123 Cerebellar tonsil
98 Posterior semicircular canal	107 Aqueduct of Sylvius	116 Superior cerebellar peduncle	124 Inferior sagittal sinus
99 Midbrain (mesencephalon)	108 Spinal cord	117 Inferior cerebellar peduncle	125 Dentate nucleus of cerebellum
100 Medulla oblongata	109 Foramen magnum	118 Cerebellar hemisphere	126 Nodule of cerebellum
101 Middle cerebellar peduncle	110 Mastoid air cells	119 Trigone of lateral ventricle	127 Cisterna magna
102 Cerebellar folia	111 Trapezius muscle	120 Internal cerebral vein (of Galen)	128 Lateral foramen (of Lushka)
103 Pineal gland	112 Tectum (quadrigeminal plate) of midbrain	121 Basal vein (of Rosenthal)	129 Medial foramen (of Magendie)
104 Internal cerebral veins	113 Tentorium cerebelli	122 Fourth ventricle	130 Quadrigeminal cistern
105 Superior colliculus	114 Uncus of temporal lobe		

Numbers 1–130 are common to pages 48–51.



(a)–(d) Neonatal brain, coronal ultrasound images.

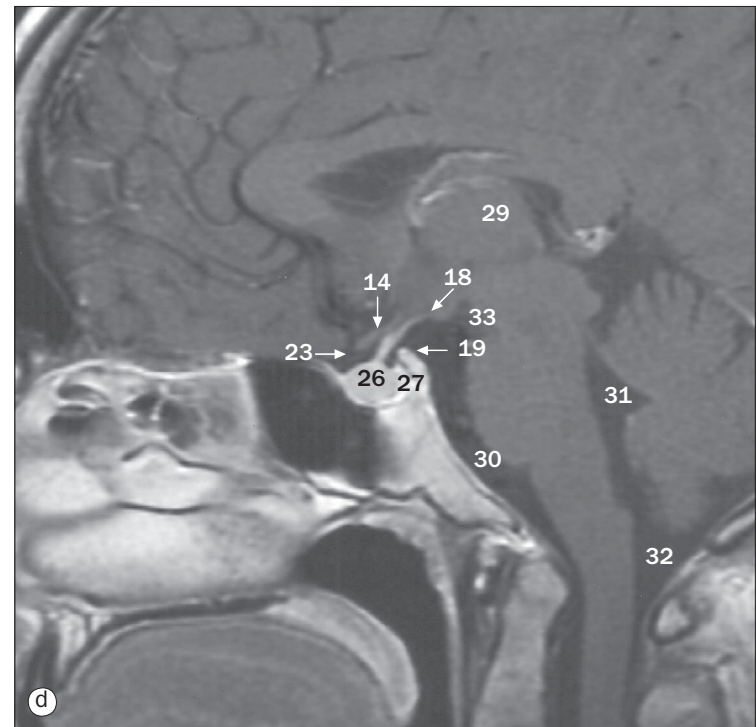
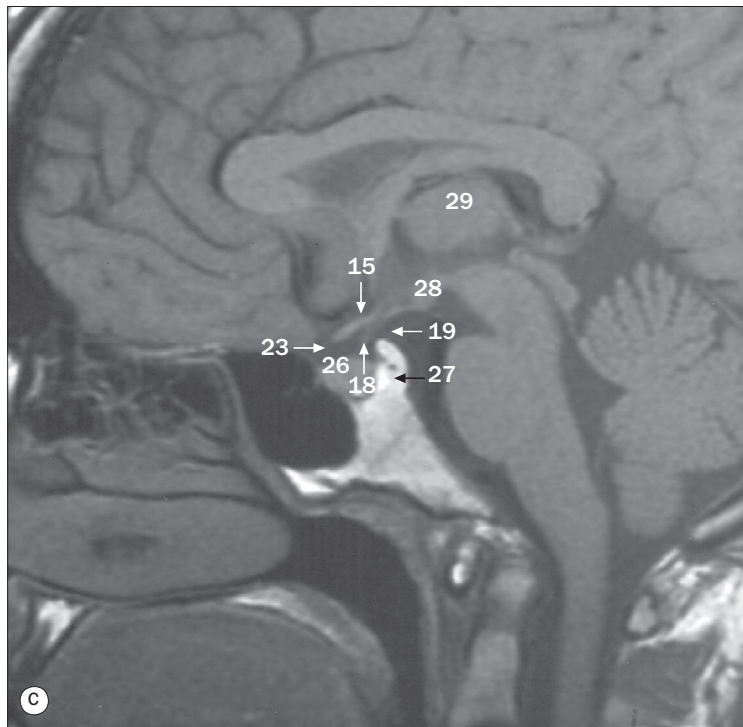
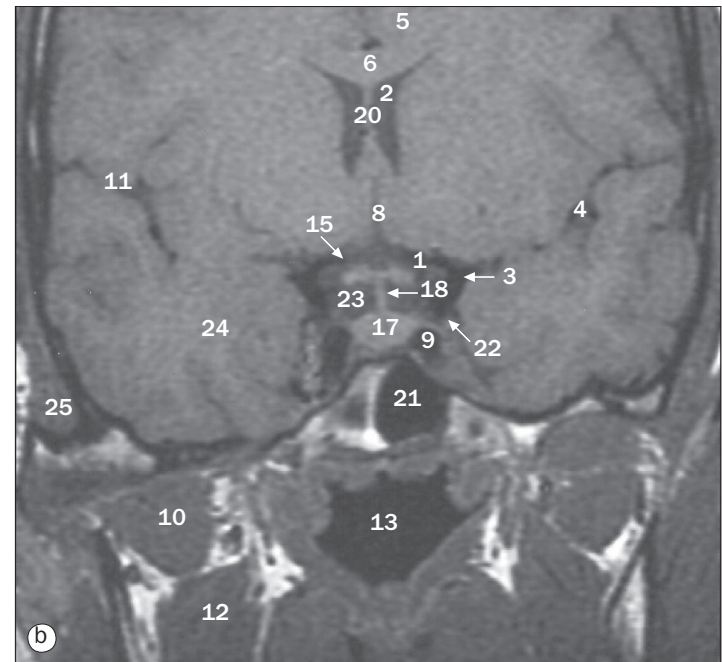
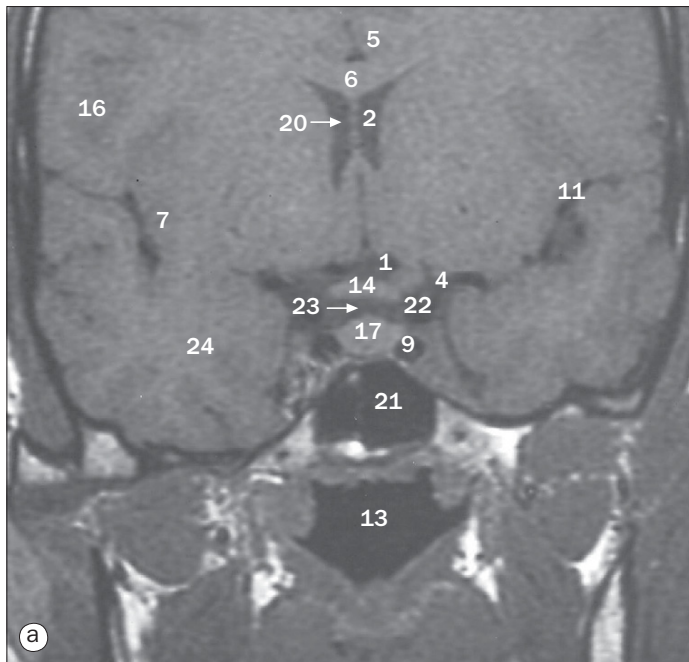
- 1 Body of caudate nucleus
- 2 Brainstem
- 3 Cavum septum pellucidum
- 4 Cerebellum
- 5 Choroid plexus
- 6 Corpus callosum
- 7 Falx cerebri
- 8 Head of caudate nucleus
- 9 Lateral ventricle
- 10 Parietal lobe of brain
- 11 Sylvian fissure
- 12 Temporal lobe
- 13 Thalamus
- 14 Third ventricle



(e)–(h) Neonatal brain, sagittal ultrasound images.

- 1 Body of caudate nucleus
- 2 Body of corpus callosum
- 3 Brainstem
- 4 Cavum septum pellucidum
- 5 Cerebellum
- 6 Choroid plexus
- 7 Clivus
- 8 Fourth ventricle
- 9 Frontal lobe
- 10 Genu of corpus callosum

- 11 Greater wing of sphenoid
- 12 Head of caudate nucleus
- 13 Lateral ventricle
- 14 Occipital lobe
- 15 Parietal lobe of brain
- 16 Splenum of corpus callosum
- 17 Temporal lobe
- 18 Thalamus
- 19 Third ventricle

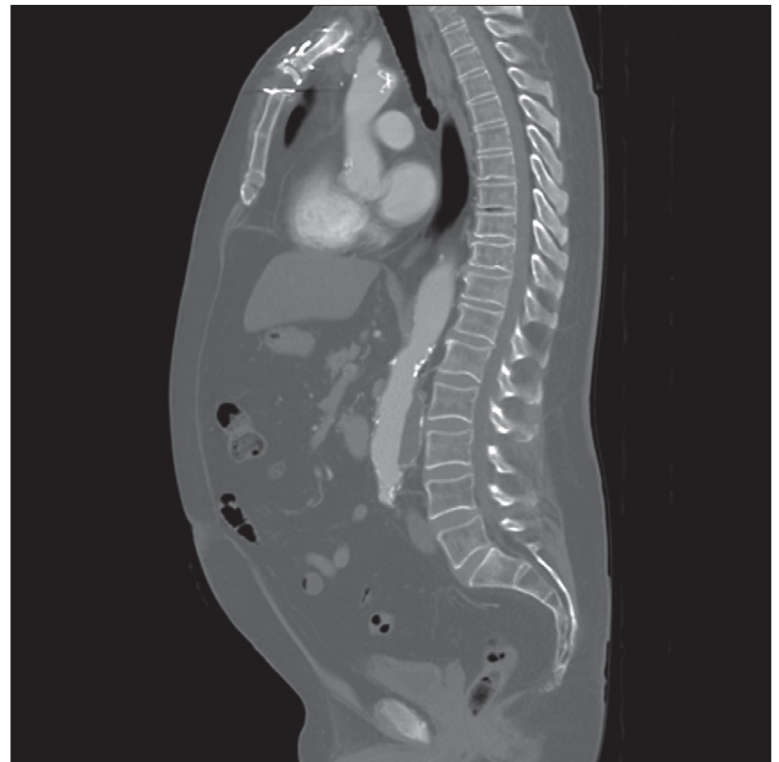
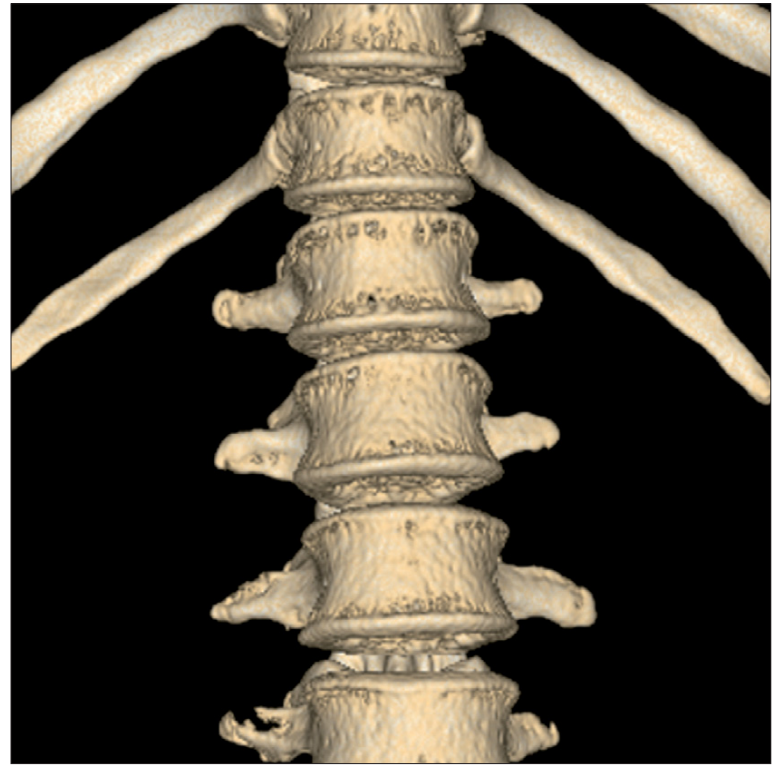
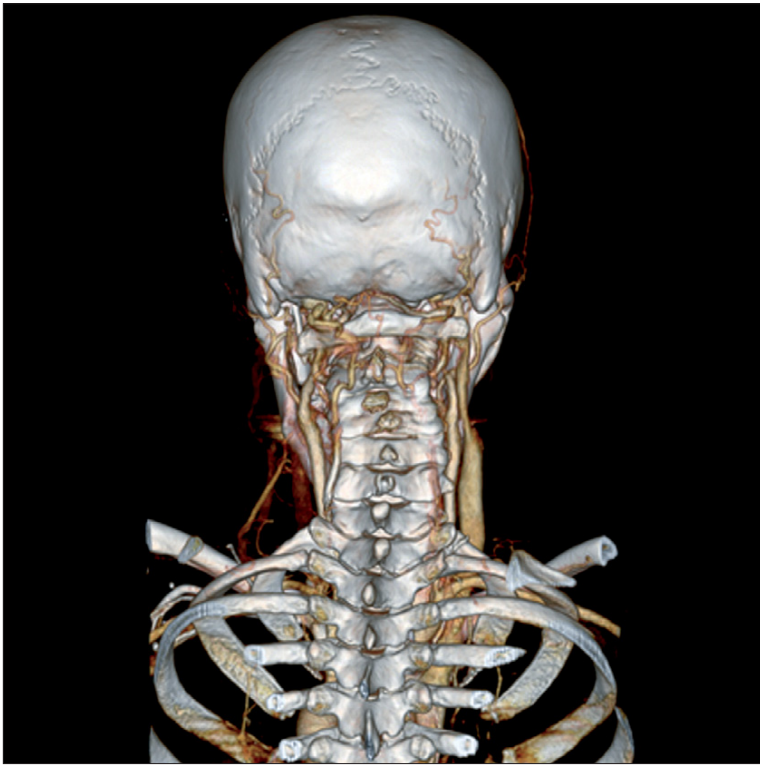


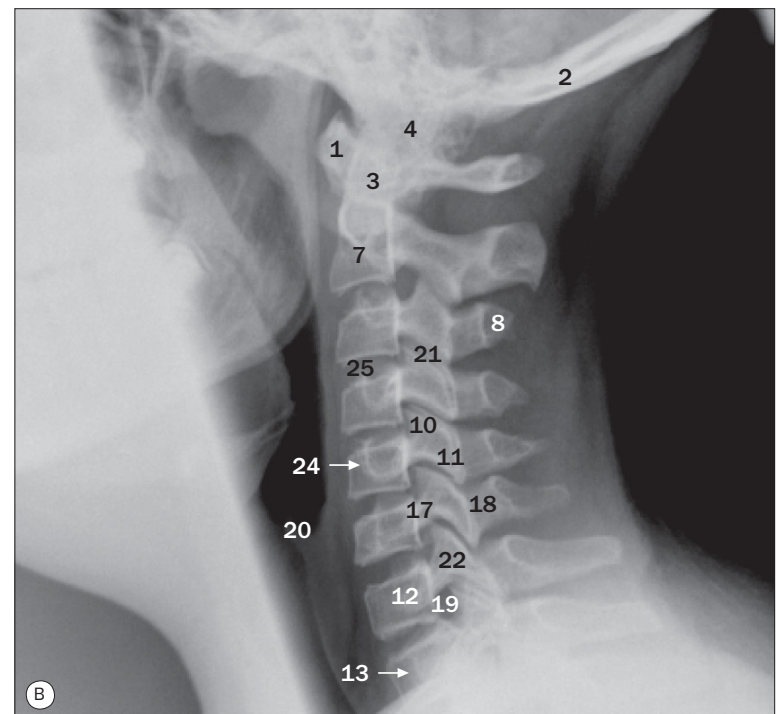
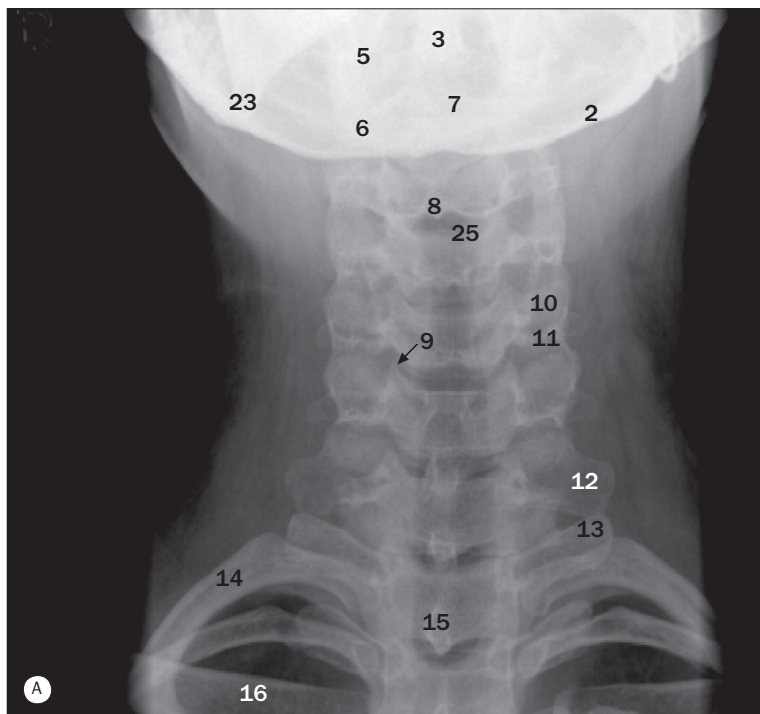
T1w MR images of pituitary fossa (a) and (b) coronal, (c) sagittal, (d) sagittal post gadolinium.

- | | | | |
|--|--|--------------------------------|------------------------------|
| 1 Anterior cerebral artery | 7 Insula | 15 Optic tract | 25 Temporalis muscle |
| 2 Anterior horn of lateral ventricle | 8 Interhemispheric fissure | 16 Parietal lobe of brain | 26 Anterior pituitary gland |
| 3 Bifurcation of internal carotid artery | 9 Internal carotid artery in cavernous sinus | 17 Pituitary gland | 27 Posterior pituitary gland |
| 4 Branch of middle cerebral artery in lateral sulcus (Sylvian fissure) | 10 Lateral pterygoid muscle | 18 Pituitary stalk | 28 Mammillary body |
| 5 Cingulate gyrus | 11 Lateral sulcus (Sylvian fissure) | 19 Posterior clinoid process | 29 Thalamus |
| 6 Corpus callosum | 12 Medial pterygoid muscle | 20 Septum pellucidum | 30 Prepontine cistern |
| | 13 Nasopharynx | 21 Sphenoidal sinus | 31 Fourth ventricle |
| | 14 Optic chiasma | 22 Supraclinoid carotid artery | 32 Cisterna magna |
| | | 23 Suprasellar cistern | 33 Interpeduncular cistern |
| | | 24 Temporal lobe of brain | |

2

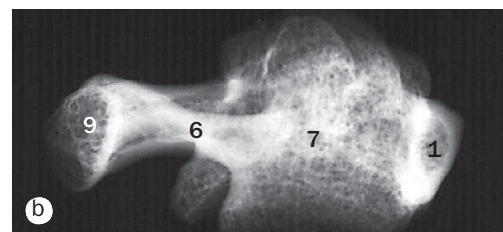
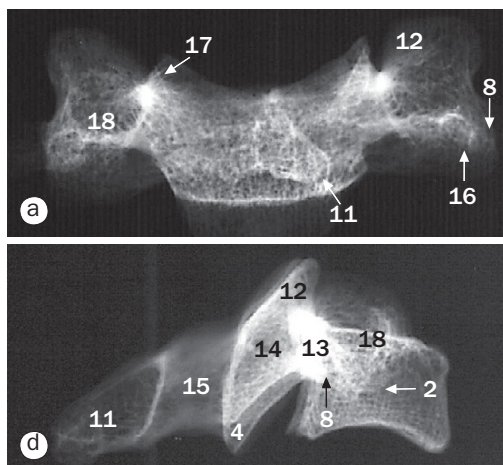
Vertebral column and spinal cord



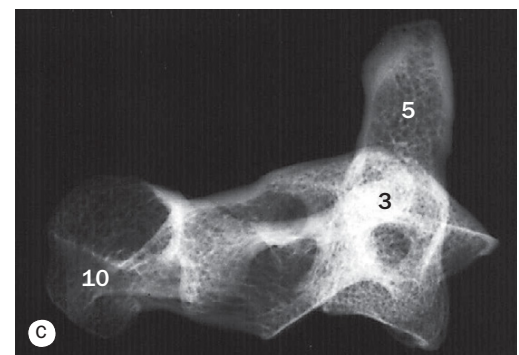


(a) Cervical spine, anteroposterior projection, (b) cervical spine, lateral projection.

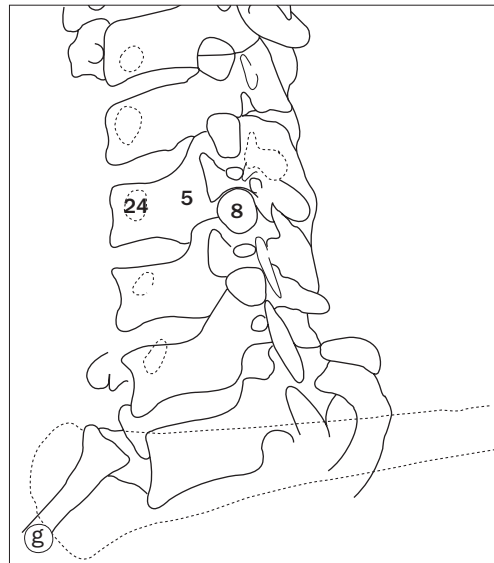
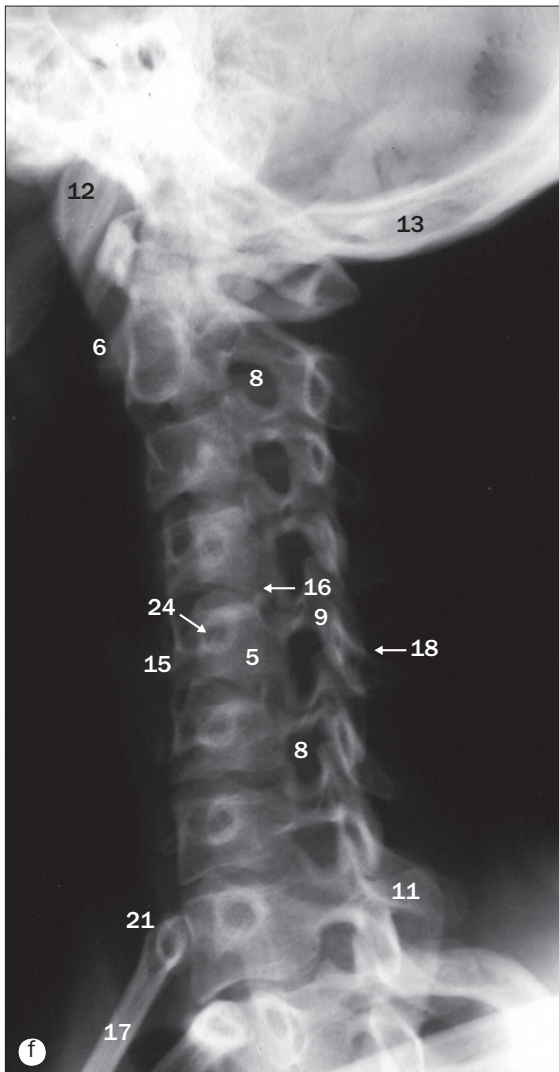
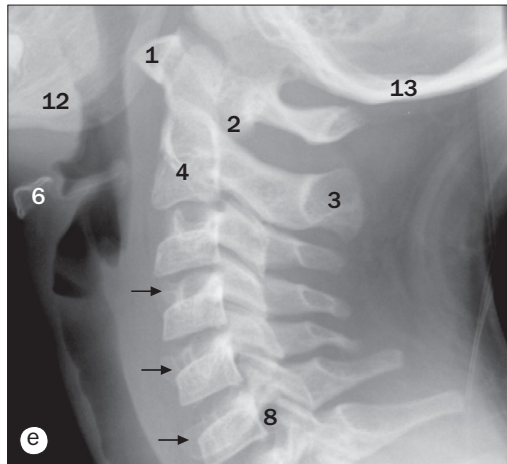
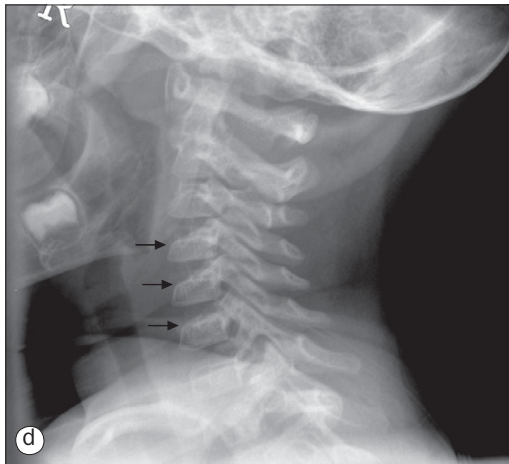
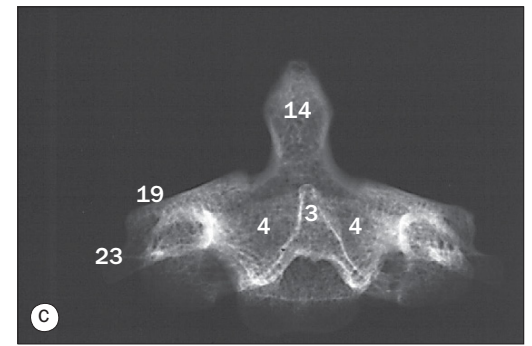
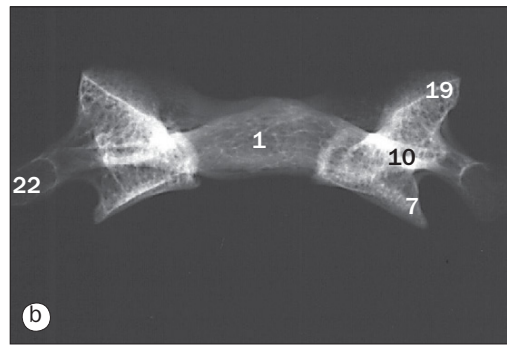
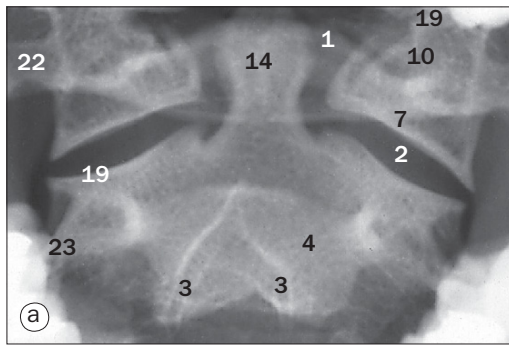
- | | | | |
|------------------------------|--|--|--|
| 1 Anterior arch of atlas | 9 Uncovertebral joint (Lushka) of C5/6 | 15 Spinous process of T1 | 21 Facet (zygapophyseal joint) of C3/4 |
| 2 Basiocciput | 10 Superior articular process of C5 | 16 Clavicle | 22 Pars interarticularis of C7 |
| 3 Odontoid peg (of axis) | 11 Inferior articular process of C5 | 17 Pedicle of C6 | 23 Angle of mandible |
| 4 Occipital condyle | 12 Transverse process of C7 | 18 Lamina of C6 | 24 Transverse process of C5 |
| 5 Lateral mass of atlas (C1) | 13 Transverse process of T1 | 19 Intervertebral foramen of C7/T1 (for C8 root) | 25 Intervertebral disc at C3/4 |
| 6 Lateral mass of axis (C2) | 14 First rib | 20 Epiglottis | |
| 7 Body of axis (C2) | | | |
| 8 Spinous process of C3 | | | |



X-ray films of dissociated cervical vertebrae.
 (a) AP view C4.
 (b) Lateral view C1.
 (c) Lateral view C2.
 (d) Lateral view C4.



- | | | |
|---|--|---|
| 1 Anterior arch of atlas (first cervical vertebra) | 7 Body of atlas (first cervical vertebra) | 12 Superior articular process (facet) of fourth cervical vertebra |
| 2 Anterior tubercle of transverse process of fourth cervical vertebra | 8 Posterior tubercle of transverse process of fourth cervical vertebra | 13 Pedicle of C4 |
| 3 Body of axis (second cervical vertebra) | 9 Posterior tubercle of atlas (first cervical vertebra) | 14 Pars interarticularis of C4 |
| 4 Inferior articular process (facet) of fourth cervical vertebra | 10 Spinous process of axis (second cervical vertebra) | 15 Lamina of C4 |
| 5 Odontoid process (dens) of axis (second cervical vertebra) | 11 Spinous process of fourth cervical vertebra | 16 Intertubercular lamella of C4 transverse process |
| 6 Posterior arch of atlas (first cervical vertebra) | | 17 Posterolateral lip (uncus) of C4 |
| | | 18 Body of transverse process of C4 |



- 1 Anterior arch of atlas (first cervical vertebra)
- 2 Atlanto-axial joint
- 3 Bifid spinous process of axis (second cervical vertebra)
- 4 Body of axis (second cervical vertebra)
- 5 Body of fifth cervical vertebra
- 6 Hyoid bone
- 7 Inferior articular process (facet) of atlas (first cervical vertebra)
- 8 Intervertebral foramen
- 9 Lamina of fifth cervical vertebra
- 10 Lateral mass of atlas (first cervical vertebra)
- 11 Left first rib
- 12 Mandible
- 13 Occipital bone
- 14 Odontoid process (dens) of axis (second cervical vertebra)
- 15 Posterior tubercle of transverse process of fifth cervical vertebra
- 16 Posterolateral lip (uncus) of fifth cervical vertebra
- 17 Right first rib
- 18 Spinous process of fifth cervical vertebra
- 19 Superior articular process (facet) of atlas (first cervical vertebra)
- 20 Superior articular process (facet) of axis (second cervical vertebra)
- 21 Trachea
- 22 Transverse process of atlas (first cervical vertebra)
- 23 Transverse process of axis (second cervical vertebra)
- 24 Transverse process of fifth cervical vertebra

(a) Atlas (first cervical vertebra) and axis (second cervical vertebra), 'open mouth' anteroposterior projection.

(b) Dried atlas (first cervical vertebra), anteroposterior projection.

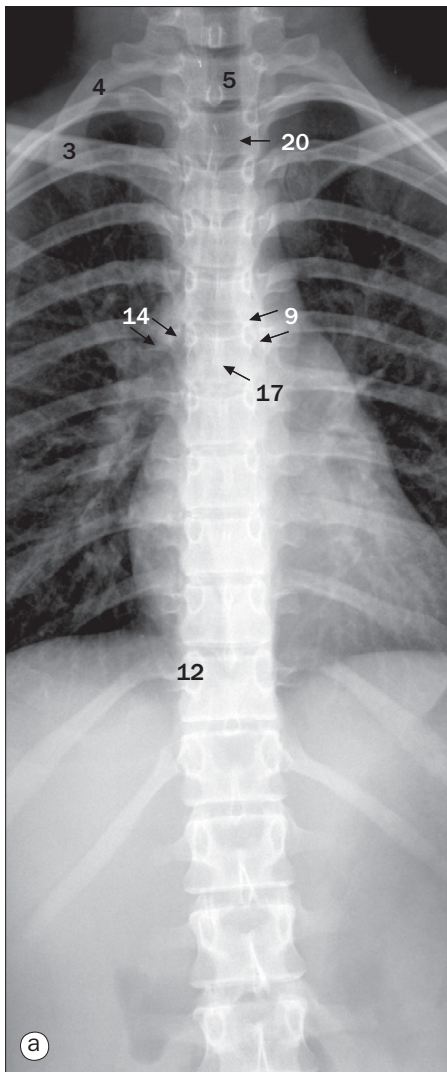
(c) Dried axis (second cervical vertebra), anteroposterior projection.

(d) Cervical spine X-ray of a 3 year old, lateral projection. The atlanto-axial joint can normally be up to 5mm (up to 3mm in adults).

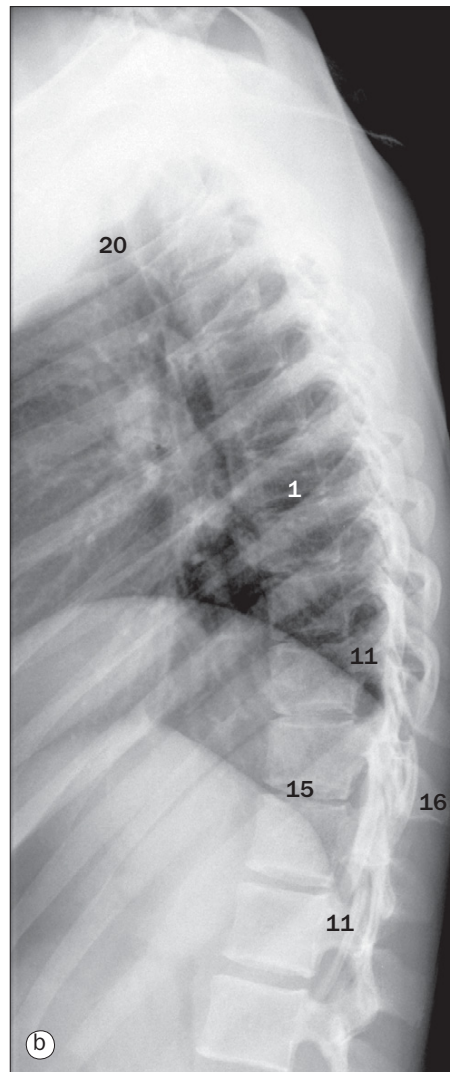
(e) Cervical spine X-ray of a 9 year old, lateral projection. Note normal physiological wedging of the vertebral bodies (arrows) due to unossified superior endplate apophyses.

(f) Oblique X-ray of adult cervical spine.

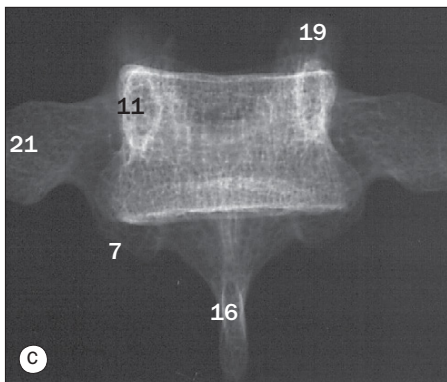
(g) Line drawing of (f).



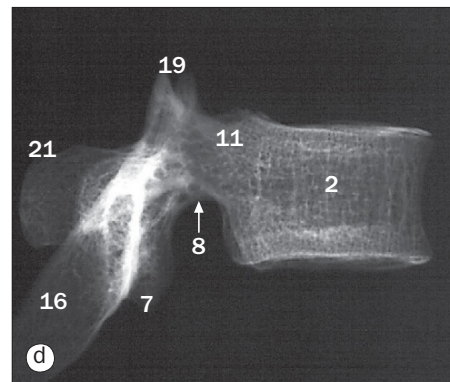
(a) Thoracic spine, anteroposterior projection.



(b) Thoracic spine, lateral projection.

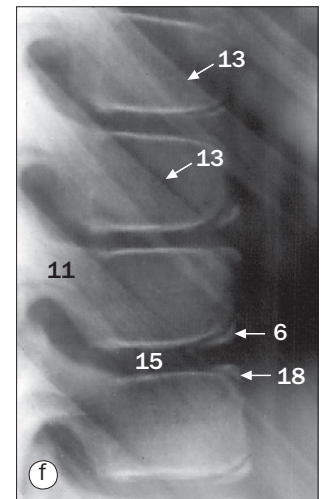
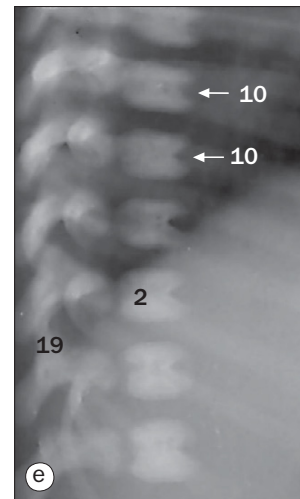


(c) Dried thoracic vertebra, anteroposterior projection.

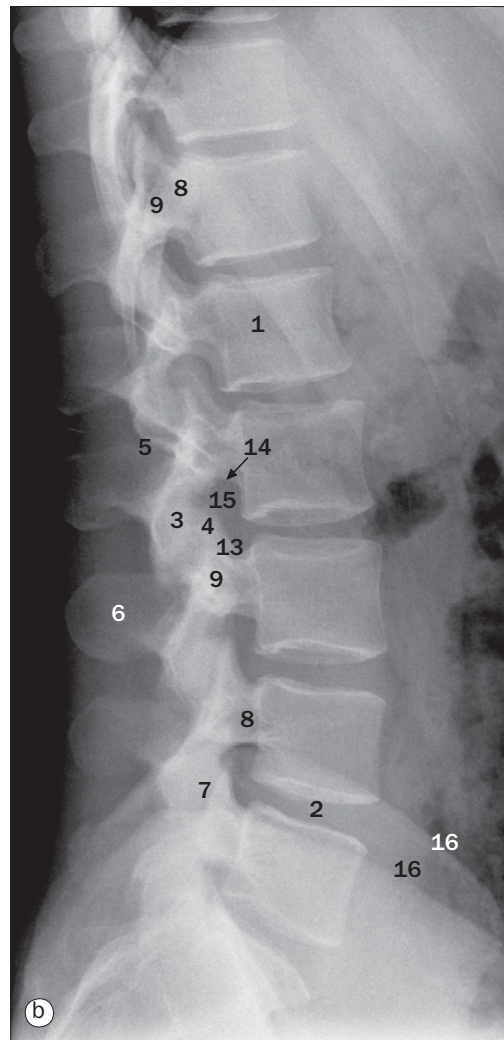
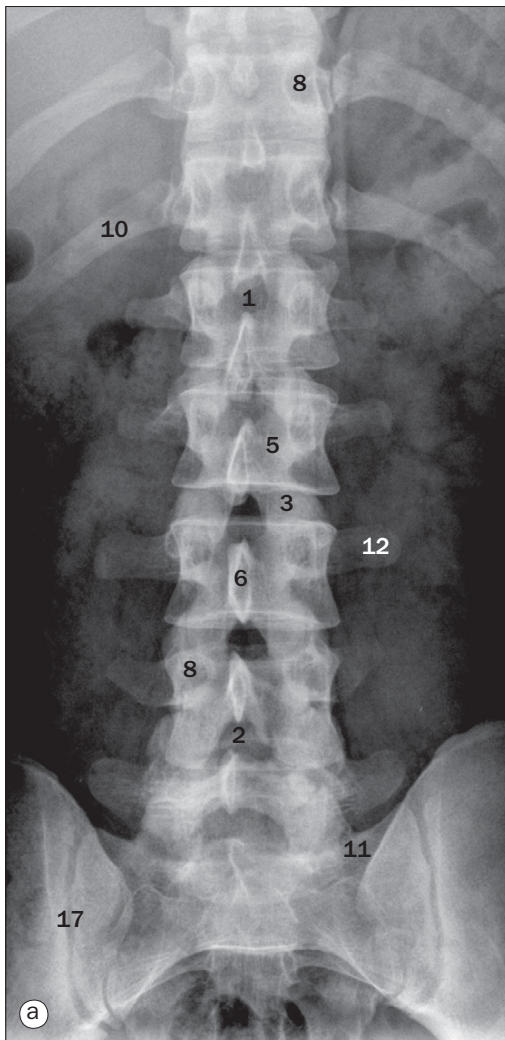


(d) Dried sixth thoracic vertebra, lateral projection.

Thoracic spine, (e) of a 7-day-old neonate, (f) of a 12-year-old child, lateral projections.



- 1 Body of sixth thoracic vertebra
- 2 Body of vertebra
- 3 Clavicle
- 4 First rib
- 5 First thoracic vertebra
- 6 Inferior annular epiphysial discs for vertebral body
- 7 Inferior articular process (facet)
- 8 Inferior vertebral notch
- 9 Left main bronchus
- 10 Natal cleft
- 11 Pedicle
- 12 Pedicle of eleventh thoracic vertebra
- 13 Ribs
- 14 Right main bronchus
- 15 Site of intervertebral disc
- 16 Spinous process
- 17 Spinous process of sixth thoracic vertebra
- 18 Superior annular epiphysial discs for vertebral body
- 19 Superior articular process (facet)
- 20 Trachea
- 21 Transverse process



(a) Lumbar spine, anteroposterior radiograph.

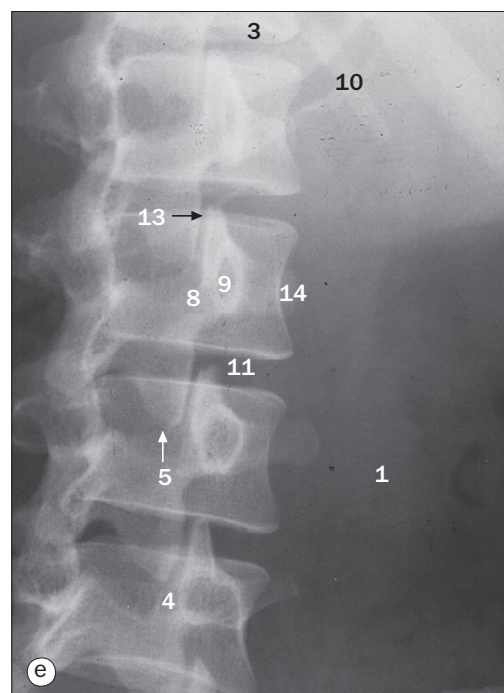
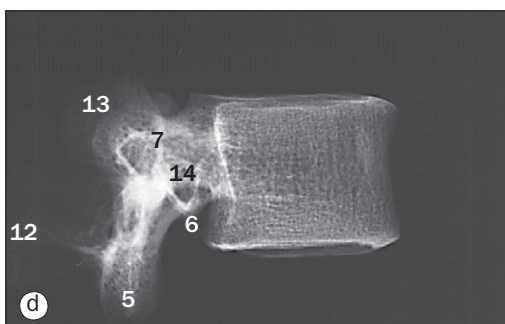
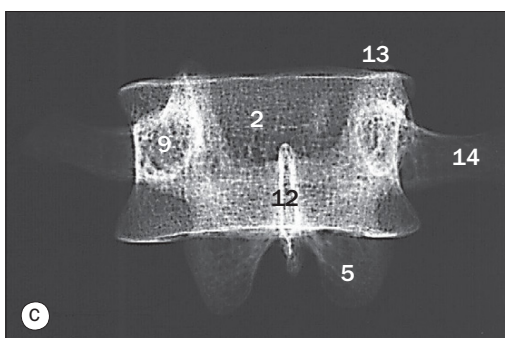
(b) Lumbar spine, lateral projection.

(c) Dried second lumbar vertebra, anteroposterior projection.

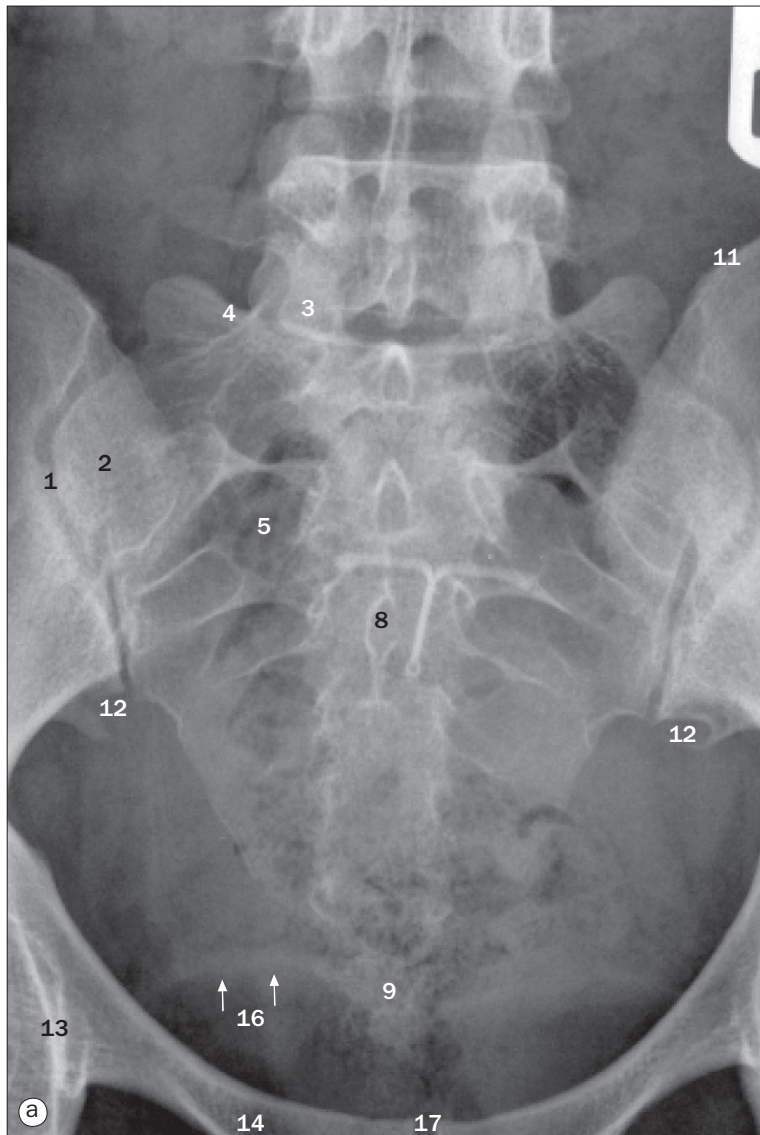
(d) Dried second lumbar vertebra, lateral projection.

(e) Lumbar spine, oblique projection.

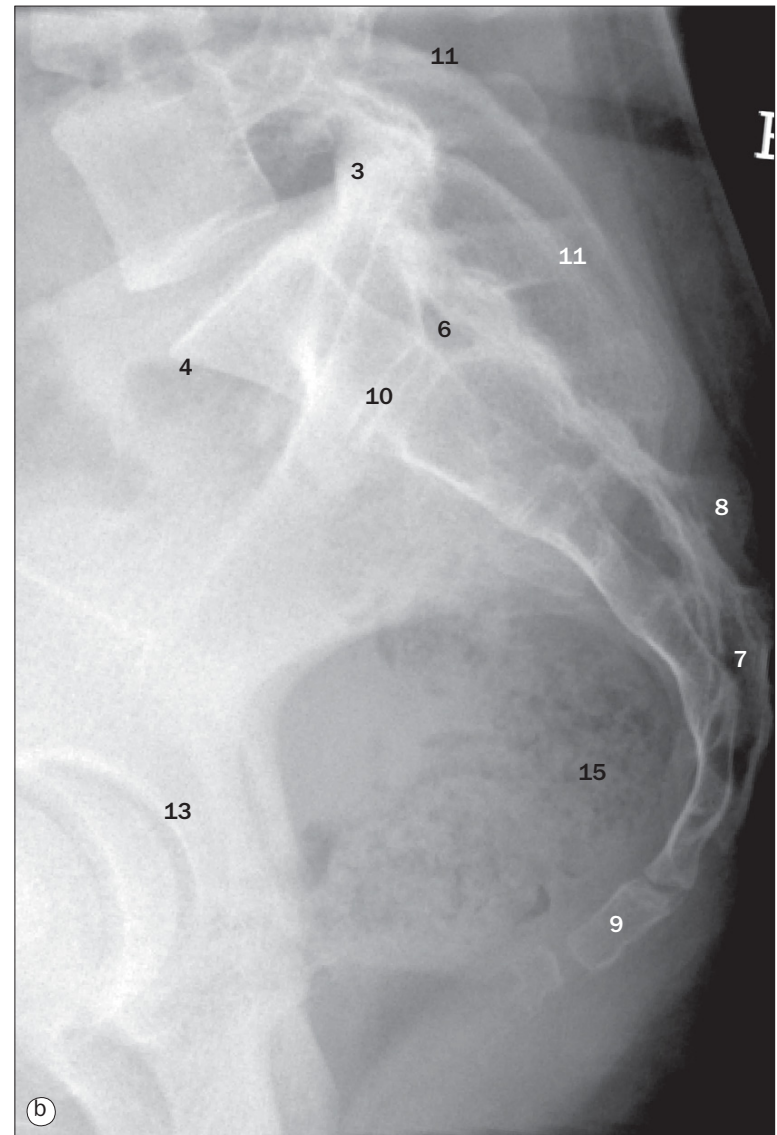
- 1 Body of first lumbar vertebra
- 2 Intervertebral disc L4/5
- 3 Inferior articular process (facet) of L2
- 4 Superior articular process (facet) L3
- 5 Lamina of L2
- 6 Spinous process of L3
- 7 Facet (zygapophyseal joint) of L4/5
- 8 Pedicle
- 9 Pars interarticularis
- 10 Right twelfth rib
- 11 Sacral promontory
- 12 Transverse process of L3
- 13 Mamillary process
- 14 Inferior vertebral notch of L2
- 15 Neural foramen of L2/3 (for L2 root)
- 16 Iliac crest
- 17 Sacroiliac joint



- 1 Psoas muscle outline
- 2 Body of second lumbar vertebra
- 3 Body of twelfth thoracic vertebra
- 4 Body of fourth lumbar vertebra
- 5 Inferior articular process (facet) of second lumbar vertebra
- 6 Inferior vertebral notch of second lumbar vertebra
- 7 Mammillary process of second lumbar vertebra
- 8 Pars interarticularis
- 9 Pedicle of second lumbar vertebra
- 10 Twelfth rib
- 11 Intervertebral disc space between L2 and L3
- 12 Spinous process of second lumbar vertebra
- 13 Superior articular process (facet) of second lumbar vertebra
- 14 Transverse process of second lumbar vertebra



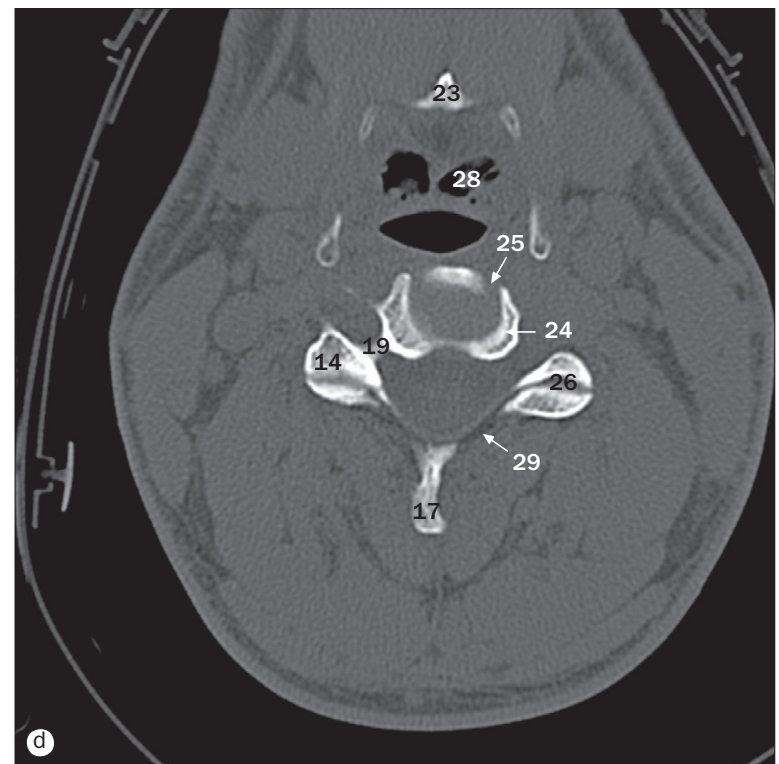
(a) Sacrum, anteroposterior projection.



(b) Sacrum and coccyx, lateral projection.

- 1 Sacroiliac joint
- 2 Ala of sacrum
- 3 Superior articular process of sacrum
- 4 Sacral promontory
- 5 Sacral foramen (S1/2 for right S1 root)
- 6 Upper part of sacral canal
- 7 Lower part of sacral canal
- 8 Spinous tubercle on median sacral crest
- 9 Coccyx
- 10 Rudimentary S1/2 disc space
- 11 Iliac crest
- 12 Preauricular (paraglenoid) sulcus
- 13 Acetabular roof
- 14 Superior pubic ramus
- 15 Rectum
- 16 Levator ani (outlined by fat in ischioanal fossa)
- 17 Symphysis pubis

The preauricular (paraglenoid) sulcus is a characteristic of the female pelvis and is due to bone resorption at the insertion of the anterior sacroiliac ligament. It is prominent in parous women.

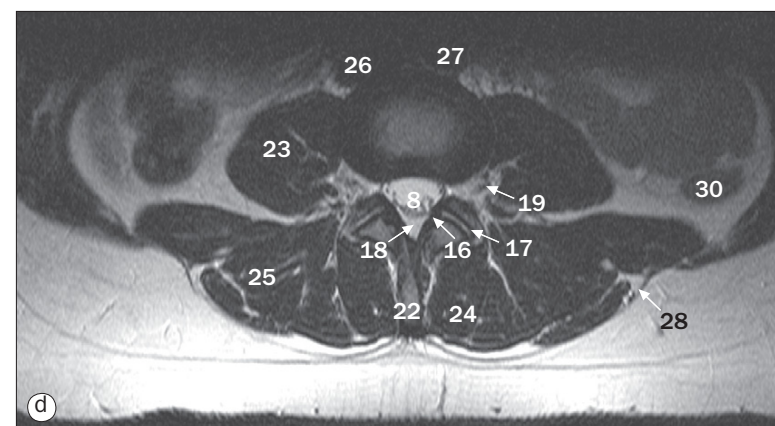
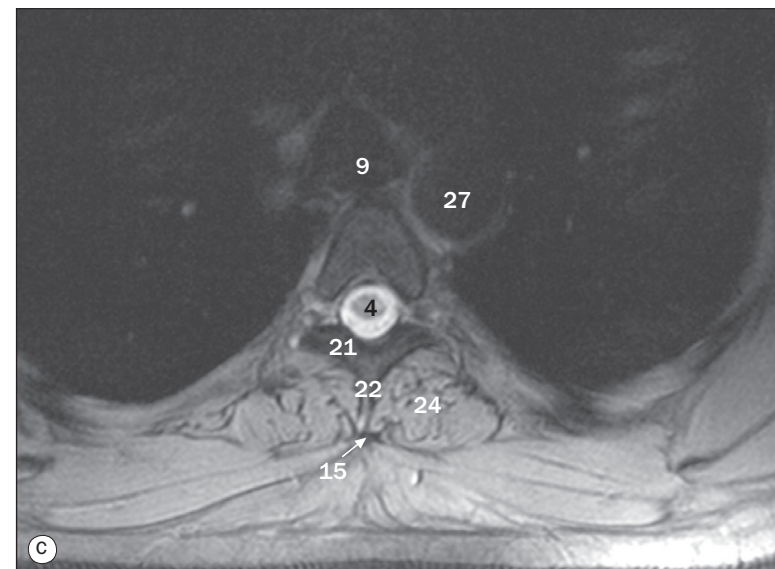
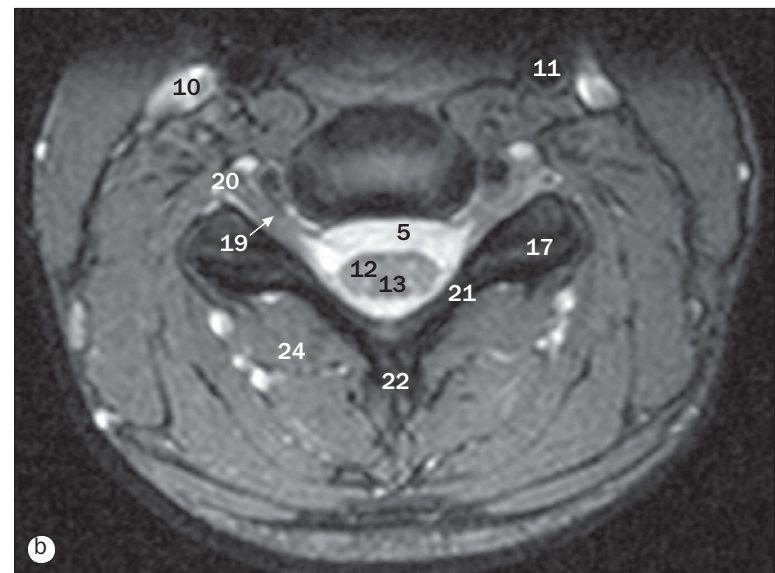


Axial CT images of the upper cervical spine at C1/2 (a,b), C2 (c) and C2/3 level (d).

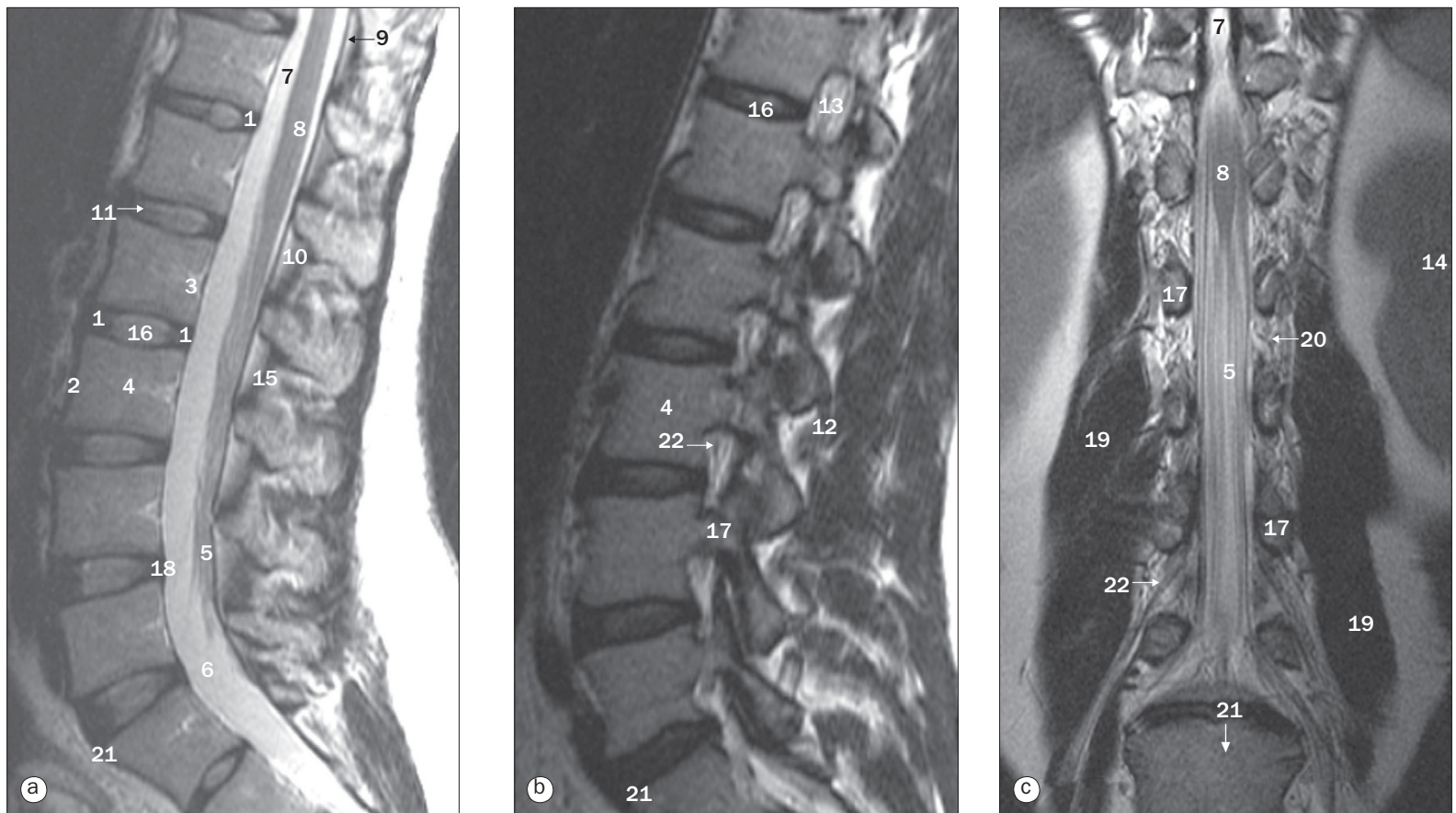
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|--|--|---|
| 1 Mastoid process (tip) | 11 Inferior alveolar foramen of mandibular ramus | 21 Anterior tubercle of transverse process of C2 |
| 2 Transverse ligament (attachment) | 12 Foramen transversarium of C1 | 22 Posterior tubercle of transverse process of C2 |
| 3 Anterior arch of atlas (C1) | 13 Transverse process of C1 | 23 Thyroid cartilage |
| 4 Lateral mass of atlas | 14 Inferior articular process of C2 | 24 Uncus of C3 vertebral body |
| 5 Posterior arch of C1 | 15 Lamina of C2 | 25 Uncovertebral joint (of Luschka) at C2/3 |
| 6 Groove for vertebral artery | 16 Pedicle of C2 | 26 Facet (zygapophyseal) joint at C2/3 |
| 7 Odontoid process (dens) of axis (C2) | 17 Spinous process of C2 | 27 Epiglottis |
| 8 Lingula of mandible | 18 Body of C2 | 28 Vallecula |
| 9 Styloid process | 19 Intervertebral foramen of C2/3 | 29 Ligamentum flavum |
| 10 Hamulus of medial pterygoid plate | 20 Spinal cord | |



MR images of the spine, (a) sagittal T2 wide field of view and axial T2 sections from the (b) cervical, (c) thoracic and (d) lumbar regions.

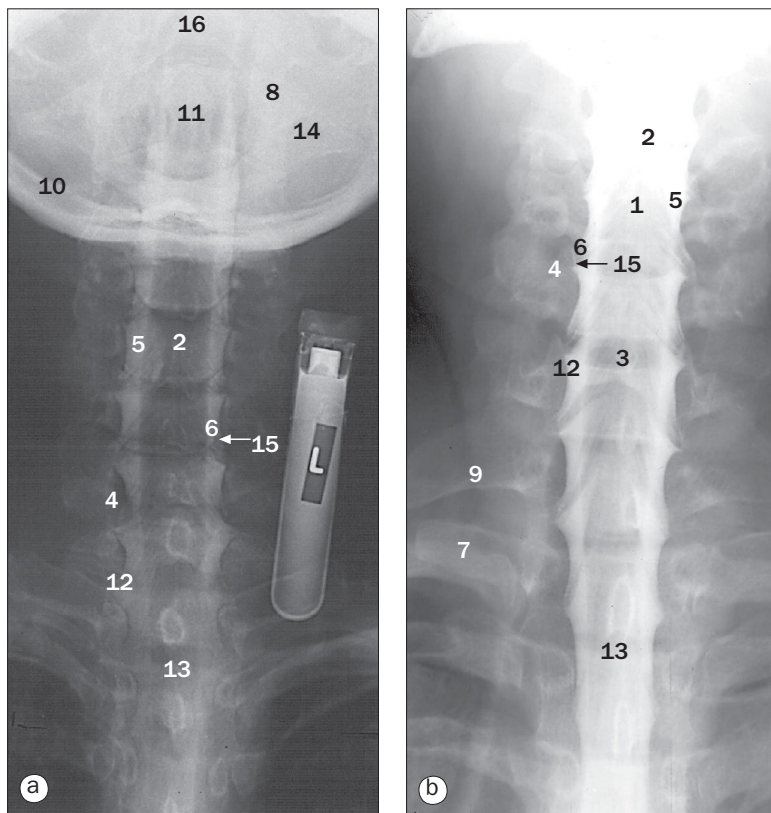


- | | | | |
|---|-----------------------------------|--------------------------------|--------------------------|
| 1 Foramen magnum | 7 Conus medullaris | 14 Spinous process of T4 | 23 Psoas major muscle |
| 2 Body of C7 | 8 Cauda equina | 15 Supraspinous ligament | 24 Erector spinae muscle |
| 3 Nucleus pulposus of T5/6
intervertebral disc | 9 Trachea | 16 Ligamentum flavum | 25 Multifidus muscle |
| 4 Spinal cord | 10 Internal jugular vein | 17 Facet (zygapophyseal) joint | 26 Inferior vena cava |
| 5 CSF in subarachnoid space
(flow void artefact) | 11 Common carotid artery | 18 Epidural fat | 27 Aorta |
| 6 Basivertebral vein | 12 Grey matter of spinal
cord | 19 Dorsal root ganglion | 28 Thoracolumbar fascia |
| | 13 White matter of spinal
cord | 20 Spinal nerve root | 29 Ligamentum nuchae |
| | | 21 Lamina | 30 Descending colon |
| | | 22 Spinous process | |



Lumbosacral spine, (a) sagittal MR image, (b) parasagittal MR image, (c) coronal MR image.

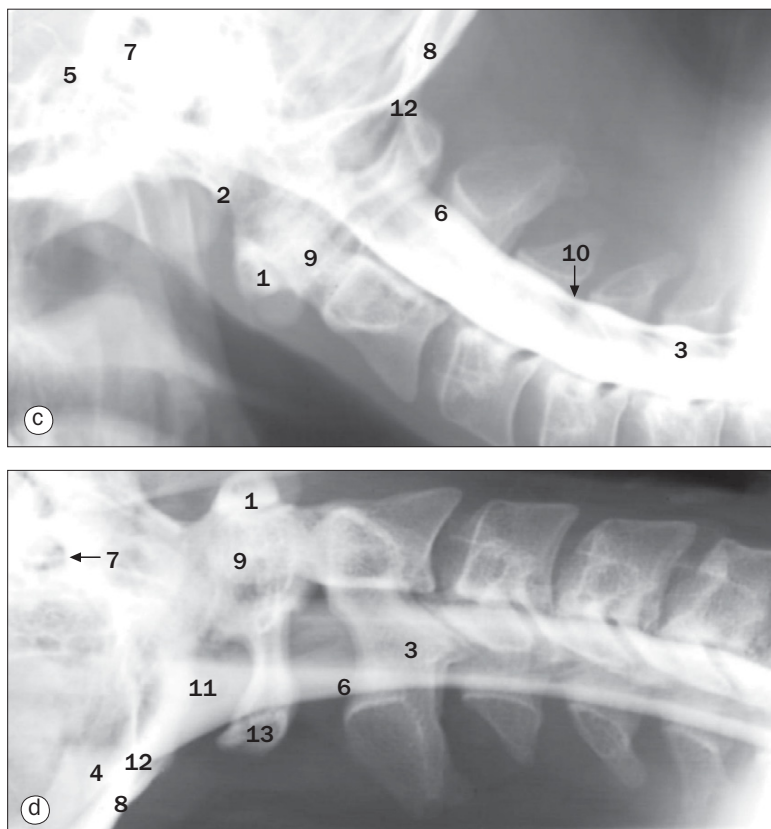
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|----------------------------------|--------------------------------|---|
| 1 Annulus fibrosus | 9 Dural sac | 17 Pedicle |
| 2 Anterior longitudinal ligament | 10 Epidural space (fat filled) | 18 Posterior longitudinal ligament and annulus fibrosus |
| 3 Basivertebral vein | 11 Internuclear cleft | 19 Psoas muscle |
| 4 Body of third lumbar vertebra | 12 Interspinous ligament | 20 Radicular vessels |
| 5 Cauda equina | 13 Intervertebral foramen | 21 Sacral promontory |
| 6 Caudal lumbar thecal sac | 14 Kidney | 22 Spinal nerve root in intervertebral foramen |
| 7 Cerebrospinal fluid | 15 Ligamentum flavum | |
| 8 Conus medullaris | 16 Nucleus pulposus | |



Cervical myelogram, (a) with the neck extended, (b) with the neck slightly flexed, anteroposterior projections.

Non-ionic water-soluble contrast medium is introduced into the lumbar subarachnoid space via a lumbar puncture. The patient is positioned prone, with the neck hyperextended, and strapped onto a tilting table. The contrast medium is then run up into the cervical region to demonstrate the cervical spinal cord and exiting nerve roots. There are eight cervical nerve roots: the roots of the eighth cervical nerve exit through the intervertebral foramina between the seventh cervical vertebra and the first thoracic vertebra. The normal cervical cord enlargement (3) (for the brachial plexus) extends from the third cervical vertebra to the second thoracic vertebra. It is maximal at the fifth cervical vertebra and should not be mistaken for an intramedullary lesion.

- 1 Anterior spinal artery
- 2 Cervical cord
- 3 Cervical cord enlargement
- 4 Cervical spinal nerve exiting through intervertebral foramen
- 5 Contrast medium in cervical subarachnoid space
- 6 Dorsal root of spinal nerve
- 7 First rib
- 8 Lateral mass of atlas (first cervical vertebra)
- 9 Normal large transverse process of seventh cervical vertebra
- 10 Occiput
- 11 Odontoid process (dens)
- 12 Root of eighth cervical nerve
- 13 Thoracic cord
- 14 Transverse foramen
- 15 Ventral root of spinal nerve
- 16 Vertebral artery

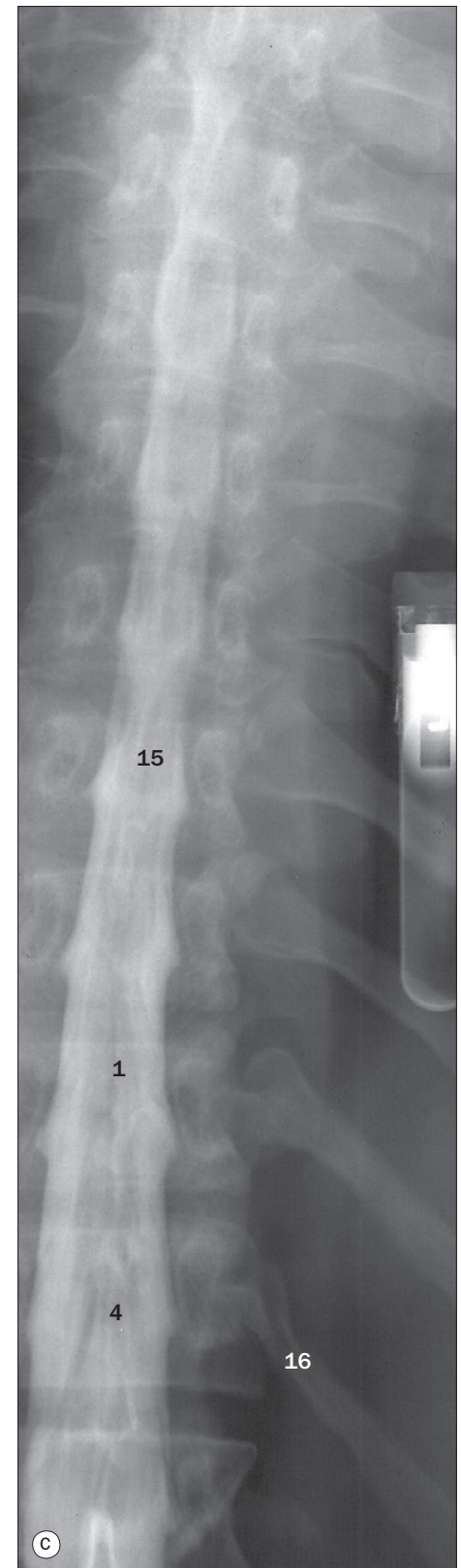
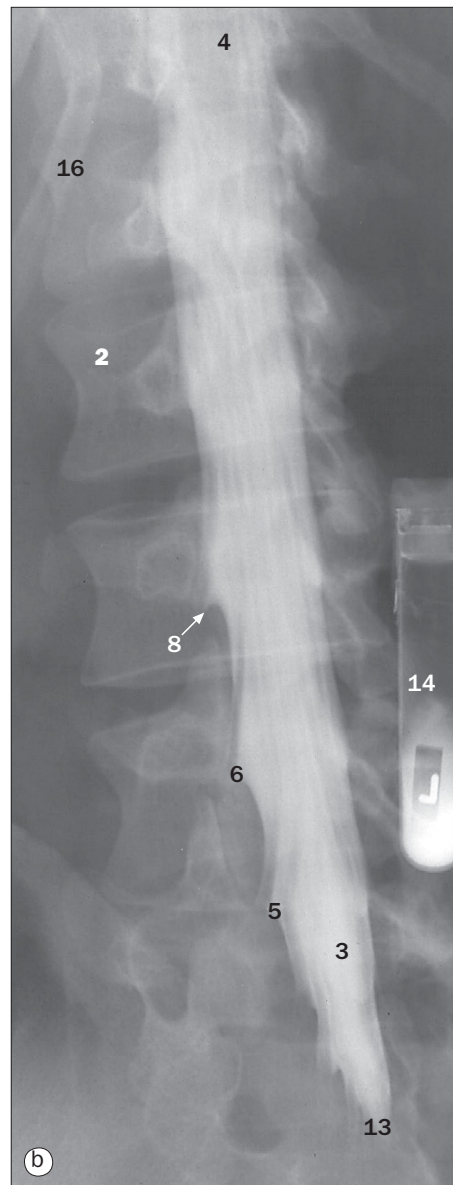
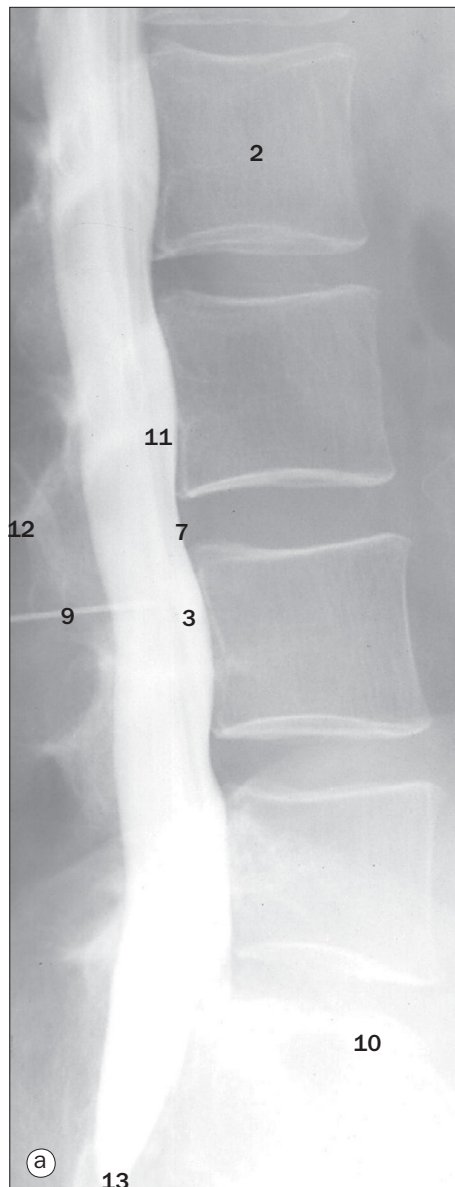


Cervical myelogram, (c) with the patient prone, (d) with the patient supine, lateral projections.

- 1 Anterior arch of atlas (first cervical vertebra)
- 2 Anterior rim of foramen magnum
- 3 Cervical cord
- 4 Cisterna magna (cerebellomedullary cistern)
- 5 Clivus
- 6 Contrast medium in cervical subarachnoid space
- 7 External acoustic meatus
- 8 Occiput
- 9 Odontoid (process) dens
- 10 Posterior indentation on theca from ligamentum flavum
- 11 Posterior inferior cerebellar artery
- 12 Posterior rim of foramen magnum
- 13 Posterior tubercle of atlas (first cervical vertebra)

Lumbar radiculogram, (a) lateral projection, (b) oblique projection, (c) anteroposterior projection.

Non-ionic water-soluble contrast medium is introduced into the lumbar subarachnoid space via a lumbar puncture. The nerve roots of the cauda equina are well demonstrated and exit through the intervertebral foramina. The nerve roots extending from the conus to the terminal thecal sac pass below the pedicle of the corresponding vertebra. The thecal sac terminates at the level of the first/second sacral vertebrae. The filum terminale may be seen. Tilting the prone patient slightly head down allows the contrast to flow cranially and outlines the conus and lower thoracic cord. The cord is uniform in size from the second to the tenth thoracic vertebra, at which point its second, smaller expansion (for the lumbosacral plexus) extends from the tenth thoracic vertebra to the level of the first lumbar vertebra. The conus medullaris usually terminates at the first/second lumbar vertebrae, but may be seen at a level above and below as a normal variant.



- 1 Anterior median fissure
- 2 Body of second lumbar vertebra
- 3 Contrast medium in subarachnoid space
- 4 Conus medullaris
- 5 Fifth lumbar spinal nerve
- 6 Fourth lumbar spinal nerve
- 7 Intervertebral disc indentations in anterior thecal margin

- 8 Lateral extension of subarachnoid space around spinal nerve roots
- 9 Lumbar puncture needle in space between third and fourth lumbar vertebrae
- 10 Sacral promontory
- 11 Spinal nerves within subarachnoid space (cauda equina)

- 12 Spinous process of third lumbar vertebra
- 13 Terminal theca at first/second sacral vertebra
- 14 Test tube containing contrast medium to indicate tilt of patient
- 15 Thoracic cord
- 16 Twelfth rib



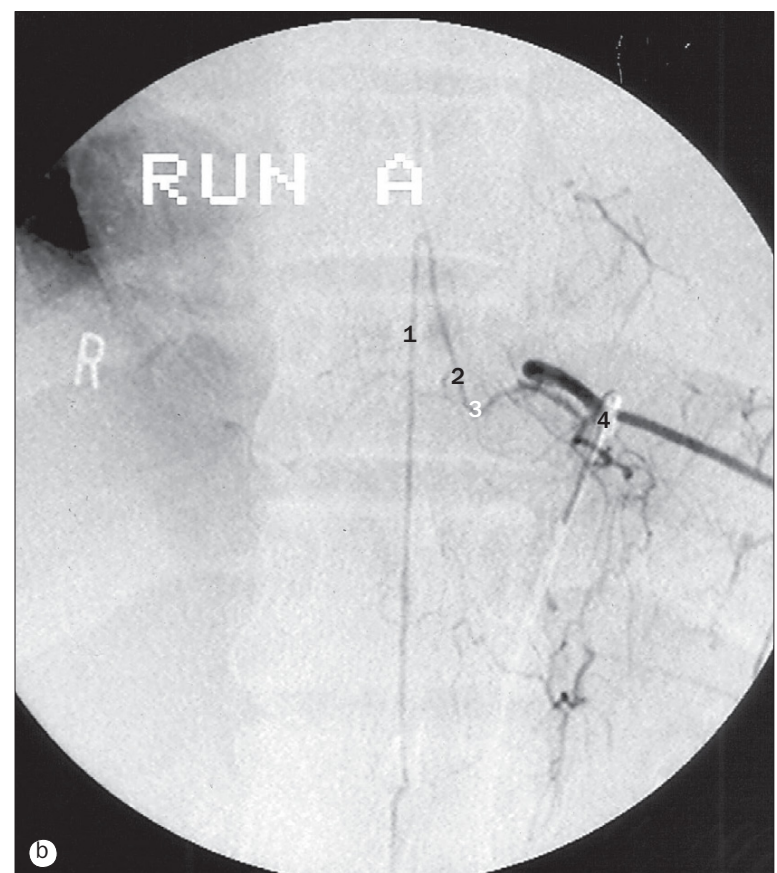
(a) Subtracted lumbar venogram.

Since the advent of CT and MR imaging techniques, lumbar venography is rarely performed. However, the anatomy of the vertebral veins is optimally demonstrated by this technique. Venous drainage of the spinal cord is longitudinally arranged via plexi, which anastomose freely with the internal (6) and external (1 and 4) vertebral venous plexi, which also communicate (4 and 2). Note how the internal veins bend laterally at the level of the disc interspace and medially at the level of pedicles, where they unite via a connecting vein (2).

- 1 Ascending lumbar veins
- 2 Basivertebral veins
- 3 Catheter in common iliac vein
- 4 Intervertebral veins
- 5 Lateral sacral veins
- 6 Longitudinal vertebral venous plexi
- 7 Sacral venous plexus
- 8 Tip of catheter in intravertebral vein

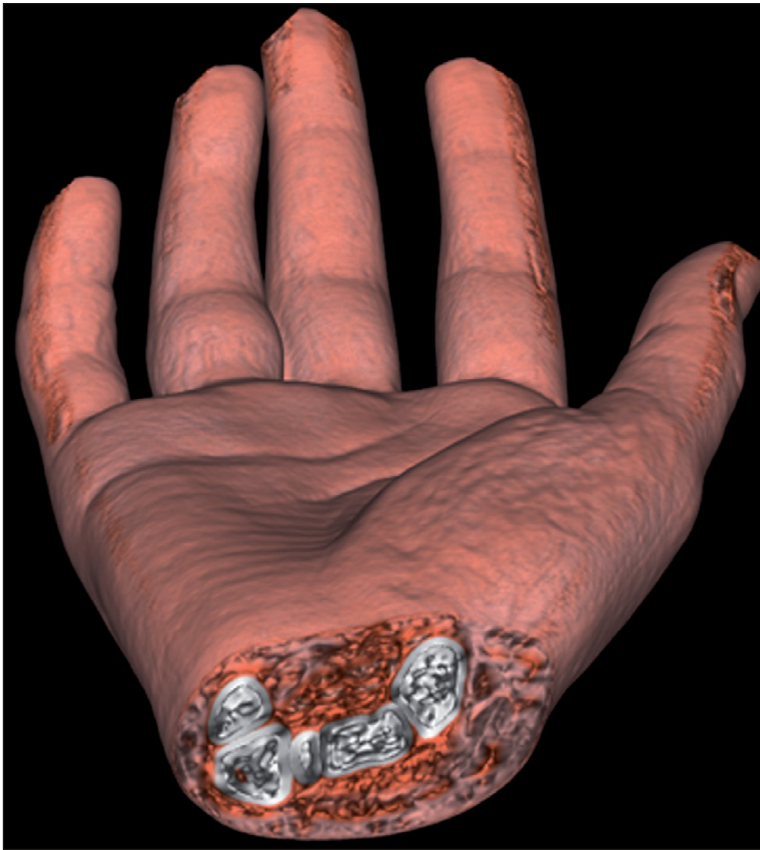
(b) Spinal arteriogram.

- 1 Anterior spinal artery
- 2 Arteria radicularis magna (Adamkiewicz)
- 3 Normal transdural stenosis of the arteria radicularis magna
- 4 Selective catheterisation of left eleventh intercostal artery



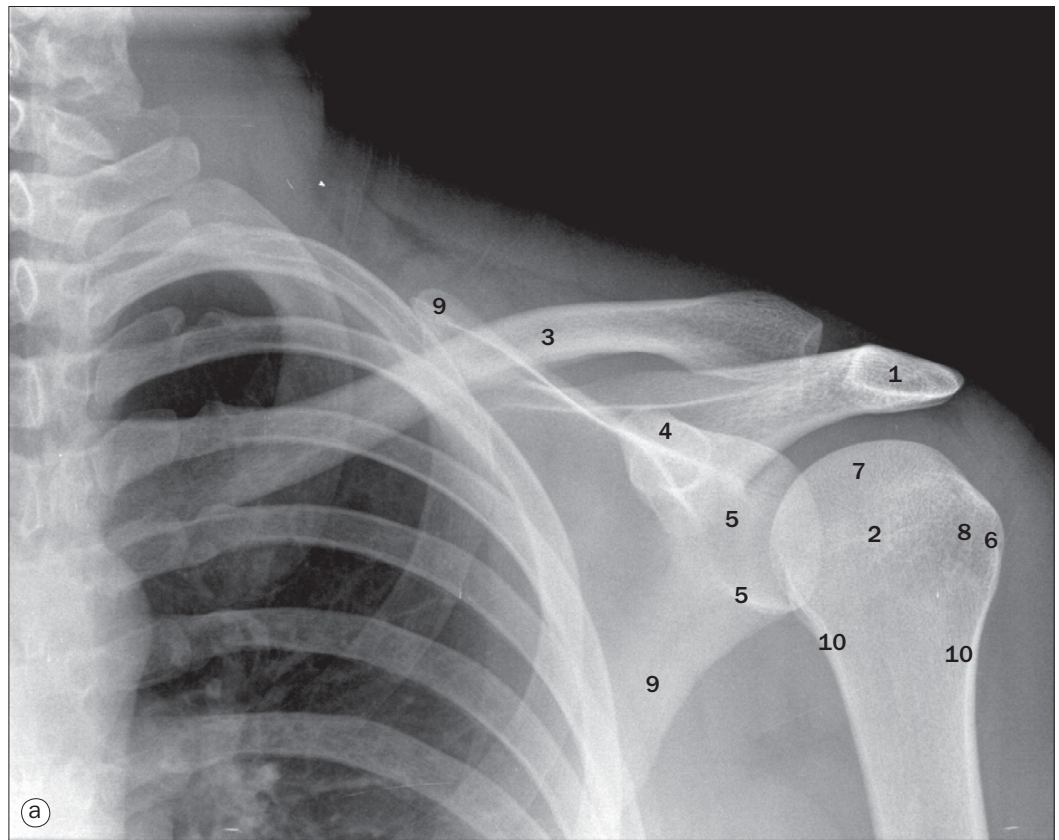
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Upper limb



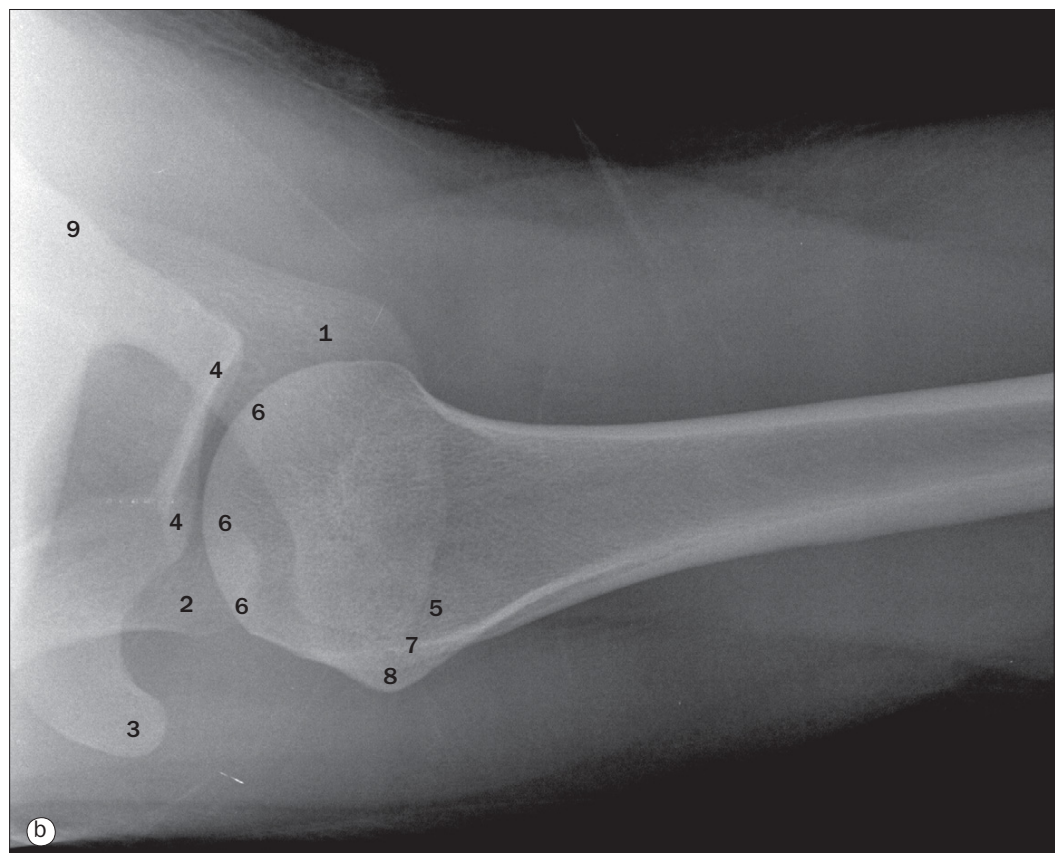
(a) Shoulder, anteroposterior radiograph.

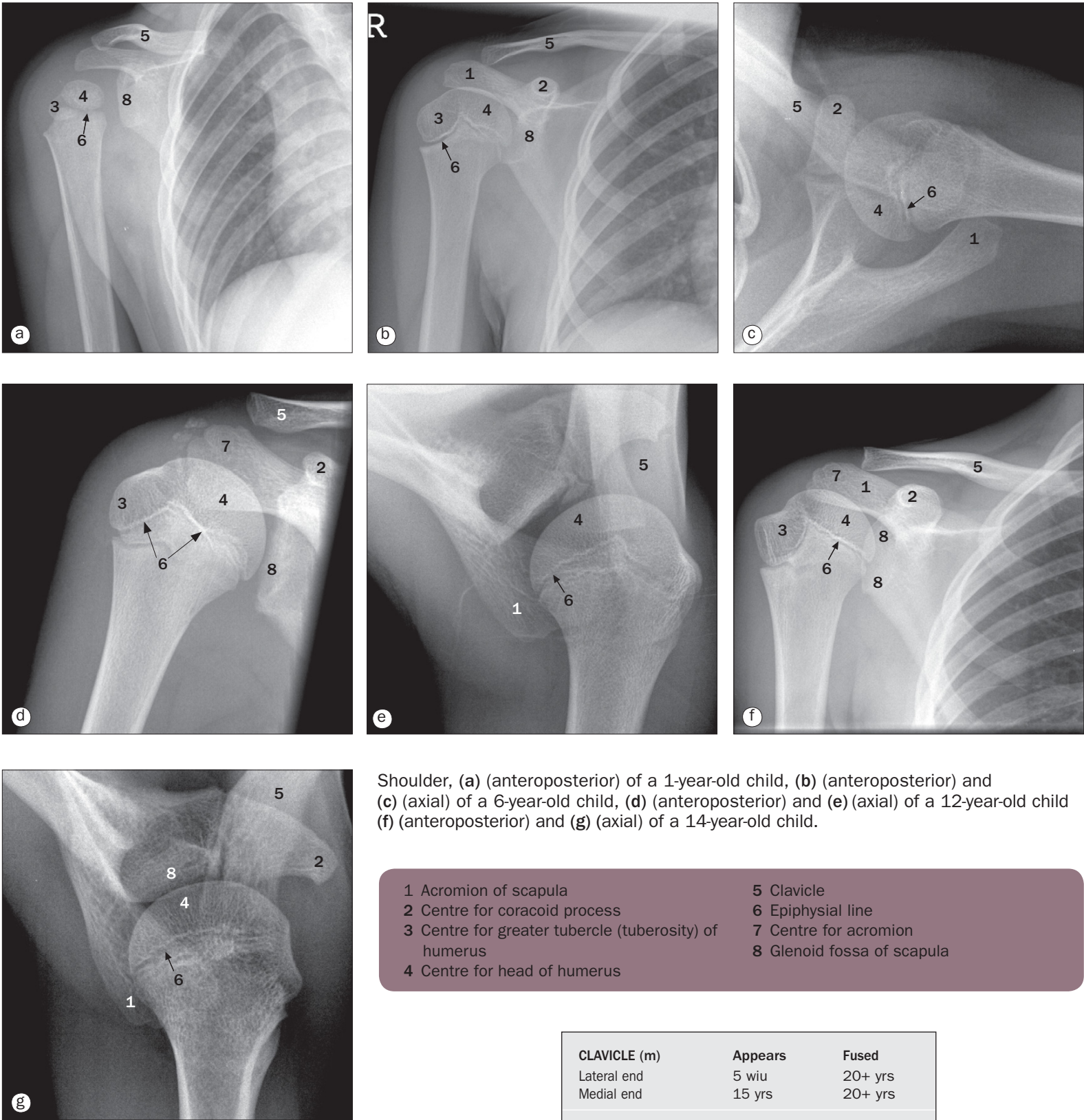
- 1 Acromion of scapula
- 2 Anatomical neck
- 3 Clavicle
- 4 Coracoid process of scapula
- 5 Glenoid fossa of scapula
- 6 Greater tubercle (tuberosity) of humerus
- 7 Head of humerus
- 8 Lesser tubercle (tuberosity) of humerus
- 9 Scapula
- 10 Surgical neck



(b) Shoulder, axial (supero-inferior) projection.

- 1 Acromion of scapula
- 2 Clavicle
- 3 Coracoid process of scapula
- 4 Glenoid fossa of scapula
- 5 Greater tubercle (tuberosity) of humerus
- 6 Head of humerus
- 7 Intertubercular groove of humerus
- 8 Lesser tubercle (tuberosity) of humerus
- 9 Spine of scapula





Shoulder, (a) (anteroposterior) of a 1-year-old child, (b) (anteroposterior) and (c) (axial) of a 6-year-old child, (d) (anteroposterior) and (e) (axial) of a 12-year-old child (f) (anteroposterior) and (g) (axial) of a 14-year-old child.

- 1 Acromion of scapula

2 Centre for coracoid process

3 Centre for greater tubercle (tuberosity) of humerus

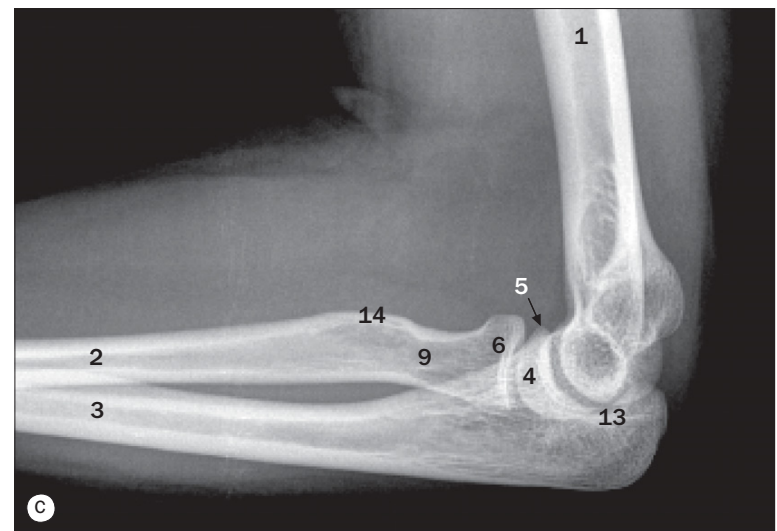
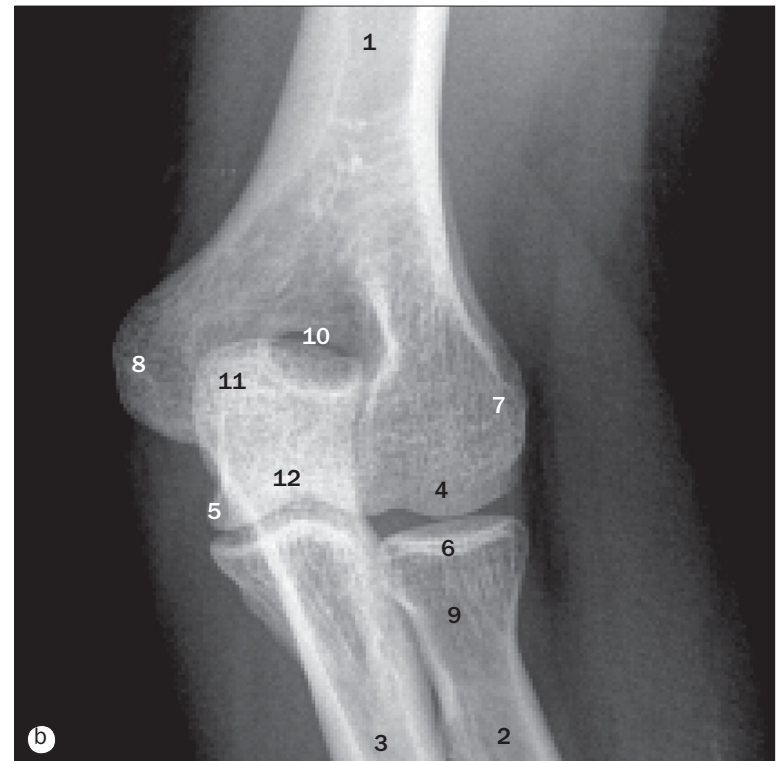
4 Centre for head of humerus
- 5 Clavicle

6 Epiphysial line

7 Centre for acromion

8 Glenoid fossa of scapula

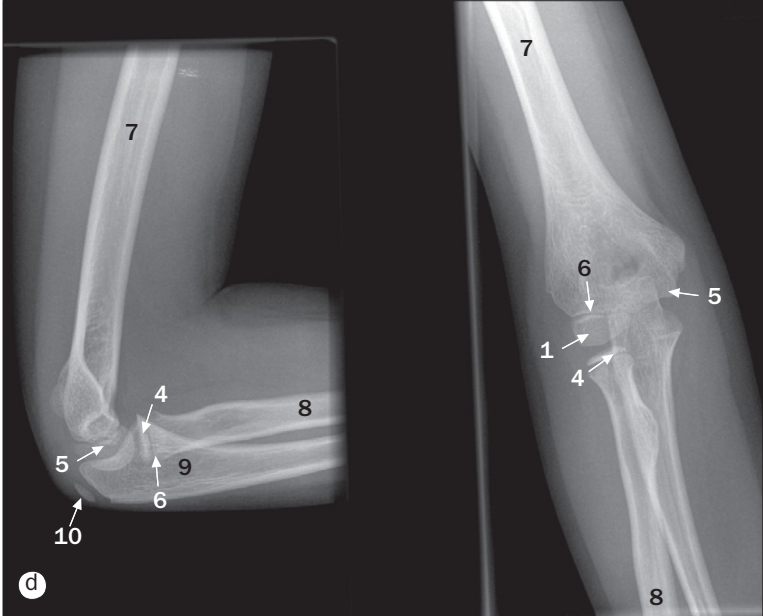
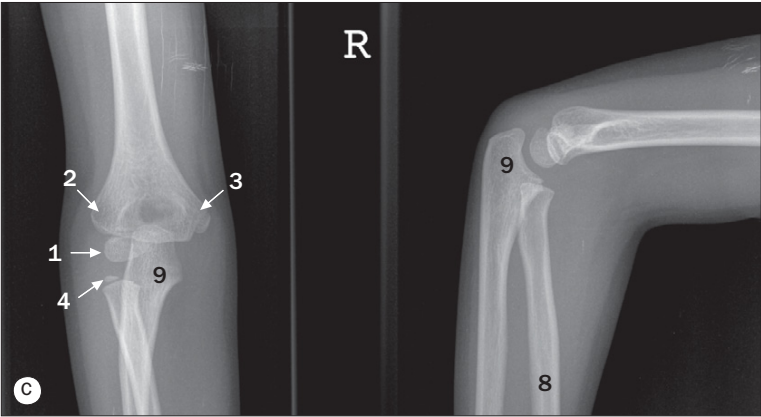
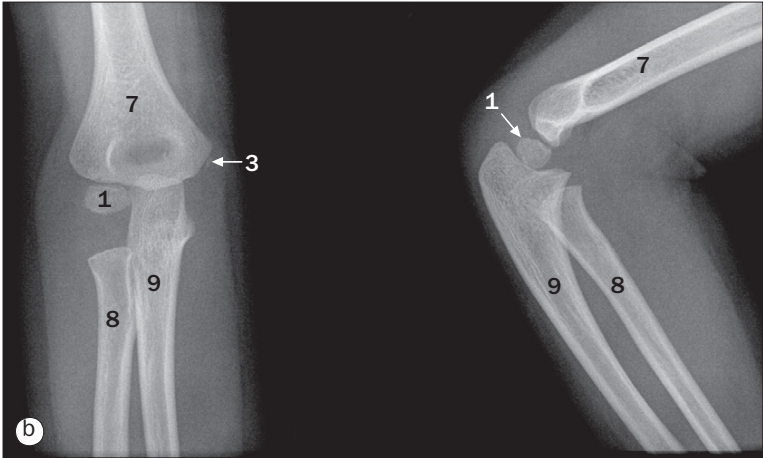
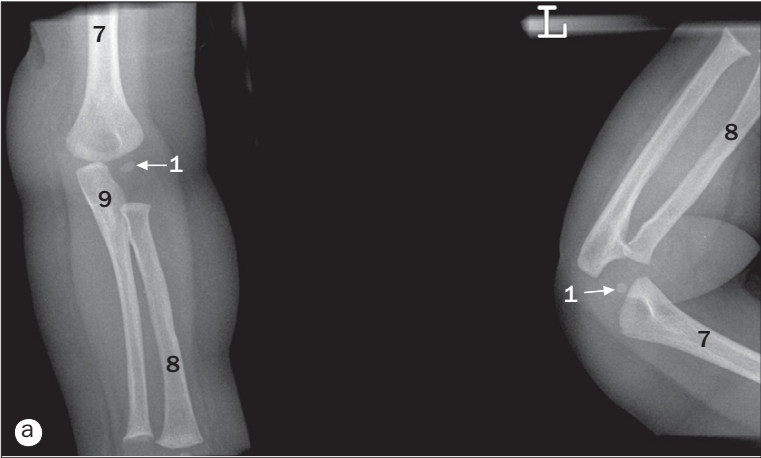
CLAVICLE (m)		
Lateral end	5 wiu	20+ yrs
Medial end	15 yrs	20+ yrs
SCAPULA (c)		
Body	8 wiu	15 yrs
Coracoid	<1 yr	20 yrs
Coracoid base	Puberty	15-20 yrs
Acromion	Puberty	15-20 yrs



(a) Humerus, lateral projection, (b) elbow, anteroposterior projection, (c) elbow, lateral projection.

- | | |
|---------------------------------|--------------------------------|
| 1 Humerus | 8 Medial epicondyle of humerus |
| 2 Radius | 9 Neck of radius |
| 3 Ulna | 10 Olecranon fossa of humerus |
| 4 Capitulum of humerus | 11 Olecranon of ulna |
| 5 Coronoid process of ulna | 12 Trochlea of humerus |
| 6 Head of radius | 13 Trochlear notch of ulna |
| 7 Lateral epicondyle of humerus | 14 Tuberosity of radius |

HUMERUS (c)	Appears	Fused
Shaft	8 wiu	15–20 yrs
Head	1–6 mths	15–20 yrs
Greater tubercle	6 mths–1 yr	15–20 yrs
Lesser tubercle	3–5 yrs	18–20 yrs
Capitulum	4 mths–1 yr	13–16 yrs
Medial trochlea	10 yrs	13–16 yrs
Medial epicondyle	3–6 yrs	13–16 yrs
Lateral epicondyle	9–12 yrs	13–16 yrs

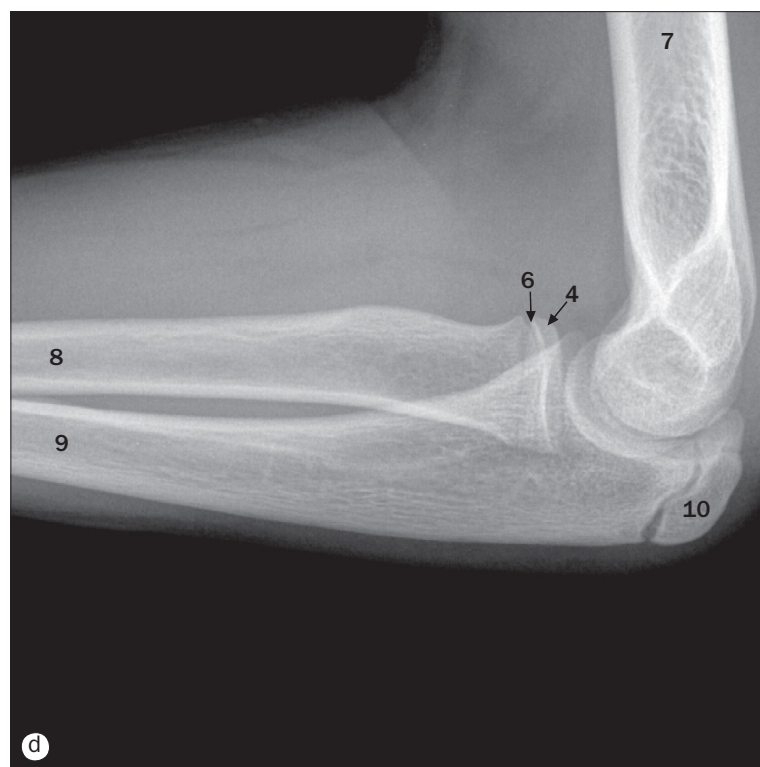
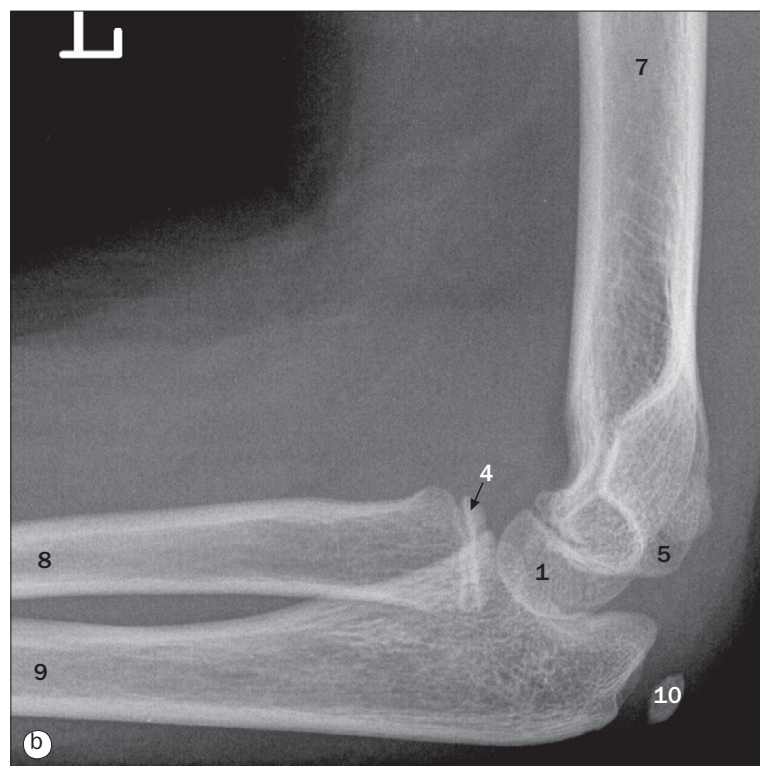
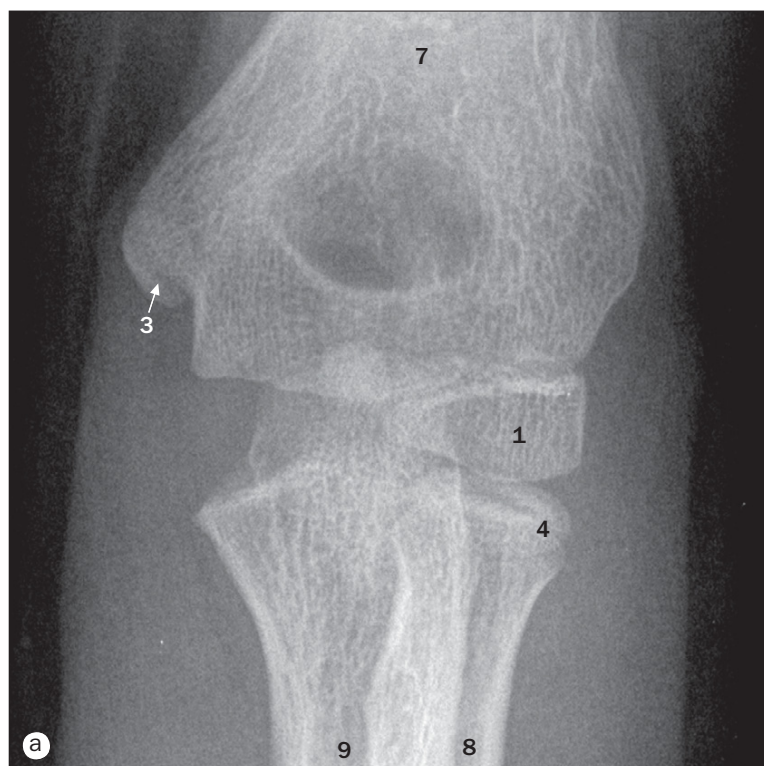


Elbow images, (a) 7-month-old child, (b) 3-year-old child, (c) 6-year-old child, (d) 9-year-old child.

RADIUS (c)		
Shaft	8 wiu	
Proximal	4–6 yrs	13–16 yrs
Distal	1 yr	16–18 yrs

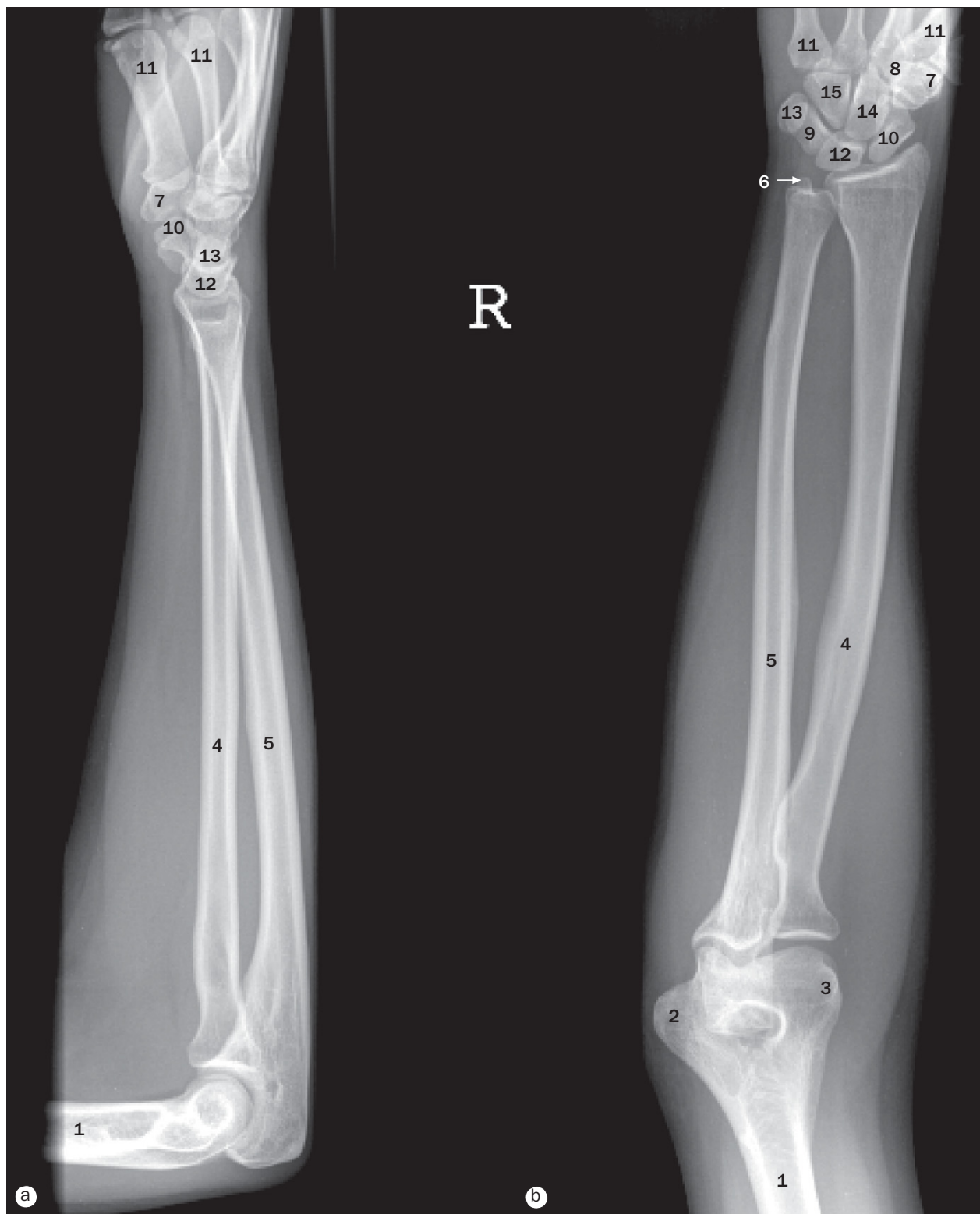
ULNA (c)		
Shaft	8 wiu	
Proximal	8–10 yrs	13–15 yrs
Distal	5–7 yrs	16–18 yrs

- 1 Centre for capitulum
- 2 Centre for lateral epicondyle
- 3 Centre for medial epicondyle
- 4 Centre for radial head
- 5 Centre for trochlea
- 6 Epiphysial line
- 7 Humerus
- 8 Radius
- 9 Ulna
- 10 Centre for olecranon



Elbow images, (a) and (b) 11-year-old child, (c) and (d) 14-year-old child.

- | | |
|---------------------------------|-------------------------|
| 1 Centre for capitulum | 6 Epiphyseal line |
| 2 Centre for lateral epicondyle | 7 Humerus |
| 3 Centre for medial epicondyle | 8 Radius |
| 4 Centre for radial head | 9 Ulna |
| 5 Centre for trochlea | 10 Centre for olecranon |

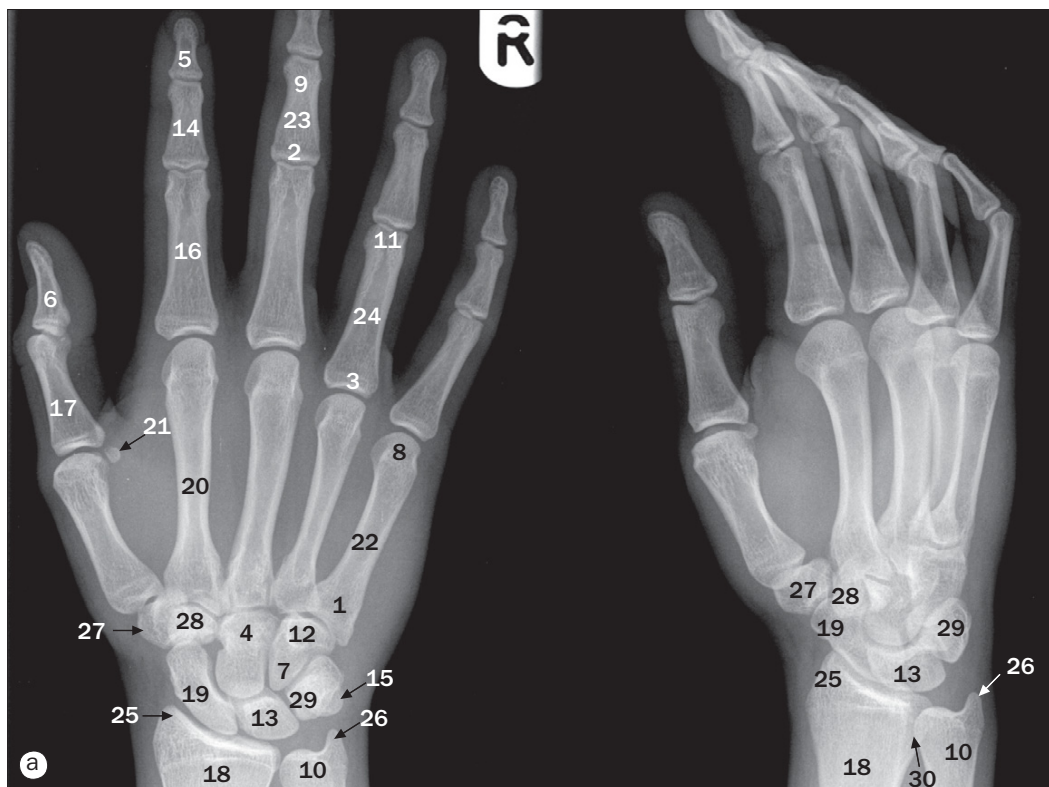


Forearm images, (a) lateral and (b) anteroposterior.

1 Humerus
2 Medial epicondyle of humerus
3 Lateral epicondyle of humerus
4 Radius

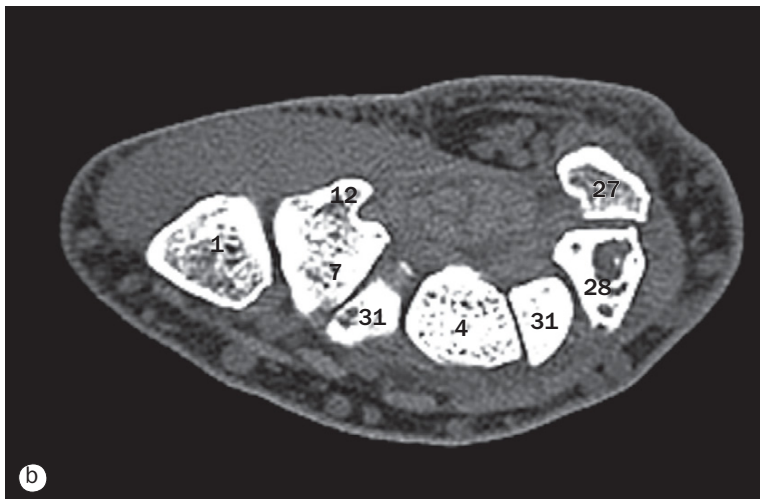
5 Ulna
6 Styloid of ulna
7 Trapezium
8 Trapezoid
9 Triquetral

10 Scaphoid
11 Metacarpals
12 Lunate
13 Pisiform
14 Capitate
15 Hamate

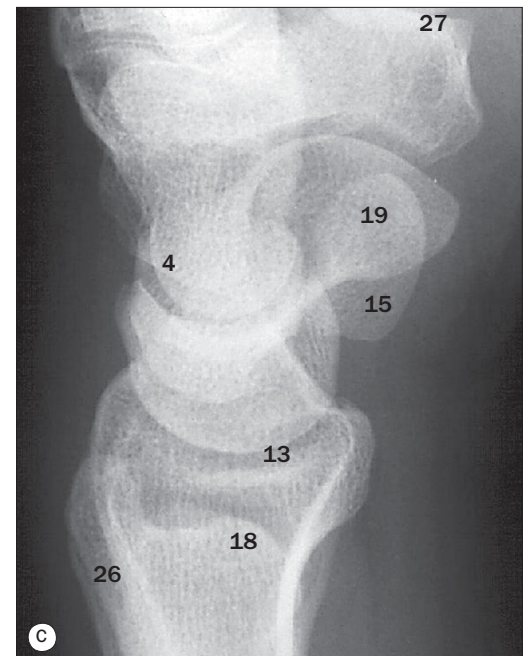


(a) Bones of the hand, dorsopalmar and oblique projection.

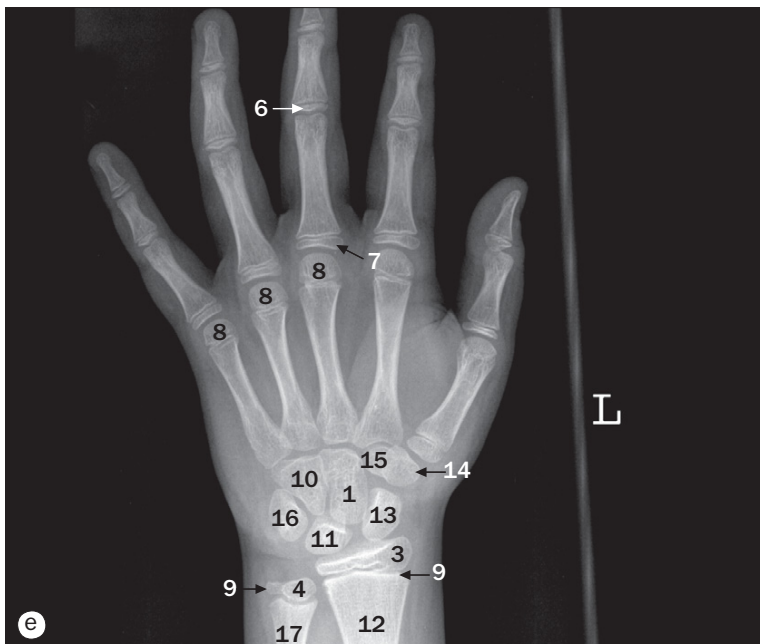
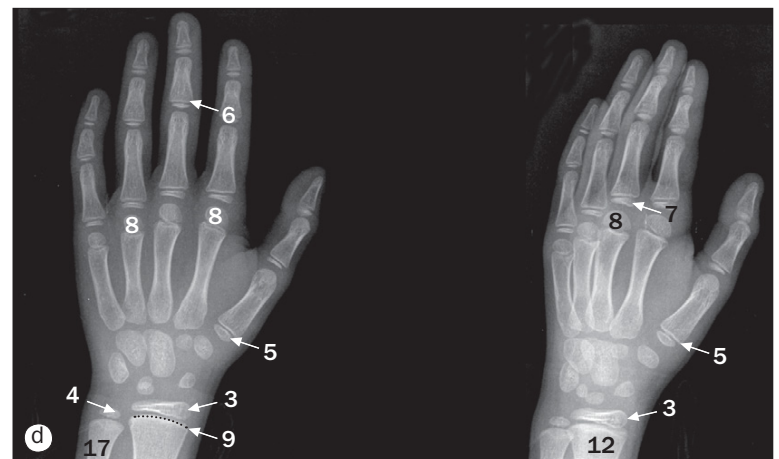
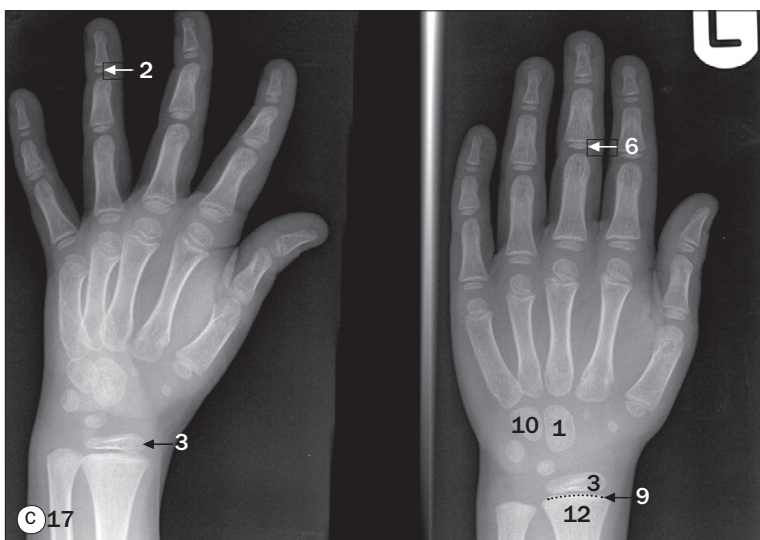
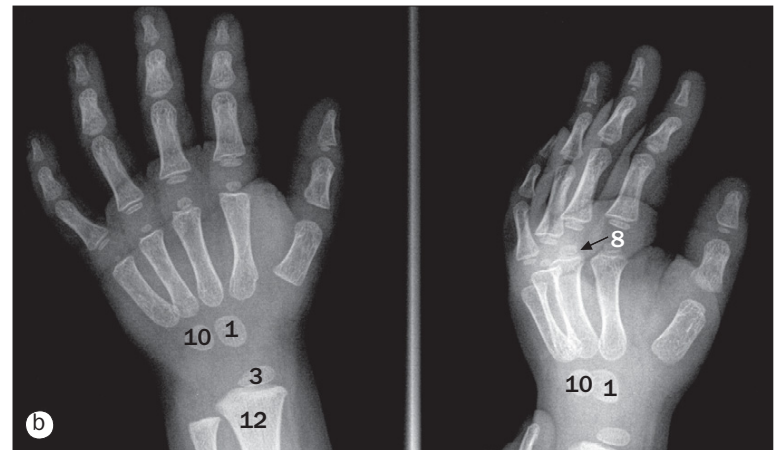
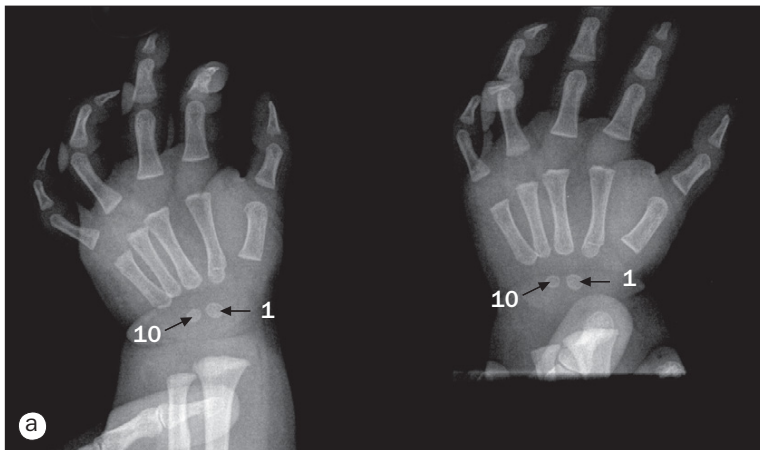
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|--|-------------------------------------|---|
| 1 Base of fifth metacarpal | 12 Hook of hamate | 22 Shaft of fifth metacarpal |
| 2 Base of middle phalanx of middle finger | 13 Lunate | 23 Shaft of middle phalanx of middle finger |
| 3 Base of proximal phalanx of ring finger | 14 Middle phalanx of index finger | 24 Shaft of proximal phalanx of ring finger |
| 4 Capitate | 15 Pisiform | 25 Styloid process of radius |
| 5 Distal phalanx of index finger | 16 Proximal phalanx of index finger | 26 Styloid process of ulna |
| 6 Distal phalanx of thumb | 17 Proximal phalanx of thumb | 27 Trapezium |
| 7 Hamate | 18 Radius | 28 Trapezoid |
| 8 Head of fifth metacarpal | 19 Scaphoid | 29 Triquetrum |
| 9 Head of middle phalanx of middle finger | 20 Second metacarpal | 30 Ulnar notch of radius |
| 10 Head of ulna | 21 Sesamoid bone | 31 Base of metacarpal |
| 11 Head of proximal phalanx of ring finger | | |



(b) Axial CT through carpal tunnel.



(c) Bones of the wrist, lateral projection.



CARPUS (c)	Appears	Fused
Capitate	1–3 mths	
Hamate	2–4 mths	
Triquetral	2–3 yrs	
Lunate	2–4 yrs	
Scaphoid	4–6 yrs	
Trapezium	4–6 yrs	
Trapezoid	4–6 yrs	
Pisiform (sesamoid)	8–12 yrs	
METACARPALS (c)		
Shaft	9 wiu	
Head	1–2 yrs	14–19 yrs
PHALANGES (c)		
Shaft	8–12 wiu	
Base	1–3 yrs	14–18 yrs

Bones of the hand (dorsopalmar projections), (a) of a 10-month-old child, (b) of a 2-year-old child, (c) of a 6-year-old child, (d) of a 9-year-old child, to illustrate centres of ossification, (e) of an 11-year-old child.

- 1 Capitate
- 2 Centre for distal phalanx of ring finger
- 3 Centre for distal radius
- 4 Centre for distal ulna

- 5 Centre for first metacarpal
- 6 Centre for middle phalanx of middle finger
- 7 Centre for proximal phalanx of middle finger

- 8 Centre for second metacarpal (applies to second to fifth metacarpals)
- 9 Epiphysial line
- 10 Hamate
- 11 Lunate

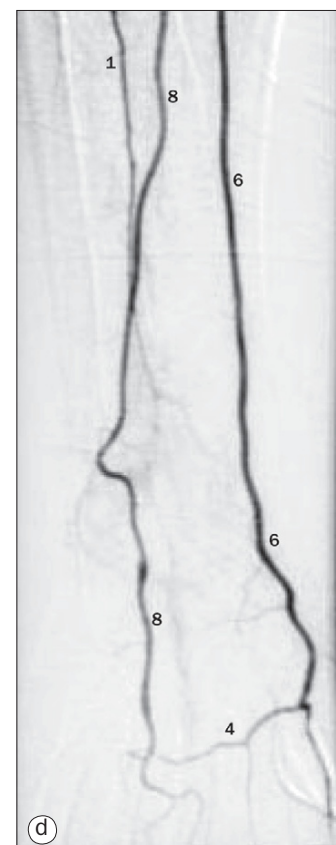
- 12 Radius
- 13 Scaphoid
- 14 Trapezium
- 15 Trapezoid
- 16 Triquetral
- 17 Ulna

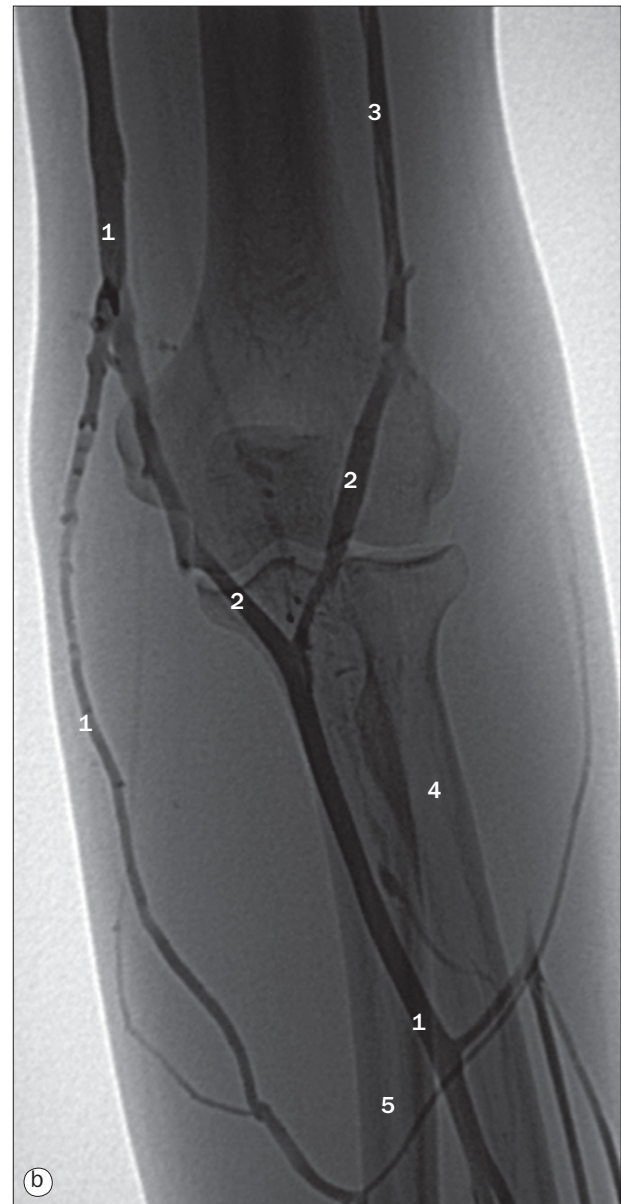
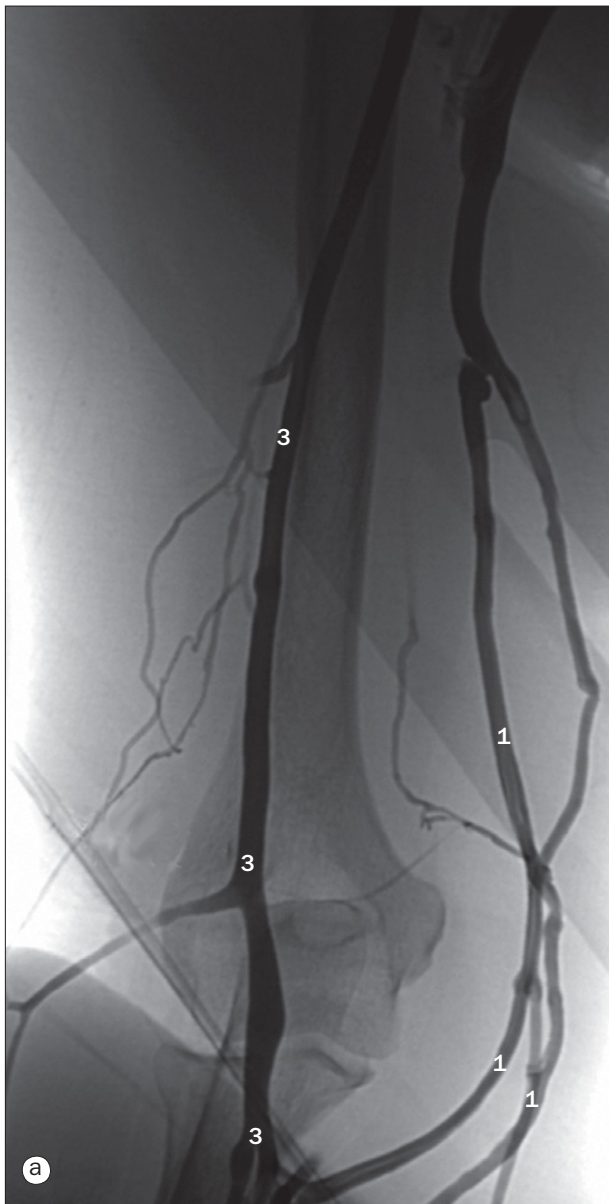


- | | |
|--|---------------------------------------|
| 1 Anterior circumflex humeral artery | 7 Posterior circumflex humeral artery |
| 2 Axillary artery | 8 Profunda brachii artery |
| 3 Brachial artery | 9 Subscapular artery |
| 4 Circumflex scapular artery | 10 Superior thoracic artery |
| 5 Lateral thoracic artery | 11 Thoraco-acromial artery |
| 6 Muscular branches of brachial artery | |

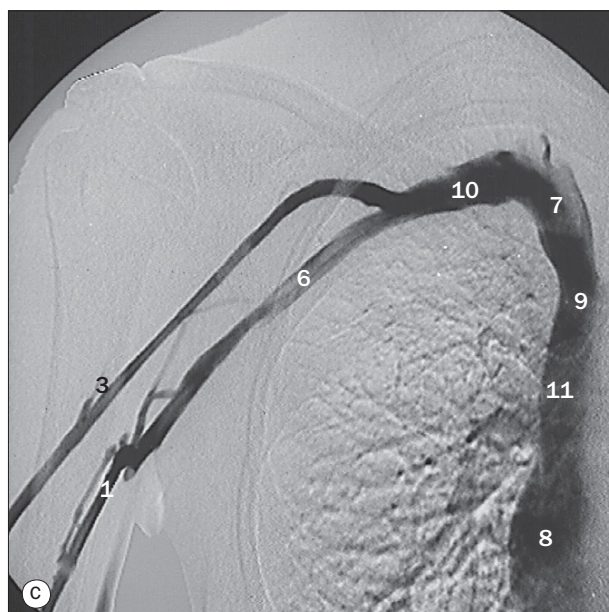
Axillary arteriograms, (a) subtracted, (b) digitally subtracted, (c) and (d) brachial arteriograms.

- | | |
|--------------------------------|---------------------------------|
| 1 Anterior interosseous artery | 5 Posterior interosseous artery |
| 2 Brachial artery | 6 Radial artery |
| 3 Common interosseous artery | 7 Radial recurrent artery |
| 4 Deep palmar arch | 8 Ulnar artery |
| | 9 Ulnar recurrent artery |

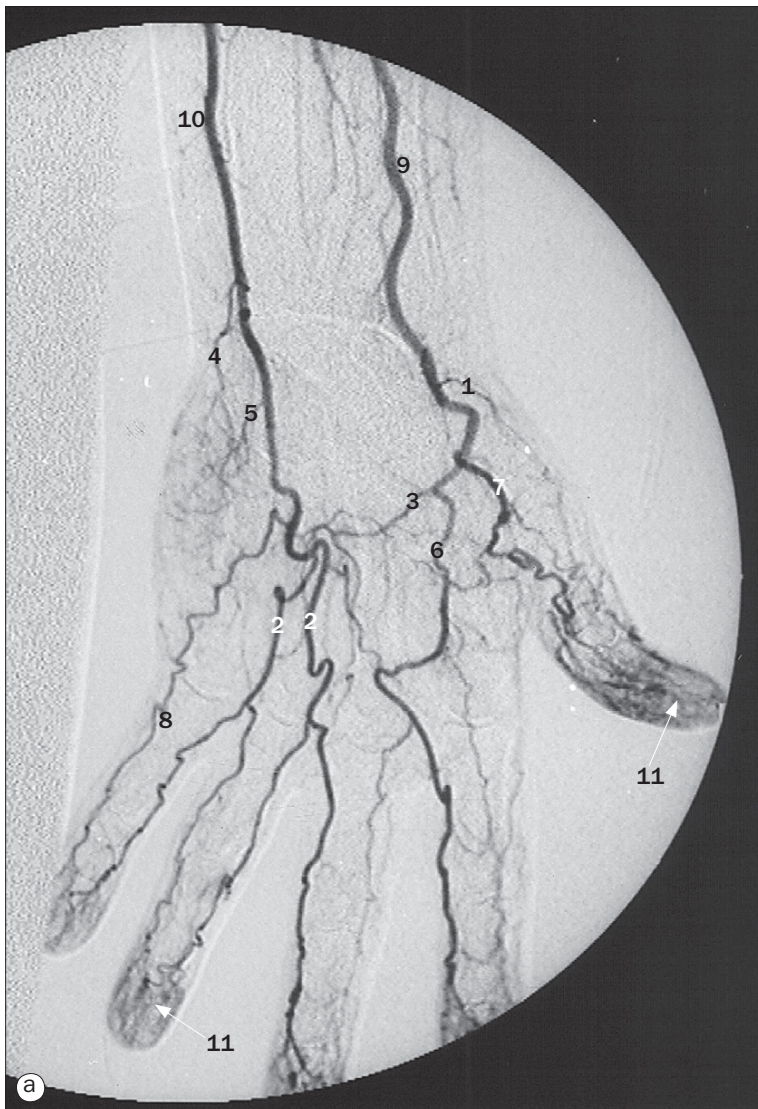




(a) and (b) Upper limbs venograms, (c) superior vena cavogram.



- 1 Basilic vein
- 2 Median cubital vein
- 3 Cephalic vein
- 4 Radius
- 5 Ulna
- 6 Axillary vein
- 7 Brachiocephalic vein
- 8 Right atrium
- 9 Site of entry of left brachiocephalic vein
- 10 Subclavian vein
- 11 Superior vena cava



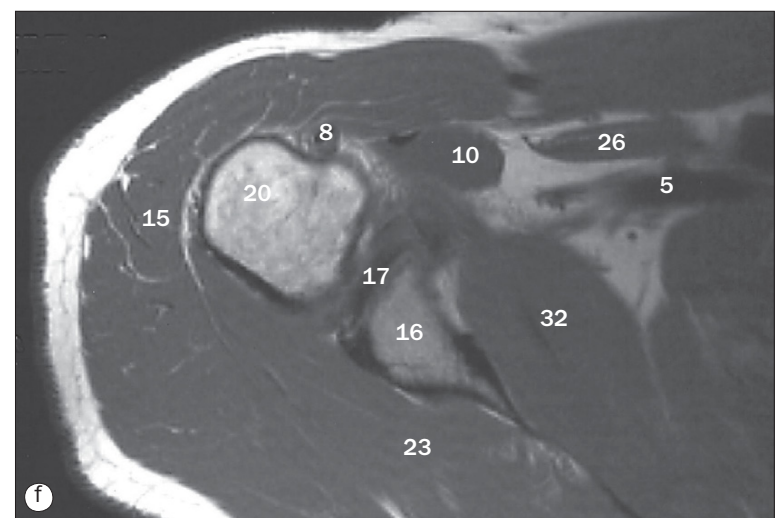
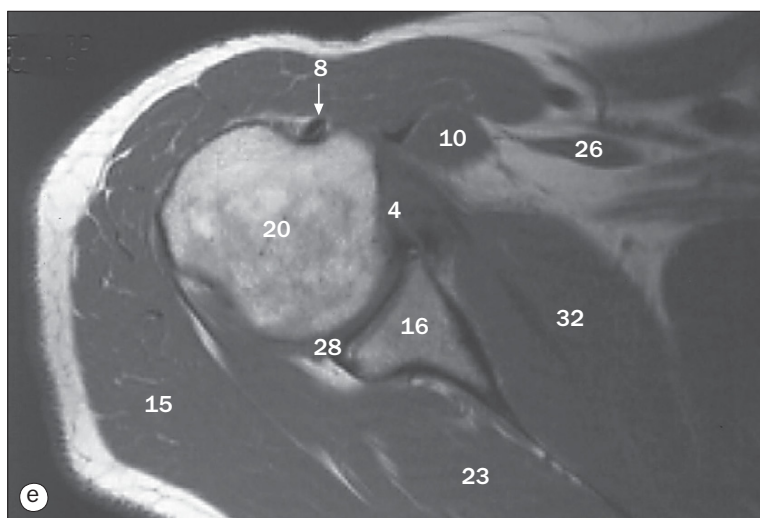
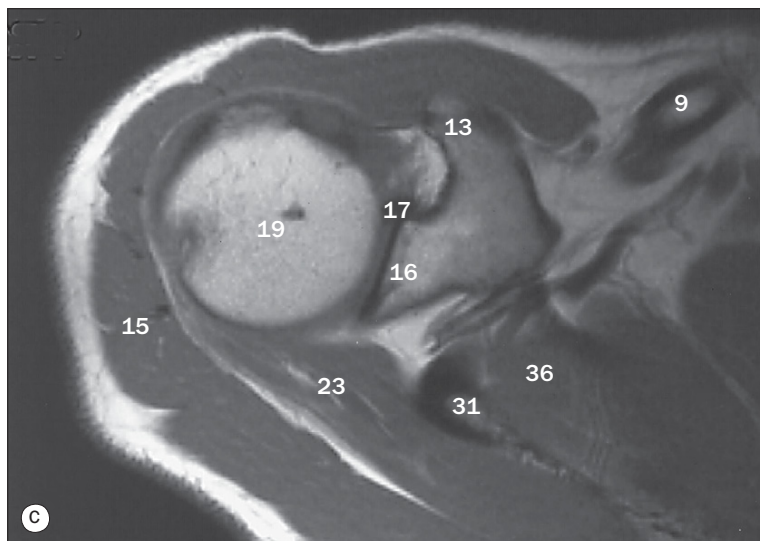
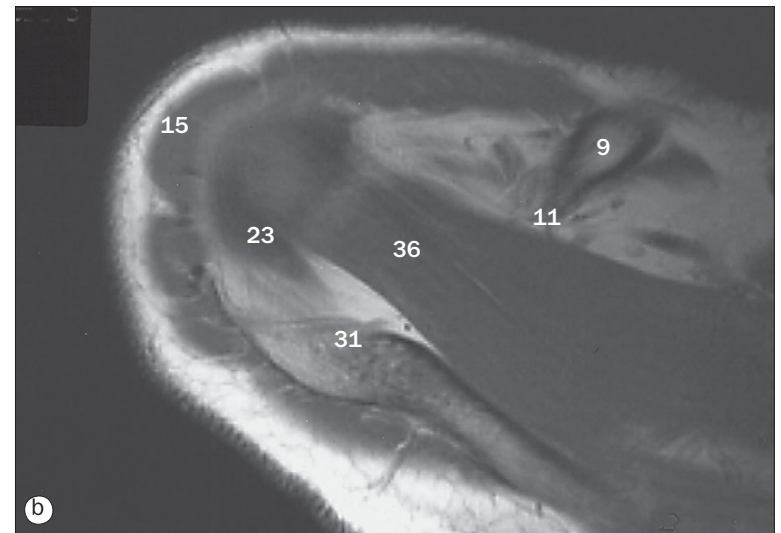
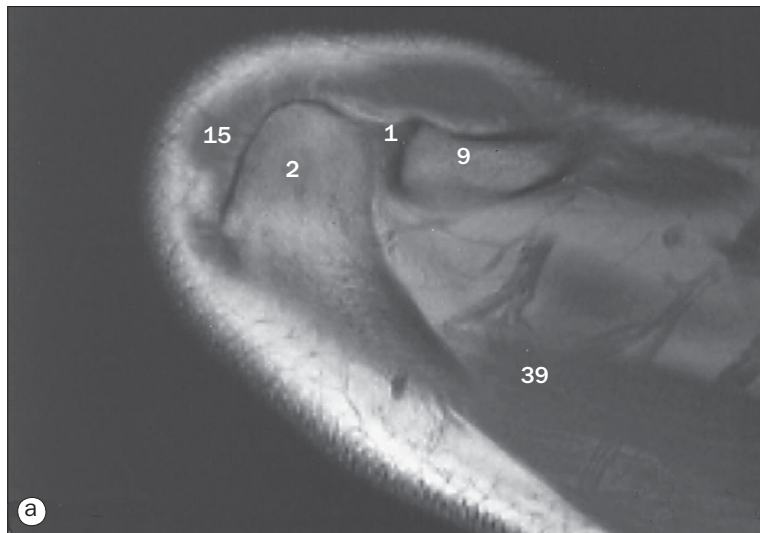
(a) Digitally subtracted hand arteriogram.
In this patient there is an incomplete superficial palmar arch.

- 1 Artery to radial aspects of thumb
- 2 Common palmar digital artery
- 3 Deep palmar arch
- 4 Deep palmar branch of ulnar artery
- 5 Palmar carpal branch of ulnar artery
- 6 Palmar metacarpal artery
- 7 Princeps pollicis artery
- 8 Proper palmar digital artery
- 9 Radial artery
- 10 Ulnar artery
- 11 Pulp anastomoses



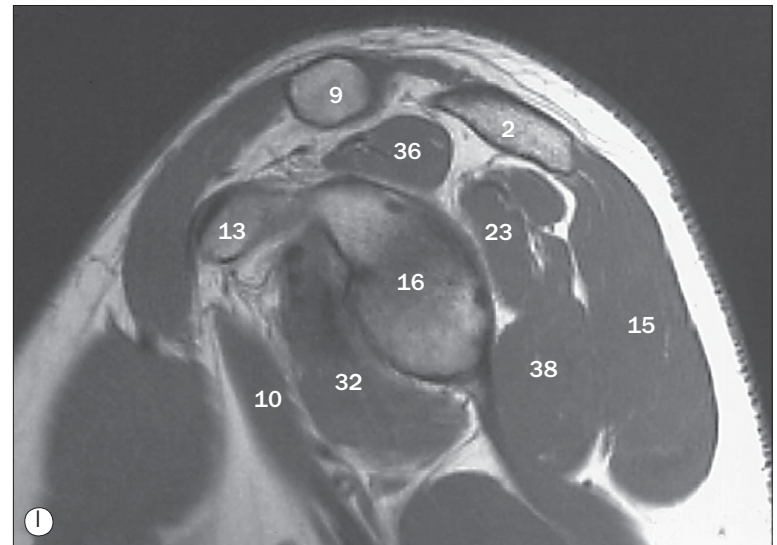
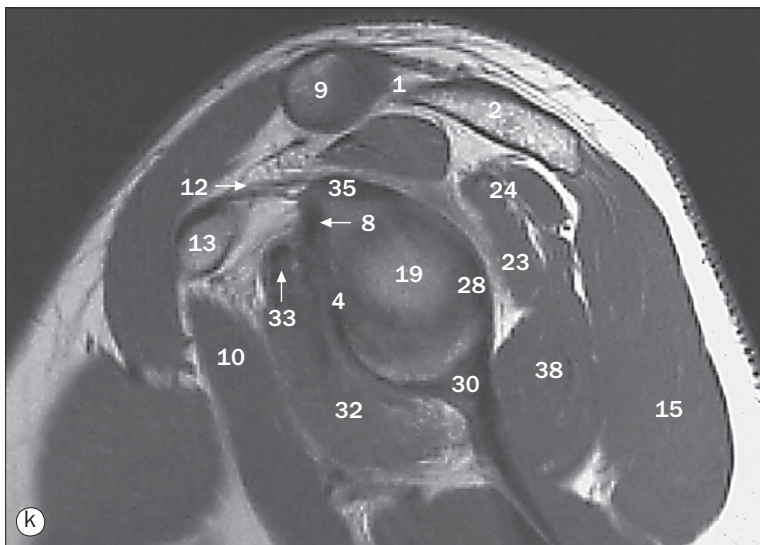
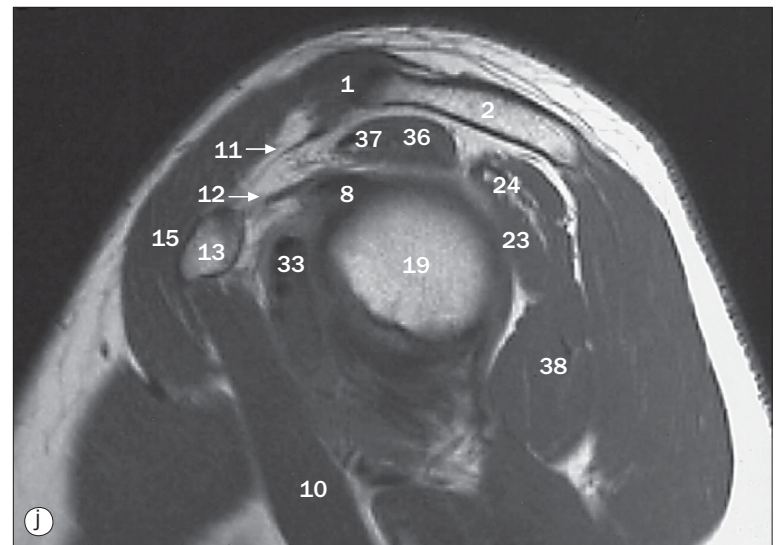
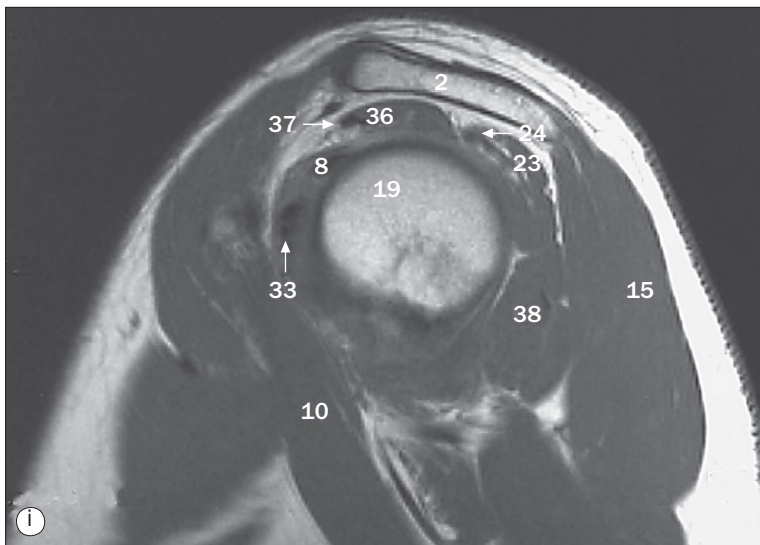
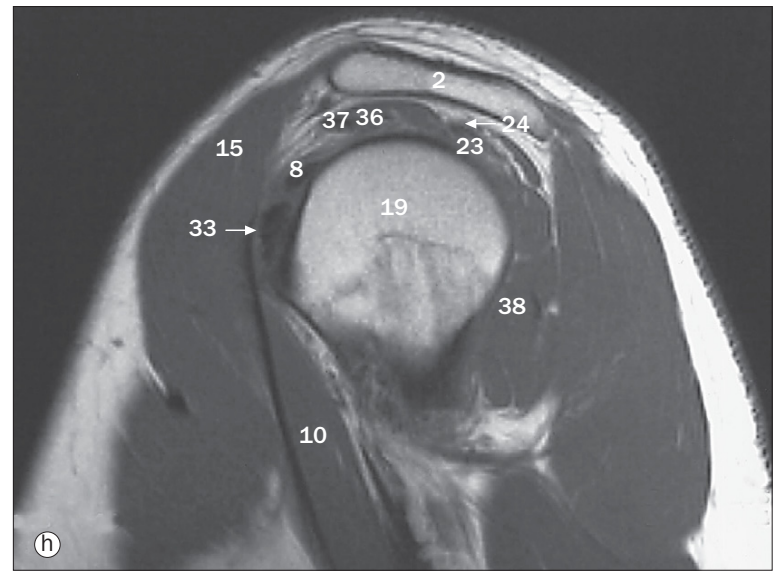
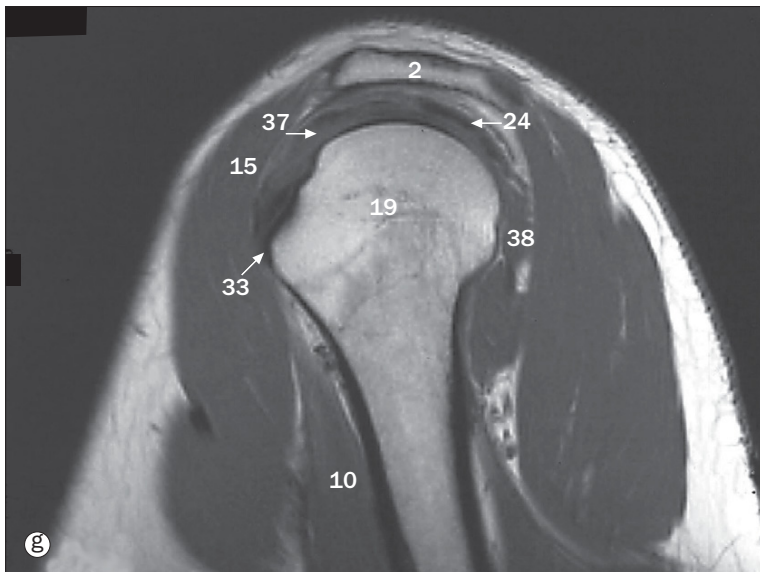
(b) Venous phase of hand arteriogram.

- 1 Basilic vein
- 2 Cephalic vein
- 3 Common palmar digital vein
- 4 Palmar digital vein
- 5 Princeps pollicis vein
- 6 Radialis indicis vein
- 7 Superficial palmar venous arch



Shoulder, axial MR arthrography images.

- | | | |
|--------------------------------------|------------------------------|-----------------------------------|
| 1 Acromioclavicular joint | 9 Clavicle | 17 Glenoid labrum |
| 2 Acromion | 10 Coracobrachialis muscle | 18 Greater tuberosity |
| 3 Anterior capsule of shoulder joint | 11 Coracoclavicular ligament | 19 Head of humerus |
| 4 Anterior labrum | 12 Coracohumeral ligament | 20 Humerus |
| 5 Axillary artery and vein | 13 Coracoid process | 21 Inferior glenohumeral ligament |
| 6 Axillary recess | 14 Deltoid tendon | 22 Inferior labrum |
| 7 Biceps brachii tendon | 15 Deltoid muscle | 23 Infraspinatus muscle |
| 8 Biceps brachii tendon (long head) | 16 Glenoid | 24 Infraspinatus tendon |

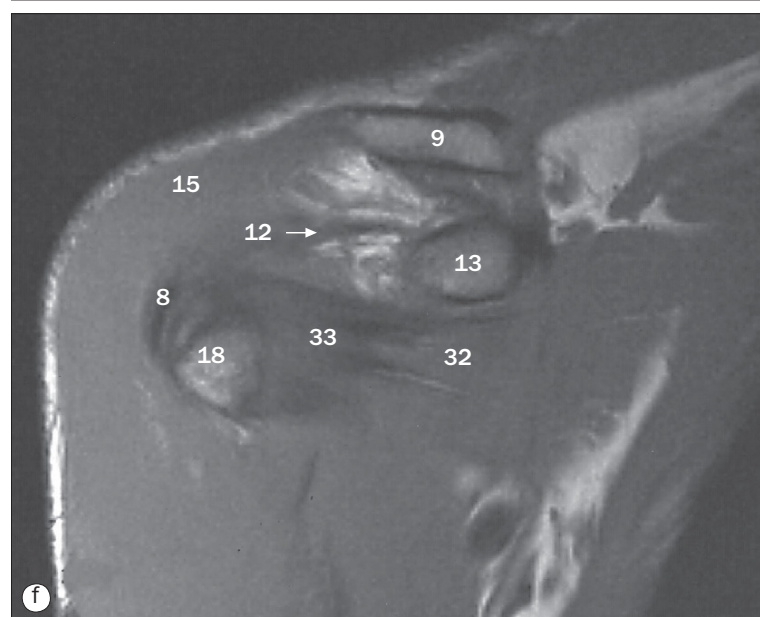
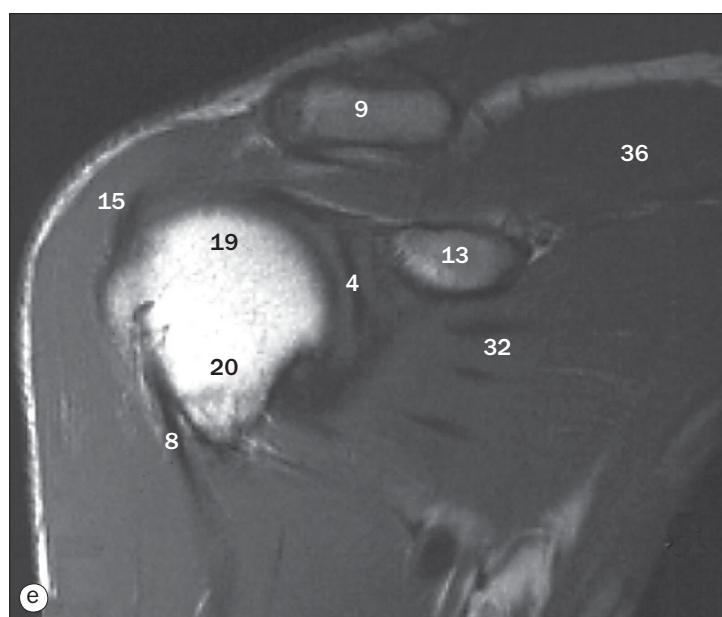
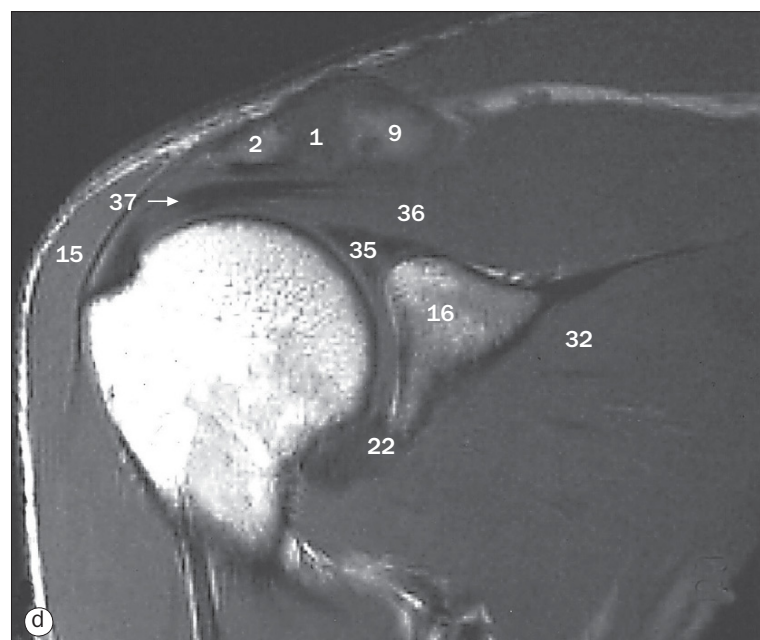
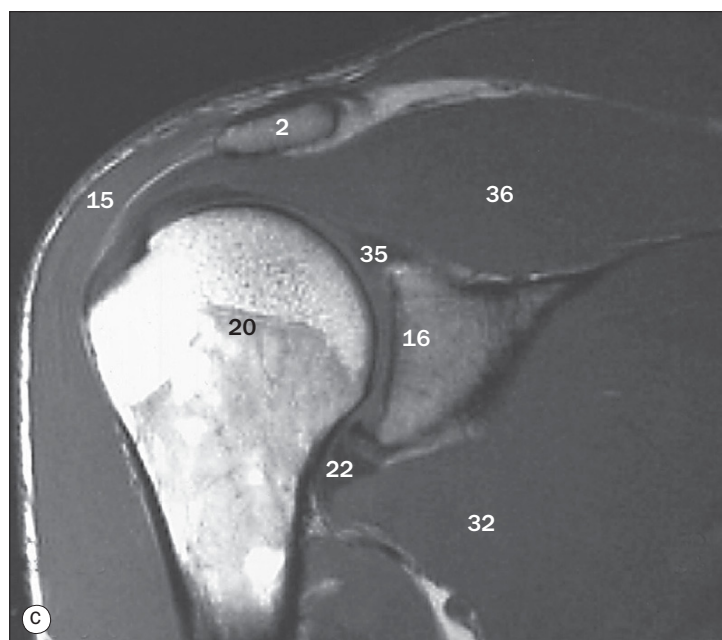
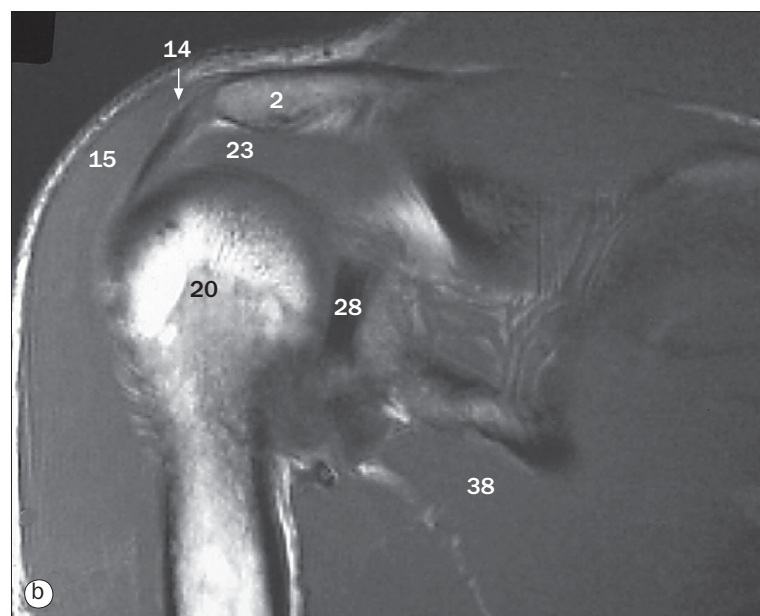
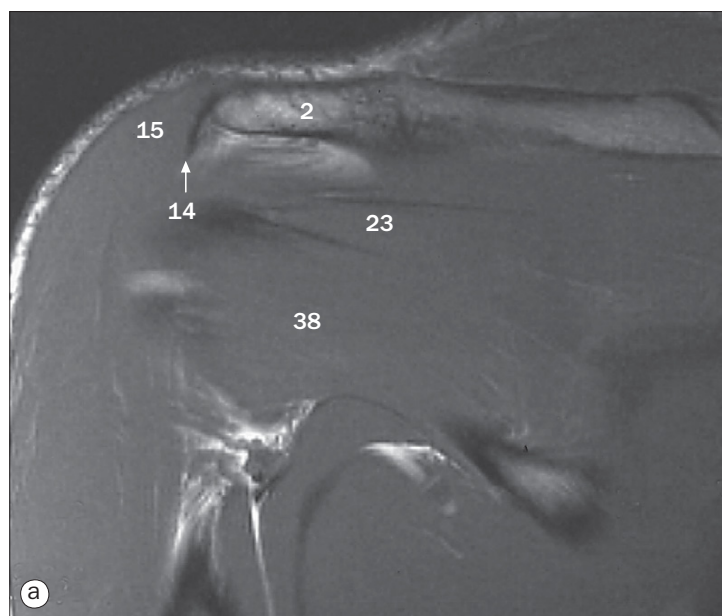


Shoulder, coronal MR arthrography images.

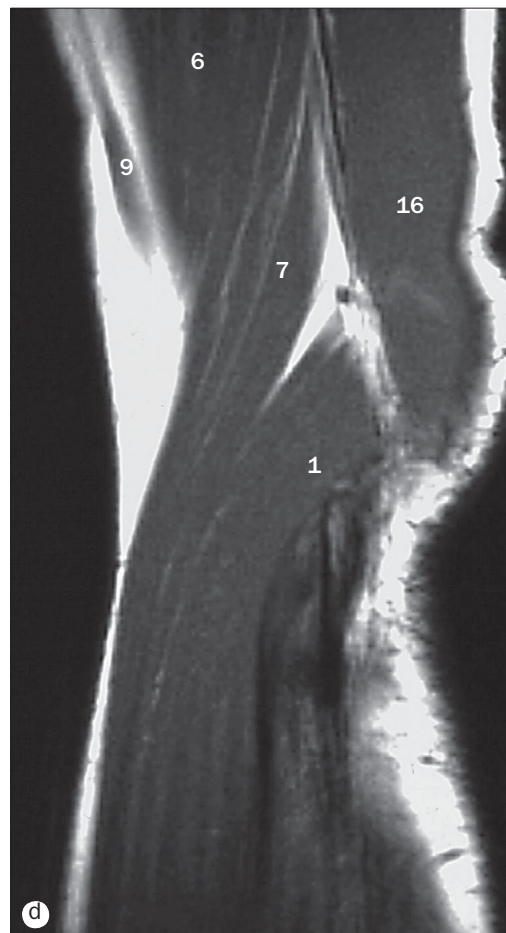
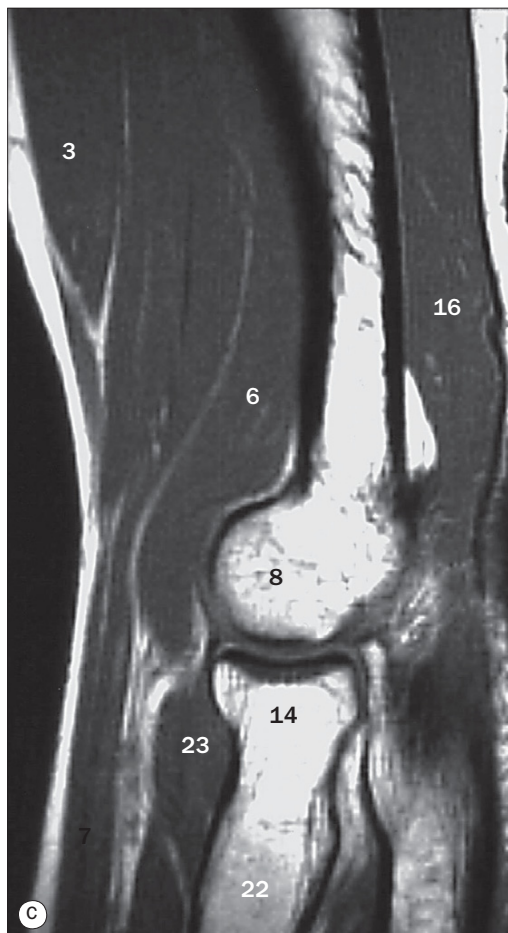
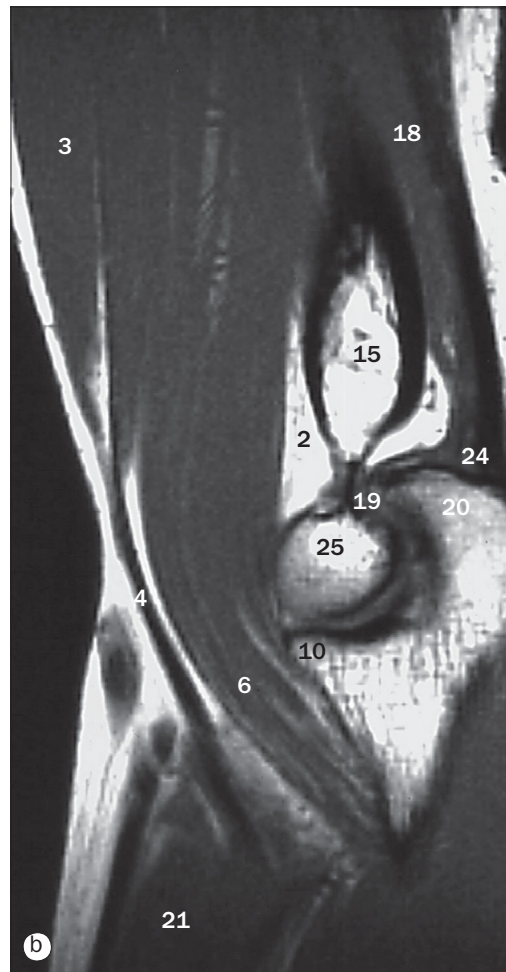
25 Middle glenohumeral ligament
26 Pectoralis minor muscle
27 Posterior capsule of shoulder joint
28 Posterior labrum
29 Rotator cuff

30 Scapula
31 Spine of scapula
32 Subscapularis muscle
33 Subscapularis tendon
34 Superior glenohumeral ligament

35 Superior labrum
36 Supraspinatus muscle
37 Supraspinatus tendon
38 Teres minor muscle
39 Trapezius muscle

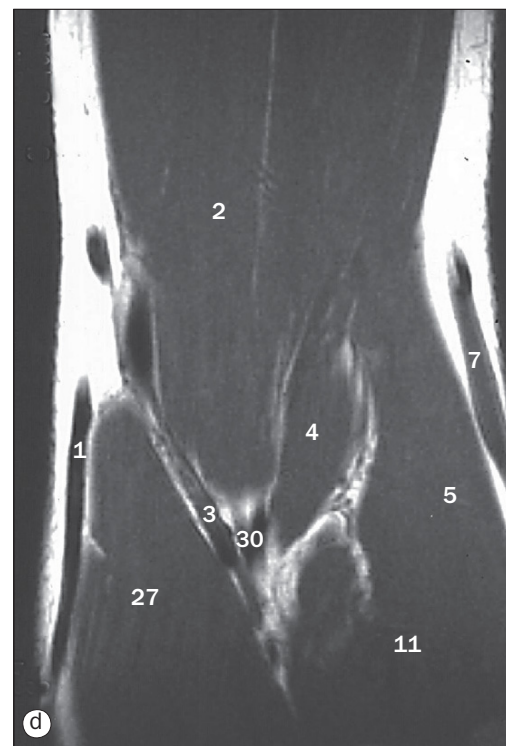
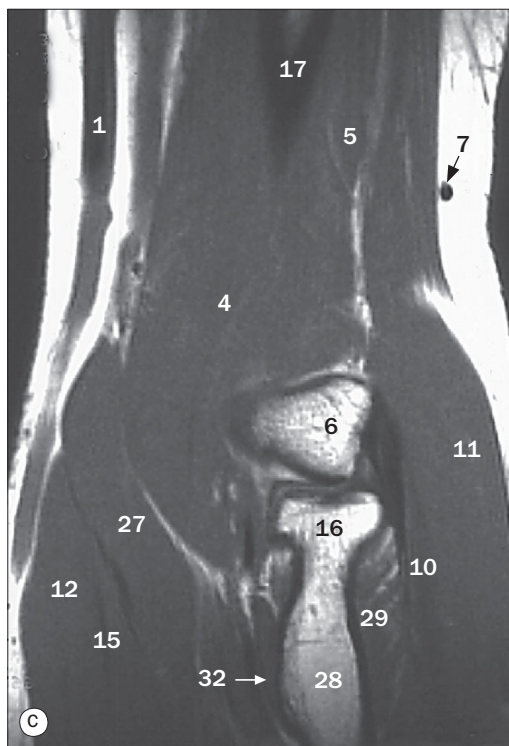
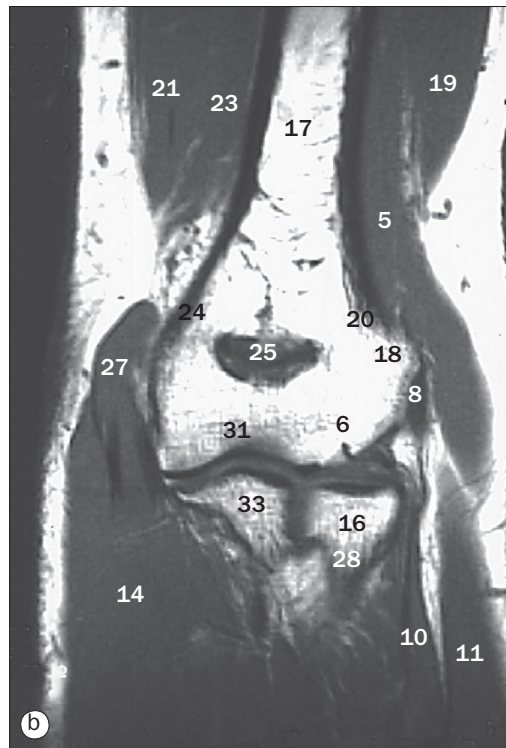
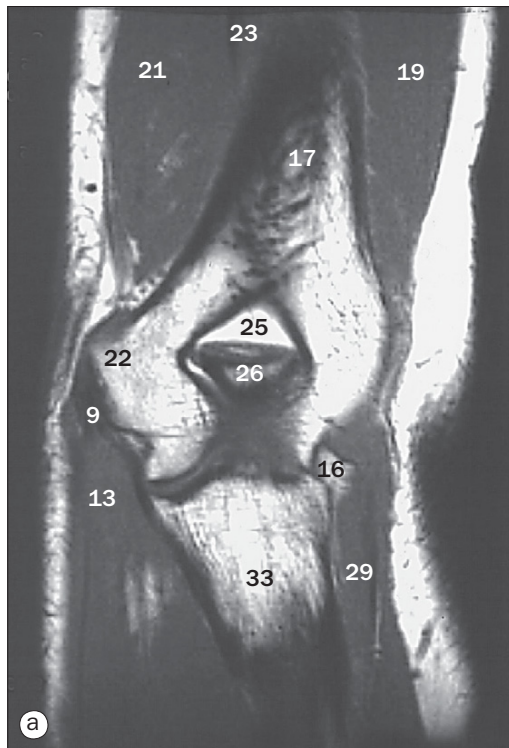


Shoulder, sagittal oblique MR arthrography images. See pages 79 and 80 for key to labels.



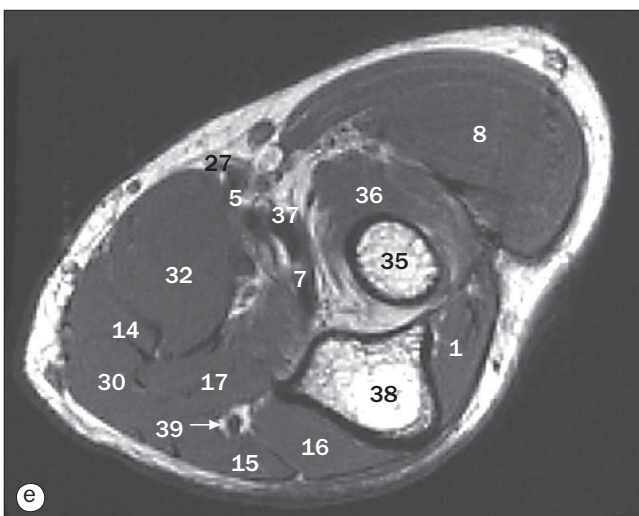
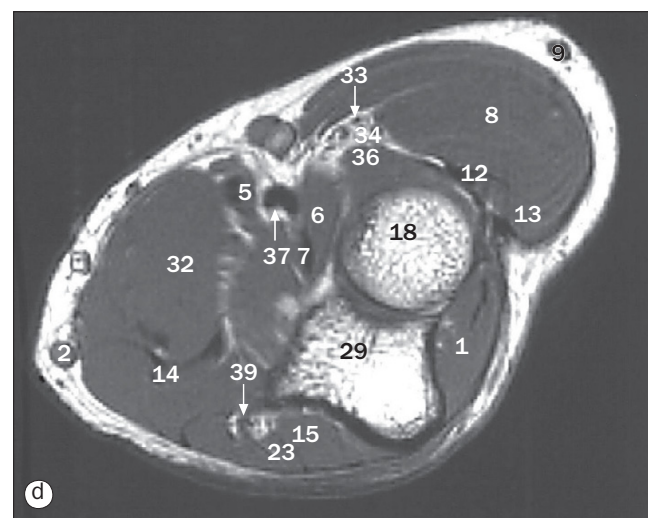
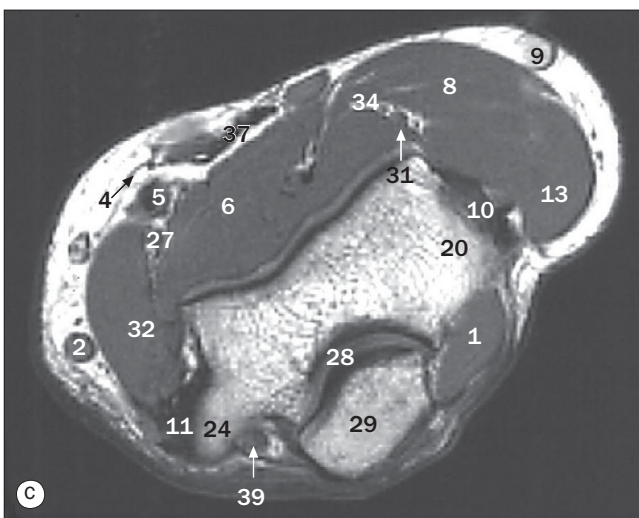
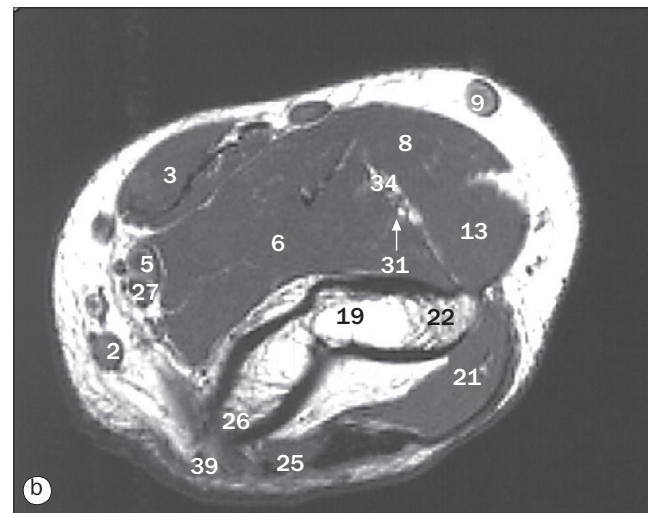
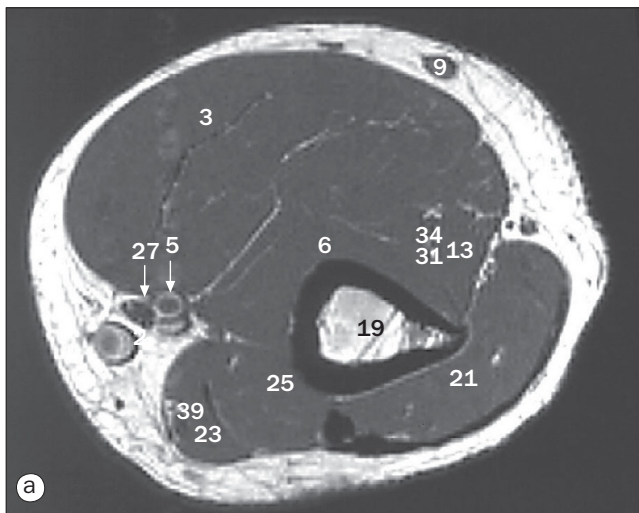
(a)–(d) Elbow, sagittal MR images.

- 1 Abductor pollicis longus muscle
- 2 Anterior fat pad
- 3 Biceps brachii muscle
- 4 Biceps brachii tendon
- 5 Brachial artery
- 6 Brachialis muscle
- 7 Brachioradialis muscle
- 8 Capitulum of humerus
- 9 Cephalic vein
- 10 Coronoid process of ulna
- 11 Flexor carpi ulnaris muscle
- 12 Flexor digitorum profundus muscle
- 13 Flexor digitorum superficialis muscle
- 14 Head of radius
- 15 Humerus
- 16 Lateral head of triceps muscle
- 17 Medial epicondyle
- 18 Medial head of triceps muscle
- 19 Olecranon fossa of humerus
- 20 Olecranon process of ulna
- 21 Pronator teres muscle
- 22 Radius
- 23 Supinator muscle
- 24 Tendon of triceps muscle
- 25 Trochlea of humerus



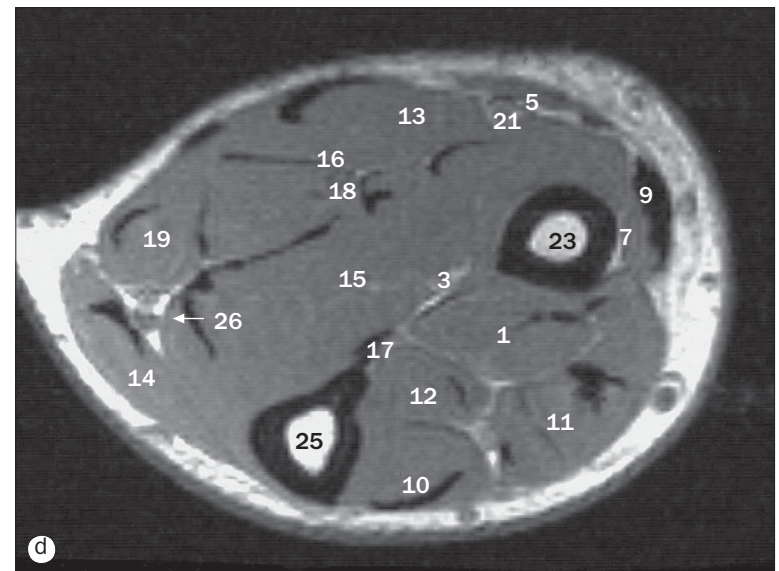
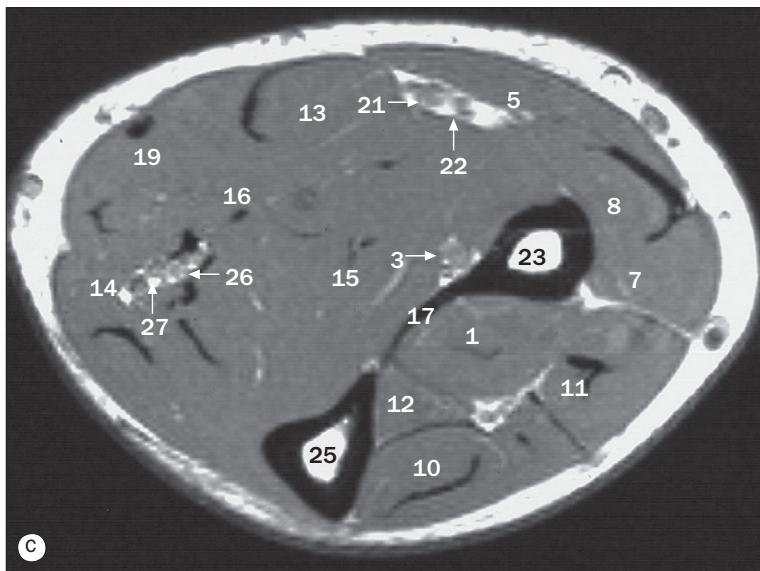
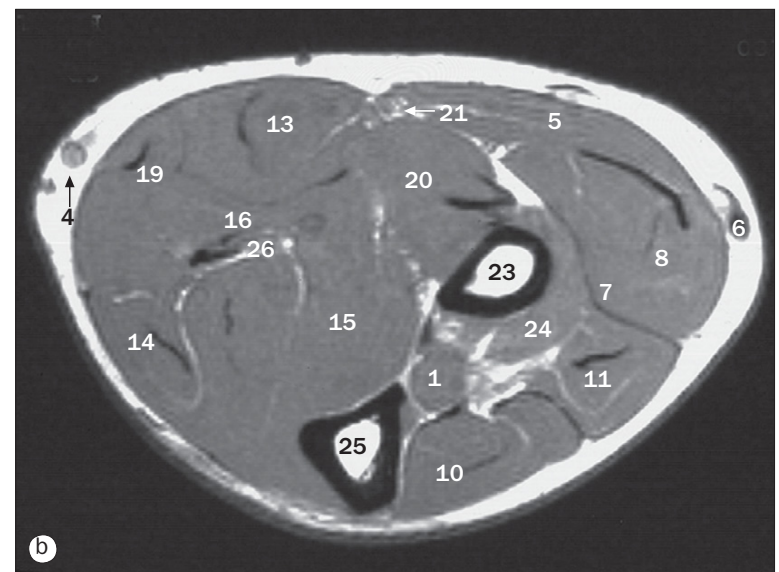
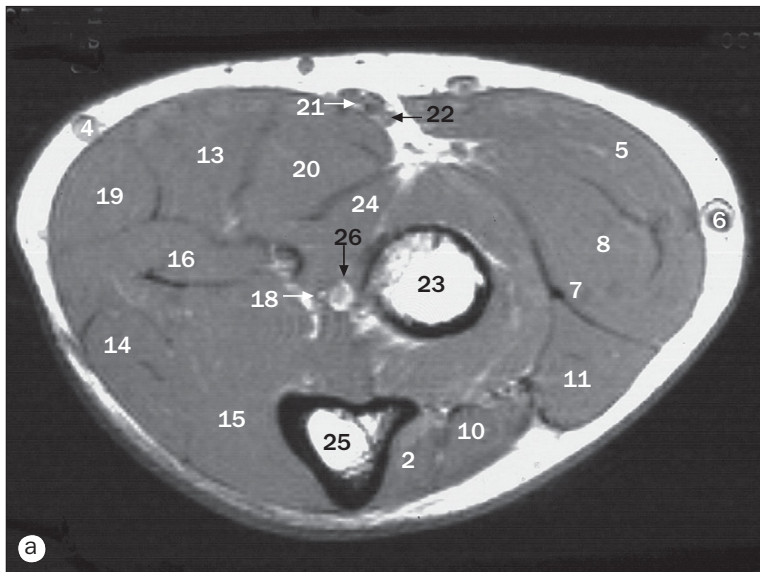
(a)–(d) Elbow, coronal MR images.

- 1 Basilic vein
- 2 Biceps brachii muscle
- 3 Brachial artery
- 4 Brachialis muscle
- 5 Brachioradialis muscle
- 6 Capitulum of humerus
- 7 Cephalic vein
- 8 Common extensor origin
- 9 Common flexor origin
- 10 Extensor carpi radialis brevis muscle
- 11 Extensor carpi radialis longus muscle
- 12 Flexor carpi radialis muscle
- 13 Flexor carpi ulnaris muscle
- 14 Flexor digitorum profundus muscle
- 15 Flexor digitorum superficialis muscle
- 16 Head of radius
- 17 Humerus
- 18 Lateral epicondyle
- 19 Lateral head of triceps muscle
- 20 Lateral supracondylar ridge
- 21 Long head of triceps muscle
- 22 Medial epicondyle
- 23 Medial head of triceps muscle
- 24 Medial supracondylar ridge
- 25 Olecranon fossa of humerus
- 26 Olecranon process of ulna
- 27 Pronator teres muscle
- 28 Radius
- 29 Supinator muscle
- 30 Tendon of biceps brachii muscle
- 31 Trochlea of humerus
- 32 Tuberosity of radius
- 33 Ulna



(a)–(e) Elbow, axial MR images.

- | | |
|--|------------------------------------|
| 1 Anconeus muscle | 20 Lateral epicondyle |
| 2 Basilic vein | 21 Lateral head of triceps muscle |
| 3 Biceps brachii muscle | 22 Lateral supracondylar ridge |
| 4 Bicipital aponeurosis | 23 Long head of triceps muscle |
| 5 Brachial artery | 24 Medial epicondyle |
| 6 Brachialis muscle | 25 Medial head of triceps muscle |
| 7 Brachialis tendon | 26 Medial supracondylar ridge |
| 8 Brachioradialis muscle | 27 Median nerve |
| 9 Cephalic vein | 28 Olecranon fossa of humerus |
| 10 Common extensor origin | 29 Olecranon process of ulna |
| 11 Common flexor origin | 30 Palmaris longus muscle |
| 12 Extensor carpi radialis brevis muscle | 31 Profunda brachii artery |
| 13 Extensor carpi radialis longus muscle | 32 Pronator teres muscle |
| 14 Flexor carpi radialis muscle | 33 Radial artery |
| 15 Flexor carpi ulnaris muscle | 34 Radial nerve |
| 16 Flexor digitorum profundus muscle | 35 Radius |
| 17 Flexor digitorum superficialis muscle | 36 Supinator muscle |
| 18 Head of radius | 37 Tendon of biceps brachii muscle |
| 19 Humerus | 38 Ulna |
| | 39 Ulnar nerve |

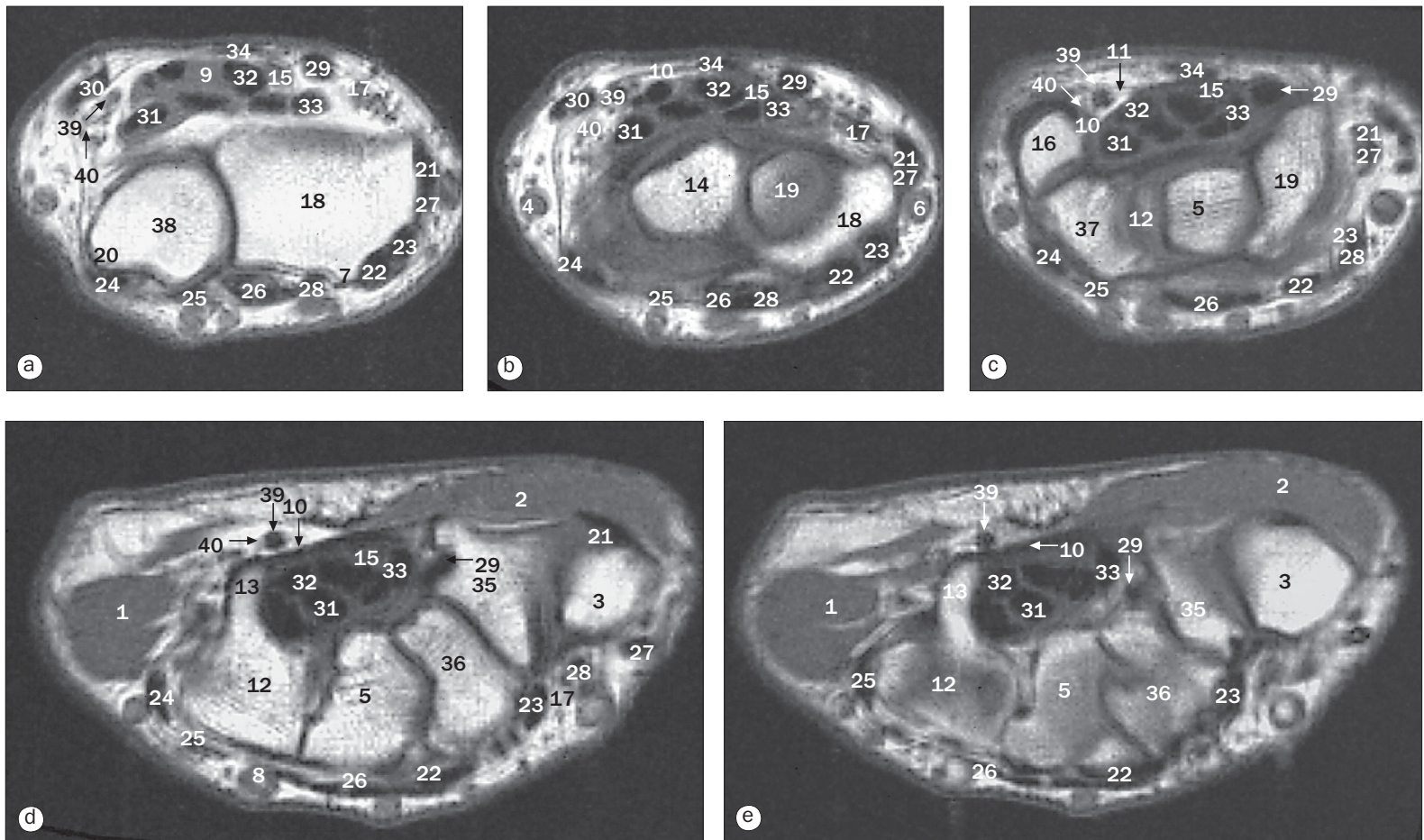


(a)–(d) Forearm, axial MR images.

1 Abductor pollicis longus muscle
2 Anconeus muscle
3 Anterior interosseous artery
4 Basilic vein
5 Brachioradialis muscle
6 Cephalic vein
7 Extensor carpi radialis brevis muscle
8 Extensor carpi radialis longus muscle
9 Extensor carpi radialis longus tendon

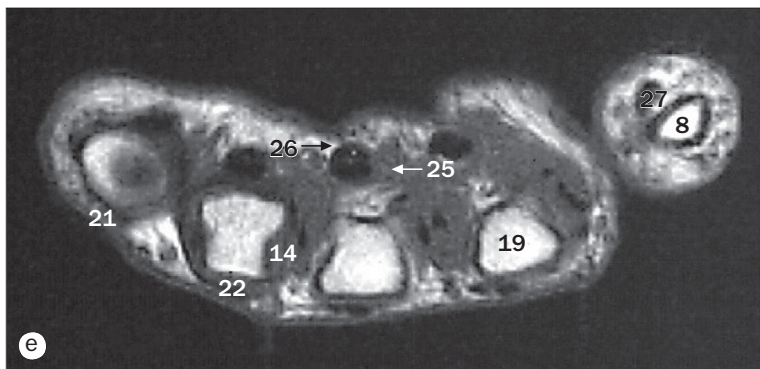
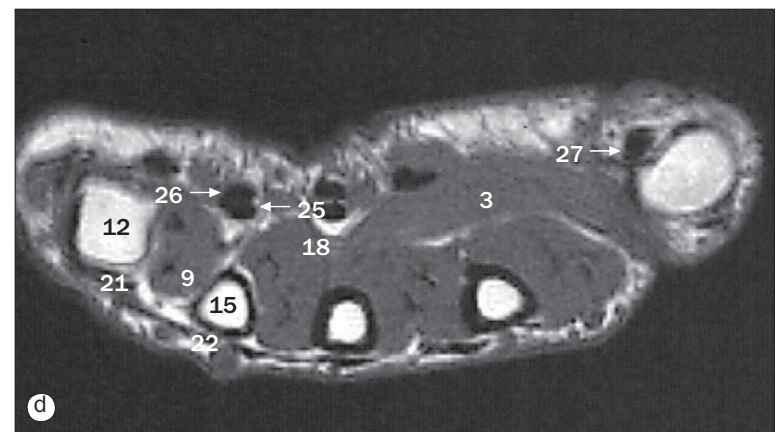
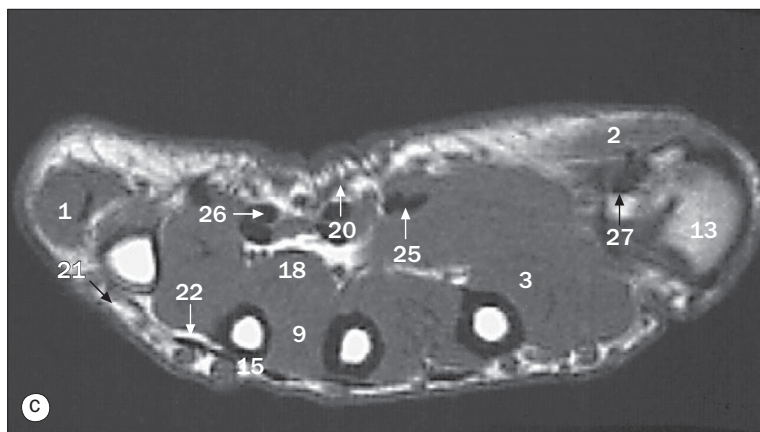
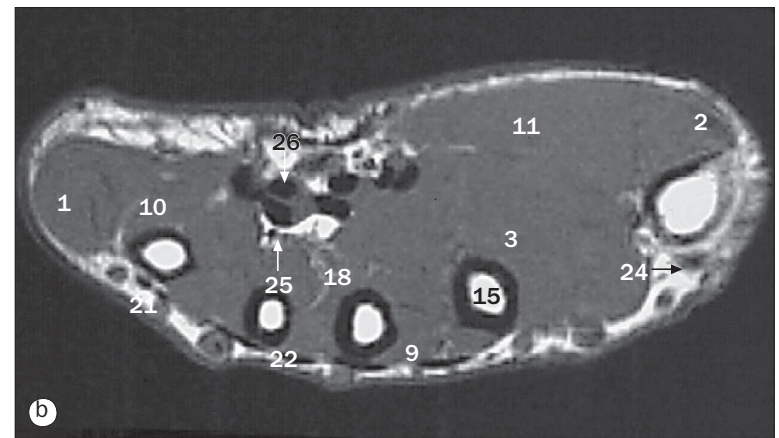
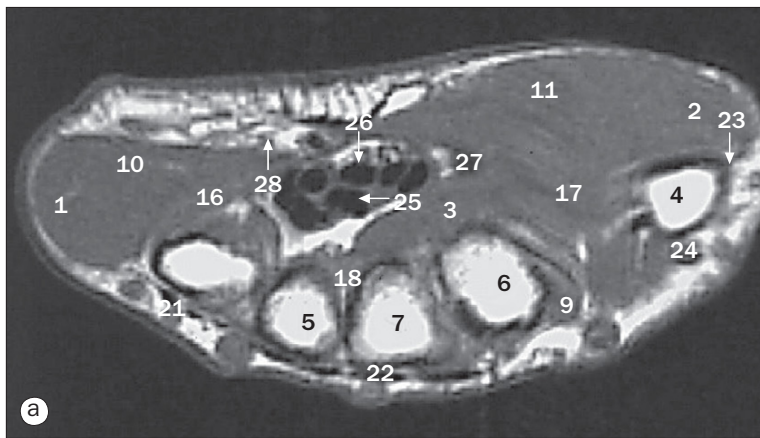
10 Extensor carpi ulnaris muscle
11 Extensor digitorum muscle
12 Extensor pollicis longus muscle
13 Flexor carpi radialis muscle
14 Flexor carpi ulnaris muscle
15 Flexor digitorum profundus muscle
16 Flexor digitorum superficialis muscle
17 Interosseous membrane
18 Median nerve

19 Palmaris longus muscle
20 Pronator teres muscle
21 Radial artery
22 Radial nerve
23 Radius
24 Supinator muscle
25 Ulna
26 Ulnar artery
27 Ulnar nerve



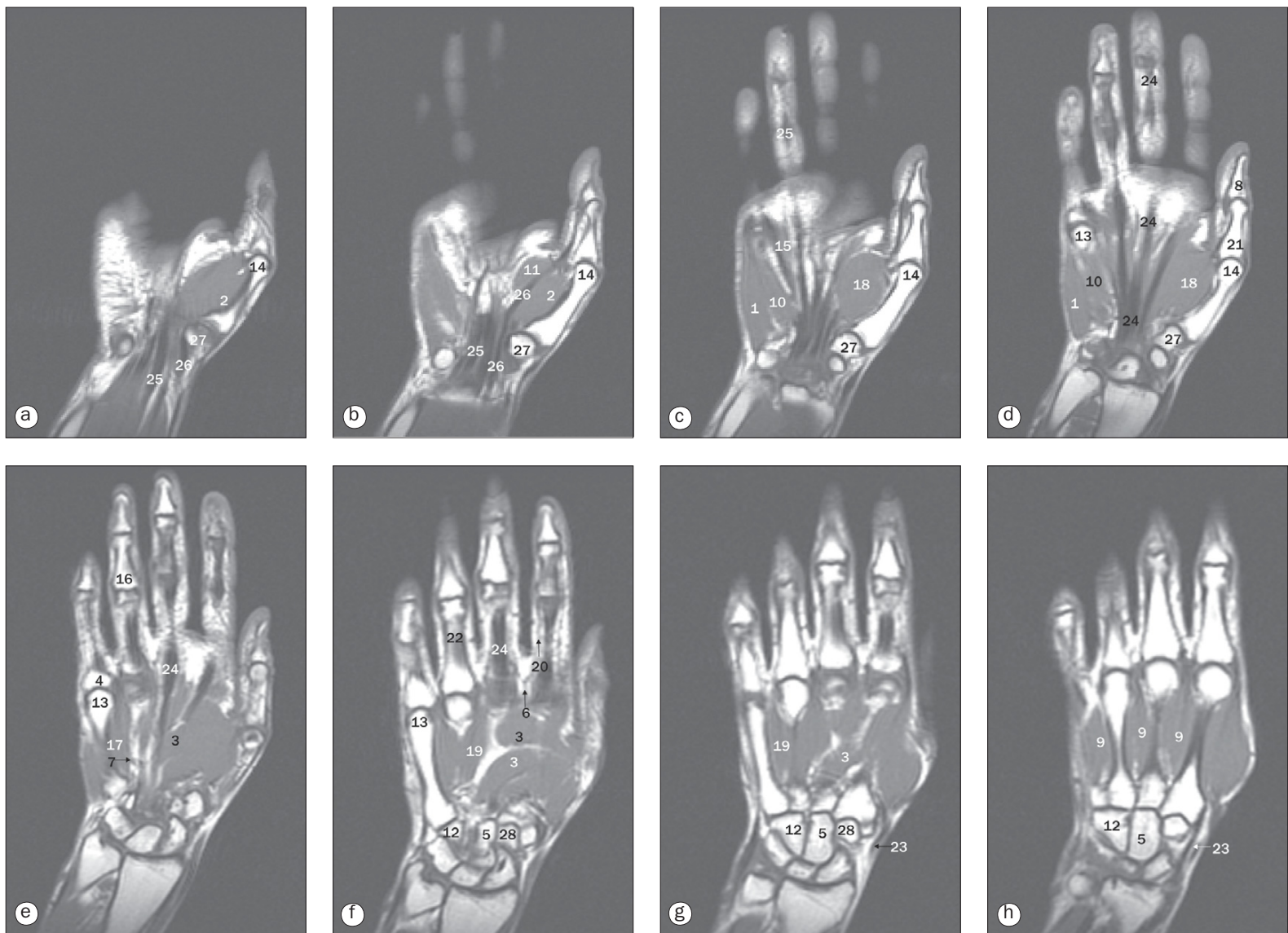
(a)–(e) Wrist, axial MR images.

- | | | |
|---|--|--|
| 1 Abductor digiti minimi muscle | 16 Pisiform | 29 Tendon of flexor carpi radialis muscle |
| 2 Abductor pollicis brevis muscle | 17 Radial artery | 30 Tendon of flexor carpi ulnaris muscle |
| 3 Base of first metacarpal | 18 Radius | 31 Tendon of flexor digitorum profundus muscle |
| 4 Basilic vein | 19 Scaphoid | 32 Tendon of flexor digitorum superficialis muscle |
| 5 Capitate | 20 Styloid process of ulna | 33 Tendon of flexor pollicis longus muscle |
| 6 Cephalic vein | 21 Tendon of abductor pollicis longus muscle | 34 Tendon of palmaris longus muscle |
| 7 Dorsal tubercle of radius | 22 Tendon of extensor carpi radialis brevis muscle | 35 Trapezium |
| 8 Dorsal venous arch | 23 Tendon of extensor carpi radialis longus muscle | 36 Trapezoid |
| 9 Flexor digitorum superficialis muscle | 24 Tendon of extensor carpi ulnaris muscle | 37 Triquetral |
| 10 Flexor retinaculum | 25 Tendon of extensor digiti minimi muscle | 38 Ulna |
| 11 Guyon's canal | 26 Tendon of extensor digitorum muscle | 39 Ulnar artery |
| 12 Hamate | 27 Tendon of extensor pollicis brevis muscle | 40 Ulnar nerve |
| 13 Hook of hamate | 28 Tendon of extensor pollicis longus muscle | |
| 14 Lunate | | |
| 15 Median nerve | | |



(a)–(e) Hand, axial MR images.

- | | |
|-----------------------------------|--|
| 1 Abductor digiti minimi muscle | 18 Palmar interossei muscles |
| 2 Abductor pollicis brevis muscle | 19 Proximal phalanx of index finger |
| 3 Adductor pollicis muscle | 20 Superficial palmar arch |
| 4 Base of first metacarpal | 21 Tendon of extensor digiti minimi muscle |
| 5 Base of fourth metacarpal | 22 Tendon of extensor digitorum muscle |
| 6 Base of second metacarpal | 23 Tendon of extensor pollicis brevis muscle |
| 7 Base of third metacarpal | 24 Tendon of extensor pollicis longus muscle |
| 8 Distal phalanx of thumb | 25 Tendon of flexor digitorum profundus muscle |
| 9 Dorsal interossei muscles | 26 Tendon of flexor digitorum superficialis muscle |
| 10 Flexor digiti minimi muscle | 27 Tendon of flexor pollicis longus muscle |
| 11 Flexor pollicis brevis muscle | 28 Ulnar artery |
| 12 Head of fifth metacarpal | |
| 13 Head of first metacarpal | |
| 14 Lumbrical muscle | |
| 15 Metacarpal shaft | |
| 16 Opponens digiti minimi muscle | |
| 17 Opponens pollicis muscle | |

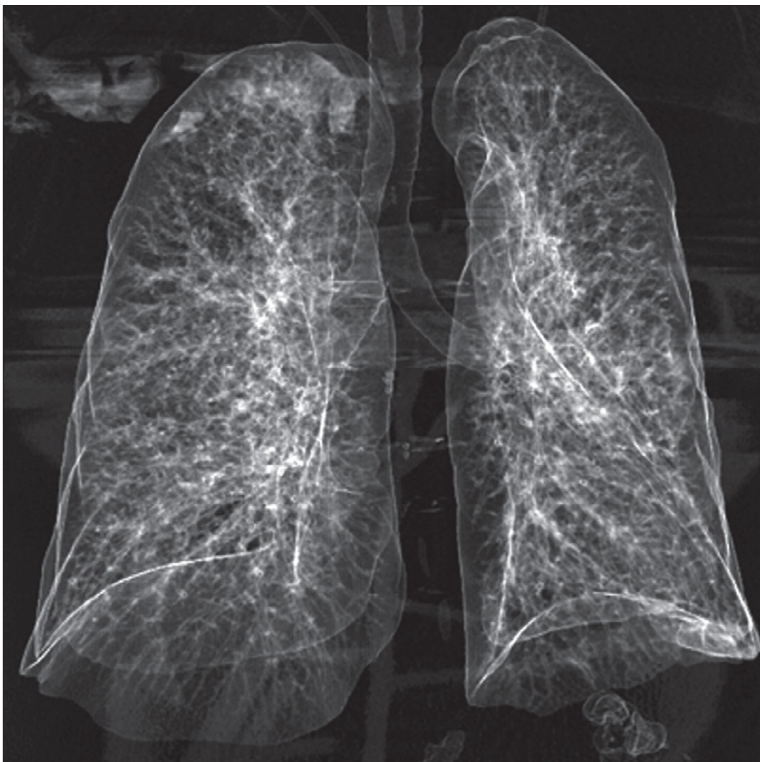
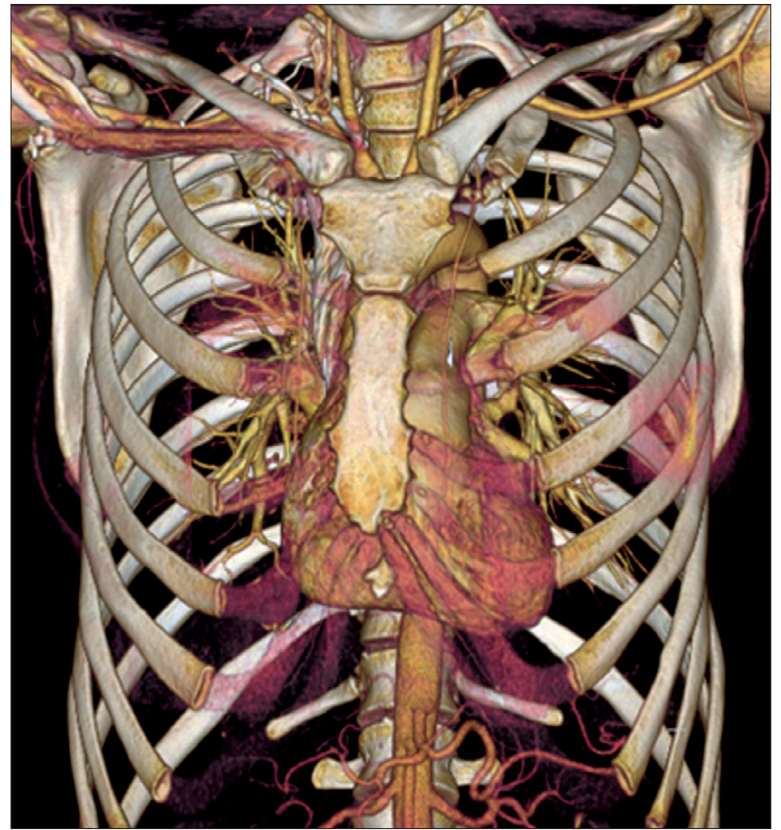


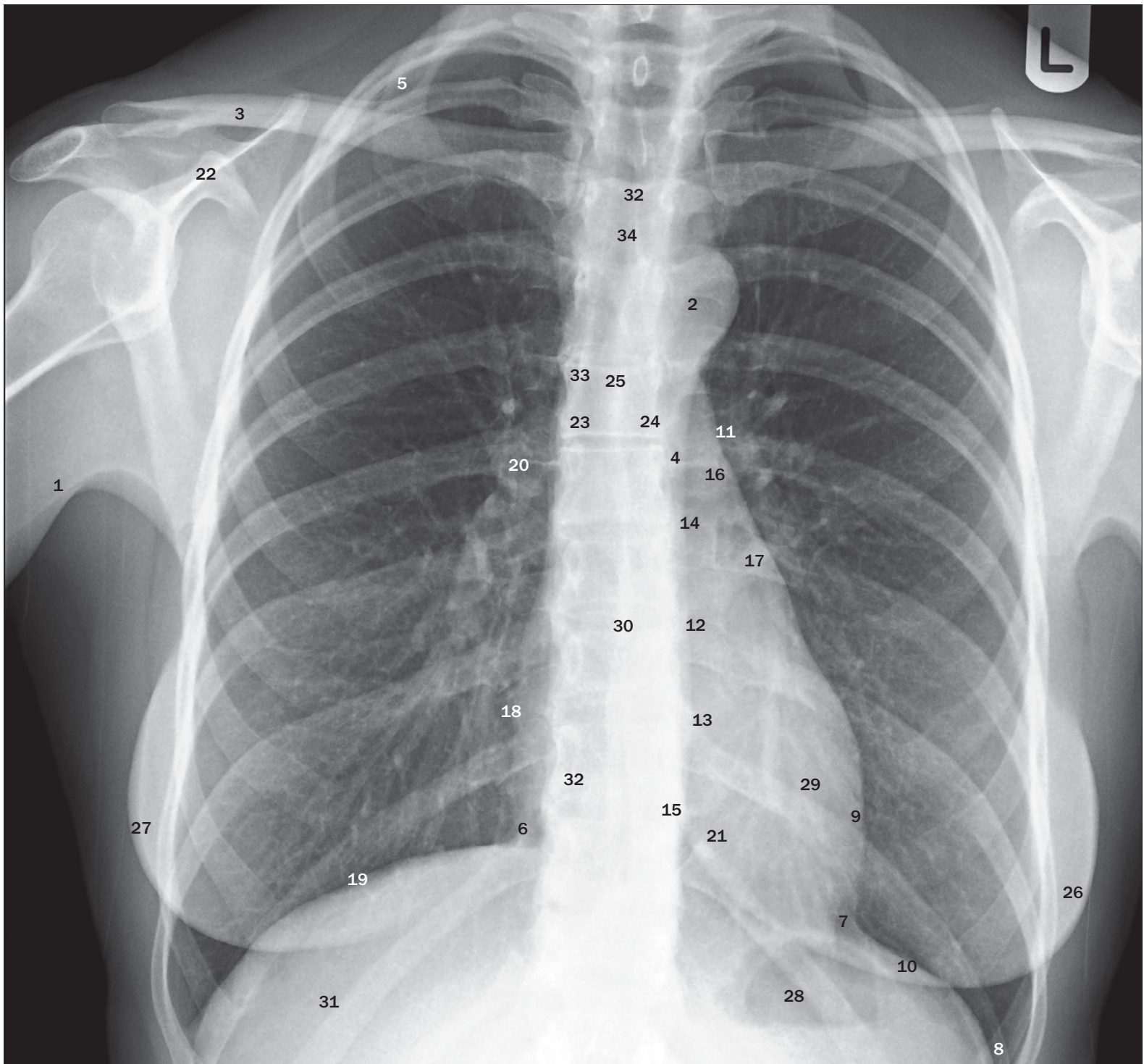
(a)–(h) Hand, coronal MR images.

- | | | | |
|-----------------------------------|----------------------------------|--|--|
| 1 Abductor digiti minimi muscle | 8 Distal phalanx of thumb | 17 Opponens digiti minimi muscle | 24 Tendon of flexor digitorum profundus muscle |
| 2 Abductor pollicis brevis muscle | 9 Dorsal interossei muscles | 18 Opponens pollicis muscle | 25 Tendon of flexor digitorum superficialis muscle |
| 3 Adductor pollicis muscle | 10 Flexor digiti minimi muscle | 19 Palmar interossei muscles | 26 Tendon of flexor pollicis longus muscle |
| 4 Base of proximal phalanx | 11 Flexor pollicis brevis muscle | 20 Proper palmar digital artery | 27 Trapezium |
| 5 Capitate | 12 Hamate | 21 Proximal phalanx of thumb | 28 Trapezoid |
| 6 Common palmar digital artery | 13 Head of fifth metacarpal | 22 Shaft of proximal phalanx | |
| 7 Deep palmar arch | 14 Head of first metacarpal | 23 Tendon of extensor pollicis longus muscle | |
| | 15 Lumbrical muscle | | |
| | 16 Middle phalanx | | |

4

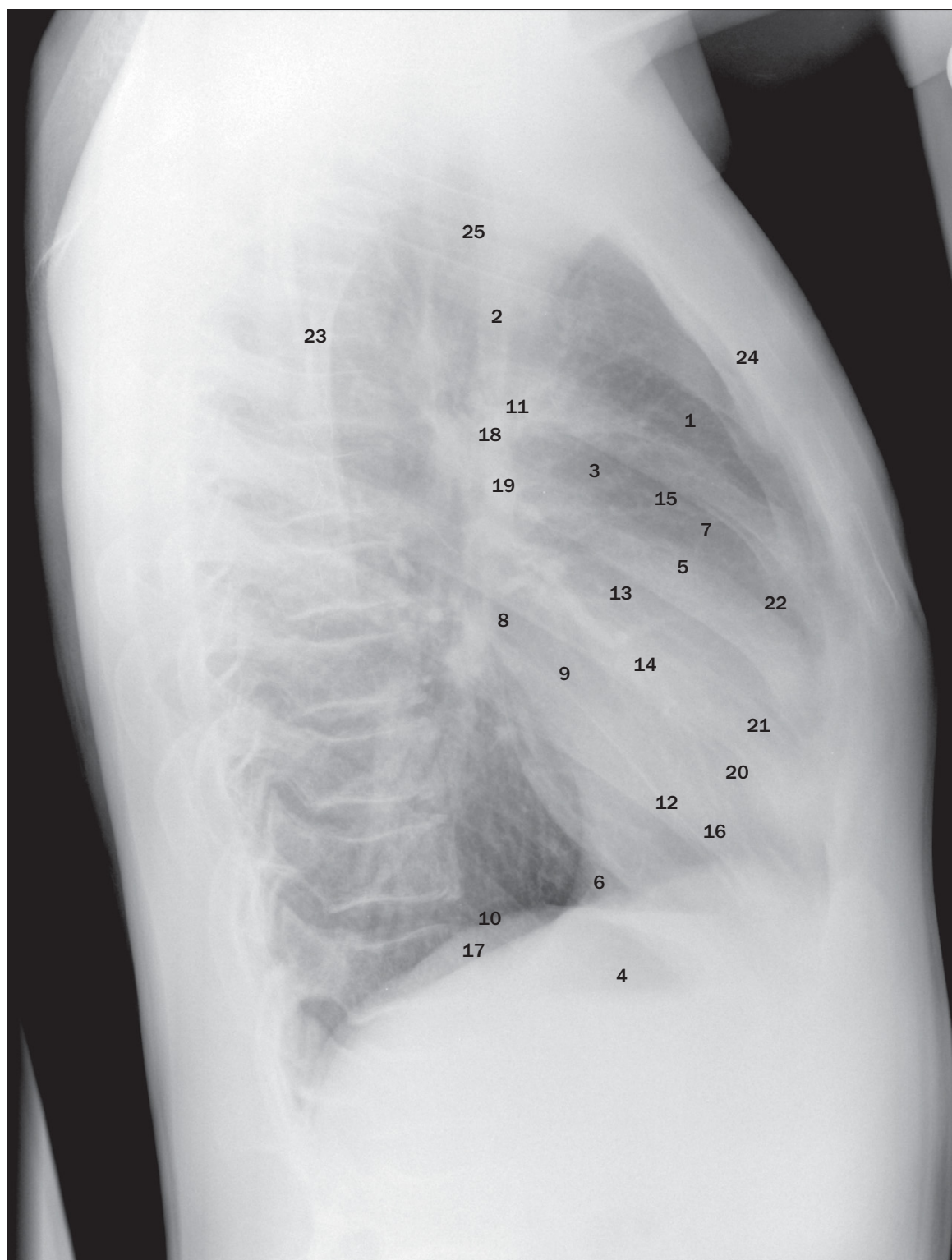
Thorax





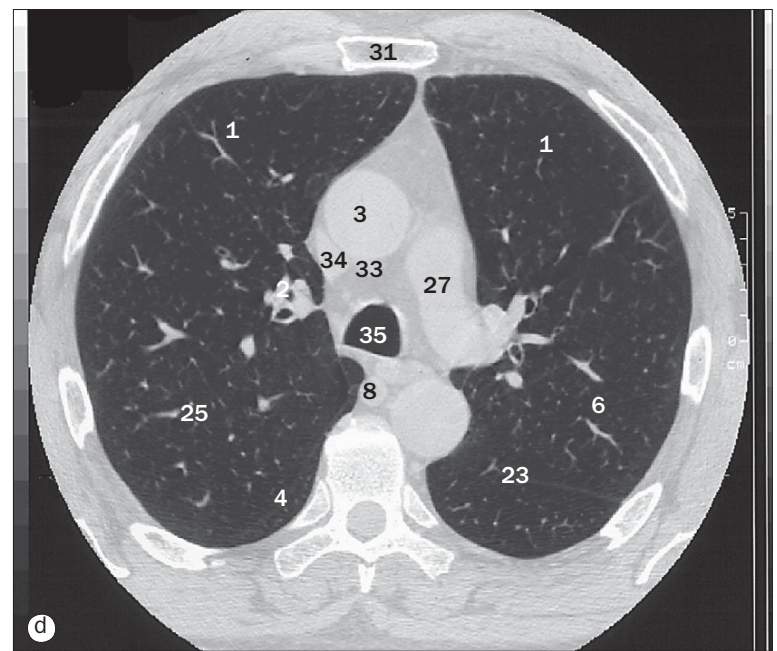
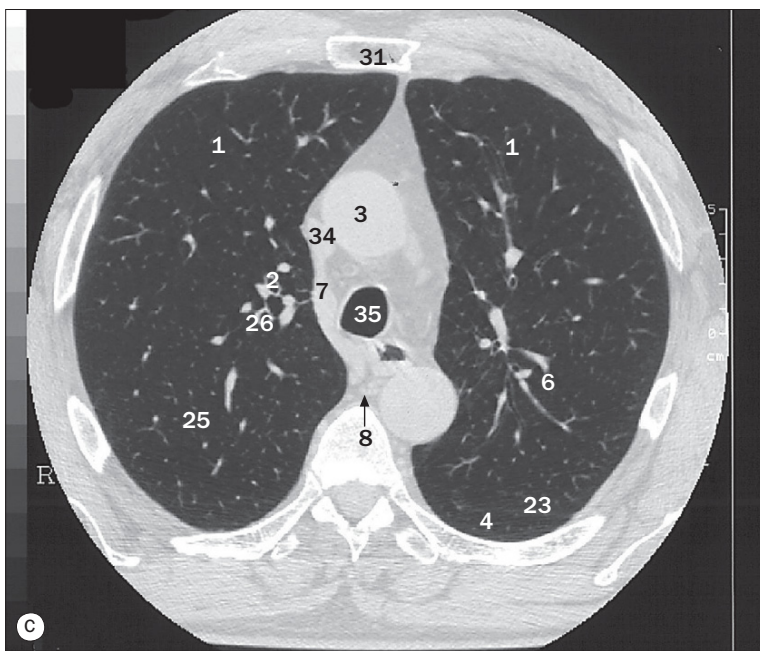
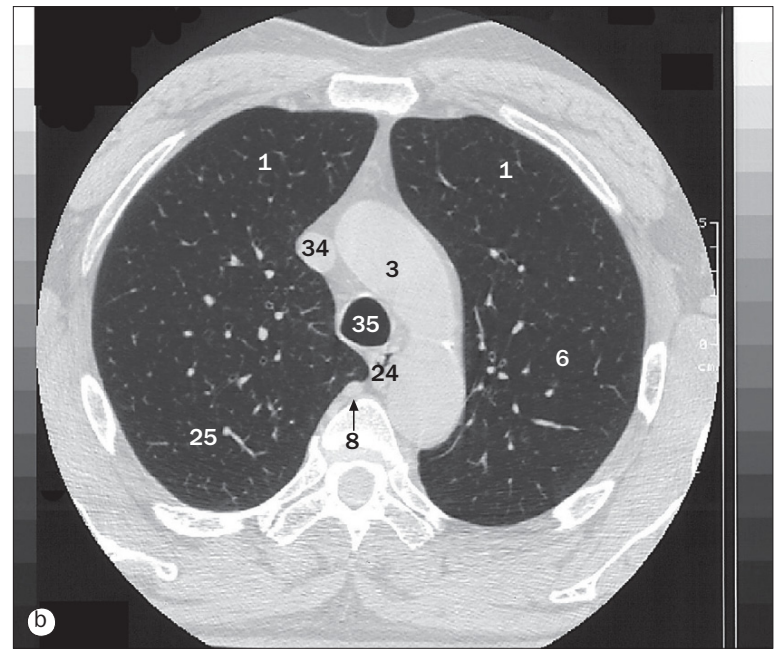
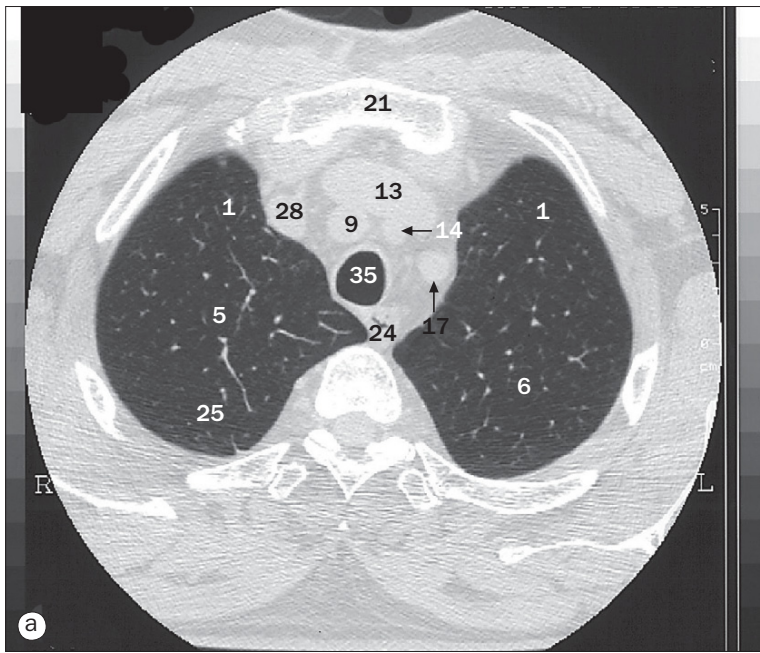
Chest radiograph, postero-anterior projection.

- | | | | |
|--|--|----------------------------|-------------------------------|
| 1 Anterior axillary fold | 10 Left dome of diaphragm | 18 Right atrial border | 27 Right breast outline |
| 2 Arch of aorta (aortic knuckle or knob) | 11 Left pulmonary artery | 19 Right dome of diaphragm | 28 Gas in fundus of stomach |
| 3 Clavicle | 12 Position of aortic valve | 20 Right pulmonary artery | 29 Position of left ventricle |
| 4 Descending aorta | 13 Position of mitral valve | 21 Right ventricle | 30 Position of left atrium |
| 5 First rib | 14 Position of pulmonary valve | 22 Spine of scapula | 31 Position of liver |
| 6 Inferior vena cava | 15 Position of tricuspid valve | 23 Right main bronchus | 32 Manubrium |
| 7 Left cardiophrenic angle | 16 Pulmonary trunk | 24 Left main bronchus | 33 Superior vena cava |
| 8 Left costophrenic angle | 17 Region of tip of auricle of left atrium | 25 Carina | 34 Trachea |
| 9 Left ventricular border | | 26 Left breast outline | |



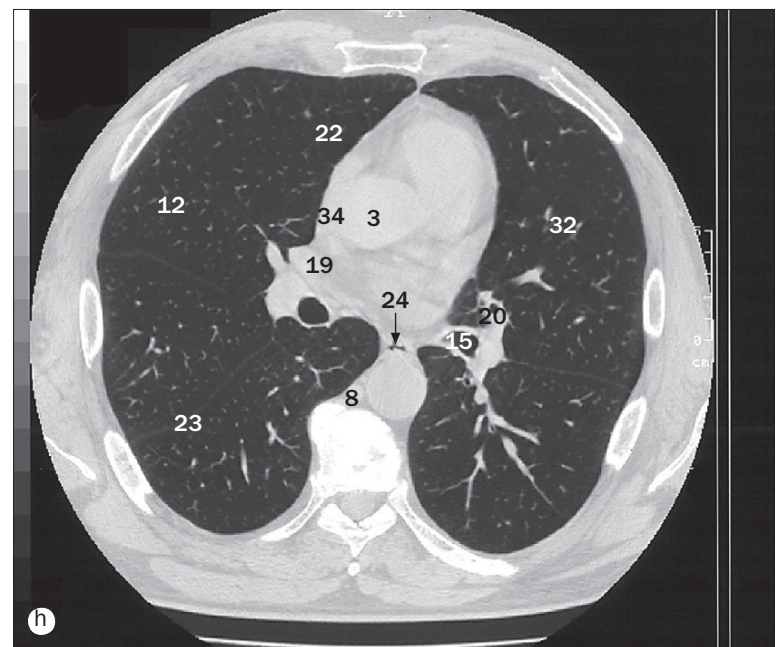
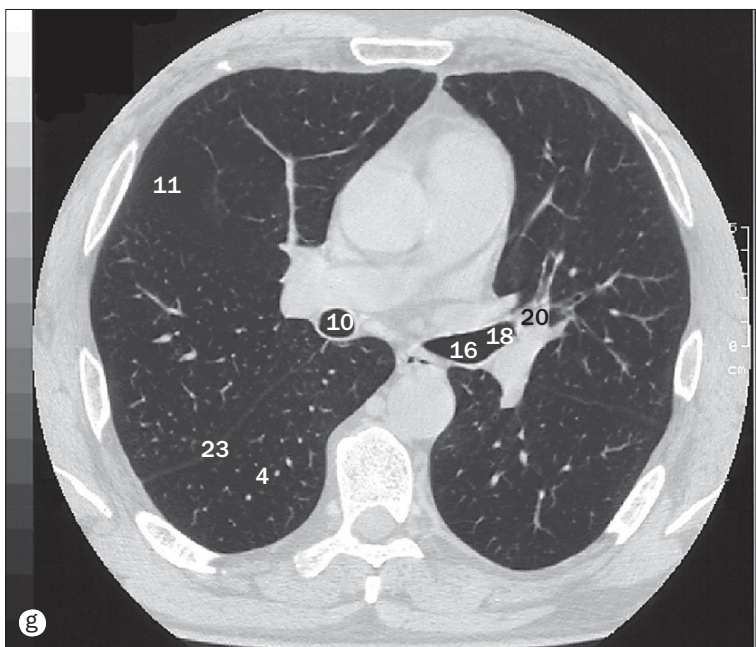
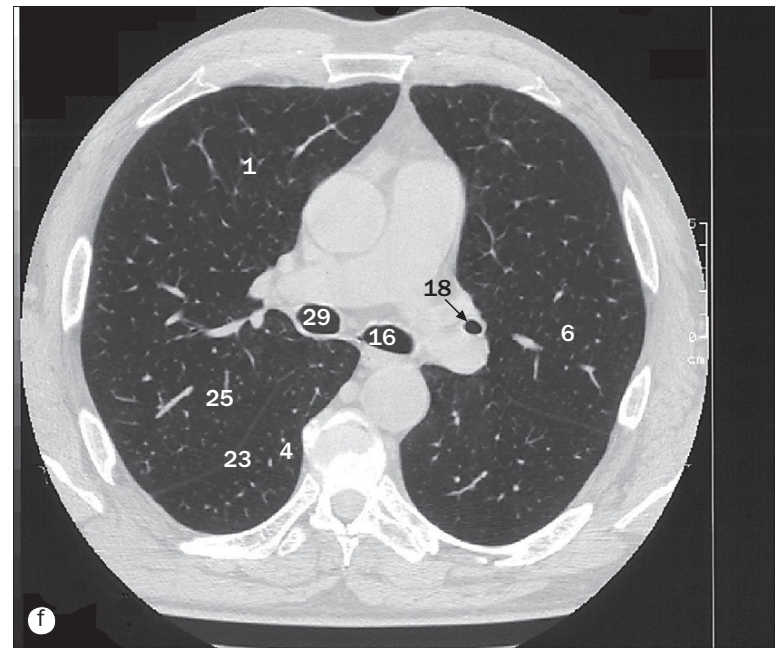
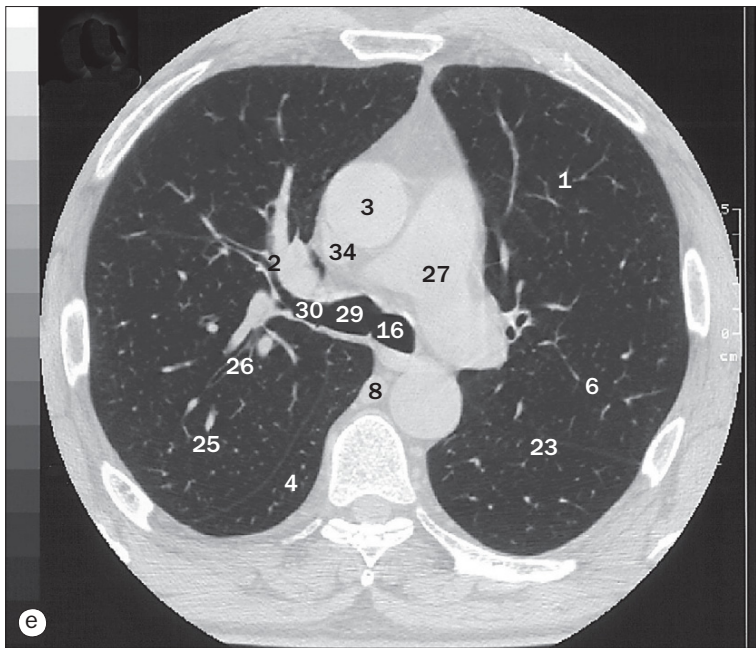
Chest radiograph, lateral projection.

- | | | | |
|--|--|--------------------------------|--------------------------------------|
| 1 Anterior mediastinal space | 7 Infundibulum of right ventricle (below) with pulmonary trunk (above) | 13 Position of aortic valve | 21 Right ventricle |
| 2 Arch of aorta (aortic knuckle or knob) | 8 Left atrial border of heart | 14 Position of mitral valve | 22 Right ventricular border of heart |
| 3 Ascending aorta | 9 Left atrium | 15 Position of pulmonary valve | 23 Scapula |
| 4 Gas in fundus of stomach | 10 Left dome of diaphragm | 16 Position of tricuspid valve | 24 Sternum |
| 5 Horizontal fissure | 11 Left main pulmonary artery | 17 Right dome of diaphragm | 25 Trachea |
| 6 Inferior vena cava | 12 Left oblique fissure | 18 Right main bronchus | |
| | | 19 Right main pulmonary artery | |
| | | 20 Right oblique fissure | |



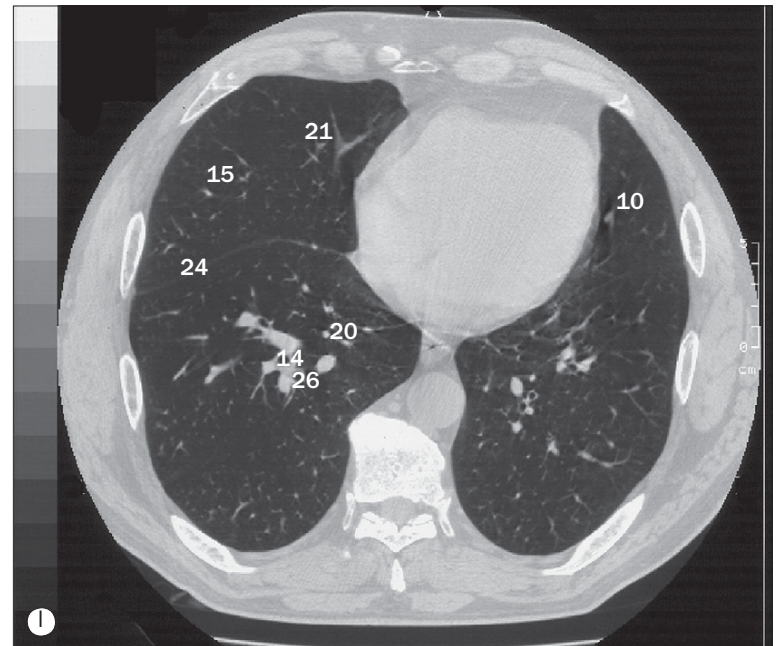
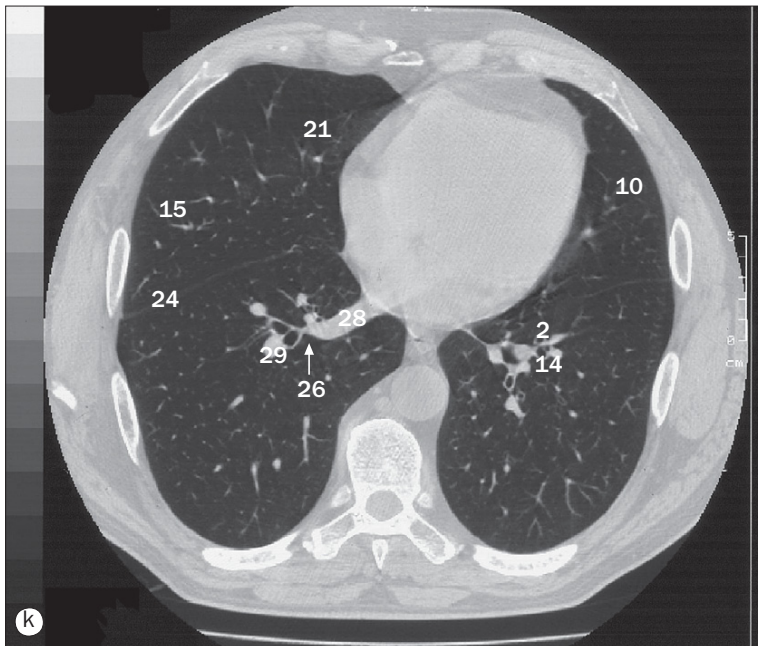
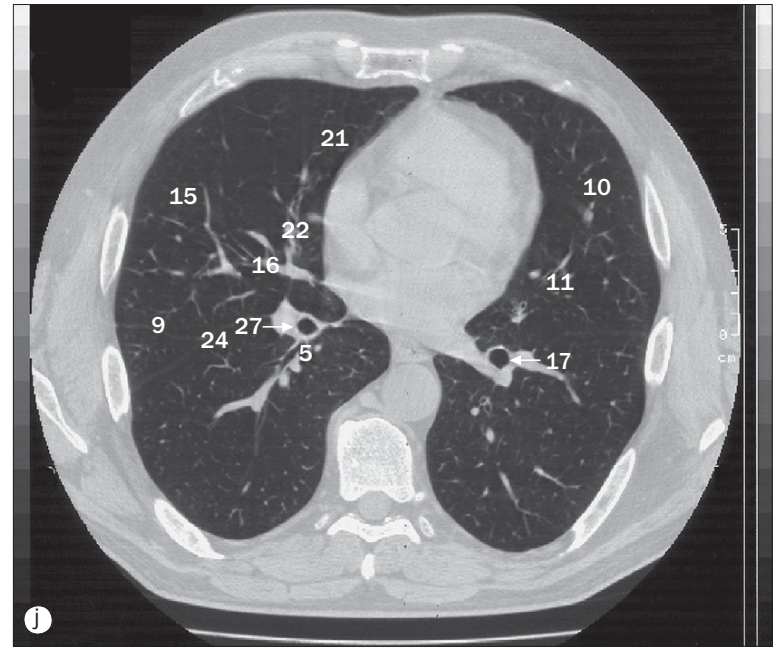
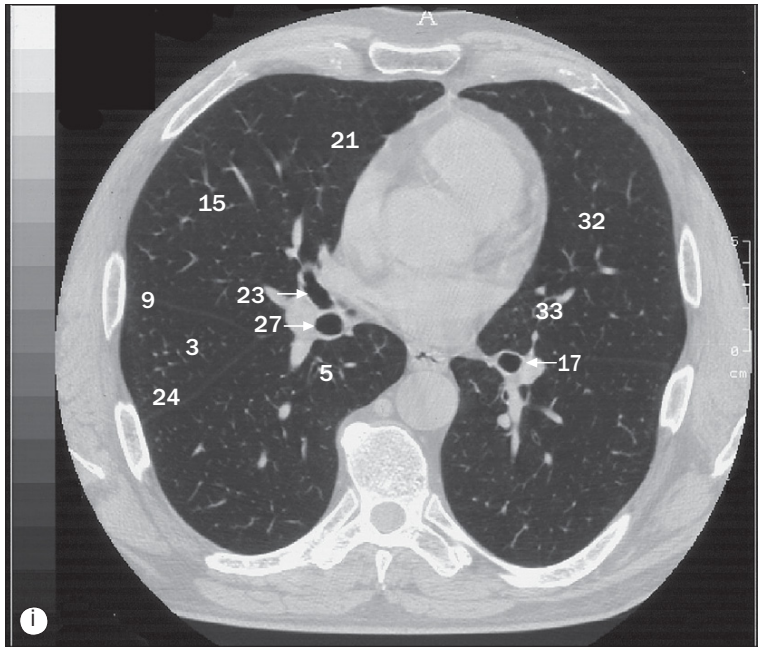
(a)–(h) Lungs, axial high-resolution CT images.

- | | | |
|---|--------------------------------|----------------------------------|
| 1 Anterior segment superior lobe | 8 Azygos vein | 15 Left inferior lobe bronchus |
| 2 Anterior segmental bronchus | 9 Brachiocephalic trunk | 16 Left main bronchus |
| 3 Aorta | 10 Bronchus intermedius | 17 Left subclavian artery |
| 4 Apical segment inferior lobe | 11 Horizontal fissure | 18 Left superior lobe bronchus |
| 5 Apical segment right superior lobe | 12 Lateral segment middle lobe | 19 Right superior pulmonary vein |
| 6 Apicoposterior segment left superior lobe | 13 Left brachiocephalic vein | 20 Lingular segmental bronchus |
| 7 Azygos arch | 14 Left common carotid artery | |



(a)–(h) Lungs, axial high-resolution CT images.

- | | | |
|------------------------------------|---------------------------------|--------------------------------|
| 21 Manubrium of sternum | 26 Posterior segmental bronchus | 31 Sternum |
| 22 Medial segment middle lobe | 27 Pulmonary artery | 32 Superior lingular segment |
| 23 Oblique fissure | 28 Right brachiocephalic vein | 33 Superior pericardial recess |
| 24 Oesophagus | 29 Right main bronchus | 34 Superior vena cava |
| 25 Posterior segment superior lobe | 30 Right superior lobe bronchus | 35 Trachea |

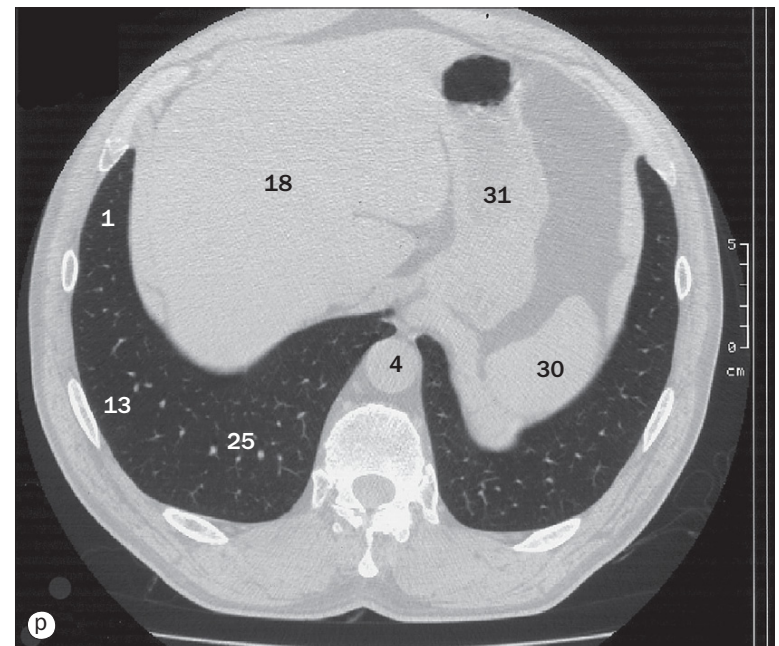
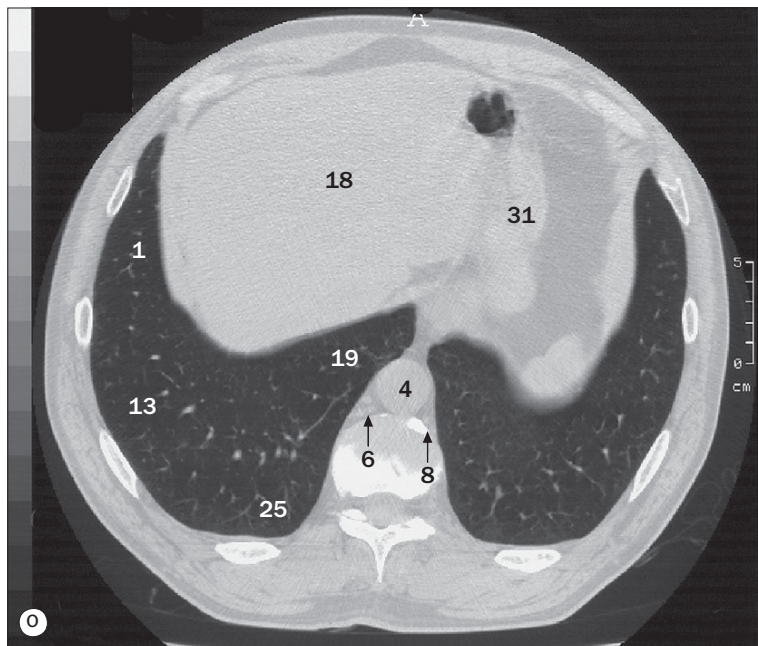
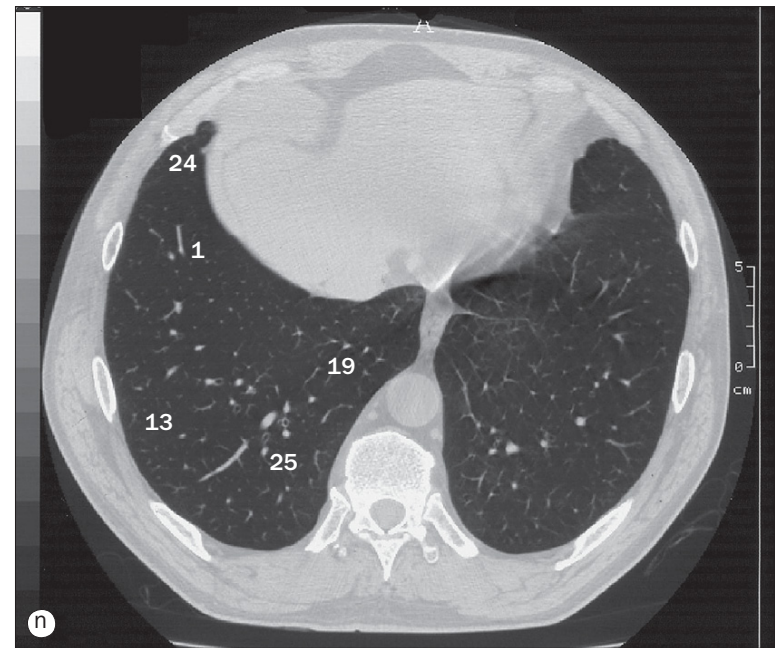
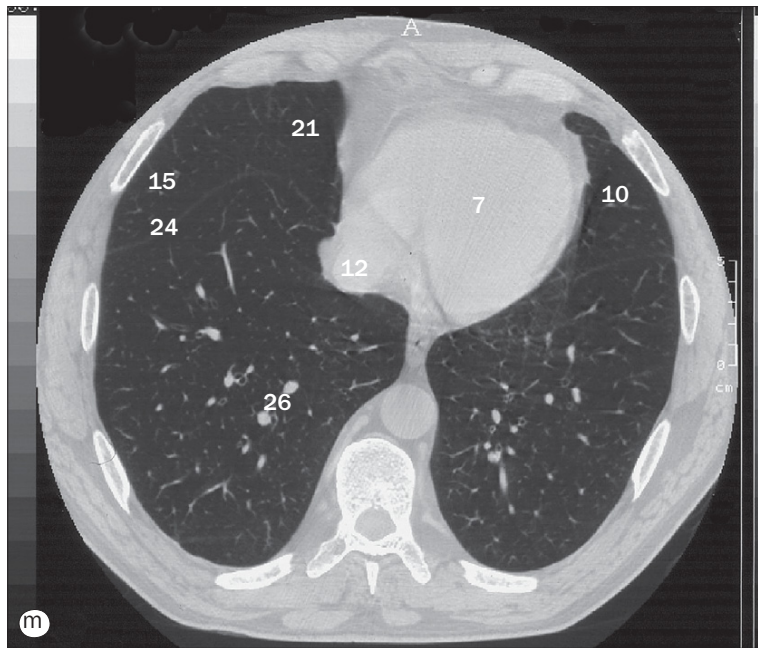


(i)–(p) Lungs, axial high-resolution CT images.

1 Anterior basal segment inferior lobe
2 Anterior basal segmental bronchus
3 Anterior segment superior lobe
4 Aorta
5 Apical segment inferior lobe bronchus
6 Azygos vein

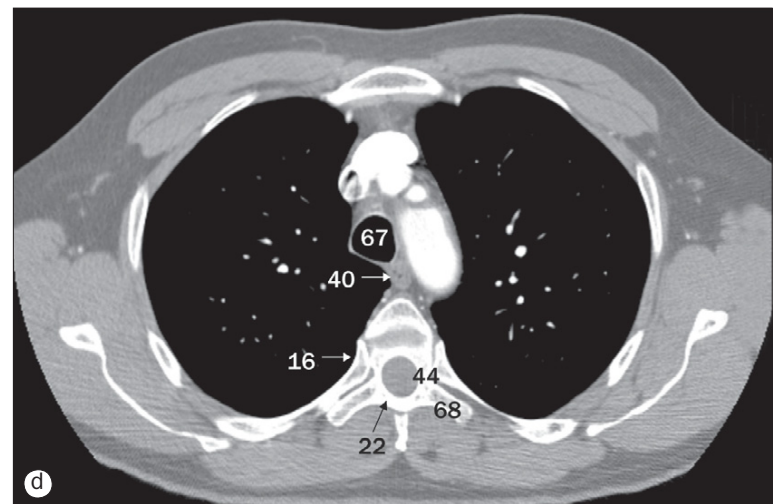
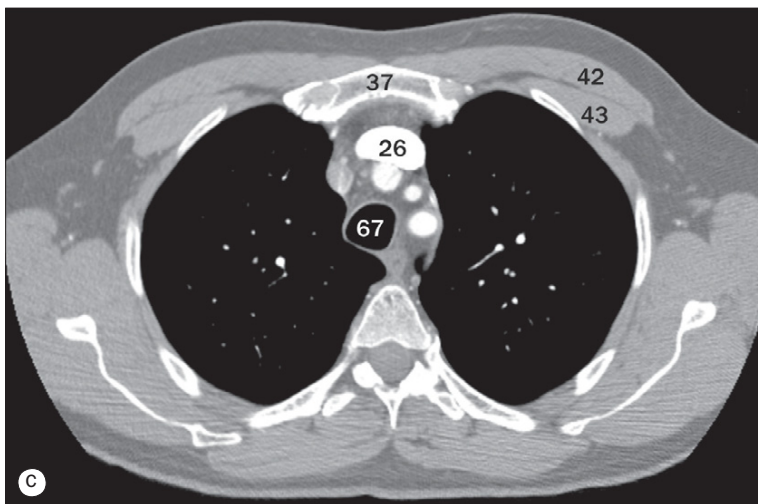
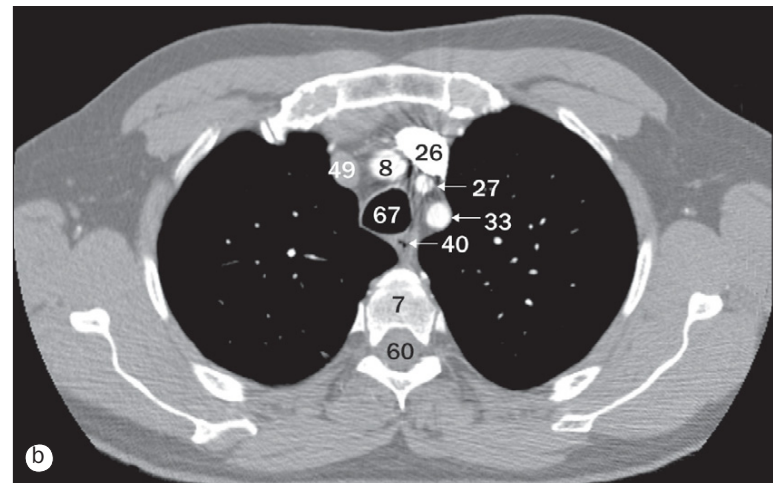
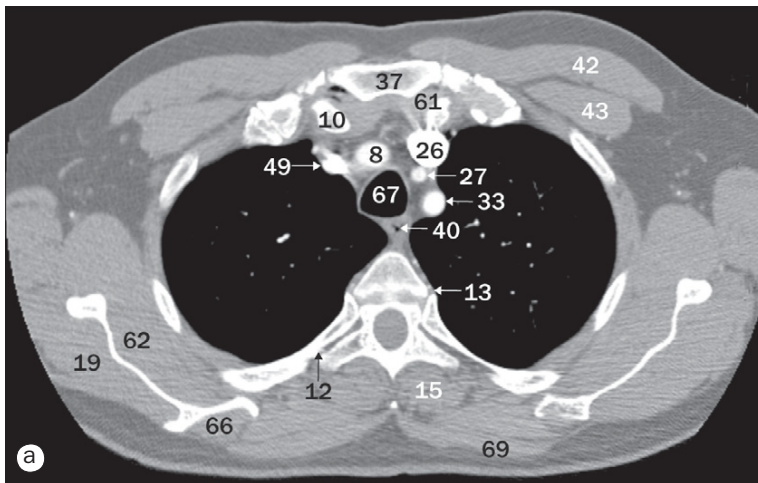
7 Heart
8 Hemi-azygos vein
9 Horizontal fissure
10 Inferior lingular segment
11 Inferior lingular segmental bronchus
12 Inferior vena cava

13 Lateral basal segment inferior lobe
14 Lateral basal segmental bronchus
15 Lateral segment middle lobe
16 Lateral segmental bronchus of middle lobe
17 Left inferior lobe bronchus



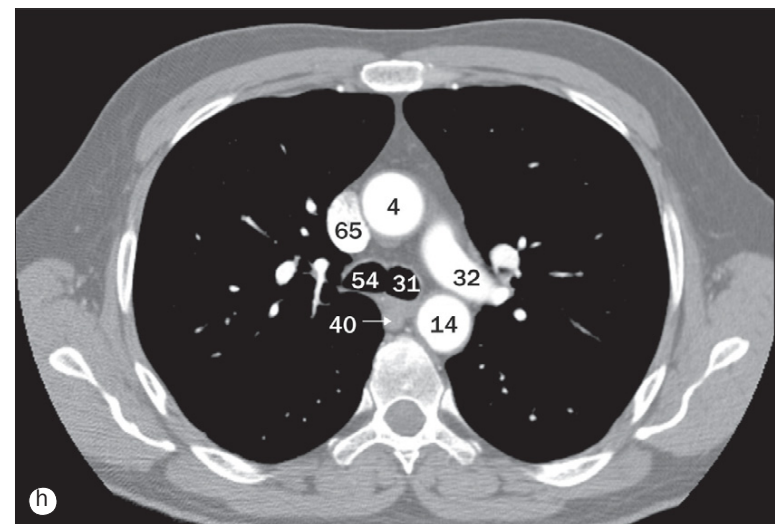
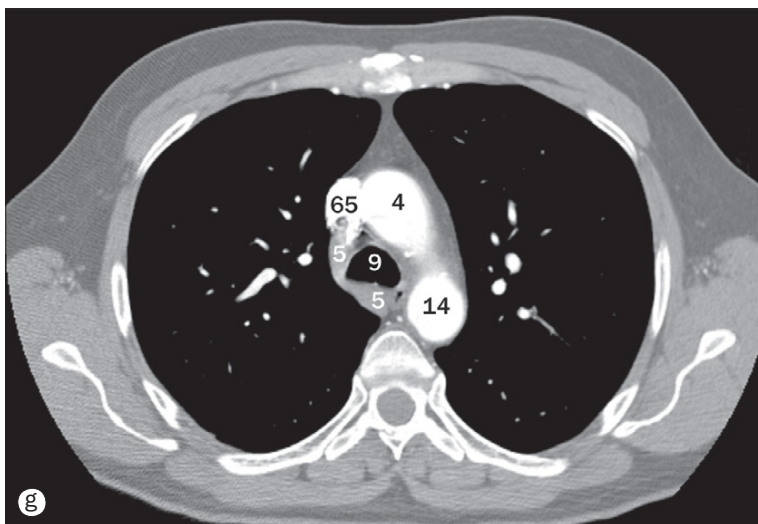
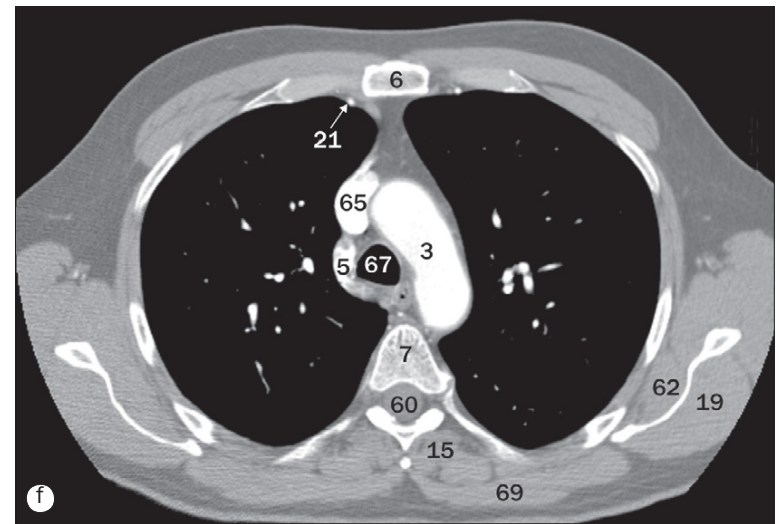
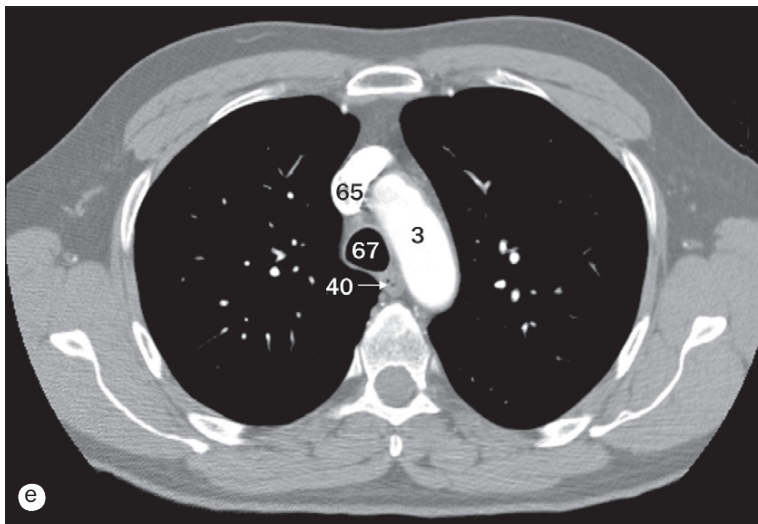
(i)-(p) Lungs, axial high-resolution CT images.

- | | | |
|---|--|---|
| 18 Liver | 23 Middle lobe bronchus | 29 Right lower lobe pulmonary artery |
| 19 Medial basal segment inferior lobe | 24 Oblique fissure | 30 Spleen |
| 20 Medial basal segmental bronchus | 25 Posterior basal segment inferior lobe | 31 Stomach |
| 21 Medial segment middle lobe | 26 Posterior basal segmental bronchus | 32 Superior lingular segment |
| 22 Medial segmental bronchus of middle lobe | 27 Right inferior lobe bronchus | 33 Superior lingular segmental bronchus |
| | 28 Right inferior pulmonary vein | |



(a)–(t) Chest, axial CT images of mediastinum.

- | | | |
|--|--------------------------------------|------------------------------------|
| 1 Anterior interventricular branch of left coronary artery | 12 Costotransverse joint | 24 Left atrial appendage (auricle) |
| 2 Aortic valve | 13 Costovertebral joint | 25 Left atrium |
| 3 Arch of aorta (aortic knuckle or knob) | 14 Descending aorta | 26 Left brachiocephalic vein |
| 4 Ascending aorta | 15 Erector spinae muscle | 27 Left common carotid artery |
| 5 Azygos vein | 16 Head of rib | 28 Left hemidiaphragm |
| 6 Body of sternum | 17 Hemi-azygos vein | 29 Left inferior lobe bronchus |
| 7 Body of vertebra | 18 Inferior vena cava | 30 Left inferior pulmonary vein |
| 8 Brachiocephalic trunk | 19 Infraspinatus muscle | 31 Left main bronchus |
| 9 Carina (bifurcation of trachea) | 20 Interatrial septum | 32 Left pulmonary artery |
| 10 Clavicle | 21 Internal thoracic artery and vein | 33 Left subclavian artery |
| 11 Coronary sinus | 22 Lamina | 34 Left superior lobe bronchus |
| | 23 Latissimus dorsi muscle | 35 Left superior pulmonary vein |

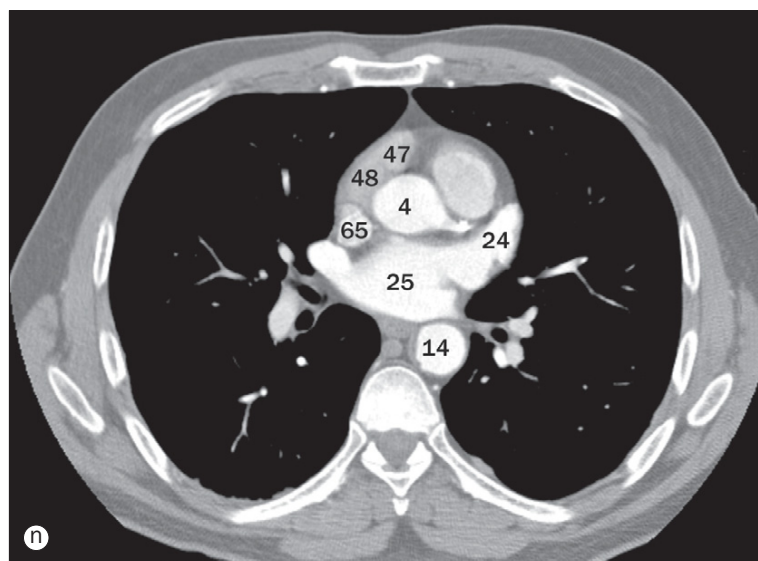
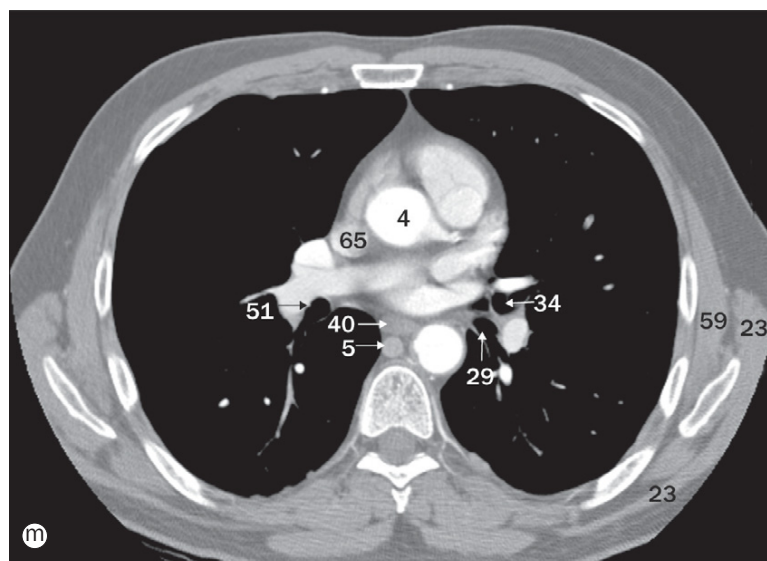
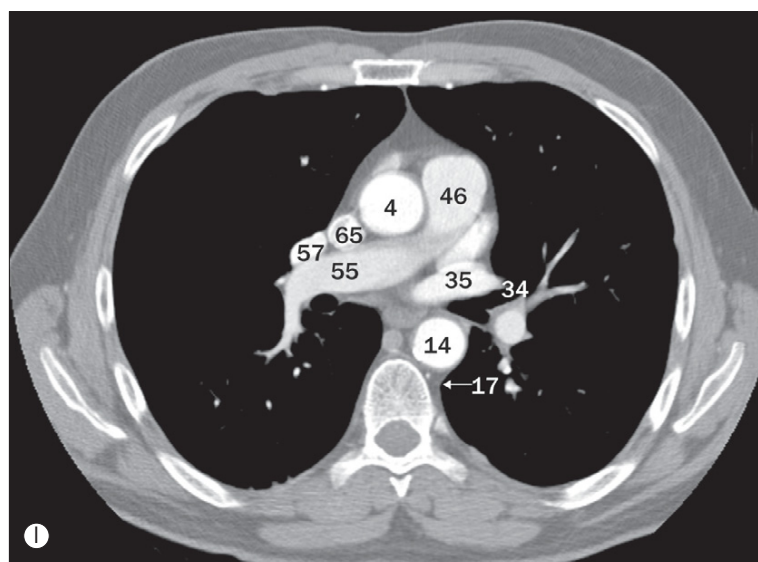
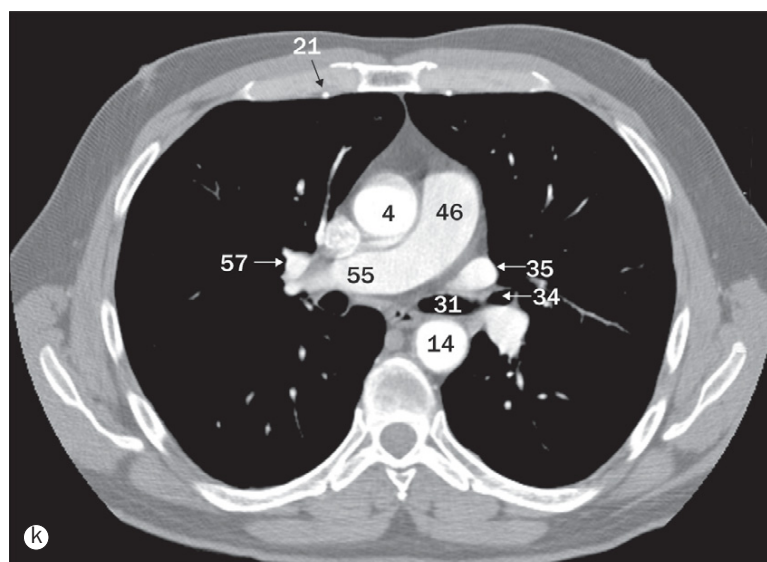
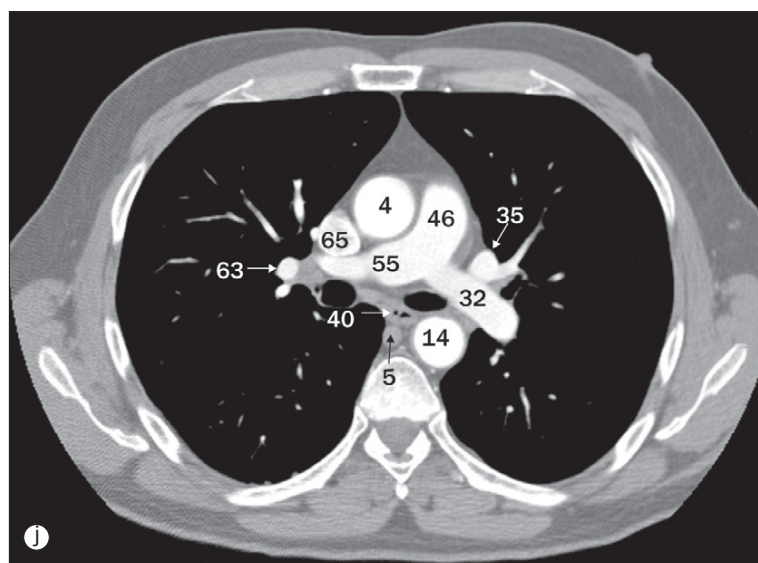
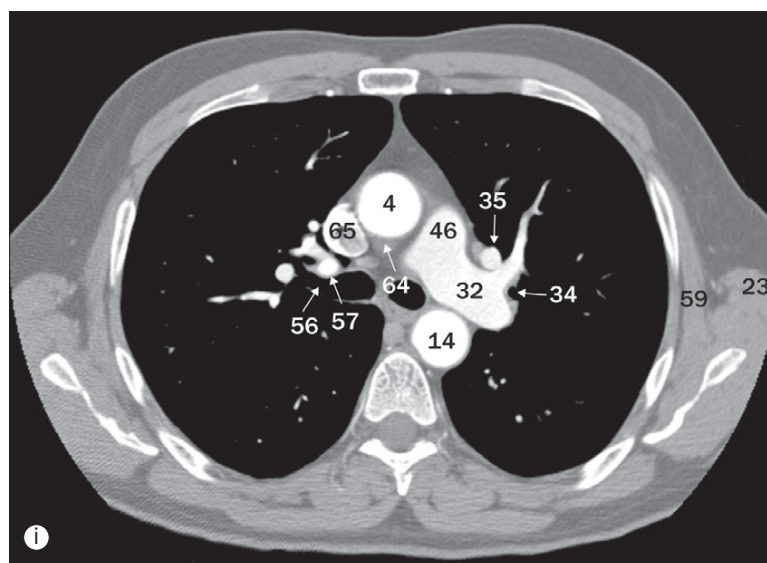


(a)–(t) Chest, axial CT images of mediastinum.

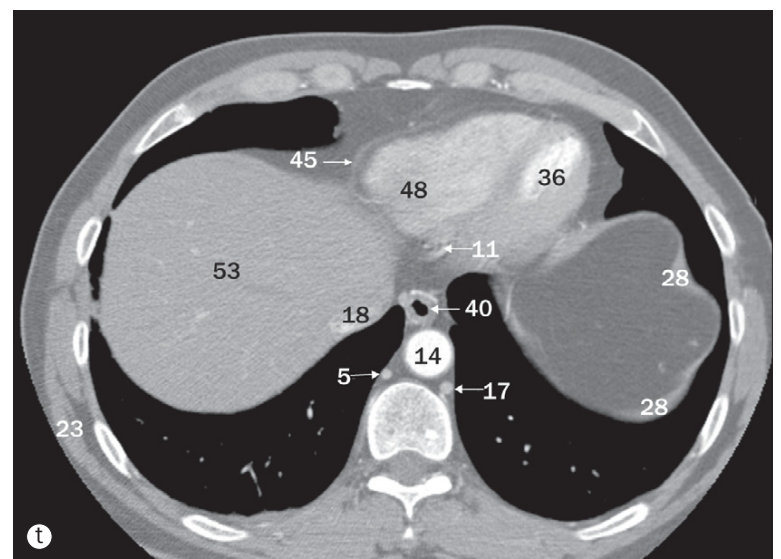
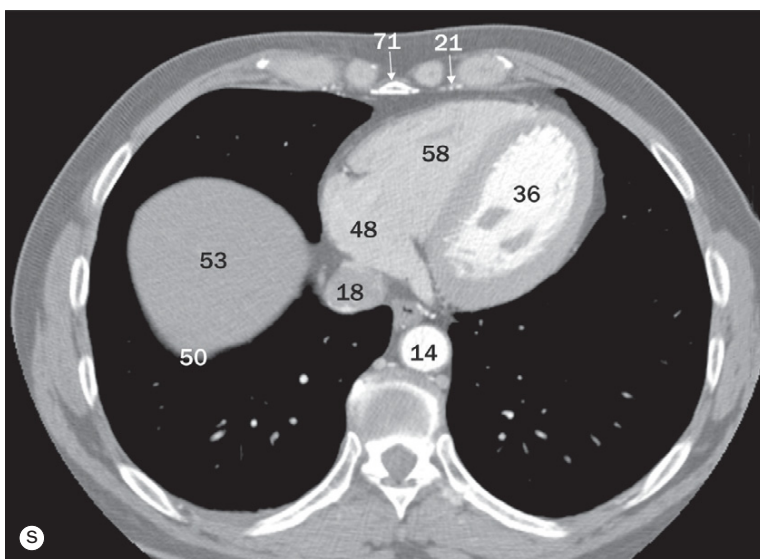
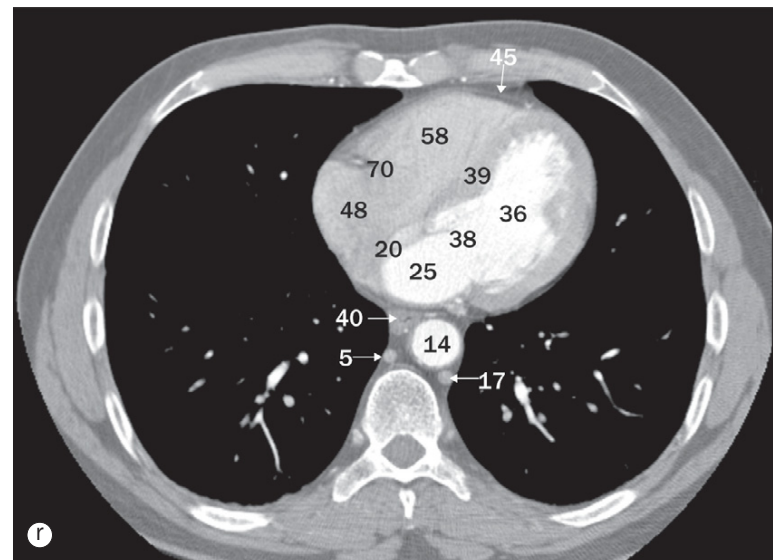
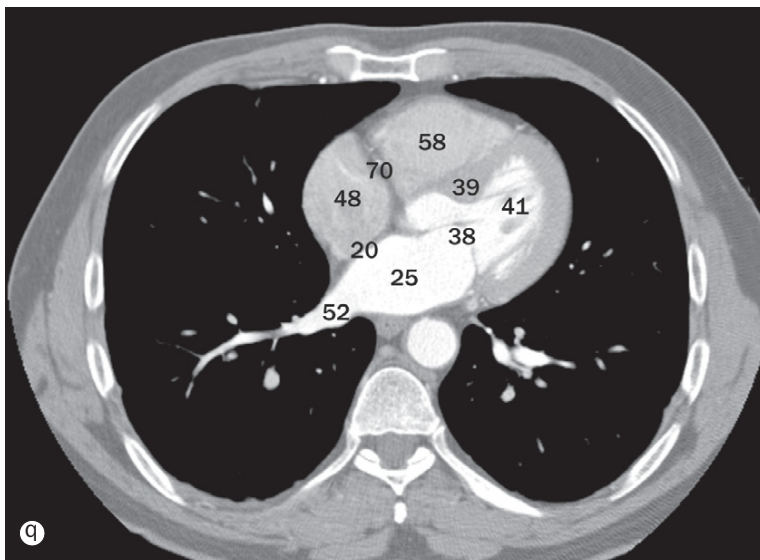
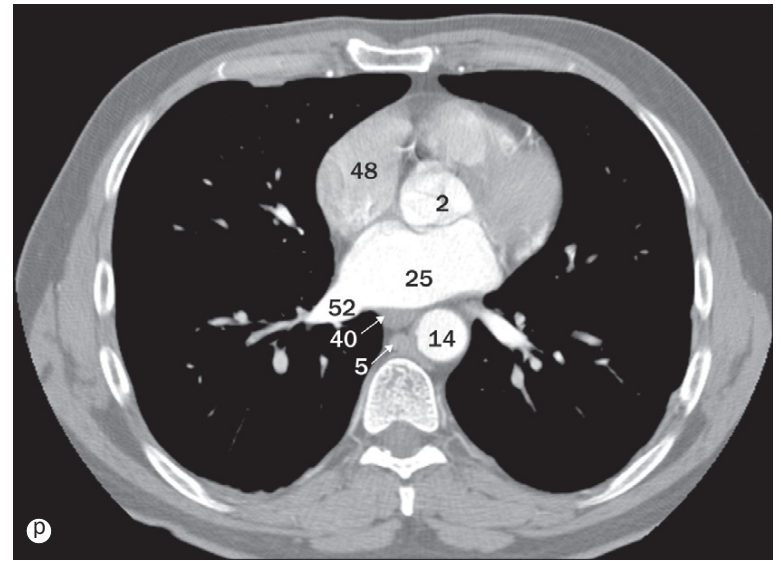
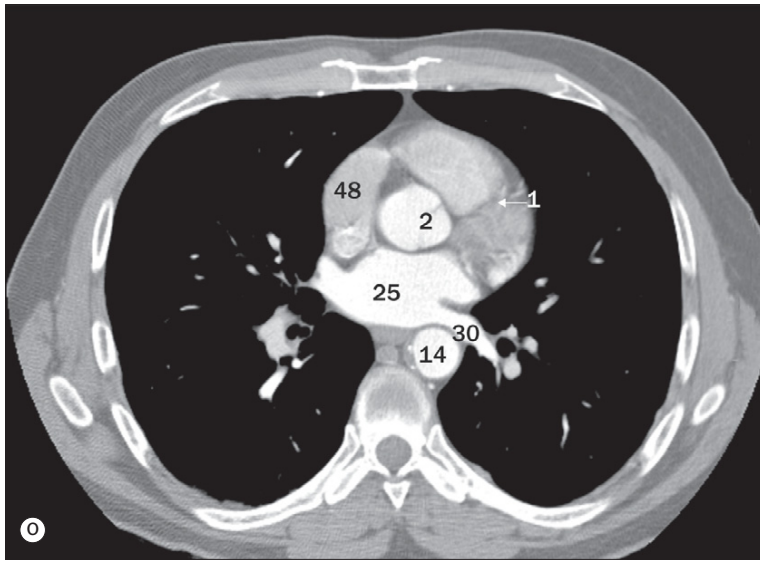
36 Left ventricular cavity
37 Manubrium of sternum
38 Mitral valve
39 Muscular interventricular septum
40 Oesophagus
41 Papillary muscles
42 Pectoralis major muscle
43 Pectoralis minor muscle
44 Pedicle
45 Pericardium
46 Pulmonary trunk
47 Right atrial appendage (auricle)
48 Right atrium

49 Right brachiocephalic vein
50 Right hemidiaphragm
51 Right inferior lobe bronchus
52 Right inferior pulmonary vein
53 Right lobe of liver
54 Right main bronchus
55 Right pulmonary artery
56 Right superior lobe bronchus
57 Right superior pulmonary vein
58 Right ventricular cavity
59 Serratus anterior muscle
60 Spinal canal
61 Sternoclavicular joint

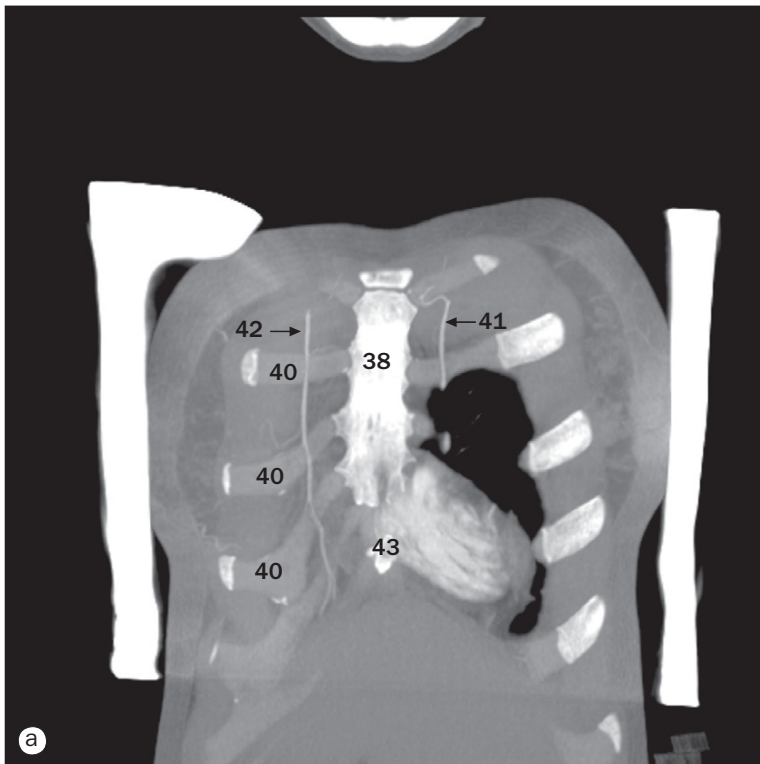
62 Subscapularis muscle
63 Superior lobe branch of right pulmonary artery
64 Superior pericardial recess
65 Superior vena cava
66 Suprascapularis muscle
67 Trachea
68 Transverse process
69 Trapezius muscle
70 Tricuspid valve
71 Xiphisternum



(a)–(t) Chest, axial CT images of mediastinum. See pages 96–97 for key.



(a)–(t) Chest, axial CT images of mediastinum. See pages 96–97 for key.

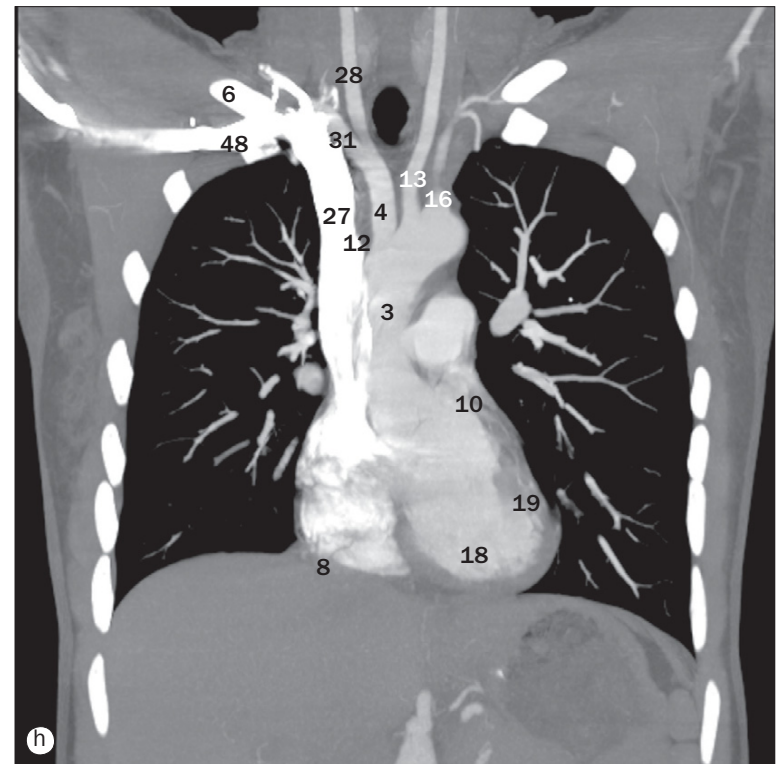
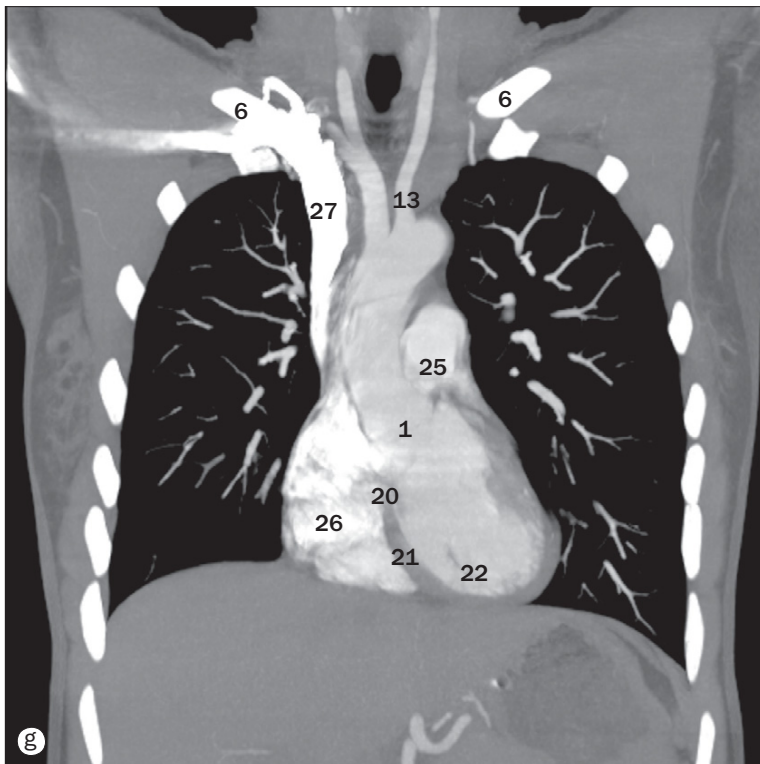
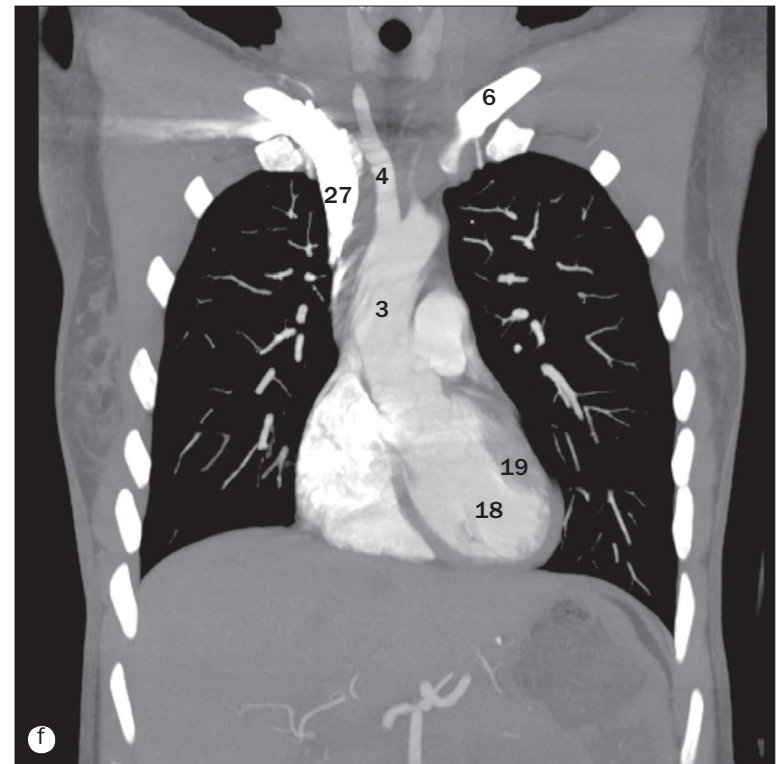
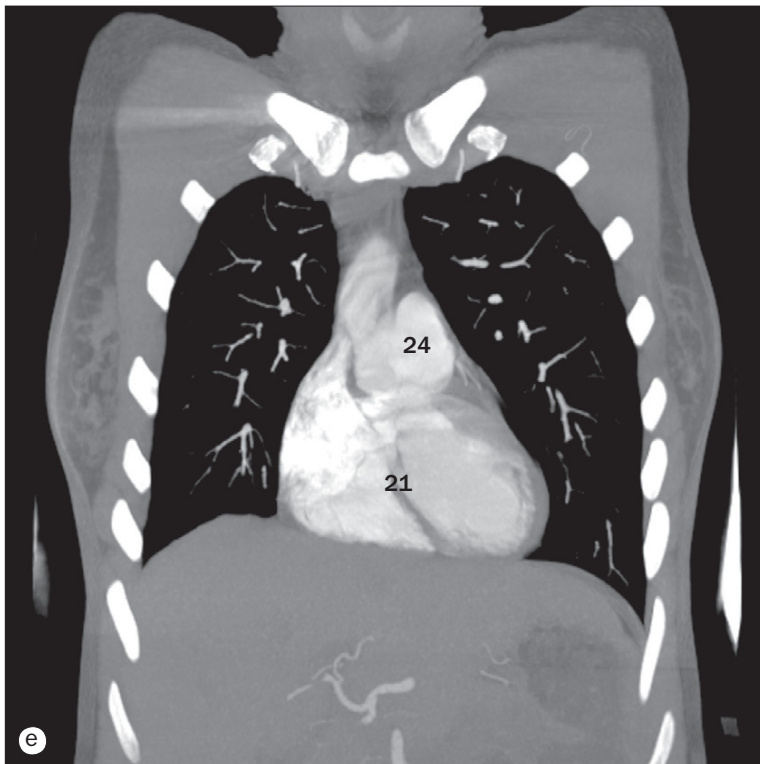


(a)–(p) Chest, coronal CT images, from anterior to posterior.

1 Aortic valve
2 Arch of aorta (aortic knuckle or knob)
3 Ascending aorta
4 Brachiocephalic trunk
5 Carina (bifurcation of trachea)
6 Clavicle
7 Descending aorta
8 Inferior vena cava

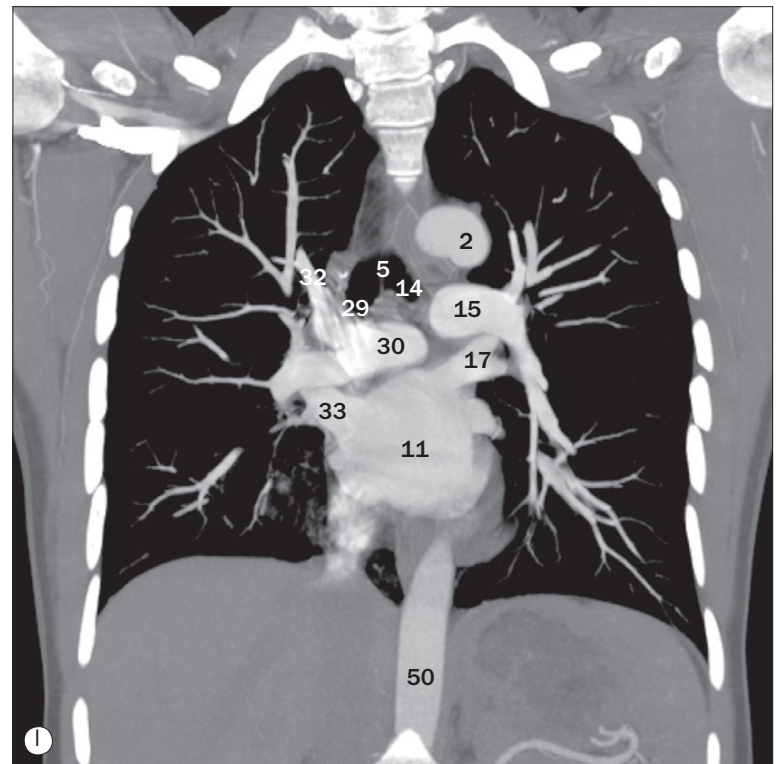
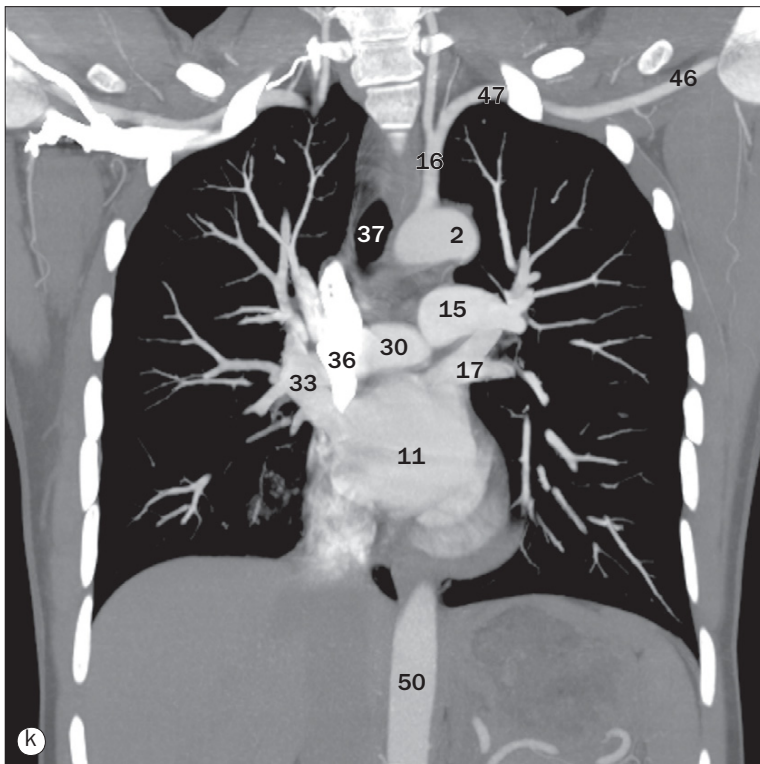
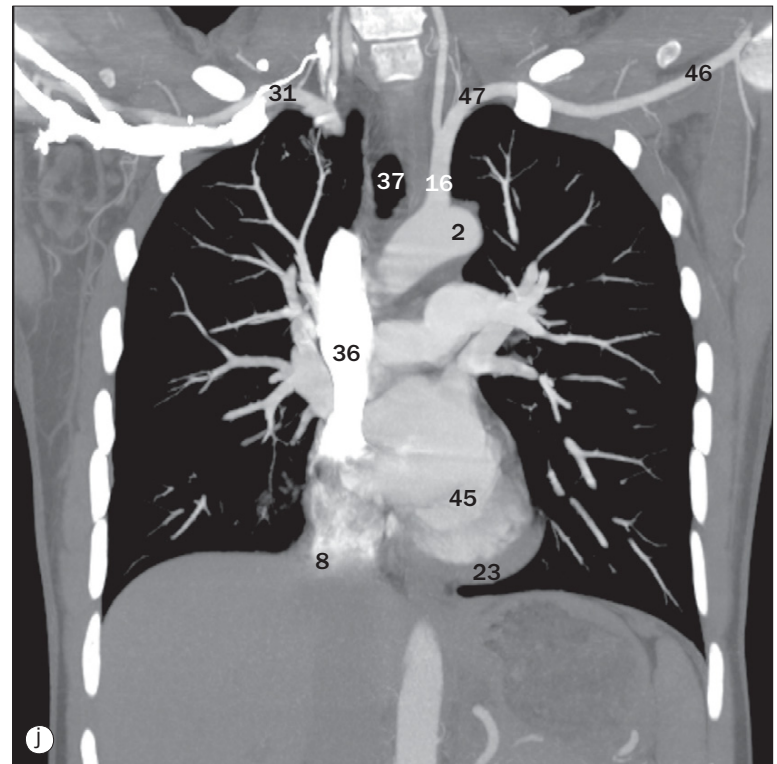
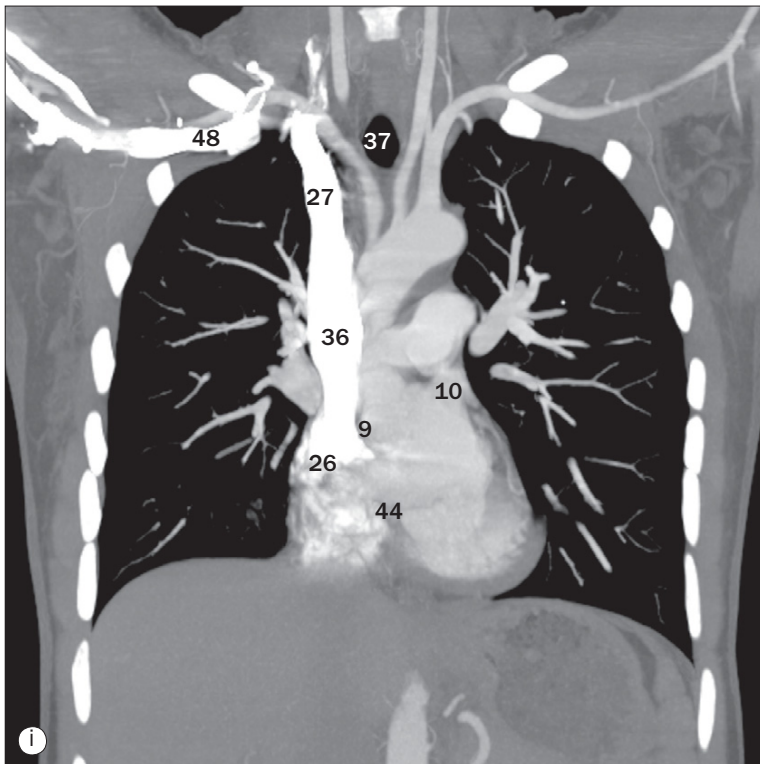
9 Interatrial septum
10 Left atrial appendage (auricle)
11 Left atrium
12 Left brachiocephalic vein
13 Left common carotid artery
14 Left main bronchus
15 Left pulmonary artery
16 Left subclavian artery

17 Left superior pulmonary vein
18 Left ventricular cavity
19 Left ventricular wall
20 Membranous interventricular septum
21 Muscular interventricular septum
22 Papillary muscles
23 Pericardium
24 Pulmonary trunk



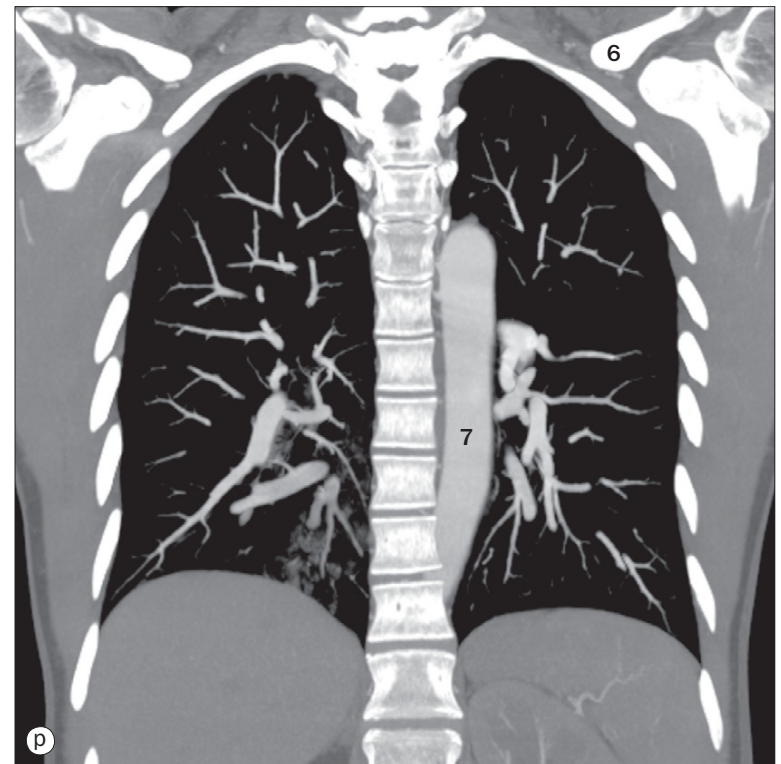
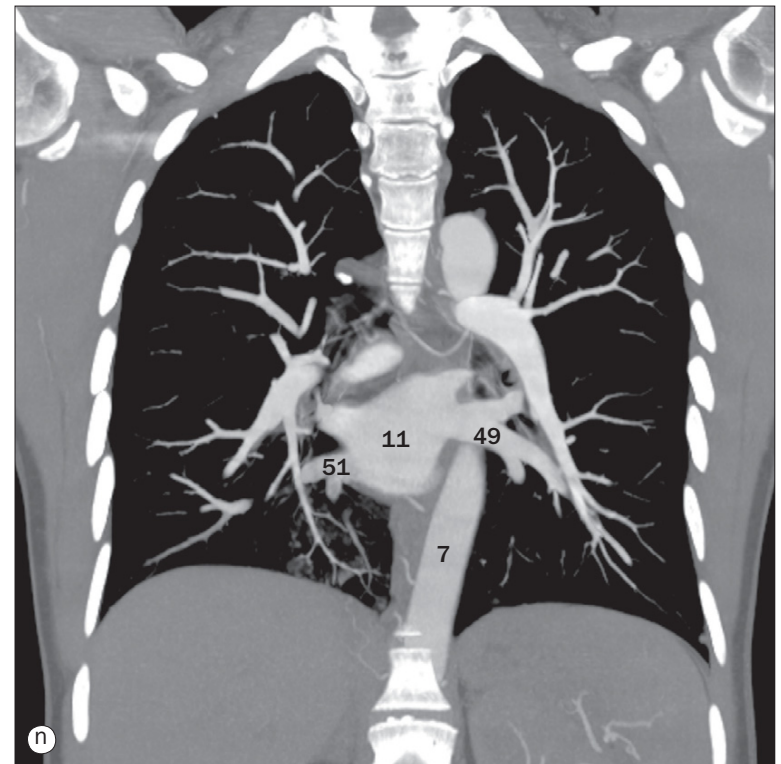
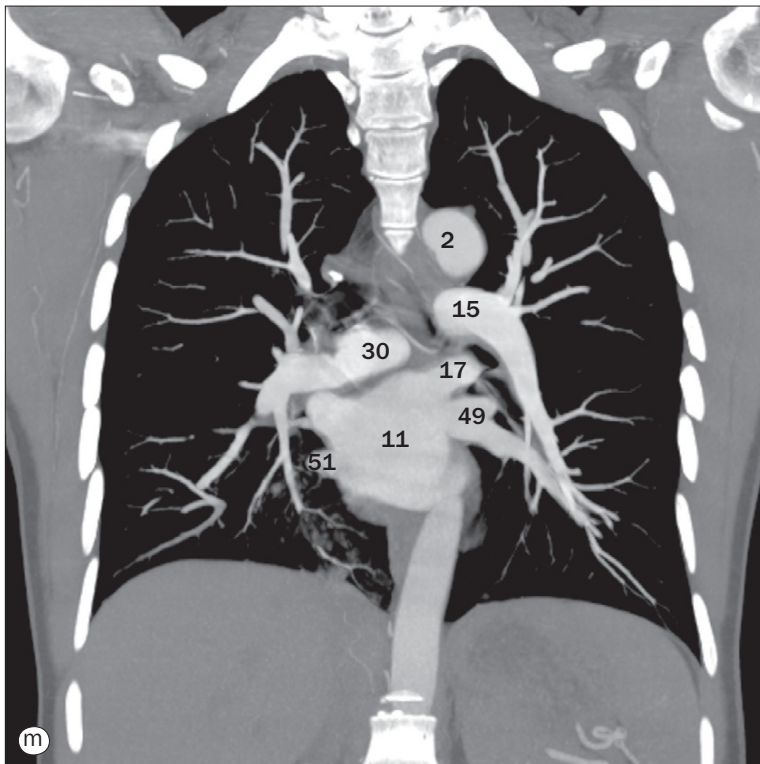
(a)–(p) Chest, coronal CT images, from anterior to posterior.

- | | | |
|---|---|----------------------------------|
| 25 Pulmonary valve | 34 Right ventricular cavity | 43 Xiphisternum |
| 26 Right atrium | 35 Right ventricular wall | 44 Tricuspid valve |
| 27 Right brachiocephalic vein | 36 Superior vena cava | 45 Mitral valve |
| 28 Right common carotid artery | 37 Trachea | 46 Left axillary artery |
| 29 Right main bronchus | 38 Sternum | 47 Left subclavian artery |
| 30 Right pulmonary artery | 39 Manubrium | 48 Right subclavian vein |
| 31 Right subclavian artery | 40 Anterior costal cartilage | 49 Left inferior pulmonary vein |
| 32 Right superior lobe pulmonary artery | 41 Left internal thoracic (mammary) artery | 50 Abdominal aorta |
| 33 Right superior pulmonary vein | 42 Right internal thoracic (mammary) artery | 51 Right inferior pulmonary vein |



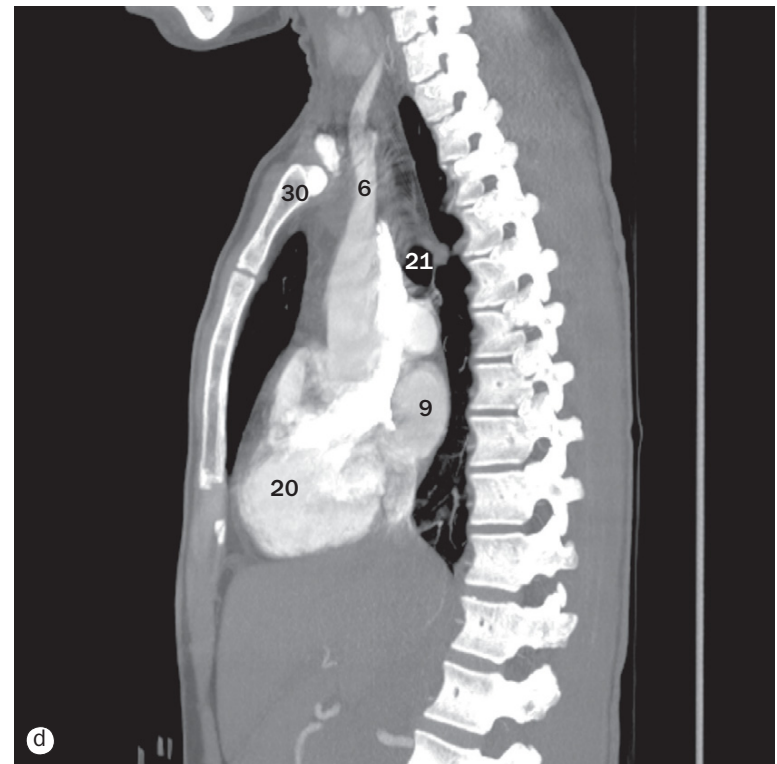
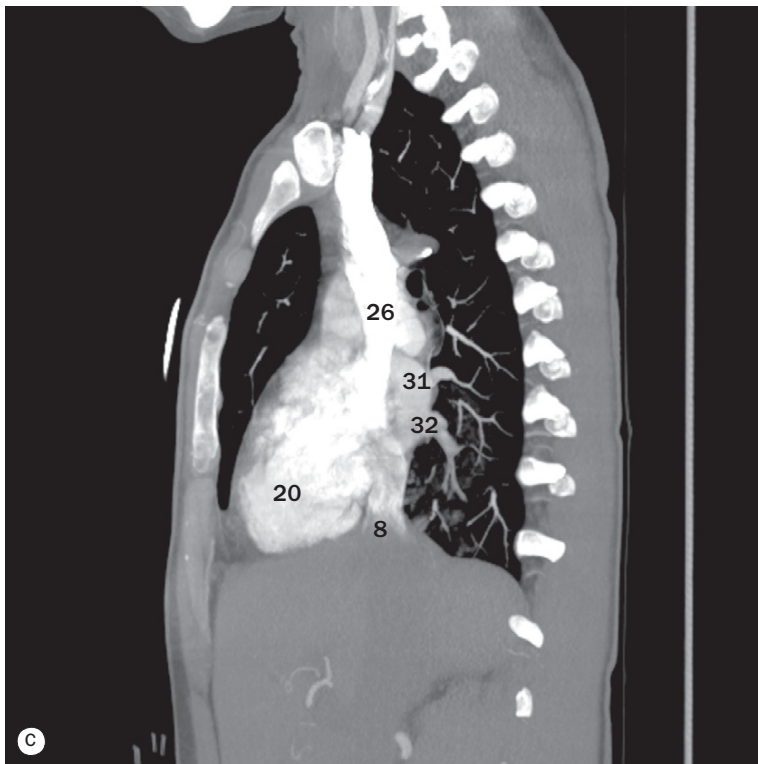
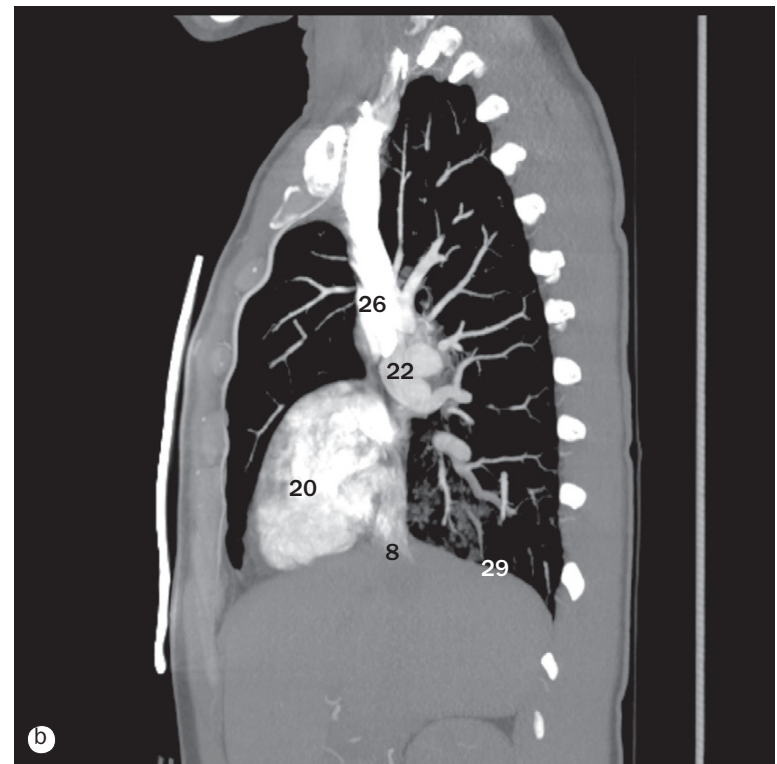
(a)–(p) Chest, coronal CT images, from anterior to posterior.

- | | | |
|--|------------------------------------|---------------------------------------|
| 1 Aortic valve | 9 Interatrial septum | 17 Left superior pulmonary vein |
| 2 Arch of aorta (aortic knuckle or knob) | 10 Left atrial appendage (auricle) | 18 Left ventricular cavity |
| 3 Ascending aorta | 11 Left atrium | 19 Left ventricular wall |
| 4 Brachiocephalic trunk | 12 Left brachiocephalic vein | 20 Membranous interventricular septum |
| 5 Carina (bifurcation of trachea) | 13 Left common carotid artery | 21 Muscular interventricular septum |
| 6 Clavicle | 14 Left main bronchus | 22 Papillary muscles |
| 7 Descending aorta | 15 Left pulmonary artery | 23 Pericardium |
| 8 Inferior vena cava | 16 Left subclavian artery | 24 Pulmonary trunk |



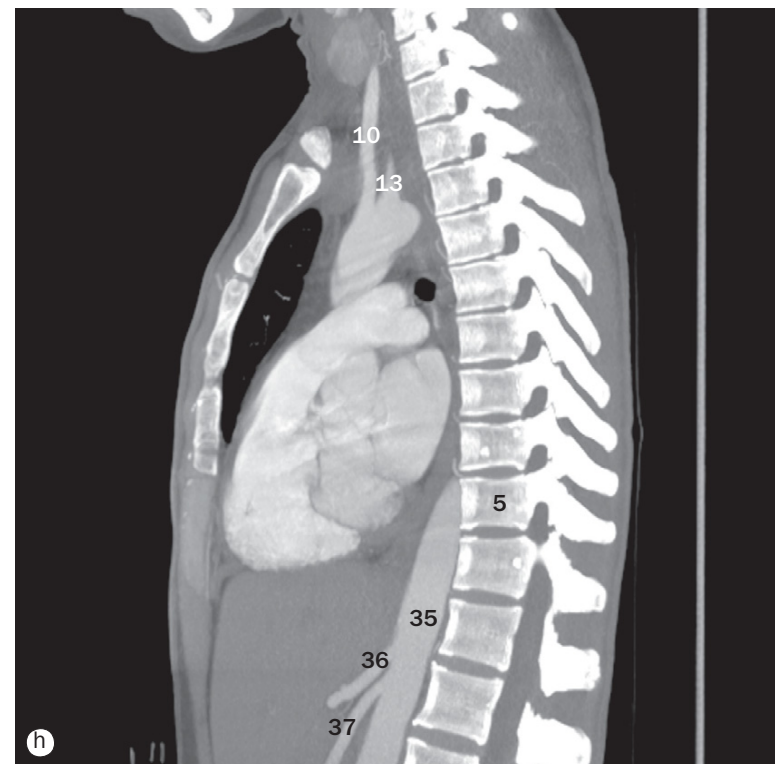
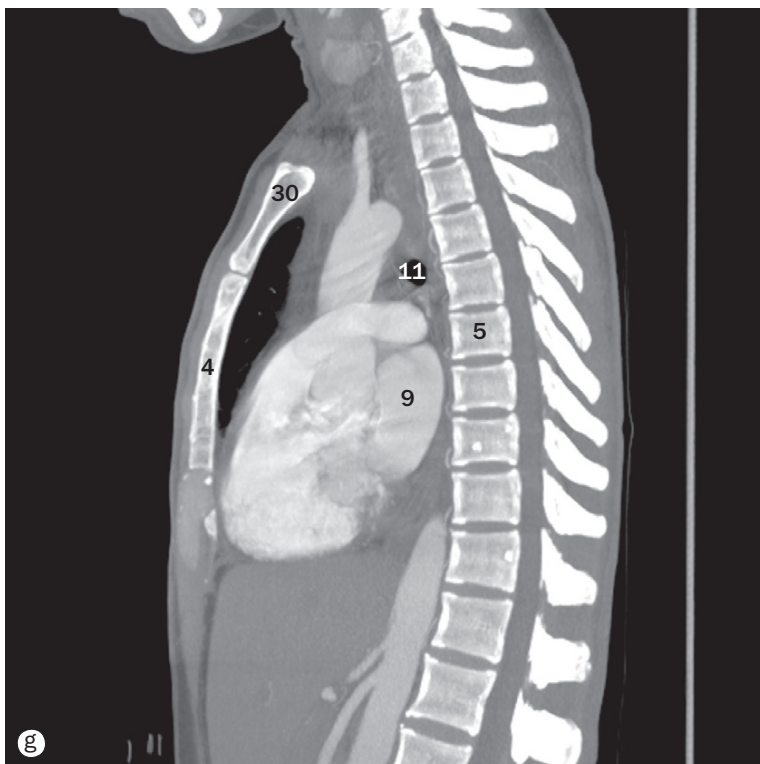
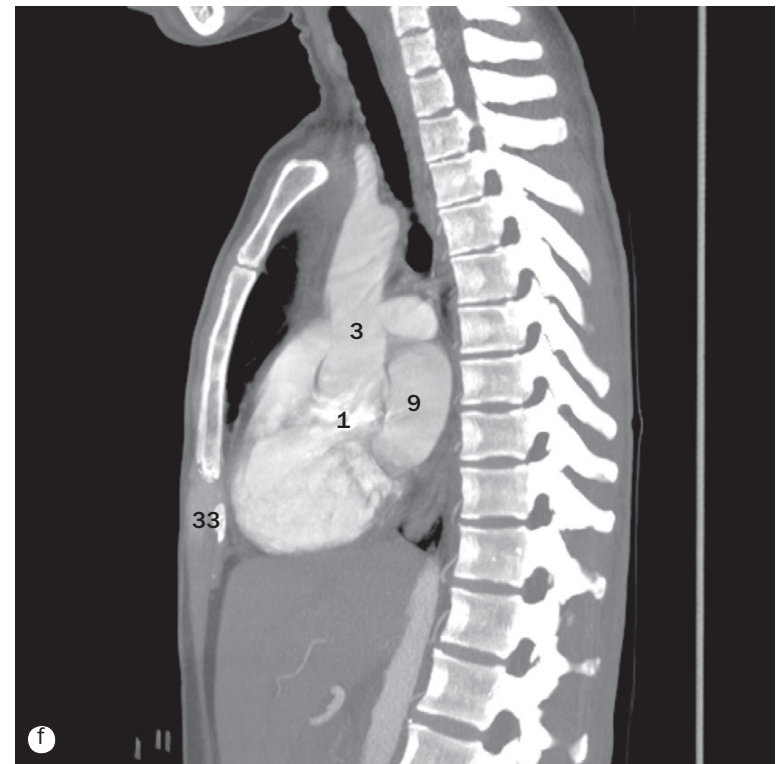
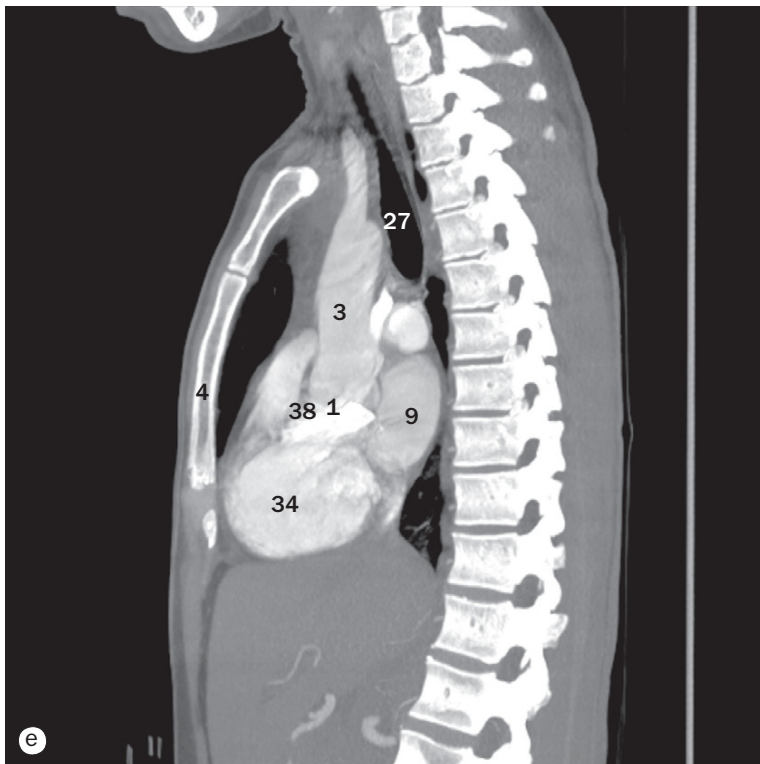
(a)–(p) Chest, coronal CT images, from anterior to posterior.

- | | | |
|---|---|----------------------------------|
| 25 Pulmonary valve | 34 Right ventricular cavity | 43 Xiphisternum |
| 26 Right atrium | 35 Right ventricular wall | 44 Tricuspid valve |
| 27 Right brachiocephalic vein | 36 Superior vena cava | 45 Mitral valve |
| 28 Right common carotid artery | 37 Trachea | 46 Left axillary artery |
| 29 Right main bronchus | 38 Sternum | 47 Left subclavian artery |
| 30 Right pulmonary artery | 39 Manubrium | 48 Right subclavian vein |
| 31 Right subclavian artery | 40 Anterior costal cartilage | 49 Left inferior pulmonary vein |
| 32 Right superior lobe pulmonary artery | 41 Left internal thoracic (mammary) artery | 50 Abdominal aorta |
| 33 Right superior pulmonary vein | 42 Right internal thoracic (mammary) artery | 51 Right inferior pulmonary vein |



(a)–(p) Chest, sagittal CT images, from right to left.

- | | | |
|--|-------------------------------|-------------------------------------|
| 1 Aortic valve | 8 Inferior vena cava | 15 Mitral valve |
| 2 Arch of aorta (aortic knuckle or knob) | 9 Left atrium | 16 Muscular interventricular septum |
| 3 Ascending aorta | 10 Left common carotid artery | 17 Pericardium |
| 4 Body of sternum | 11 Left main bronchus | 18 Pulmonary trunk |
| 5 Body of vertebra | 12 Left pulmonary artery | 19 Pulmonary valve |
| 6 Brachiocephalic trunk | 13 Left subclavian artery | 20 Right atrium |
| 7 Descending aorta | 14 Left ventricular cavity | 21 Right main bronchus |

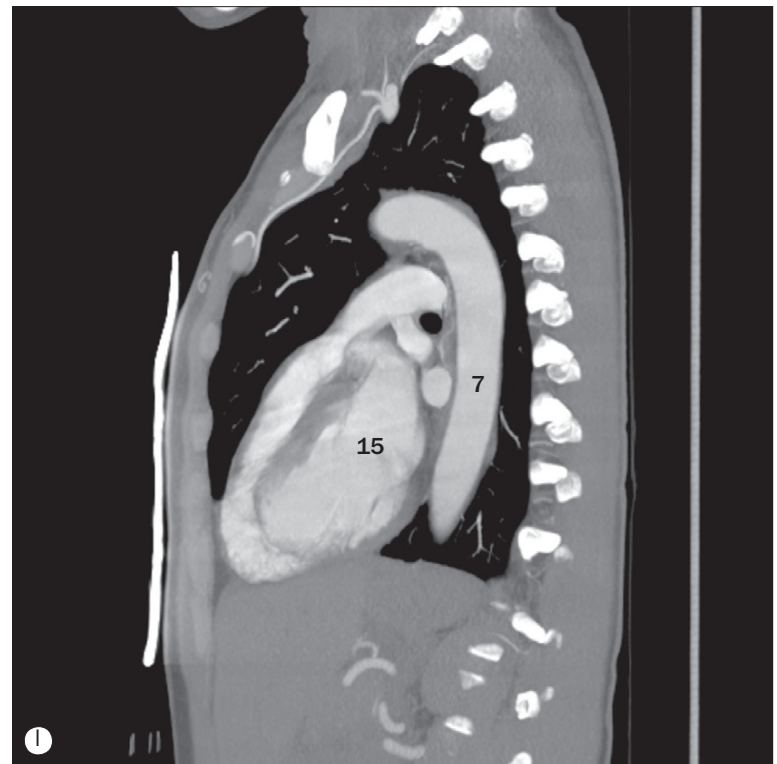
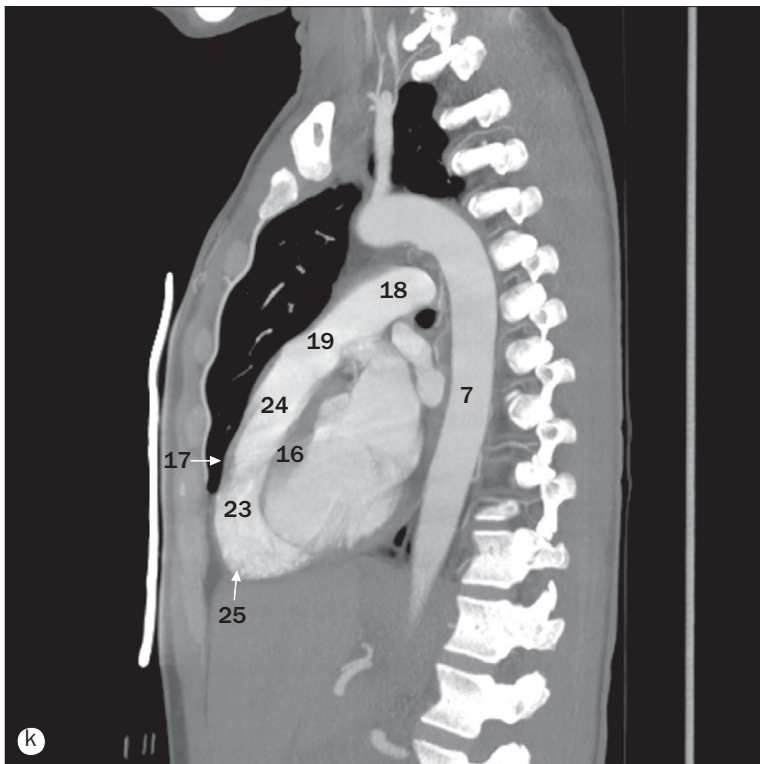
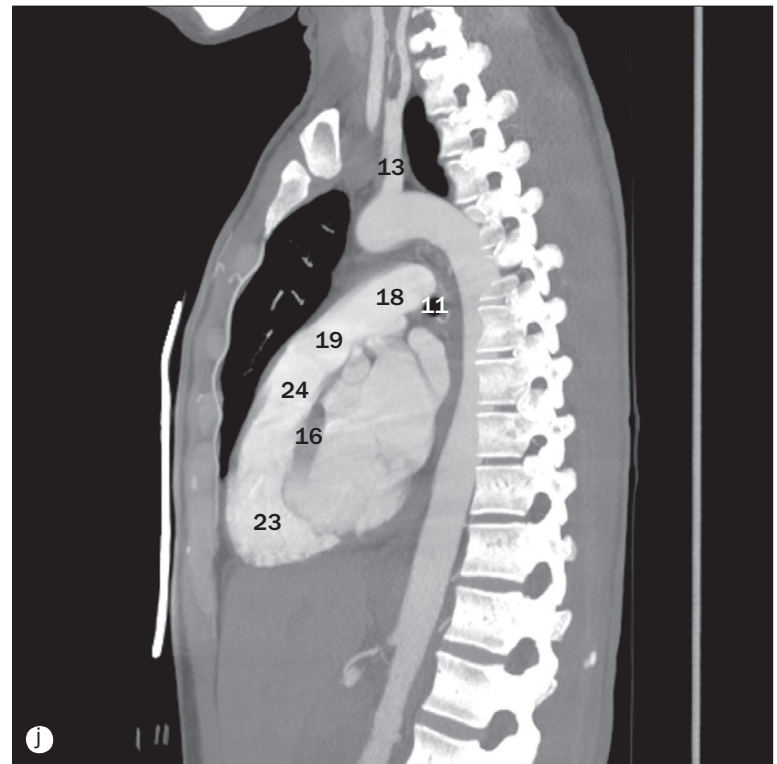
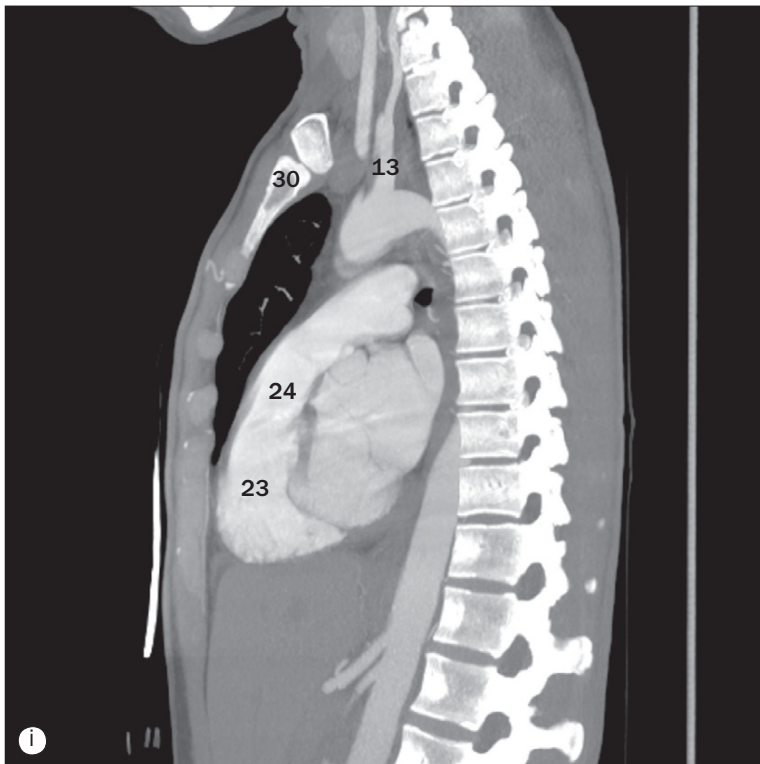


(a)–(p) Chest, sagittal CT images, from right to left.

22 Right pulmonary artery
23 Right ventricular cavity
24 Right ventricular outflow tract
25 Right ventricular wall
26 Superior vena cava
27 Trachea

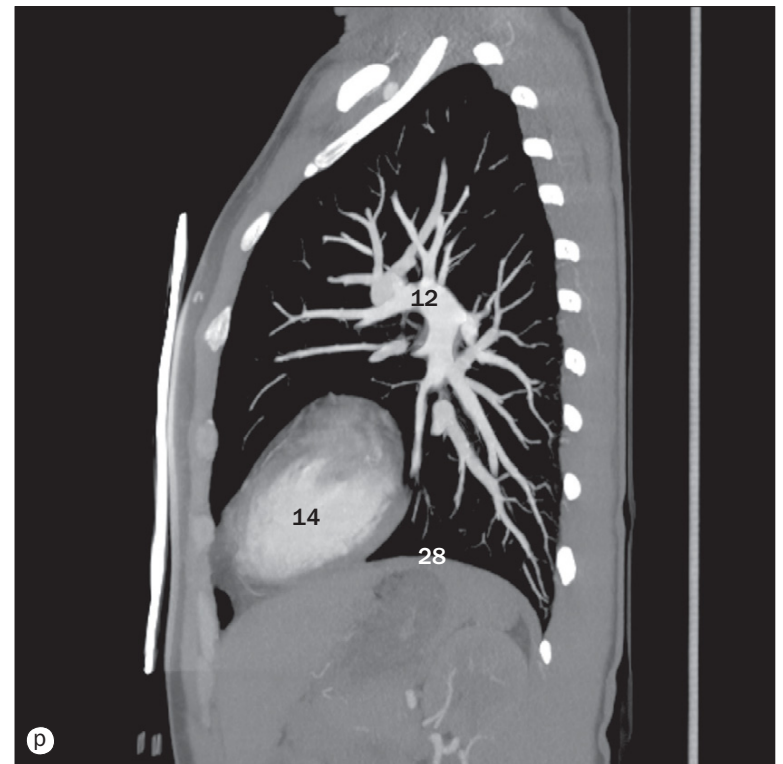
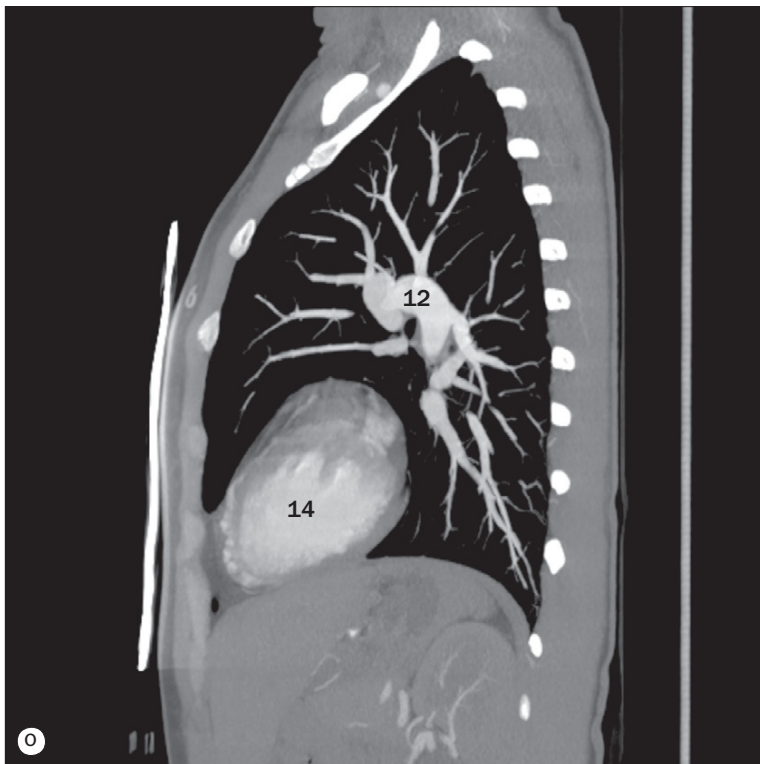
28 Left dome of diaphragm
29 Right dome of diaphragm
30 Manubrium
31 Right superior pulmonary vein
32 Right inferior pulmonary vein
33 Xiphisternum

34 Tricuspid valve
35 Abdominal aorta
36 Coeliac axis
37 Superior mesenteric artery
38 Right coronary artery



(a)–(p) Chest, sagittal CT images, from right to left.

- | | | |
|--|-------------------------------|-------------------------------------|
| 1 Aortic valve | 8 Inferior vena cava | 15 Mitral valve |
| 2 Arch of aorta (aortic knuckle or knob) | 9 Left atrium | 16 Muscular interventricular septum |
| 3 Ascending aorta | 10 Left common carotid artery | 17 Pericardium |
| 4 Body of sternum | 11 Left main bronchus | 18 Pulmonary trunk |
| 5 Body of vertebra | 12 Left pulmonary artery | 19 Pulmonary valve |
| 6 Brachiocephalic trunk | 13 Left subclavian artery | 20 Right atrium |
| 7 Descending aorta | 14 Left ventricular cavity | 21 Right main bronchus |

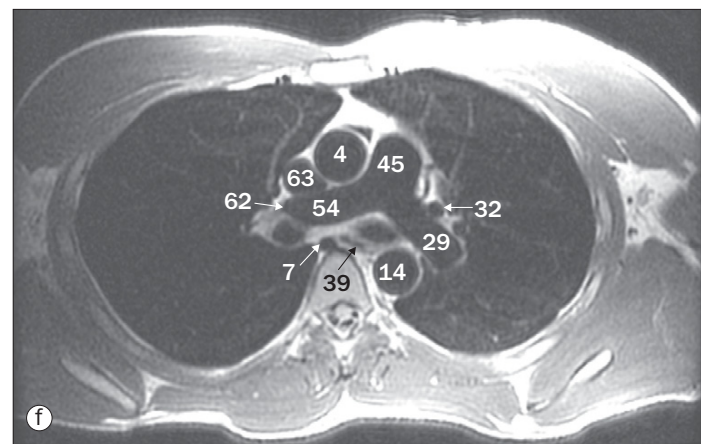
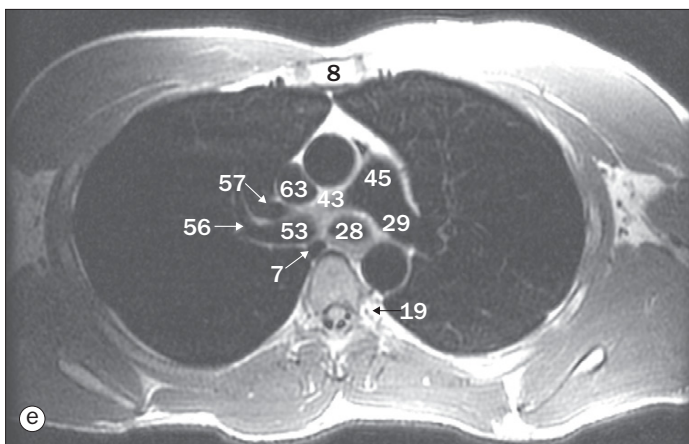
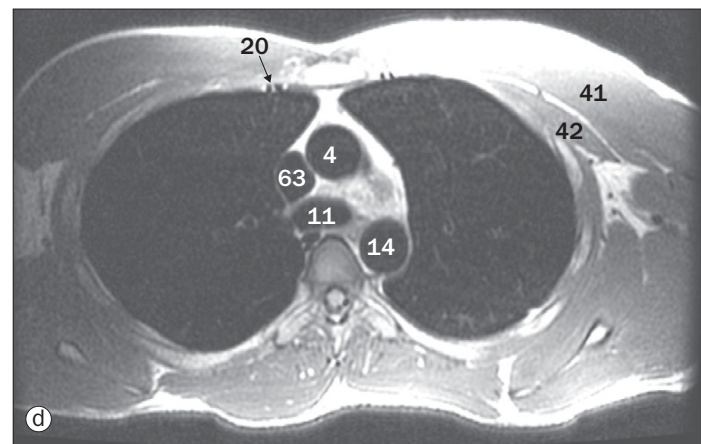
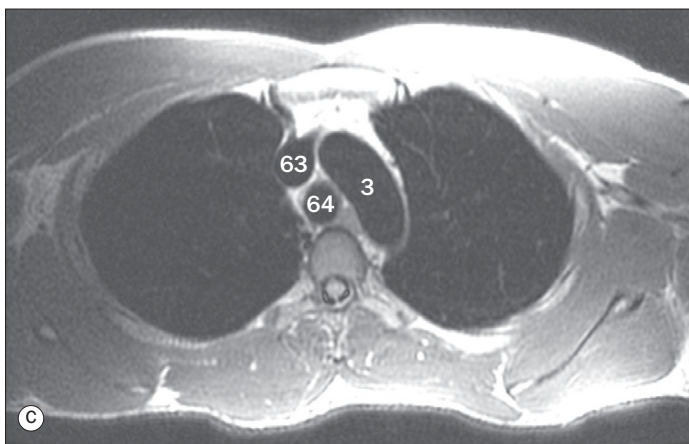
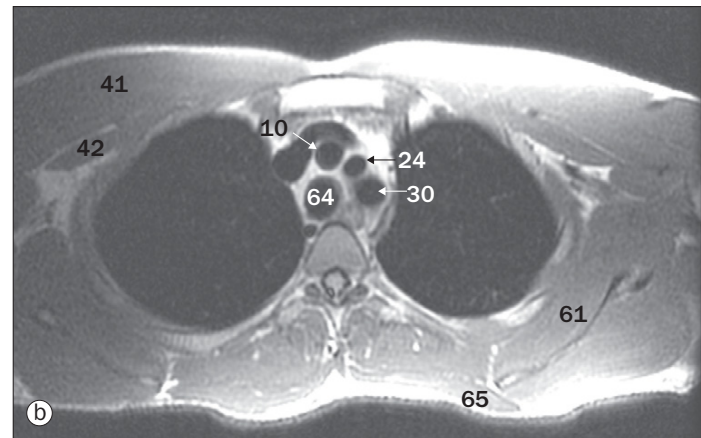
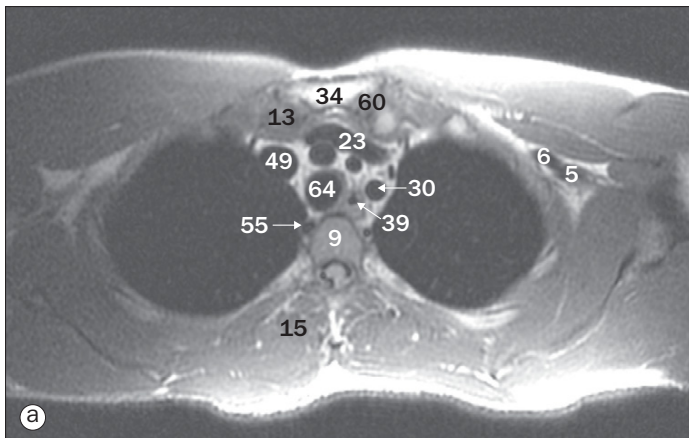


(a)–(p) Chest, sagittal CT images, from right to left.

22 Right pulmonary artery
23 Right ventricular cavity
24 Right ventricular outflow tract
25 Right ventricular wall
26 Superior vena cava
27 Trachea

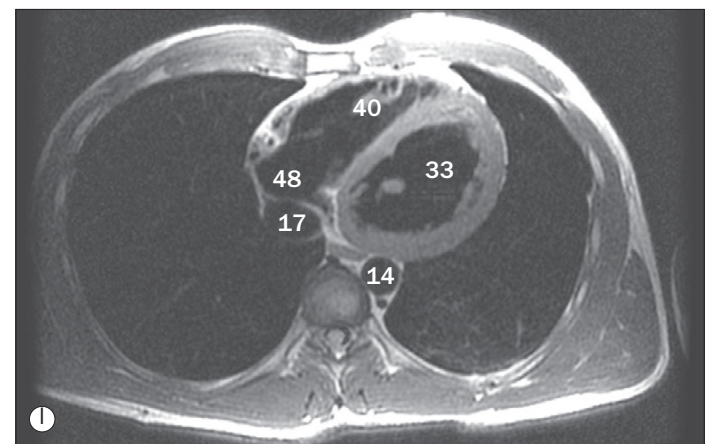
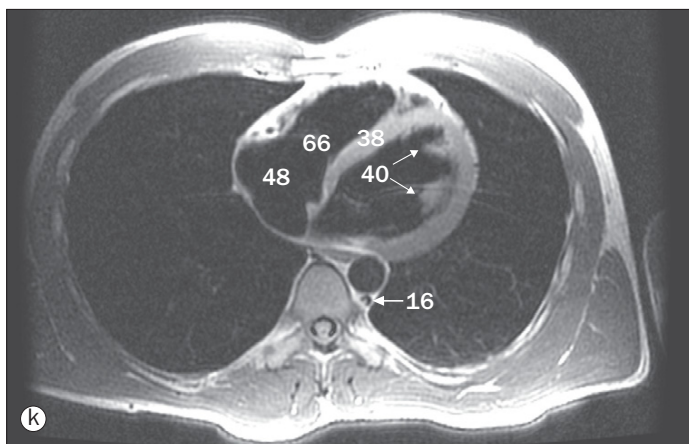
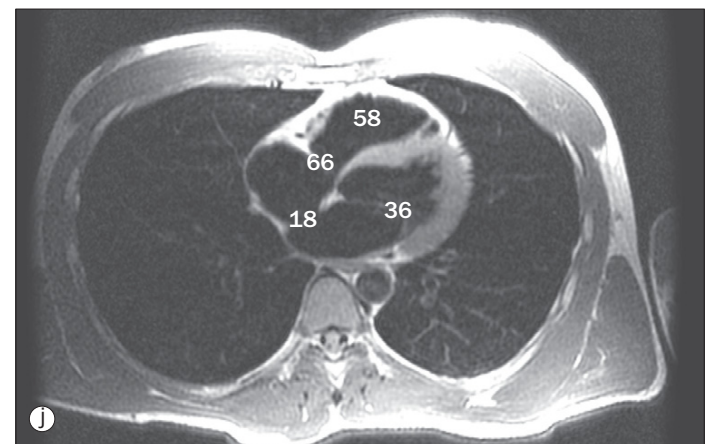
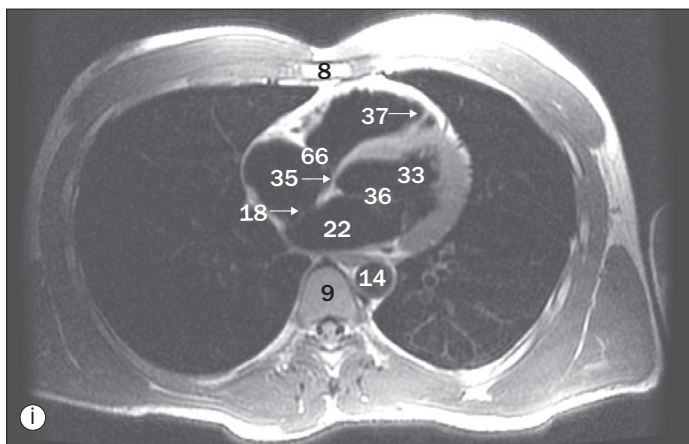
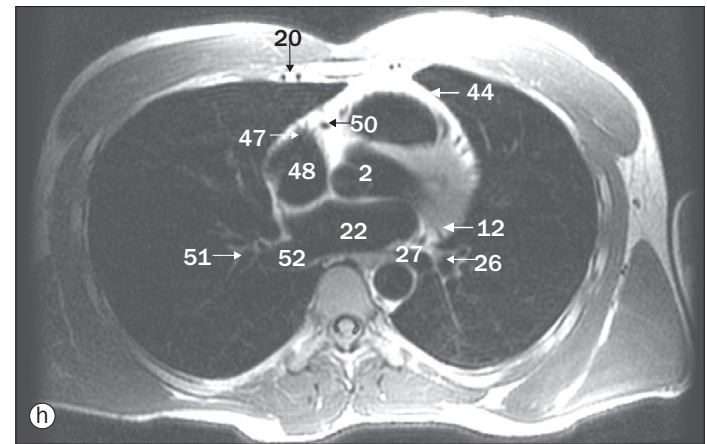
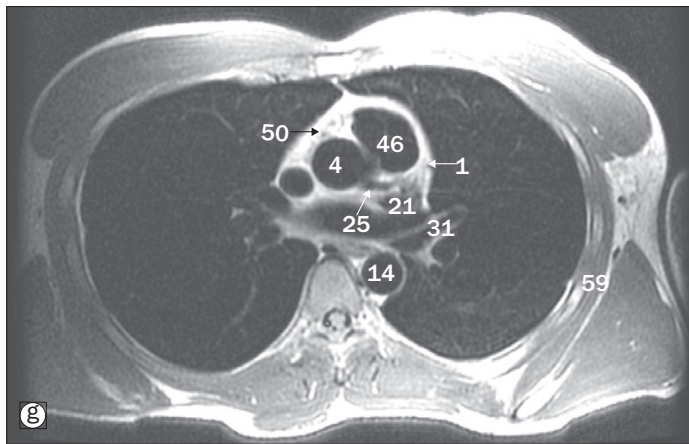
28 Left dome of diaphragm
29 Right dome of diaphragm
30 Manubrium
31 Right superior pulmonary vein
32 Right inferior pulmonary vein
33 Xiphisternum

34 Tricuspid valve
35 Abdominal aorta
36 Coeliac axis
37 Superior mesenteric artery
38 Right coronary artery



(a)–(f) Chest, axial MR images.

- | | | |
|--|--|---------------------------------------|
| 1 Anterior interventricular branch of left coronary artery | 12 Circumflex branch of left coronary artery | 24 Left common carotid artery |
| 2 Aortic valve | 13 Clavicle | 25 Left coronary artery |
| 3 Arch of aorta (aortic knuckle or knob) | 14 Descending aorta | 26 Left inferior lobe bronchus |
| 4 Ascending aorta | 15 Erector spinae muscle | 27 Left inferior pulmonary vein |
| 5 Axillary artery | 16 Hemi-azygos vein | 28 Left main bronchus |
| 6 Axillary vein | 17 Inferior vena cava | 29 Left pulmonary artery |
| 7 Azygos vein | 18 Interatrial septum | 30 Left subclavian artery |
| 8 Body of sternum | 19 Intercostal artery | 31 Left superior lobe bronchus |
| 9 Body of vertebra | 20 Internal thoracic artery and vein | 32 Left superior pulmonary vein |
| 10 Brachiocephalic trunk | 21 Left atrial appendage (auricle) | 33 Left ventricular cavity |
| 11 Carina (bifurcation of trachea) | 22 Left atrium | 34 Manubrium of sternum |
| | 23 Left brachiocephalic vein | 35 Membranous interventricular septum |



(a)–(l) Chest, axial MR images.

36 Mitral valve
37 Moderator band
38 Muscular interventricular septum
39 Oesophagus
40 Papillary muscles
41 Pectoralis major muscle
42 Pectoralis minor muscle
43 Pericardial recess
44 Pericardium
45 Pulmonary trunk
46 Pulmonary valve

47 Right atrial appendage (auricle)
48 Right atrium
49 Right brachiocephalic vein
50 Right coronary artery
51 Right inferior lobe bronchus
52 Right inferior pulmonary vein
53 Right main bronchus
54 Right pulmonary artery
55 Right superior intercostal vein
56 Right superior lobe bronchus
57 Right superior pulmonary vein

58 Right ventricular cavity
59 Serratus anterior muscle
60 Sternoclavicular joint
61 Subscapularis muscle
62 Superior lobe branch of right pulmonary artery
63 Superior vena cava
64 Trachea
65 Trapezius muscle
66 Tricuspid valve



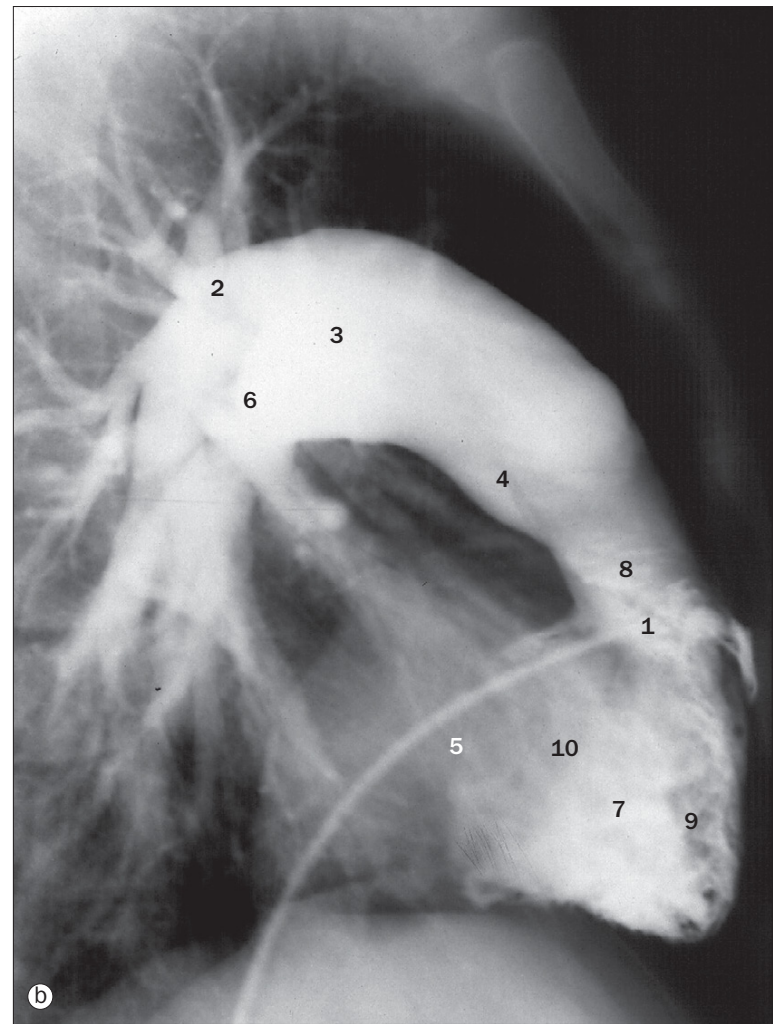
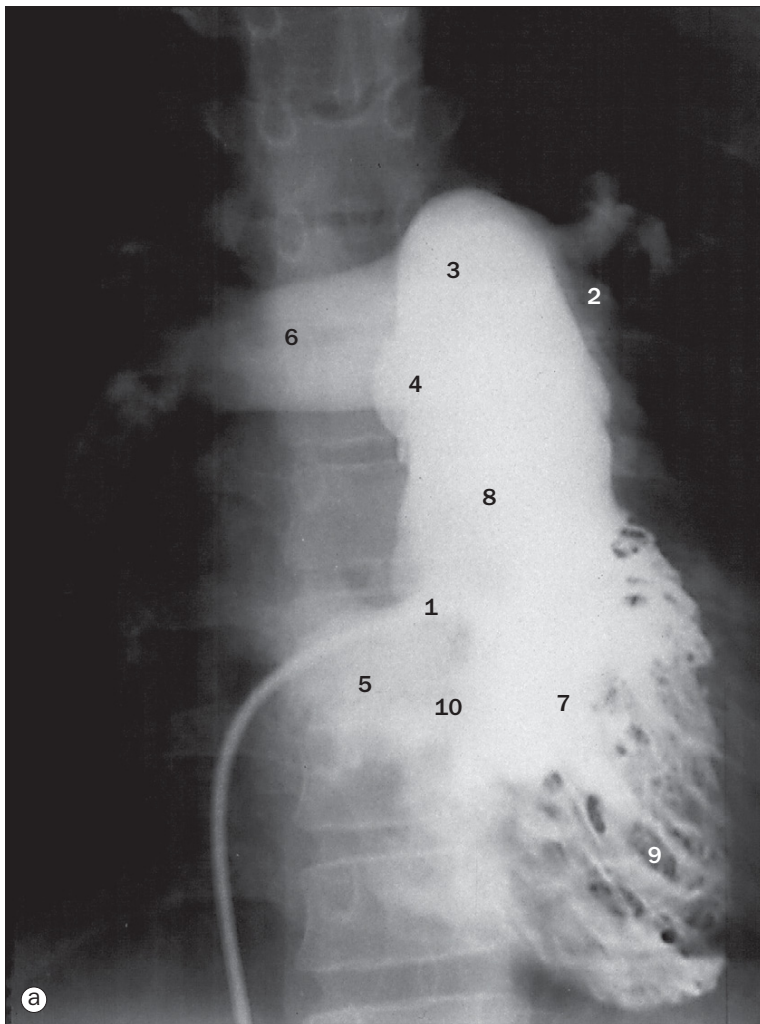
Pulmonary arteriogram, arterial phase.

- | | | |
|--|----------------------------------|-------------------------------------|
| 1 Anterior artery (superior lobe) | 6 Inferior lobe pulmonary artery | 13 Posterior artery (superior lobe) |
| 2 Anterior basal artery | 7 Lateral artery (middle lobe) | 14 Posterior basal artery |
| 3 Apical artery (superior lobe) | 8 Lateral basal artery | 15 Right pulmonary artery |
| 4 Catheter in main pulmonary artery via a femoral vein, inferior vena cava, right atrium and right ventricle | 9 Left pulmonary artery | 16 Superior lingular artery |
| 5 Inferior lingular artery | 10 Medial artery (middle lobe) | 17 Superior lobe pulmonary artery |
| | 11 Medial basal artery | |
| | 12 Middle lobe pulmonary artery | |



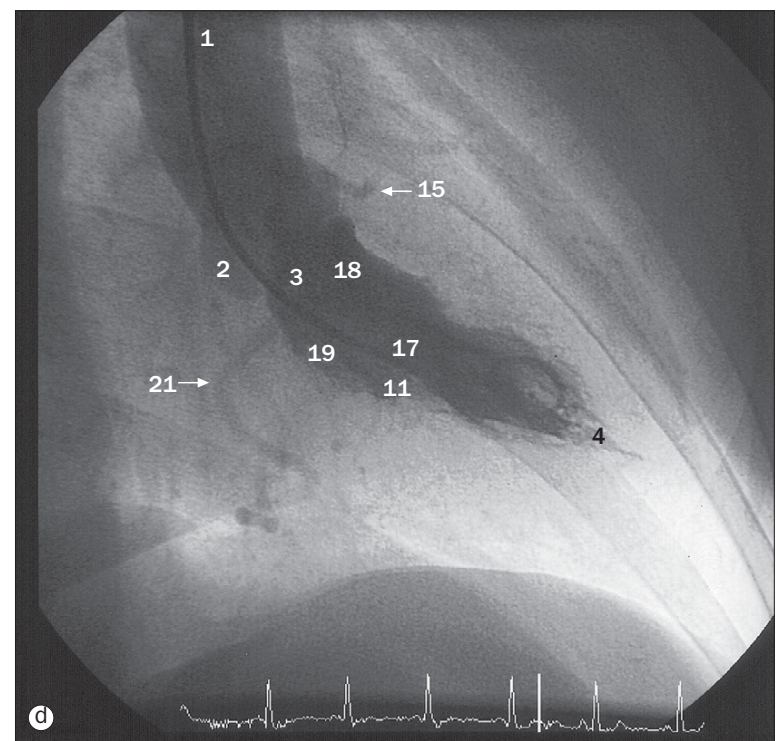
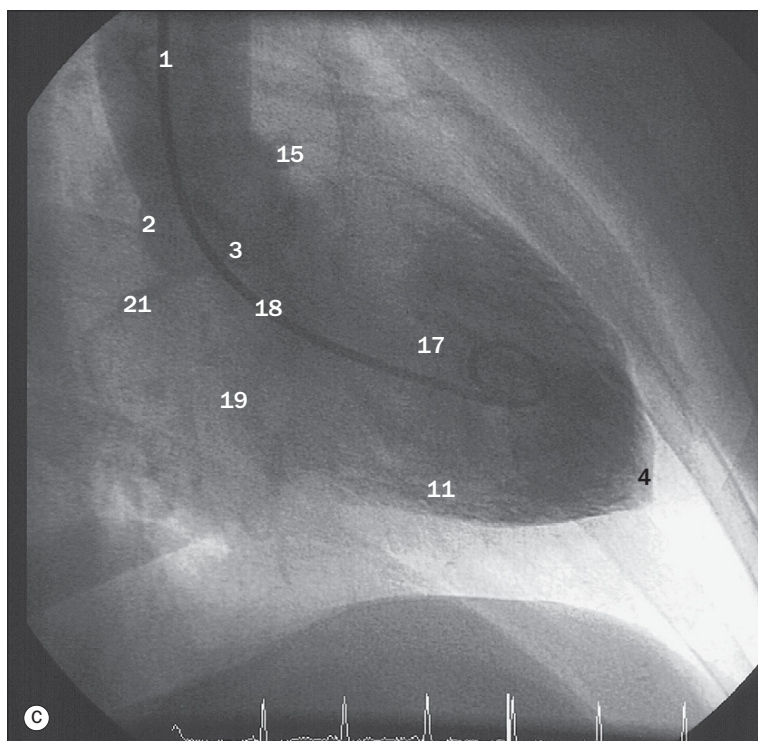
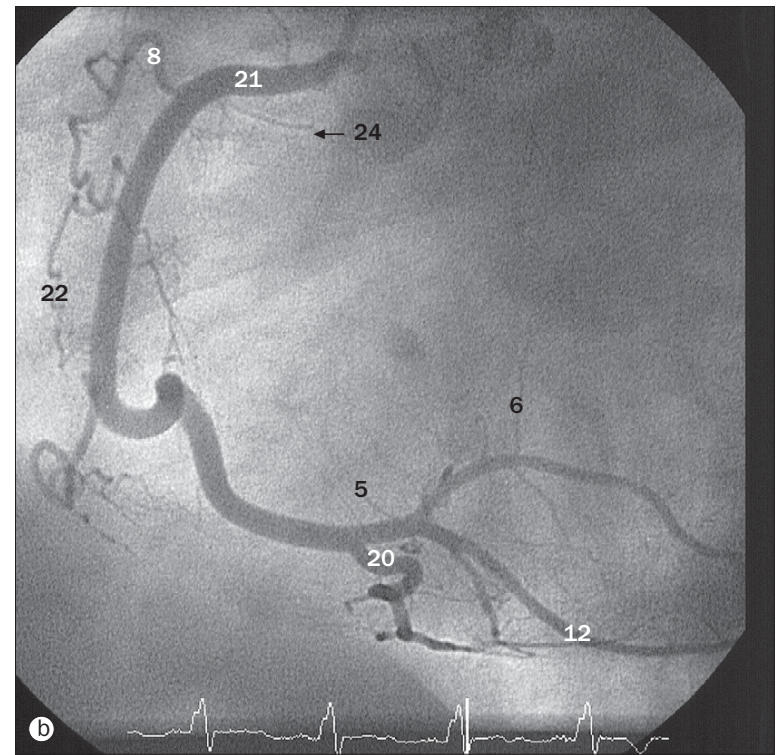
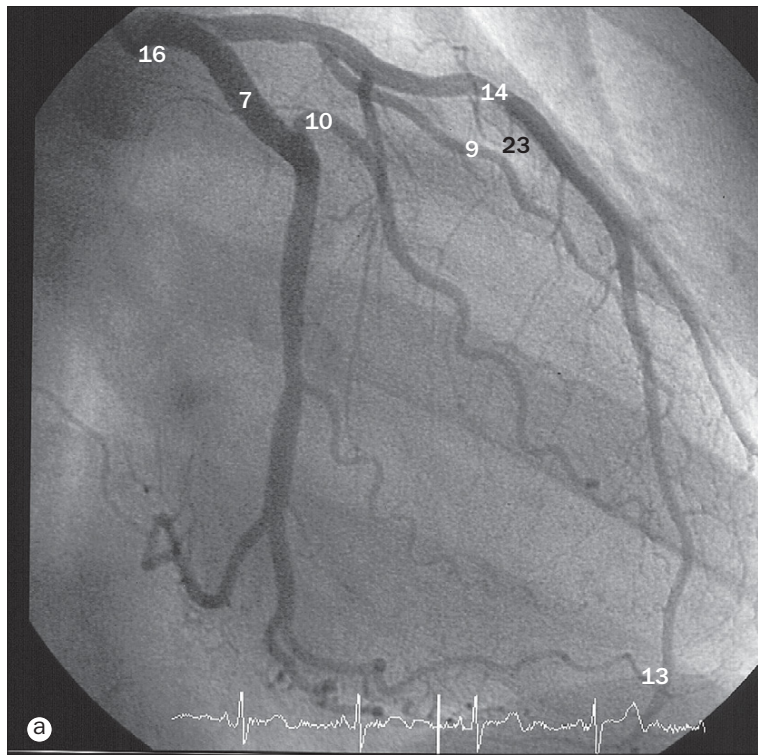
Pulmonary arteriogram, venous phase.

- | | |
|-----------------------------------|---------------------------------|
| 1 Aorta | 6 Left superior pulmonary vein |
| 2 Aortic arch | 7 Mitral valve |
| 3 Left atrial appendage (auricle) | 8 Right inferior pulmonary vein |
| 4 Left atrium | 9 Right superior pulmonary vein |
| 5 Left inferior pulmonary vein | |



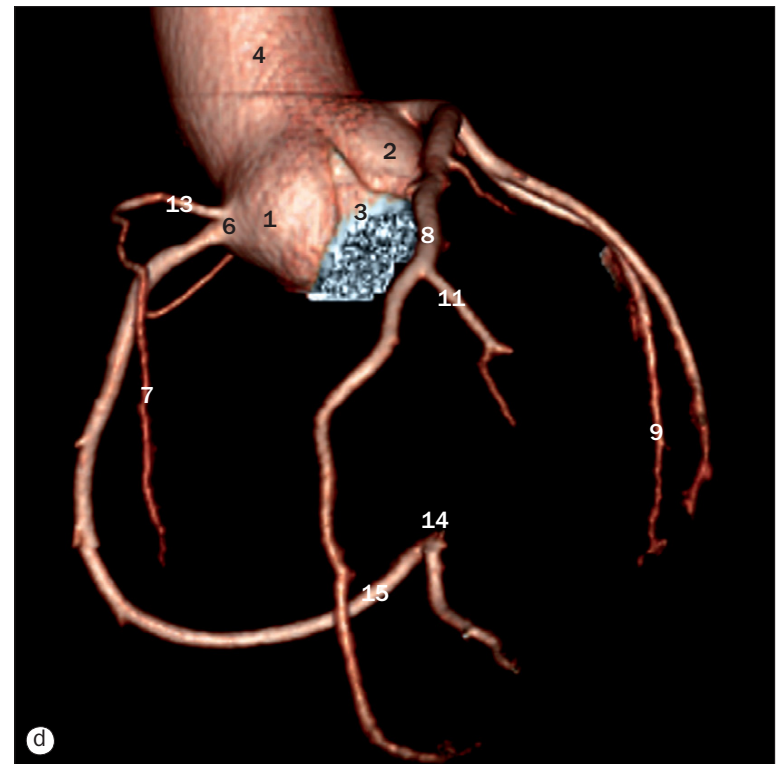
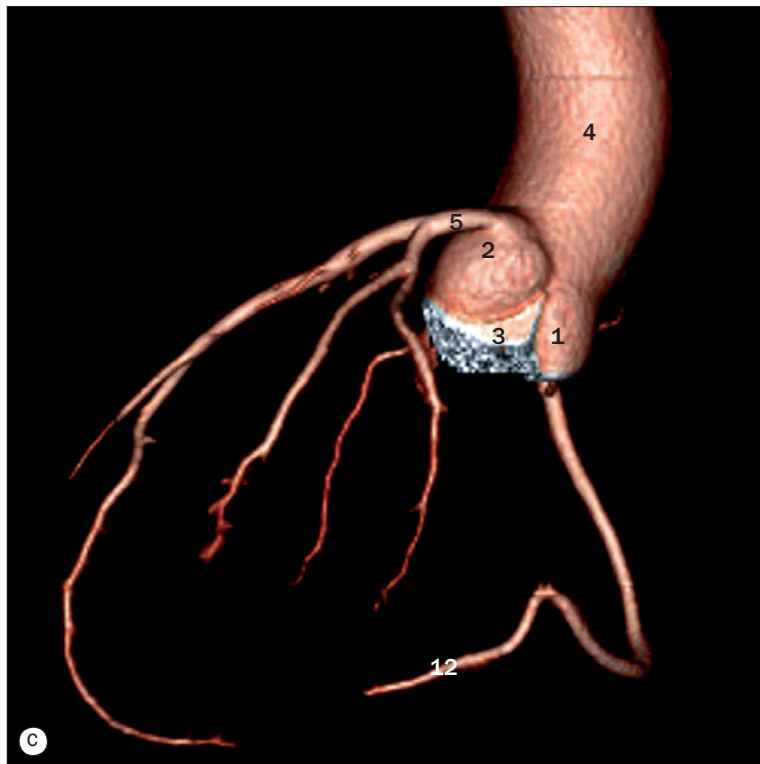
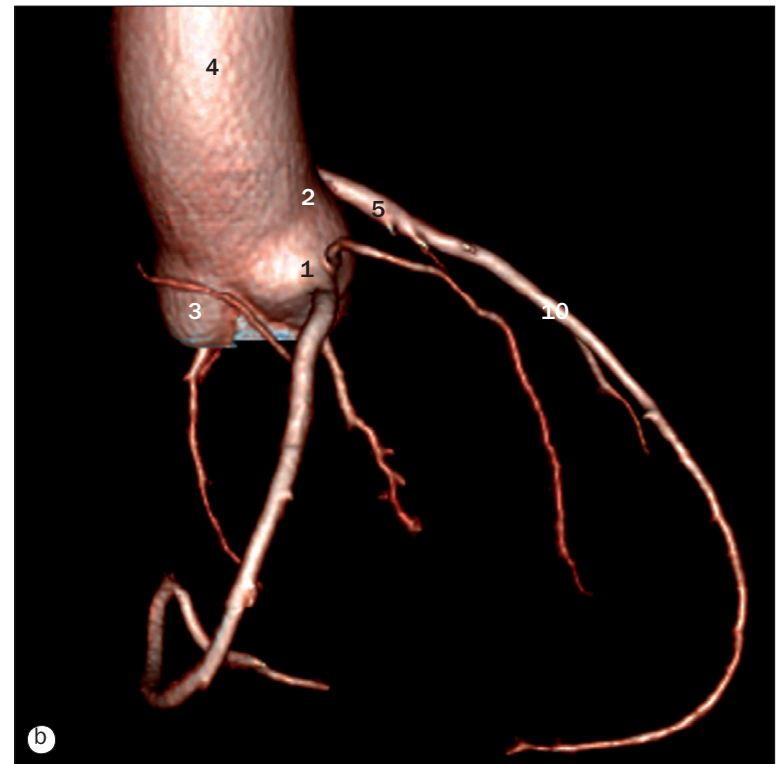
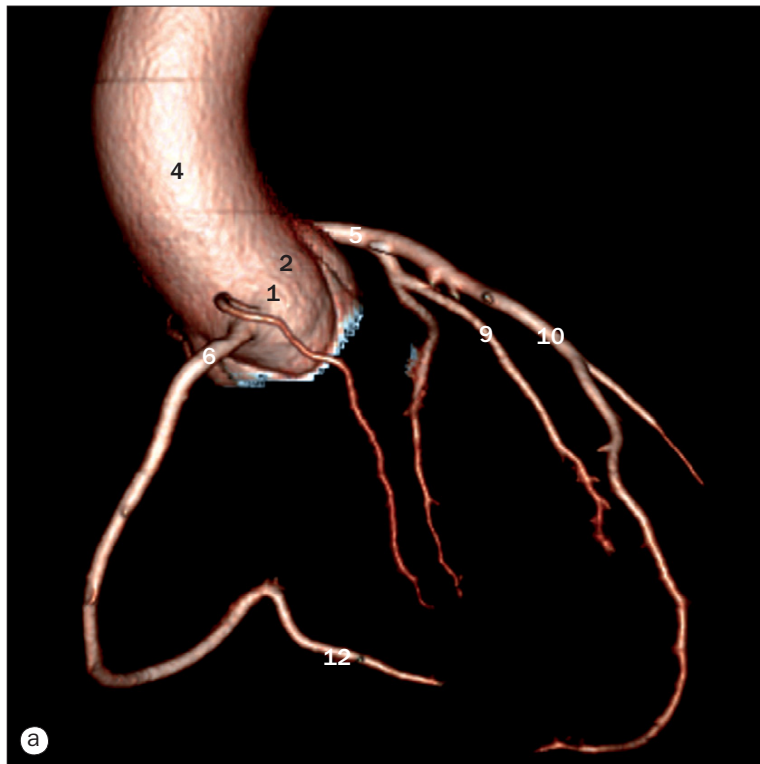
Right ventricular angiograms, (a) anteroposterior projection, (b) lateral projection.

- 1 Catheter in right ventricle via inferior vena cava and right atrium
- 2 Left main pulmonary artery
- 3 Pulmonary artery
- 4 Pulmonary valve
- 5 Right atrium
- 6 Right main pulmonary artery
- 7 Right ventricle
- 8 Right ventricular outflow tract
- 9 Trabeculae of right ventricle
- 10 Tricuspid valve



(a) Left coronary arteriogram, (b) right coronary arteriogram, (c) left ventricular angiogram, diastolic phase, (d) left ventricular angiogram, systolic phase.

- | | | |
|---------------------------------|--|---|
| 1 Aorta | 10 First obtuse marginal branch of circumflex artery | 17 Left ventricular cavity |
| 2 Aortic sinus | 11 Inferior wall of left ventricle | 18 Left ventricular outflow tract |
| 3 Aortic valve | 12 Lateral ventricular branch to left ventricle | 19 Mitral valve |
| 4 Apex of the left ventricle | 13 Left anterior interventricular artery curving round apex of heart | 20 Posterior interventricular septal artery (posterior descending artery) |
| 5 Atrioventricular nodal artery | 14 Left anterior interventricular branch (left anterior descending) | 21 Right coronary artery |
| 6 Branch to left atrium | 15 Left coronary artery | 22 Right marginal arteries |
| 7 Circumflex artery | 16 Left main stem coronary artery | 23 Septal arteries |
| 8 Conus artery | | 24 Sinuatrial nodal artery |
| 9 Diagonal arteries | | |

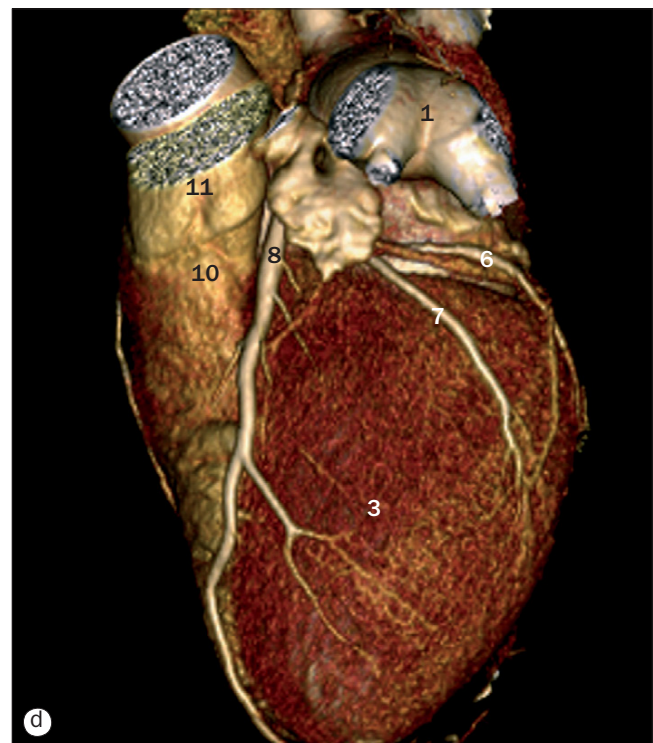
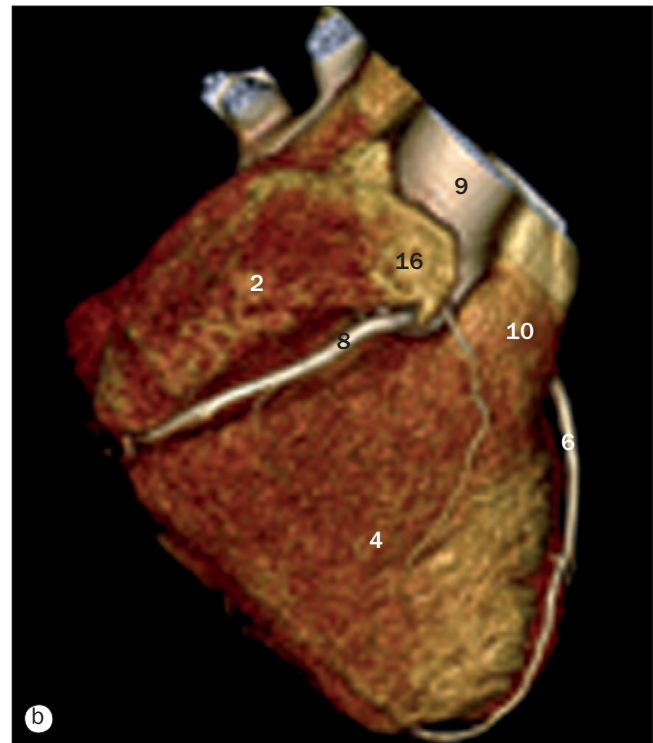


(a)–(d) 3D CT coronary angiograms.

- 1 Right coronary sinus
- 2 Left coronary sinus
- 3 Non coronary sinus
- 4 Ascending aorta
- 5 Left main coronary artery
- 6 Right main coronary artery

- 7 Right ventricular branch of right coronary artery
- 8 Circumflex artery
- 9 Diagonal artery
- 10 Left anterior descending artery
- 11 Obtuse marginal artery

- 12 Marginal artery
- 13 Right conal artery
- 14 Atrioventricular nodal artery
- 15 Posterior interventricular branch, right coronary artery

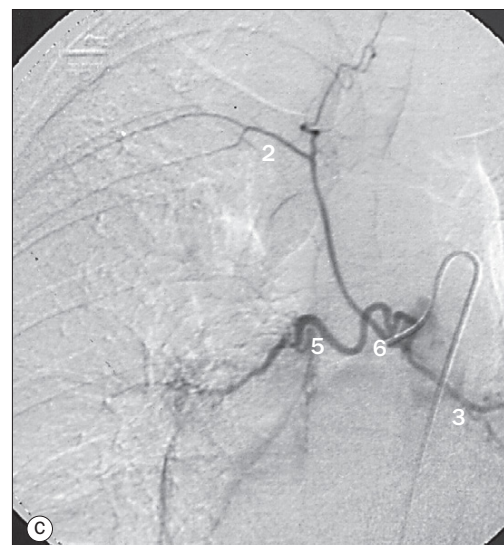
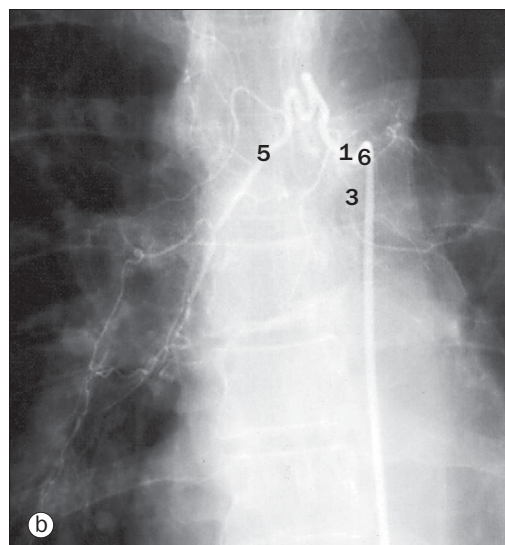
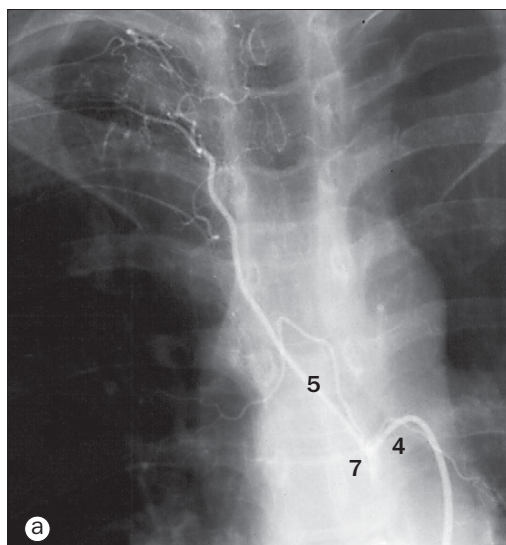


(a)–(d) 3D CT heart reconstructions.

- 1 Left atrium
- 2 Right atrium
- 3 Left ventricle
- 4 Right ventricle
- 5 Left main coronary artery
- 6 Left anterior descending coronary artery

- 7 Circumflex artery
- 8 Right coronary artery
- 9 Aortic root
- 10 Pulmonary outflow tract
- 11 Pulmonary artery

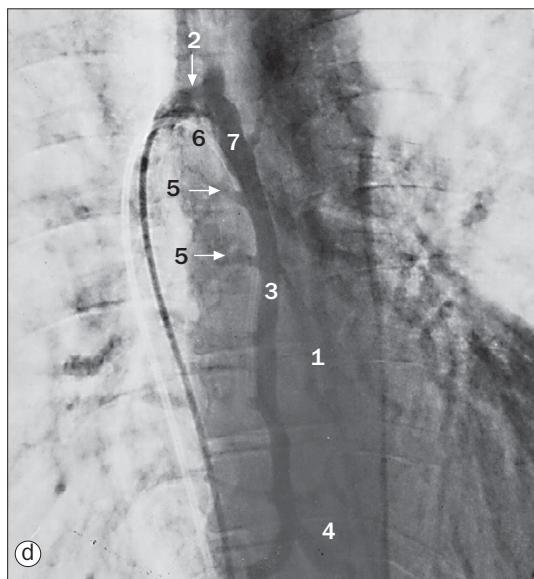
- 12 Left atrial appendage
- 13 Right pulmonary veins
- 14 Left pulmonary veins
- 15 Superior vena cava
- 16 Right atrial appendage



(a)–(c) Right bronchial arteriograms.

There is a great variability in the anatomy of the bronchial arteries, but the majority originate from the descending thoracic aorta, above the level of the left main stem bronchus between the upper border of the fifth thoracic vertebra and the lower border of the sixth thoracic vertebra. The number of bronchial arteries on each side may vary between one and four. Usually, there is one vessel to the right lung and two to the left. Accessory bronchial arteries may arise from the brachiocephalic artery and subclavian arteries, or from other branches such as the internal thoracic, pericardiophrenic and oesophageal arteries. In many cases the right bronchial artery arises from an intercostobronchial trunk, but in this example the trunk is very short and divides almost immediately into a right bronchial artery, which is directed towards the hilum, and the first right aortic intercostal artery. Reflux filling of the left bronchial artery is seen. A second larger bronchial artery which has been catheterised (b) has a common trunk arising from the front of the aorta, giving rise to a right and left bronchial artery.

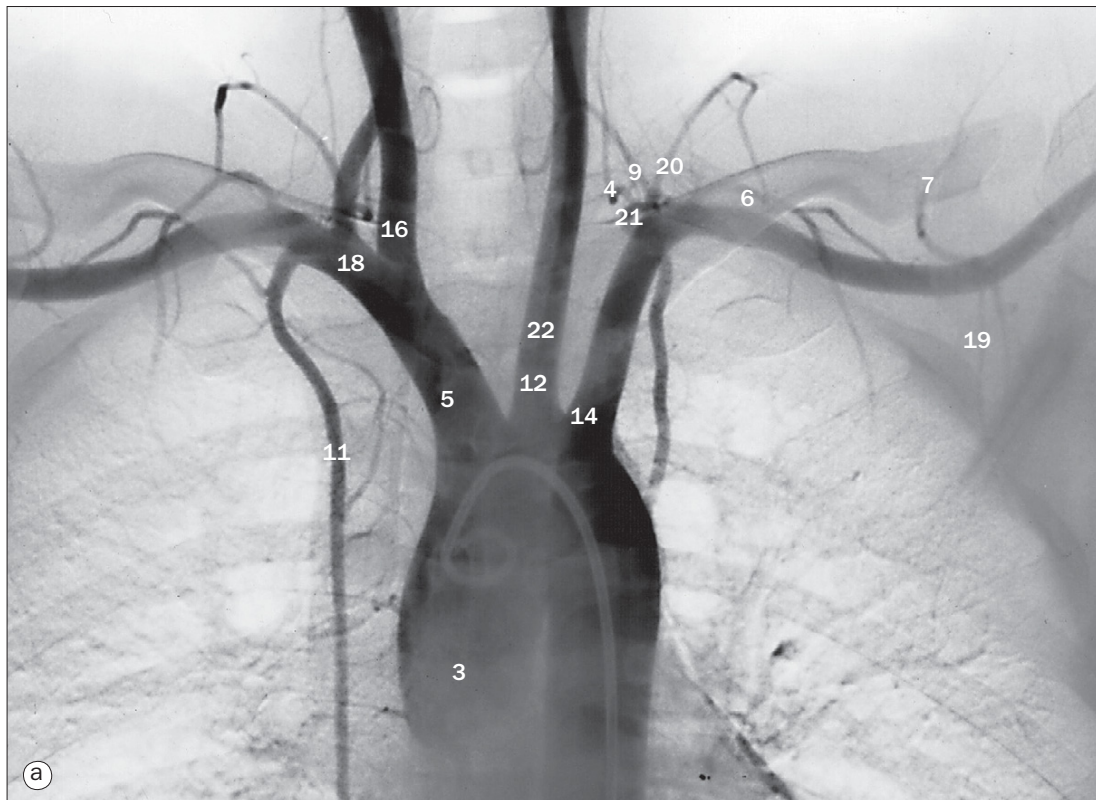
- 1 Common bronchial trunk
- 2 Intercostal artery
- 3 Left bronchial branches
- 4 Reflux filling of left bronchial artery
- 5 Right bronchial artery
- 6 Tip of catheter in common bronchial arterial trunk
- 7 Tip of catheter in intercostobronchial trunk



(d) Azygos venogram.

In the thorax the vertebral veins drain into intercostal veins, while in the lumbar region the lumbar veins drain into the ascending lumbar veins. The right ascending lumbar vein becomes the azygos vein on entering the thorax, and the left ascending lumbar vein becomes the hemi-azygos vein. At the level of the fourth thoracic vertebra, the azygos vein turns anteriorly (the arch of the azygos) to enter the superior vena cava. The hemi-azygos vein crosses to join the azygos vein at the level of the eighth or ninth thoracic vertebral body. The accessory hemi-azygos vein is continuous with the hemi-azygos vein inferiorly and the left superior intercostal vein superiorly.

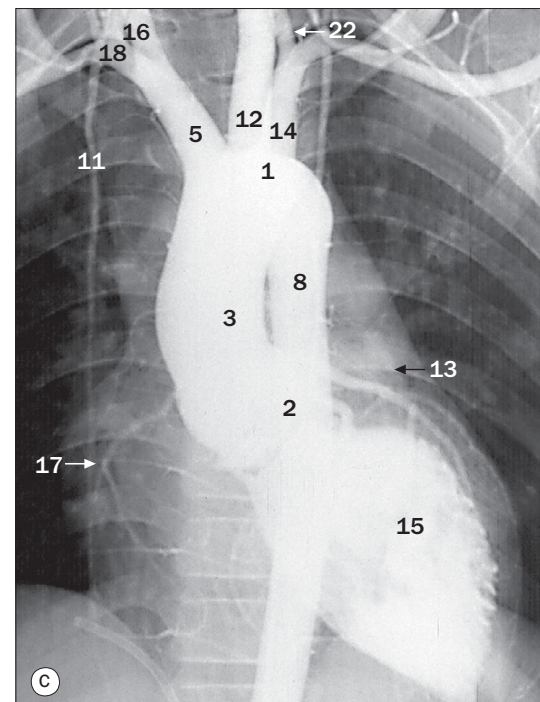
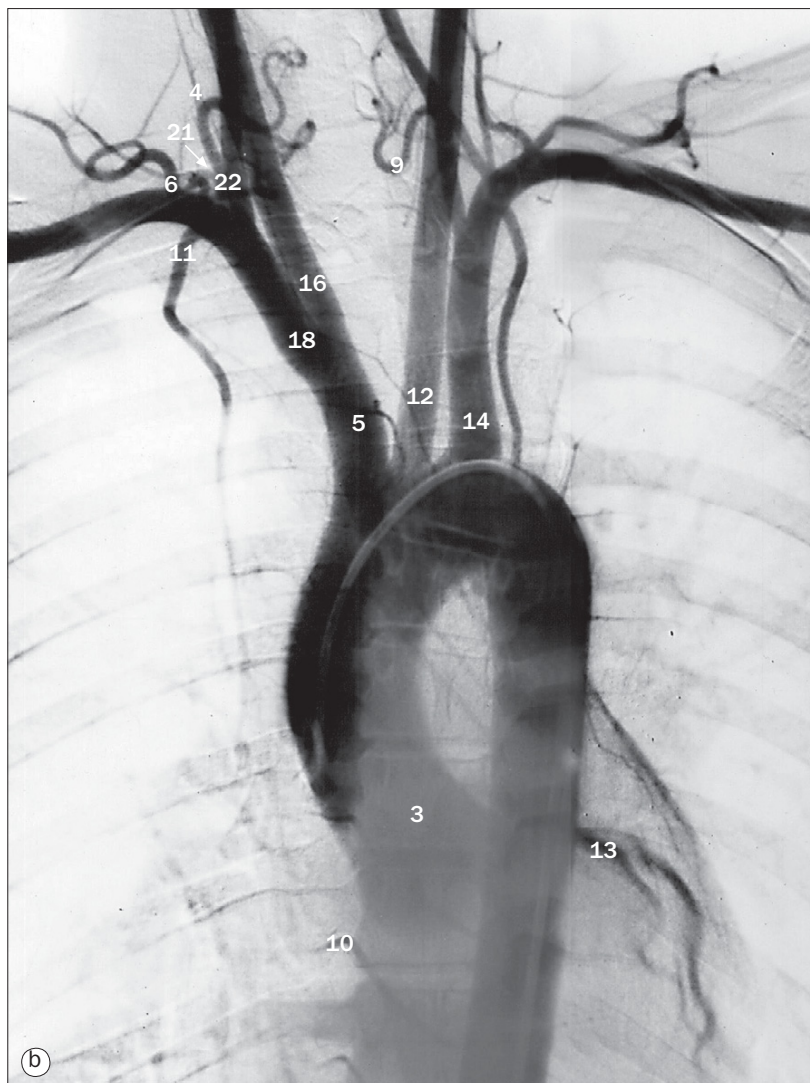
- 1 Accessory hemi-azygos vein
- 2 Azygos arch
- 3 Azygos vein
- 4 Hemi-azygos vein
- 5 Intercostal veins
- 6 Subtraction artefact caused by cardiac and catheter movement
- 7 Tip of catheter introduced via femoral vein into superior vena cava and azygos vein



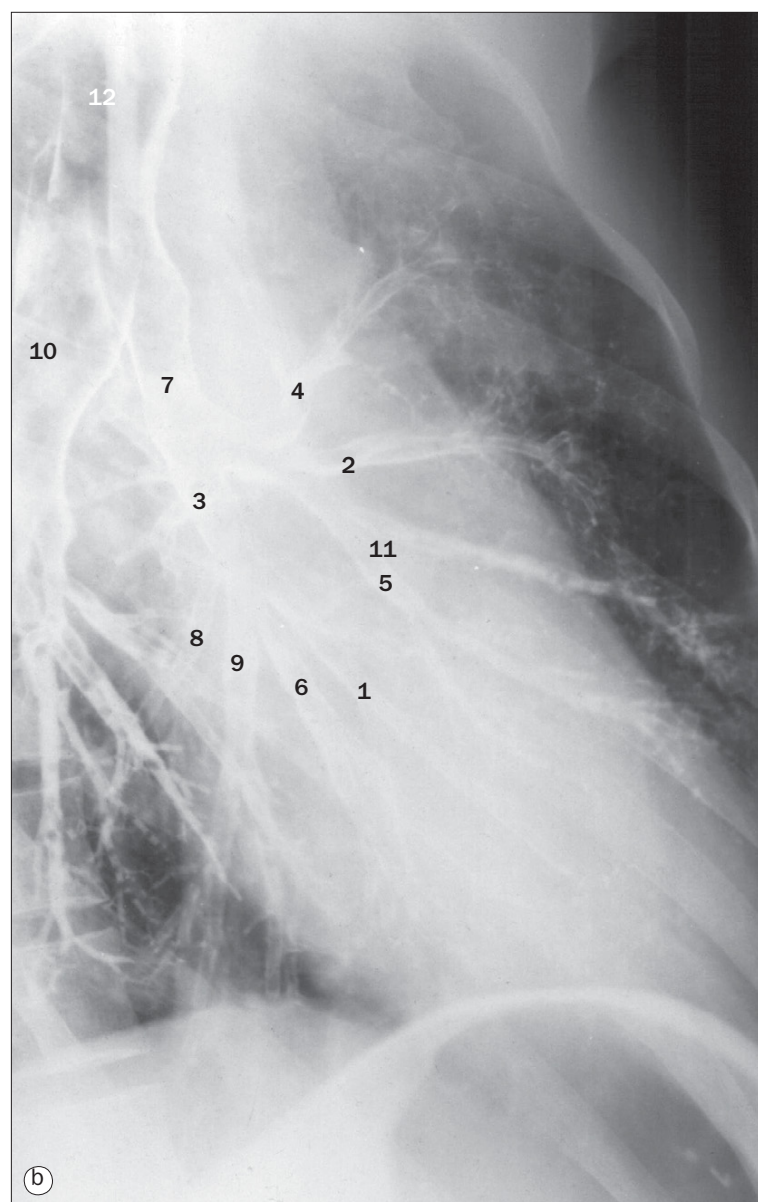
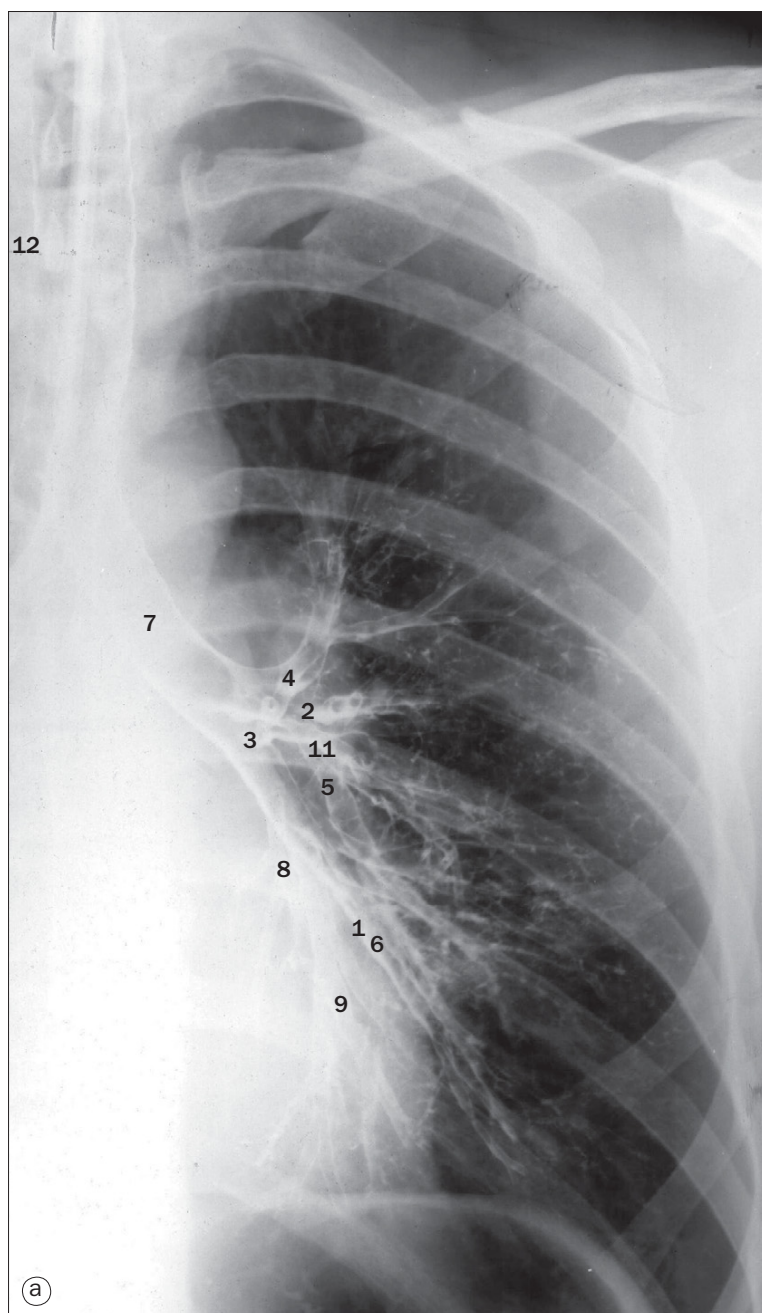
(a) Subtracted arch aortogram, anteroposterior image. The vertebral artery (22) has a separate origin off the arch, projected over the left common carotid artery in this view. This is a normal variant.

(b) Subtracted arch aortogram, left anterior oblique image. The origins of the supra-aortic branches are best shown by left anterior oblique projection, so that the origins of the vessels are not superimposed. There are many congenital variations in the way in which the major vessels arise from the aortic arch, but the most common is shown here.

(c) Left ventricular angiogram.

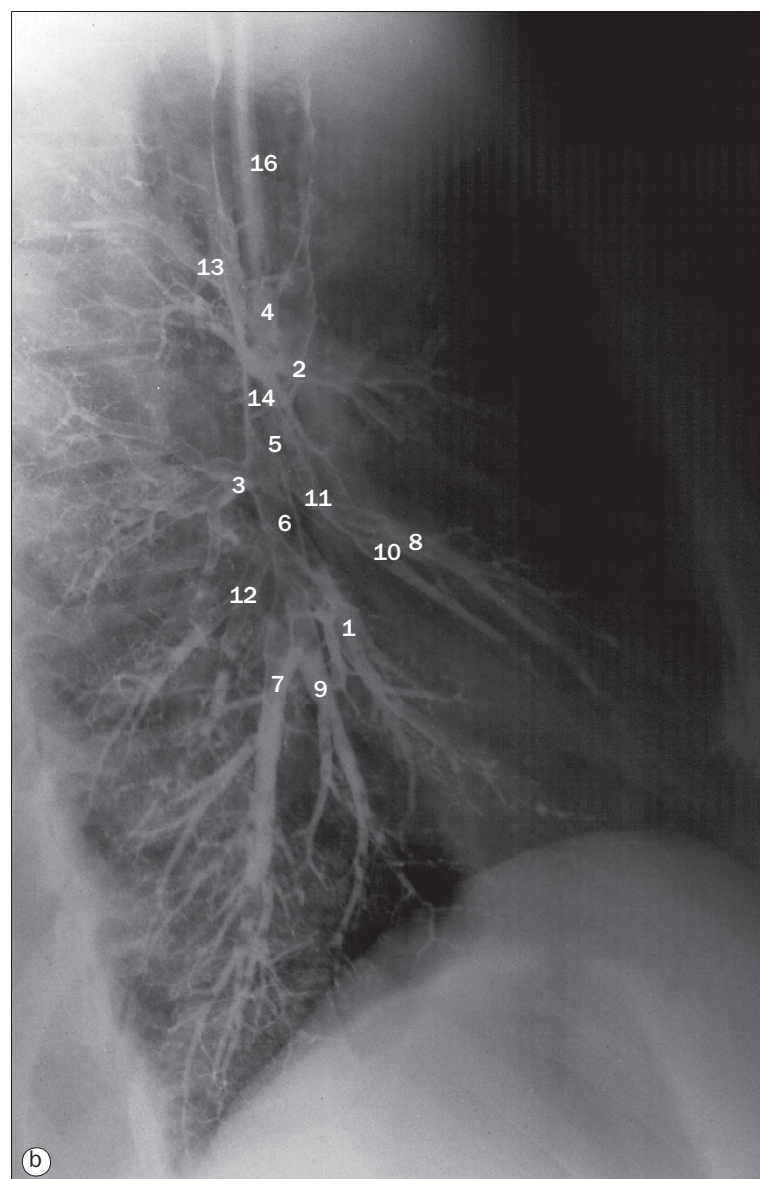
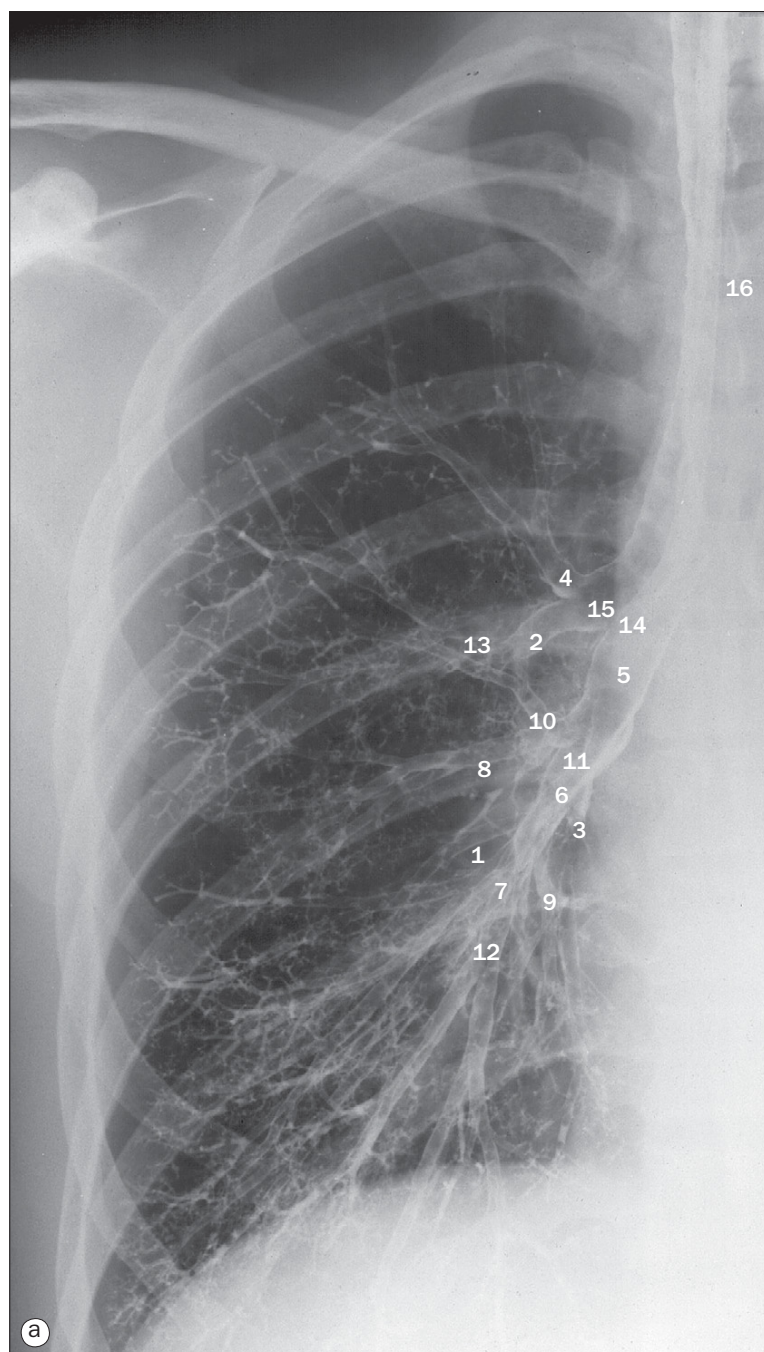


- | | |
|--|--------------------------------|
| 1 Aortic arch | 12 Left common carotid artery |
| 2 Aortic valve | 13 Left coronary artery |
| 3 Ascending aorta | 14 Left subclavian artery |
| 4 Ascending cervical artery | 15 Left ventricle |
| 5 Brachiocephalic trunk | 16 Right common carotid artery |
| 6 Costocervical trunk | 17 Right coronary artery |
| 7 Deltoid branch of thoracoacromial artery | 18 Right subclavian artery |
| 8 Descending aorta | 19 Superior thoracic artery |
| 9 Inferior thyroid artery | 20 Suprascapular artery |
| 10 Intercostal artery | 21 Thyrocervical trunk |
| 11 Internal thoracic artery | 22 Vertebral artery |



Left lung bronchogram, (a) postero-anterior image, (b) oblique projection.

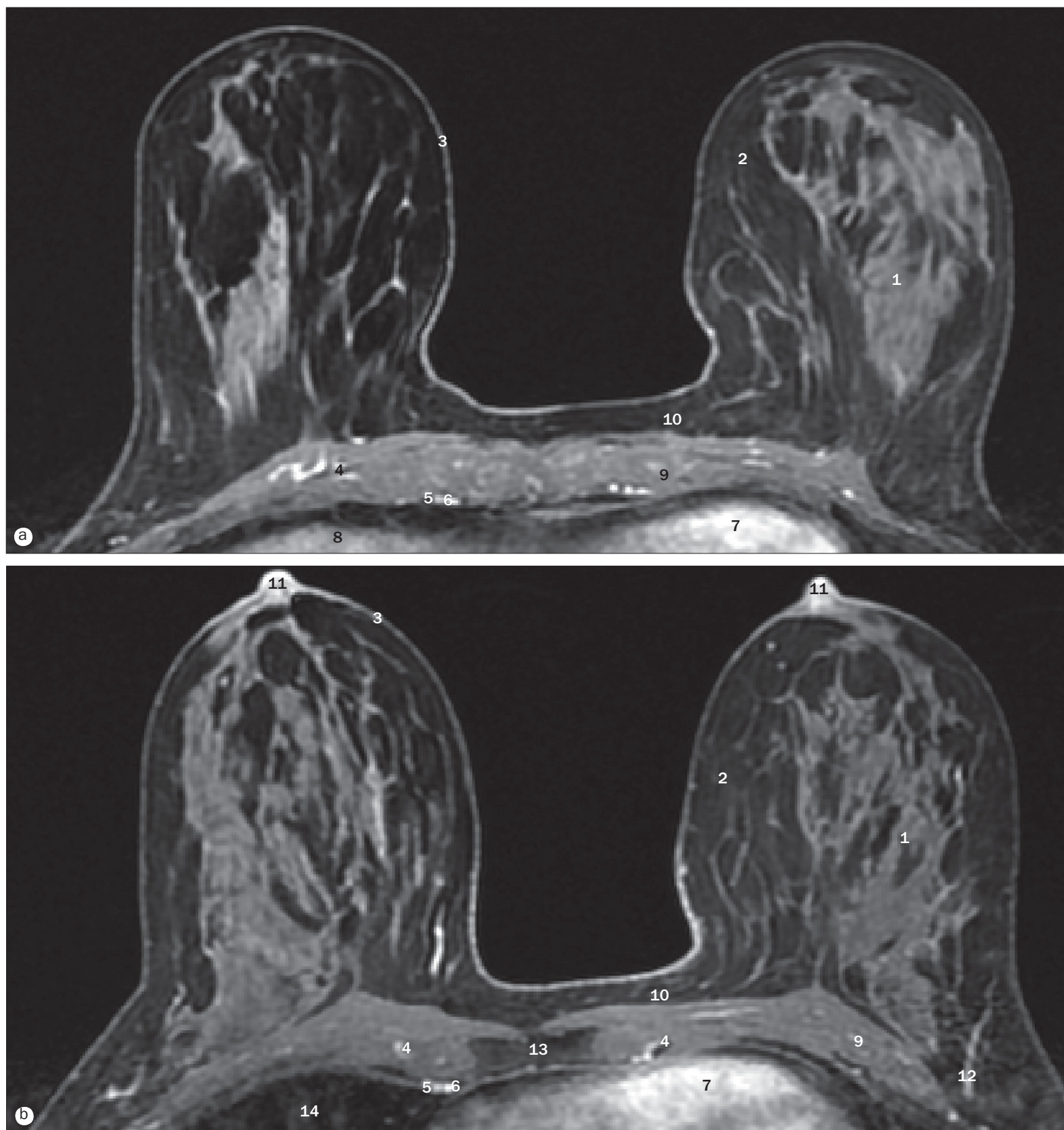
- 1 Anterior basal segmental bronchus
- 2 Anterior segmental bronchus
- 3 Apical (superior) segmental bronchus
- 4 Apicoposterior segmental bronchus
- 5 Inferior lingular segmental bronchus
- 6 Lateral basal segmental bronchus
- 7 Left main bronchus
- 8 Medial basal segmental bronchus
- 9 Posterior basal segmental bronchus
- 10 Right main bronchus
- 11 Superior lingular segmental bronchus
- 12 Trachea



Right lung bronchogram, (a) postero-anterior projection, (b) lateral projection.

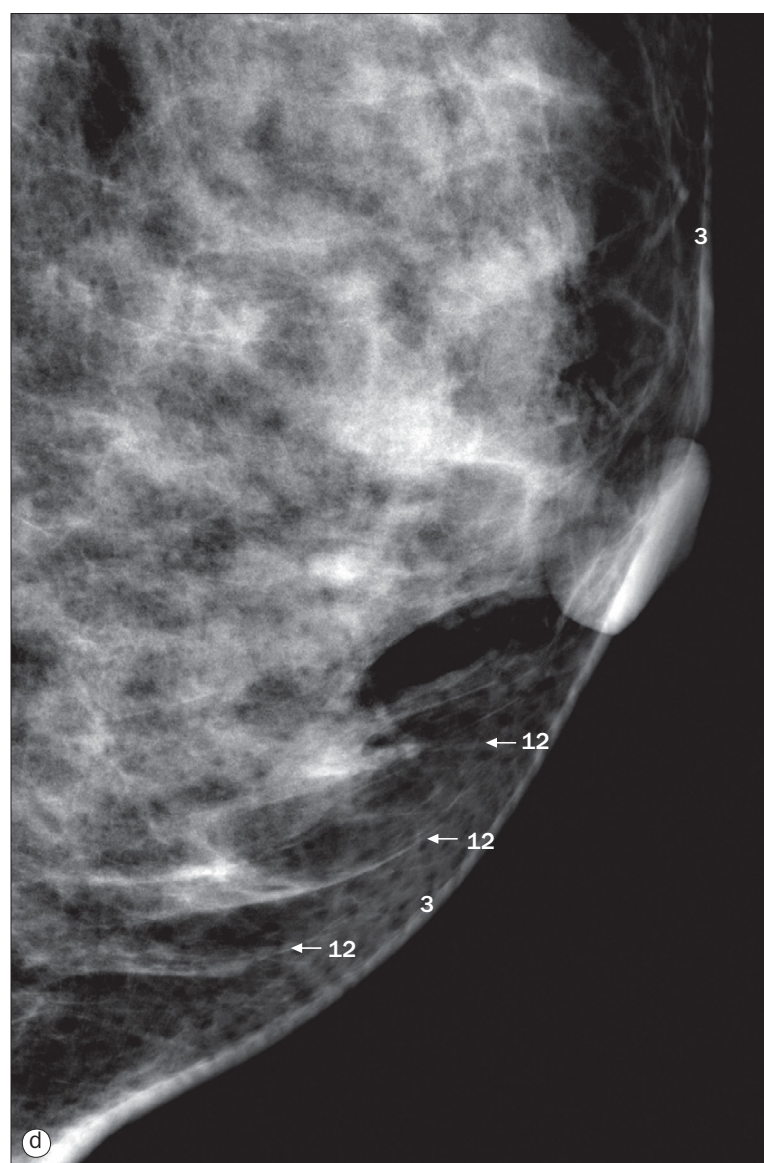
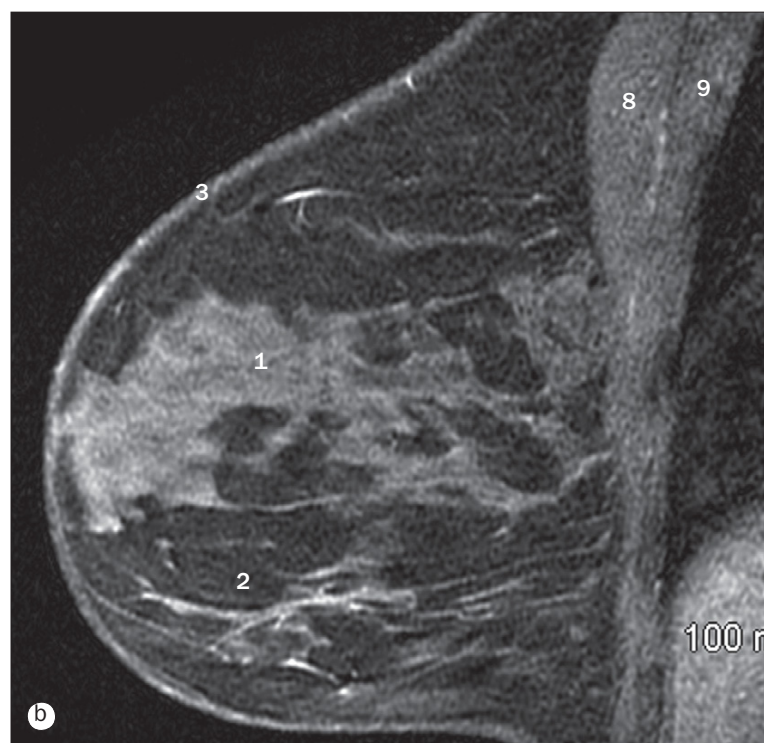
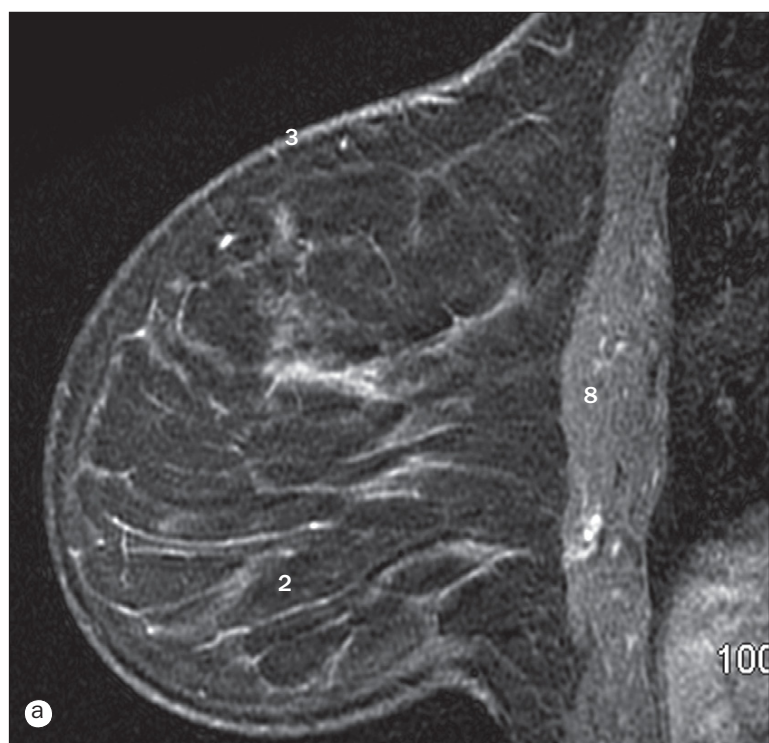
- 1 Anterior basal segmental bronchus
- 2 Anterior segmental bronchus
- 3 Apical (superior) segmental bronchus
- 4 Apical segmental bronchus
- 5 Bronchus intermedius
- 6 Inferior lobe bronchus
- 7 Lateral basal segmental bronchus
- 8 Lateral segmental bronchus of middle lobe

- 9 Medial basal segmental bronchus
- 10 Medial segmental bronchus of middle lobe
- 11 Middle lobe bronchus
- 12 Posterior basal segmental bronchus
- 13 Posterior segmental bronchus
- 14 Right main bronchus
- 15 Right superior lobe bronchus
- 16 Trachea



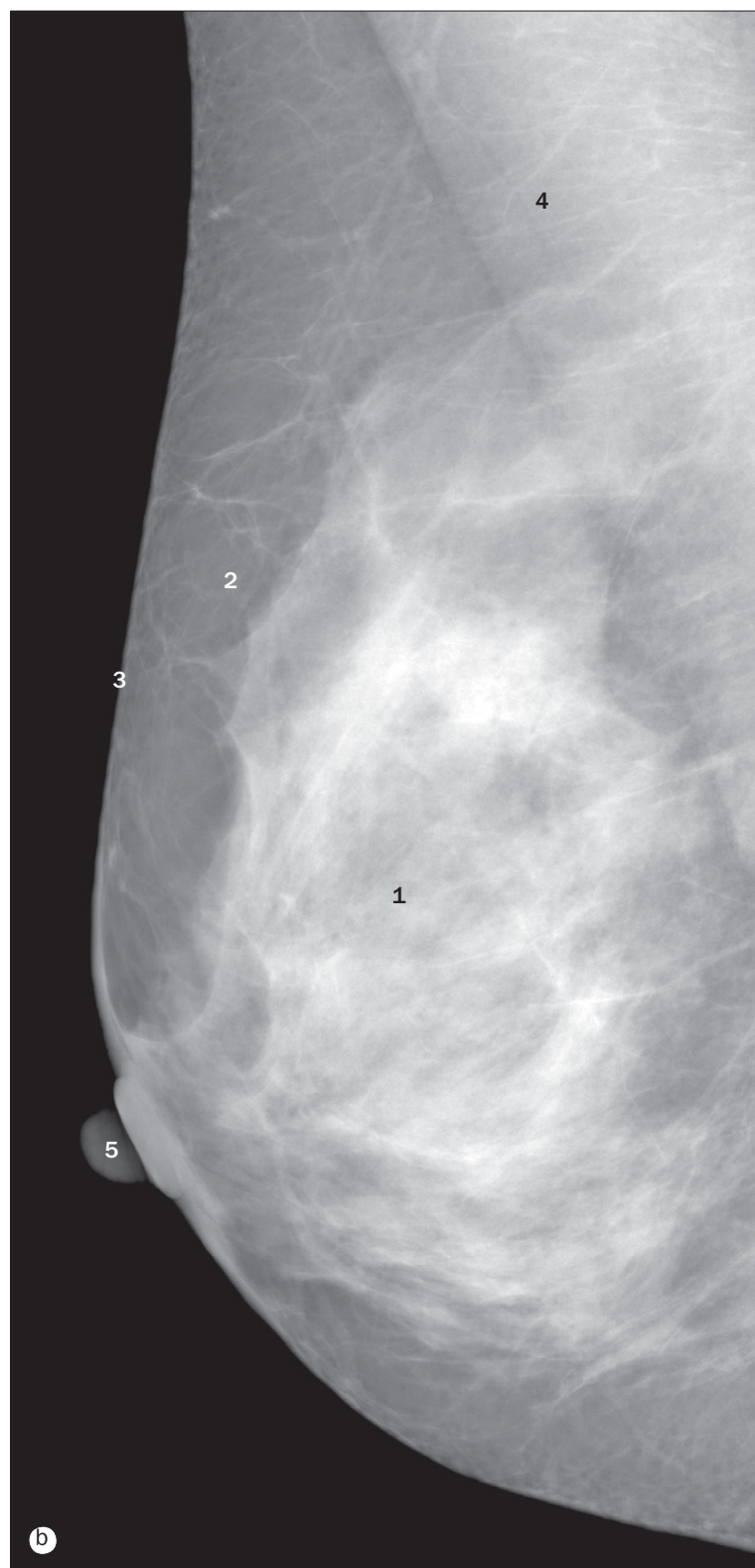
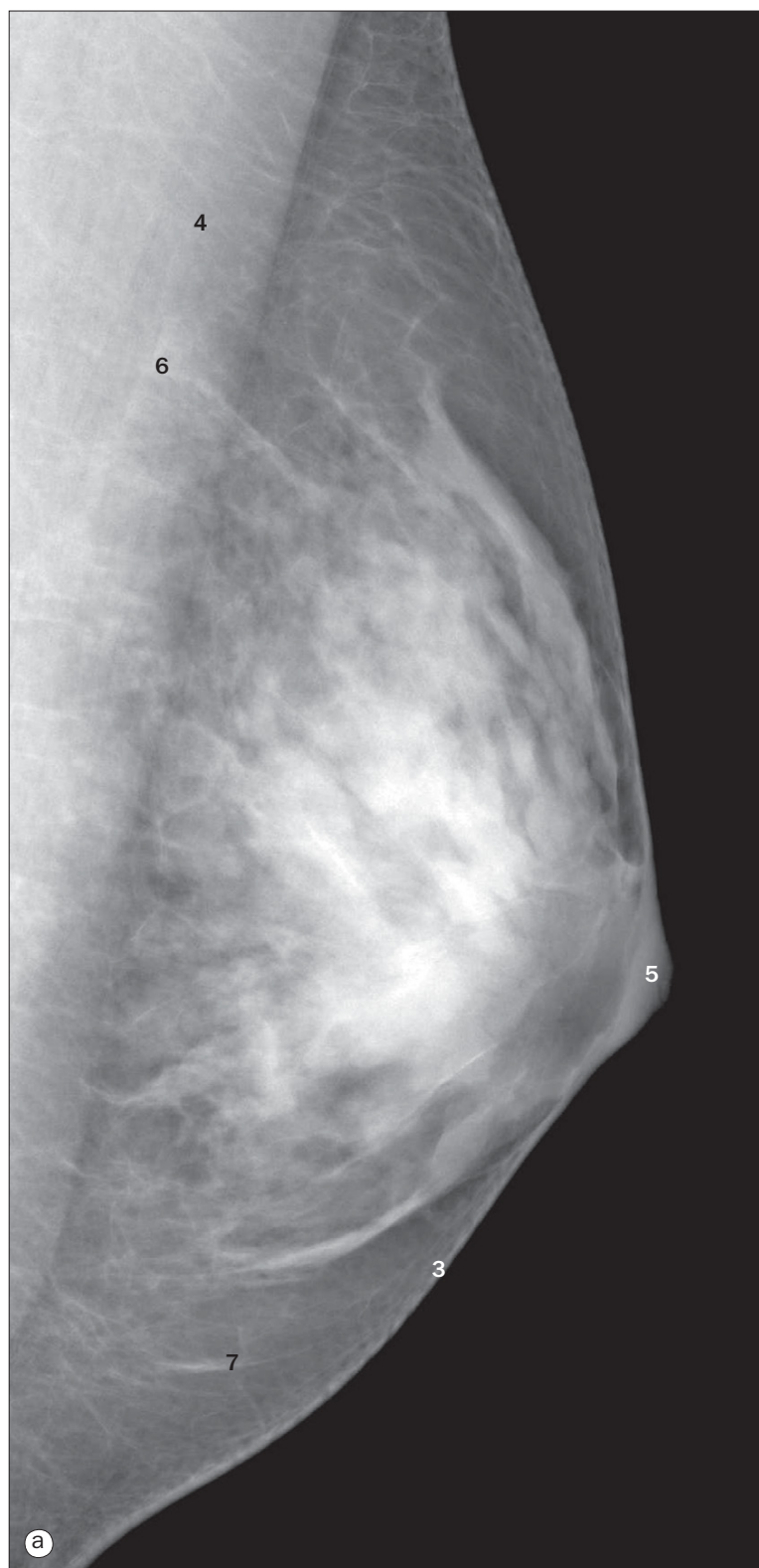
Mammograms, MR images.

- | | | |
|--|-------------------------------|---|
| 1 Fibroglandular tissue (of the right breast) | 6 Internal mammary artery | 12 Intramammary branches of lateral thoracic artery |
| 2 Adipose tissue of the breast | 7 Heart | 13 Sternum |
| 3 Skin | 8 Liver | 14 Middle lobe of the right lung |
| 4 Anterior perforating branch of the internal mammary artery | 9 Pectoralis major muscle | |
| 5 Internal mammary vein | 10 Anterior pectoralis fascia | |
| | 11 Nipple/areolar complex | |



Mammograms, (a)–(c) MR images, (d) mammographic X-ray image.

- | | |
|--|-------------------------------|
| 1 Fibroglandular tissue (of the right breast) | 6 Heart |
| 2 Adipose tissue of the breast | 7 Liver |
| 3 Skin | 8 Pectoralis major muscle |
| 4 Anterior perforating branch of the internal mammary artery | 9 Pectoralis minor muscle |
| 5 Internal mammary artery | 10 Anterior pectoralis fascia |
| | 11 Intramammary vessels |
| | 12 Cooper's ligaments |



Mammograms.

1 Fibroglandular tissue (of the right breast)

2 Adipose tissue of the breast

3 Skin

4 Pectoralis major muscle

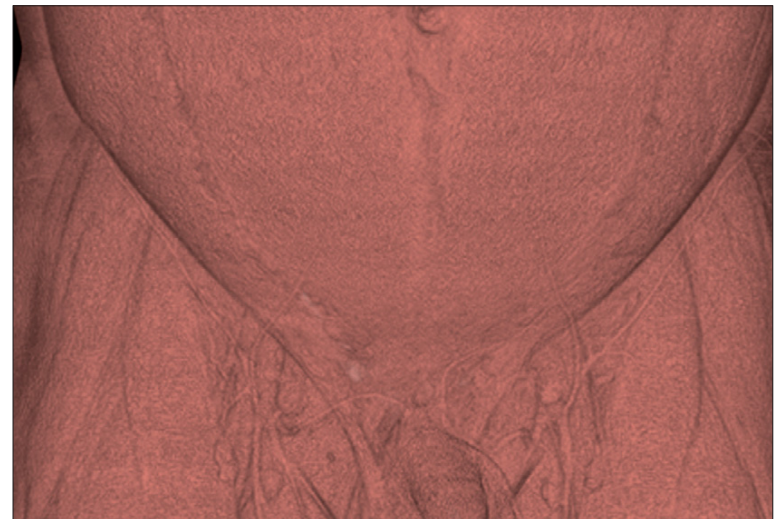
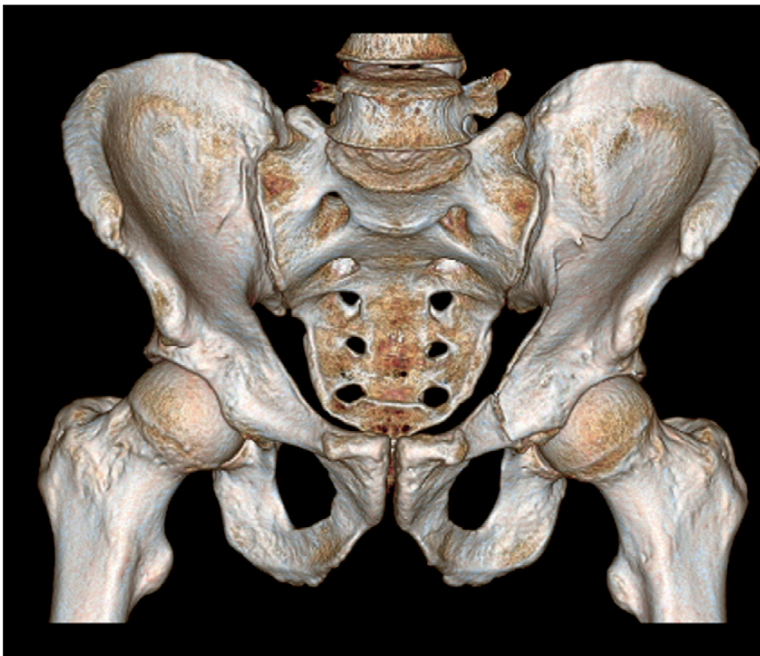
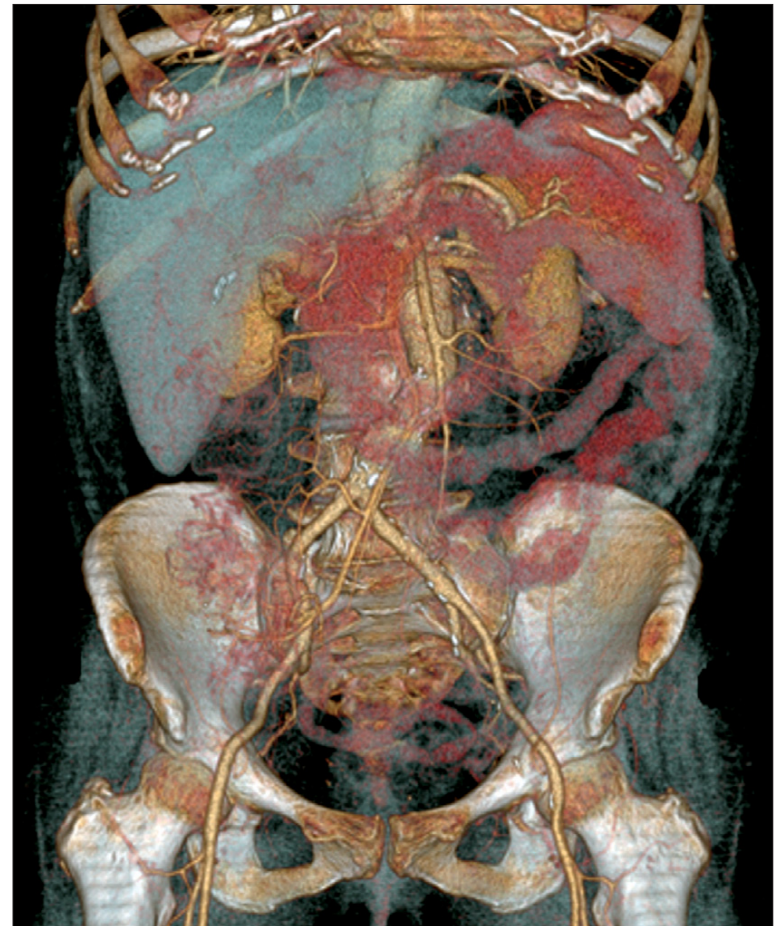
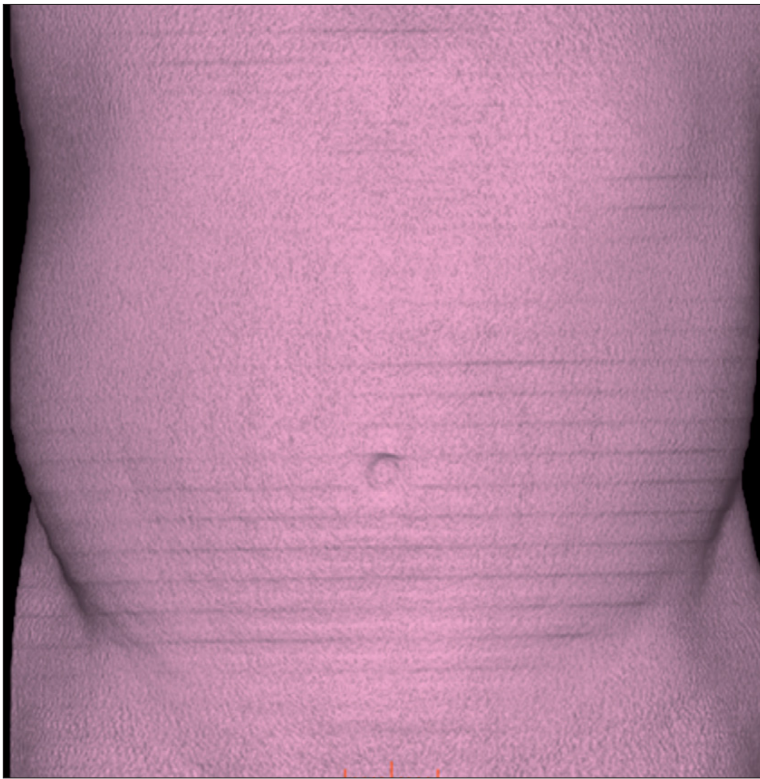
5 Nipple-areolar complex

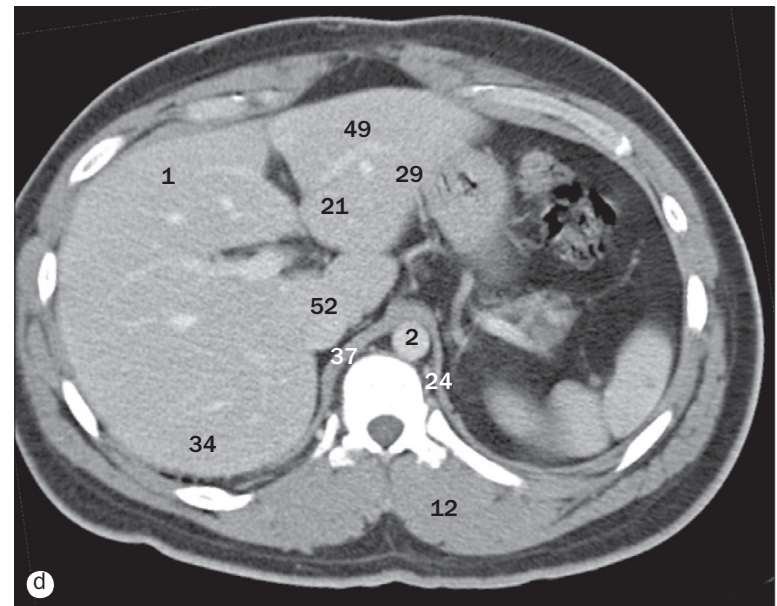
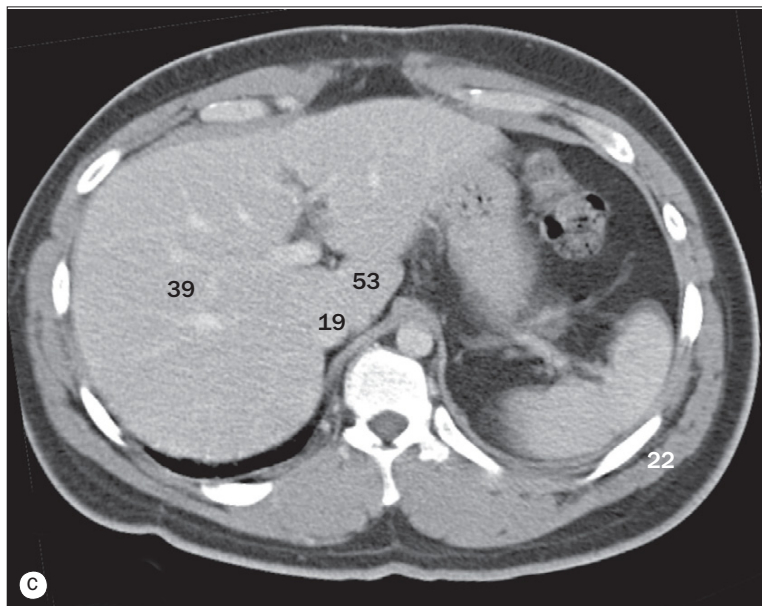
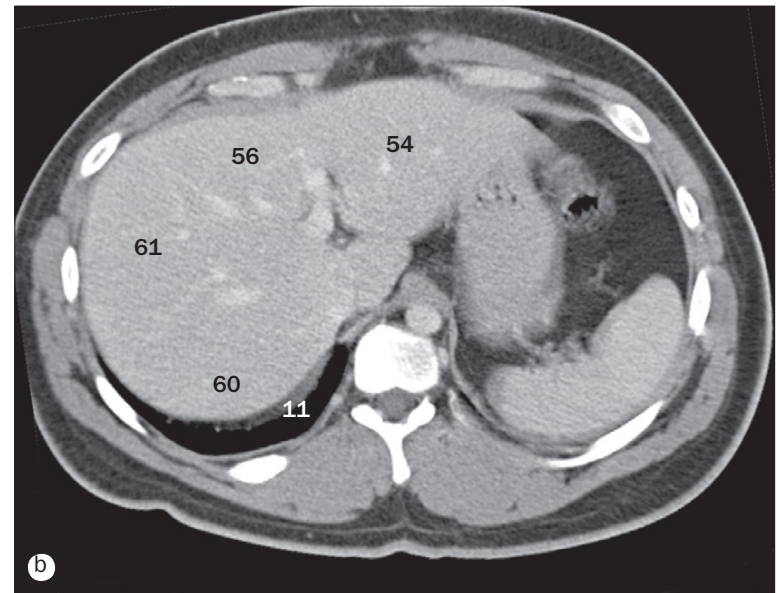
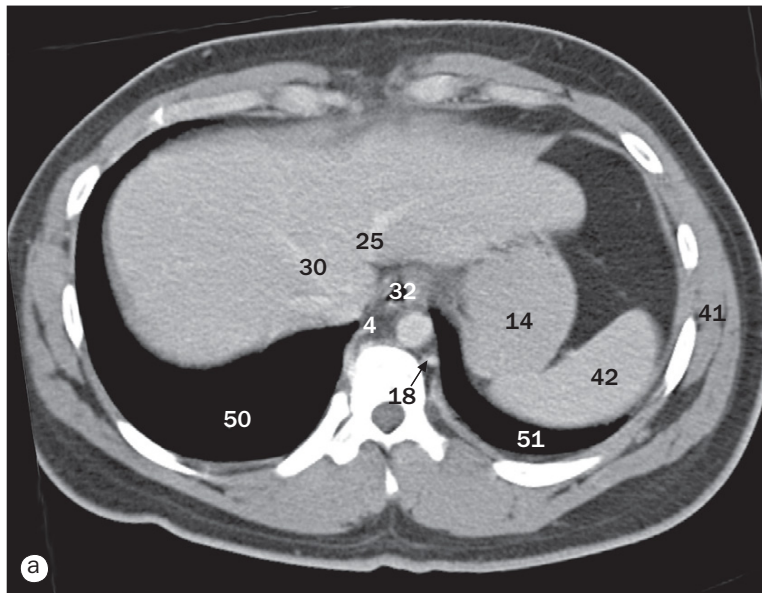
6 Vessel

7 Cooper's ligament

5

Abdomen and pelvis – Cross-sectional

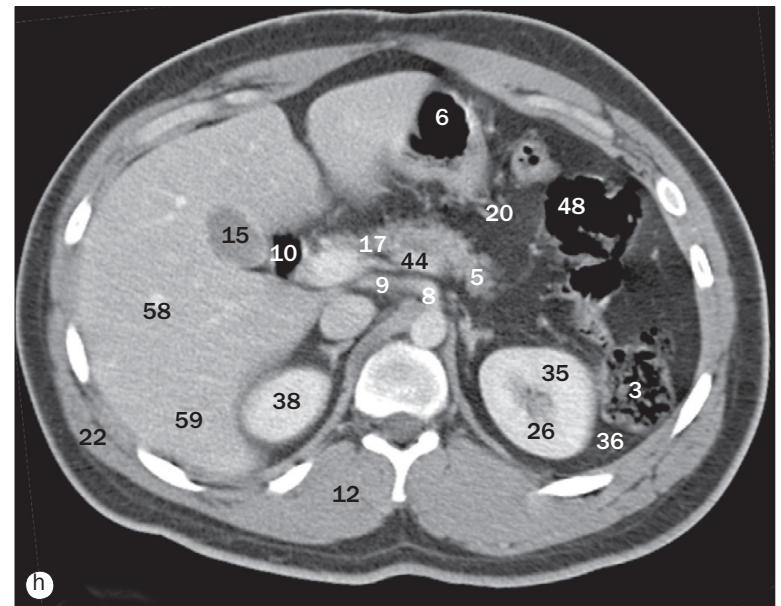
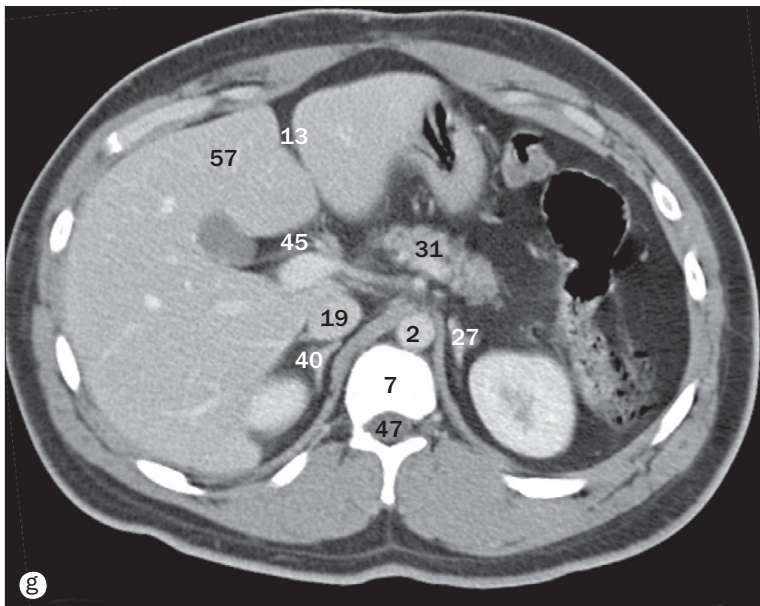
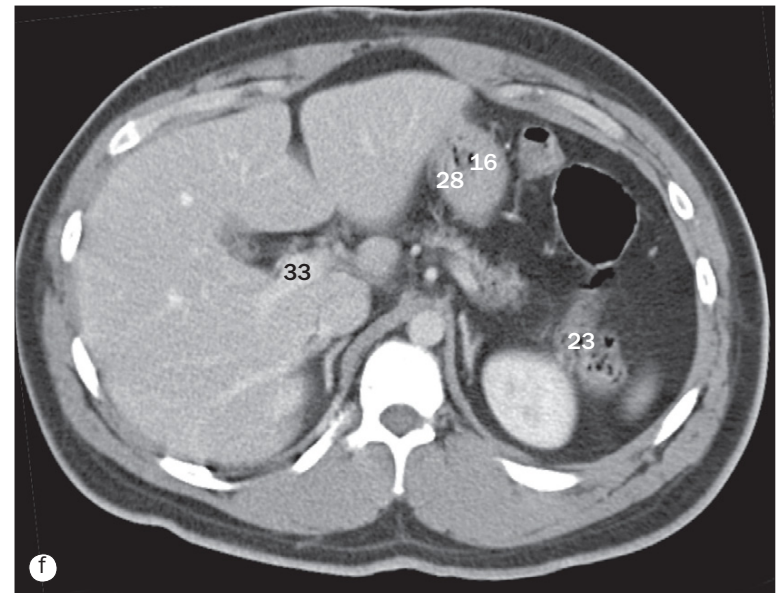
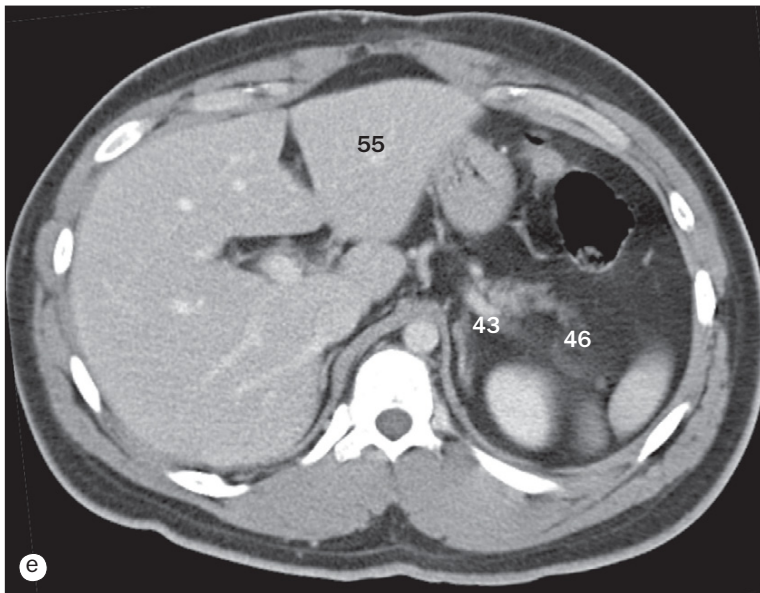




(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

Note: pages 124–135 show sequential images of the abdomen and pelvis of the same male patient.

- | | | |
|---|--|---|
| 1 Anterior segment of right lobe of liver | 14 Fundus of stomach | 27 Left suprarenal gland |
| 2 Aorta | 15 Gall bladder | 28 Lesser curvature of stomach |
| 3 Descending colon | 16 Greater curvature of stomach | 29 Medial segment of left lobe of liver |
| 4 Azygos vein | 17 Head of pancreas | 30 Middle hepatic vein |
| 5 Body of pancreas | 18 Hemi-azygos vein | 31 Neck of pancreas |
| 6 Body of stomach | 19 Inferior vena cava | 32 Oesophagus |
| 7 Body of vertebra | 20 Jejunum | 33 Portal vein |
| 8 Coeliac trunk | 21 Lateral segment of left lobe of liver | 34 Posterior segment of right lobe of liver |
| 9 Common hepatic artery | 22 Latissimus dorsi muscle | 35 Renal cortex |
| 10 Descending (second) part of duodenum | 23 Left colic (splenic) flexure | 36 Renal fascia |
| 11 Diaphragm | 24 Left crus of diaphragm | 37 Right crus of diaphragm |
| 12 Erector spinae muscle | 25 Left hepatic vein | 38 Right kidney |
| 13 Fissure for ligamentum venosum | 26 Left kidney | 39 Right lobe of liver |

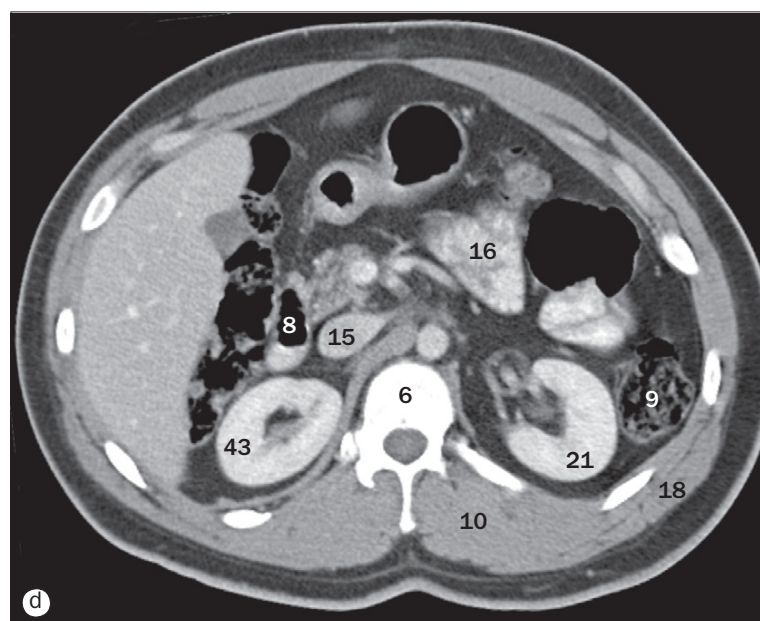
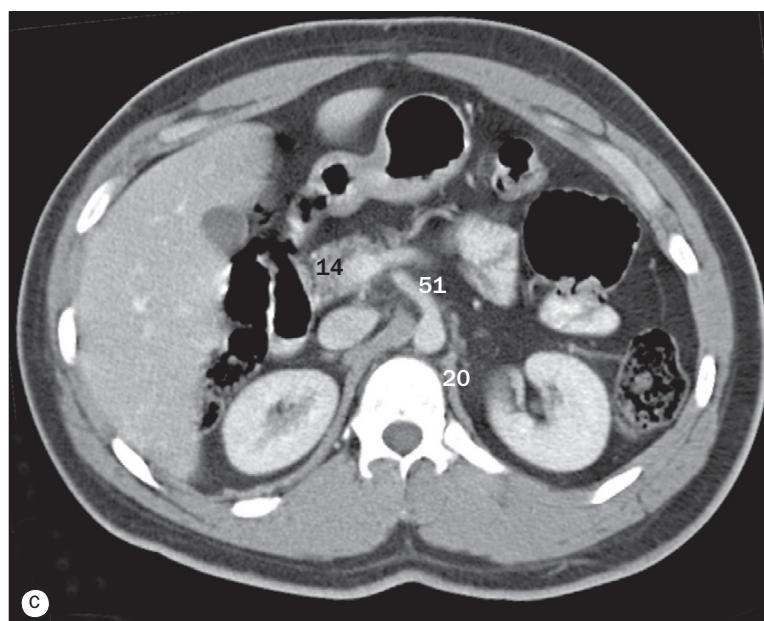
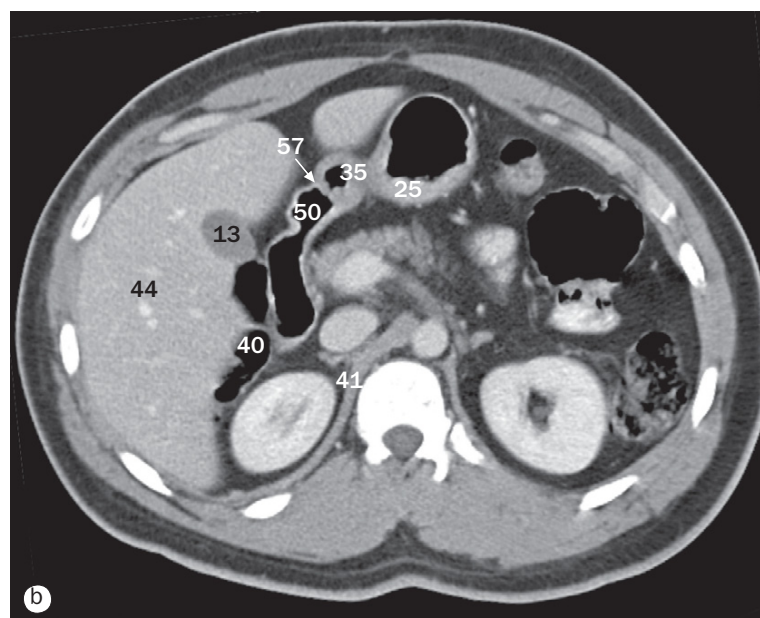
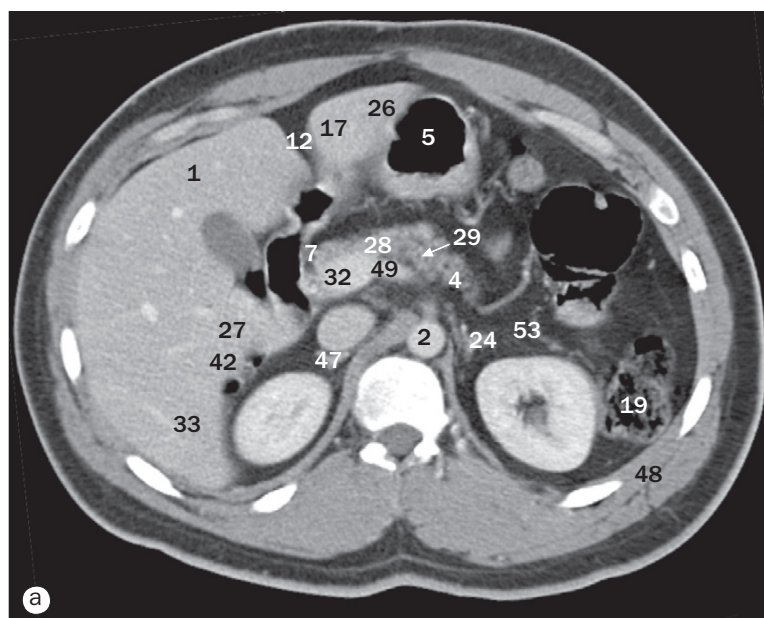


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

40 Right suprarenal gland
41 Serratus anterior muscle
42 Spleen
43 Splenic artery
44 Splenic vein
45 Superior (first) part of duodenum
46 Tail of pancreas
47 Thecal sac
48 Transverse colon
49 Left lobe of liver

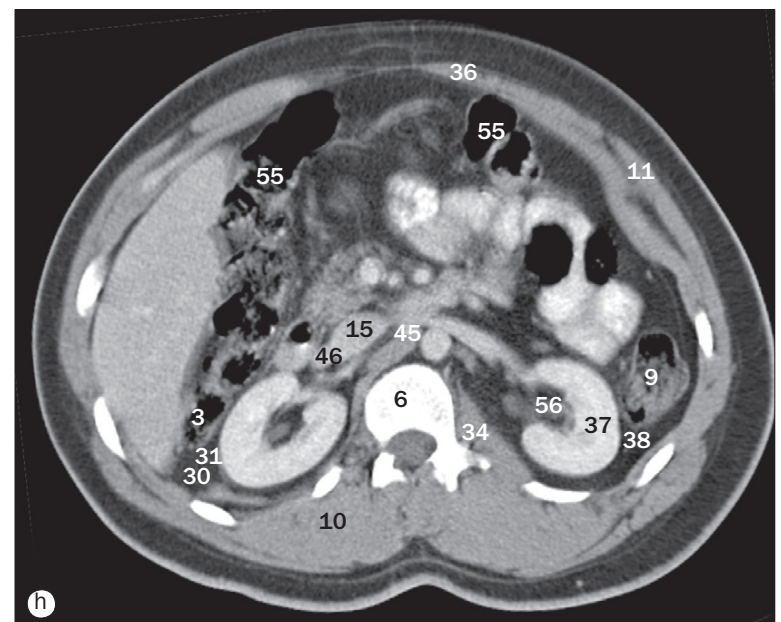
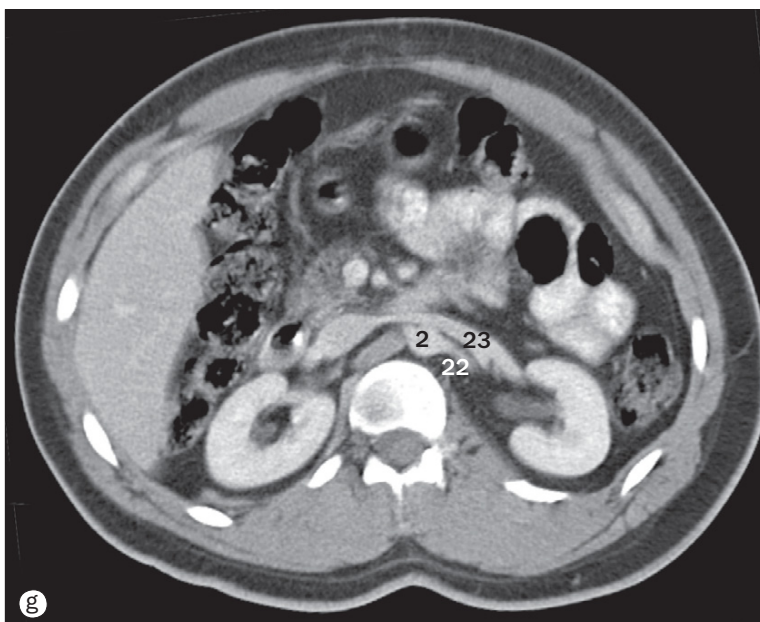
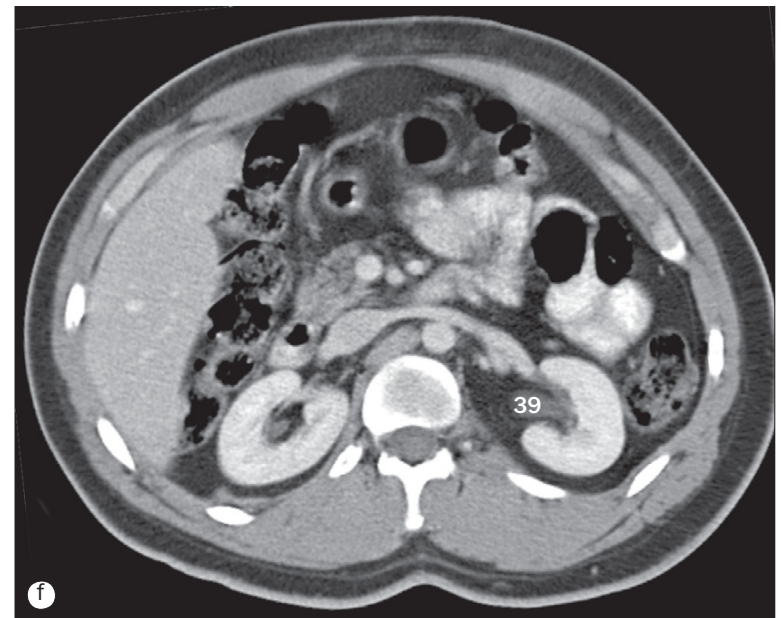
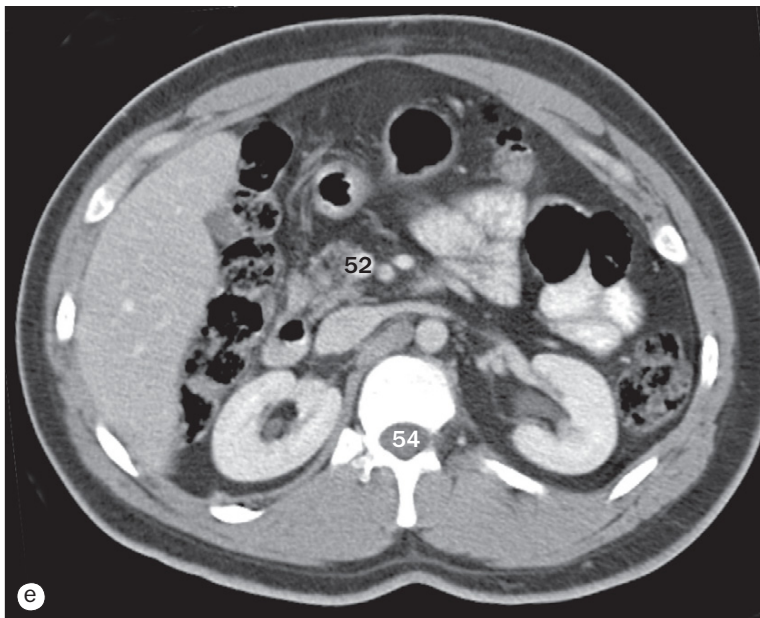
50 Right inferior lobe of lung
51 Left inferior lobe of lung
52 Caudate lobe of liver
53 Segment 1 of liver (caudate)
54 Segment 2 of liver (left lateral superior subsegment)
55 Segment 3 of liver (left lateral inferior subsegment)
56 Segment 4A of liver (left medial superior subsegment)

57 Segment 4B of liver (left medial inferior subsegment)
58 Segment 5 of liver (right anterior inferior subsegment)
59 Segment 6 of liver (right posterior inferior subsegment)
60 Segment 7 of liver (right posterior superior subsegment)
61 Segment 8 of liver (right anterior superior subsegment)



(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

- | | | |
|---|--|---|
| 1 Anterior segment of right lobe of liver | 11 External oblique muscle | 21 Left kidney |
| 2 Aorta | 12 Fissure for ligamentum venosum | 22 Left renal artery |
| 3 Ascending colon | 13 Gall bladder | 23 Left renal vein |
| 4 Body of pancreas | 14 Head of pancreas | 24 Left suprarenal gland |
| 5 Body of stomach | 15 Inferior vena cava | 25 Lesser curvature of stomach |
| 6 Body of vertebra | 16 Jejunum | 26 Medial segment of left lobe of liver |
| 7 Common bile duct | 17 Lateral segment of left lobe of liver | 27 Middle hepatic vein |
| 8 Descending (second) part of duodenum | 18 Latissimus dorsi muscle | 28 Neck of pancreas |
| 9 Descending colon | 19 Left colic (splenic) flexure | 29 Pancreatic duct |
| 10 Erector spinae muscle | 20 Left crus of diaphragm | 30 Pararenal fat |

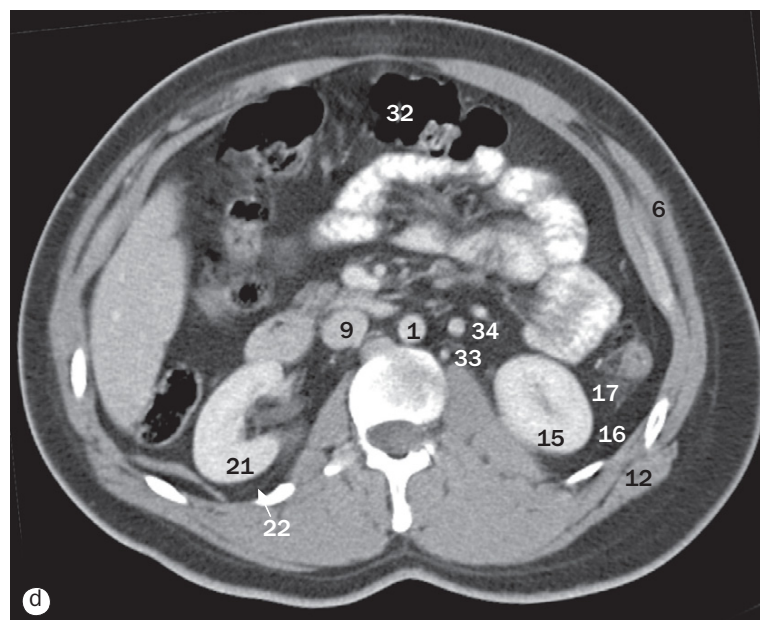
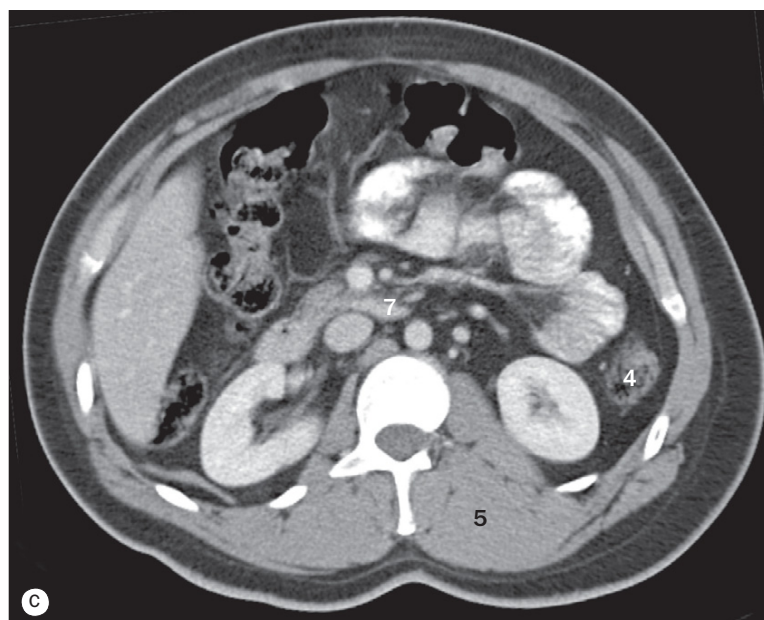
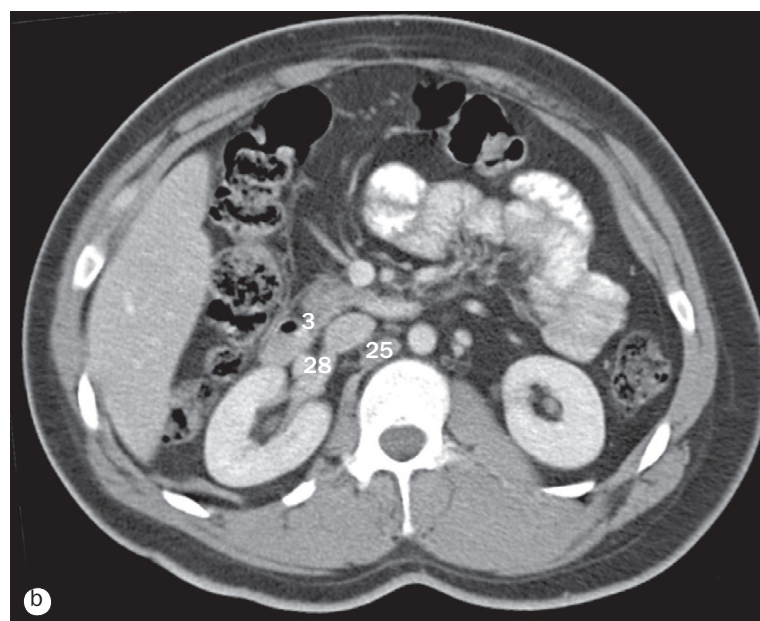
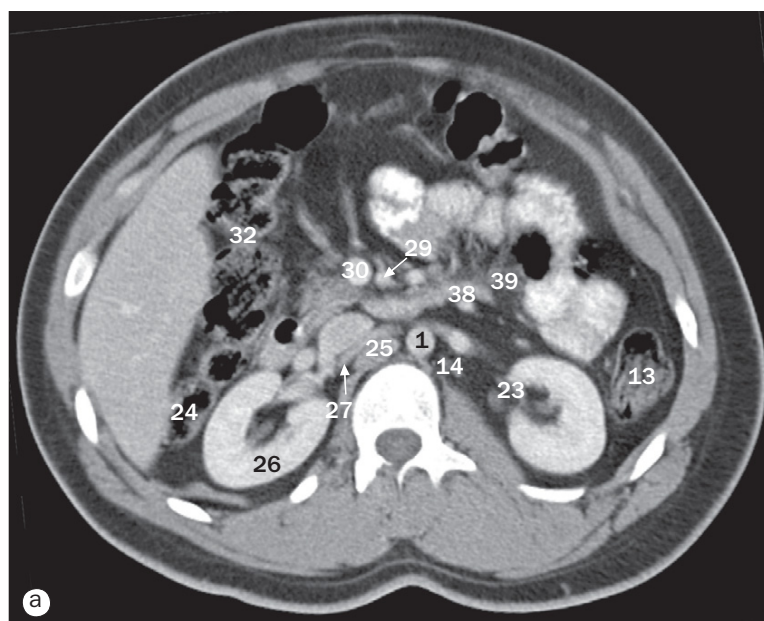


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

31 Perirenal fat
 32 Portal vein
 33 Posterior segment of right lobe of liver
 34 Psoas major muscle
 35 Pyloric part of stomach
 36 Rectus abdominis muscle
 37 Renal cortex
 38 Renal fascia
 39 Renal pelvis

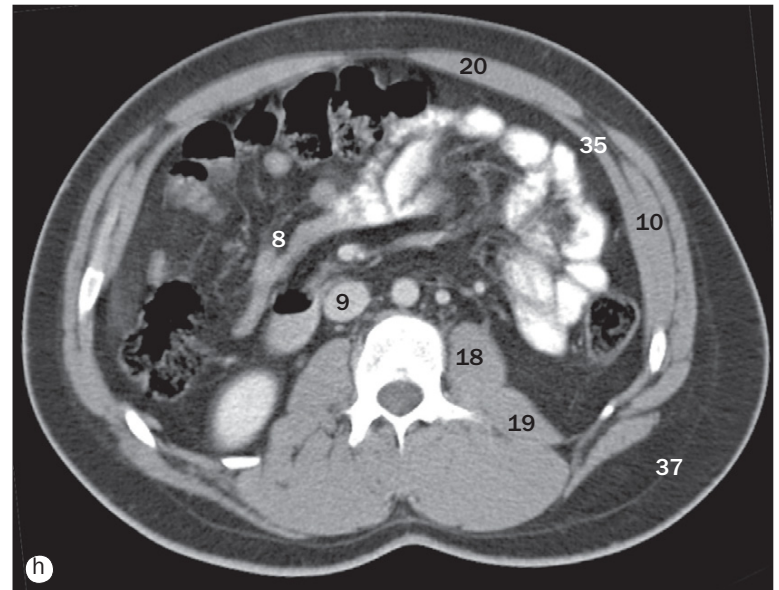
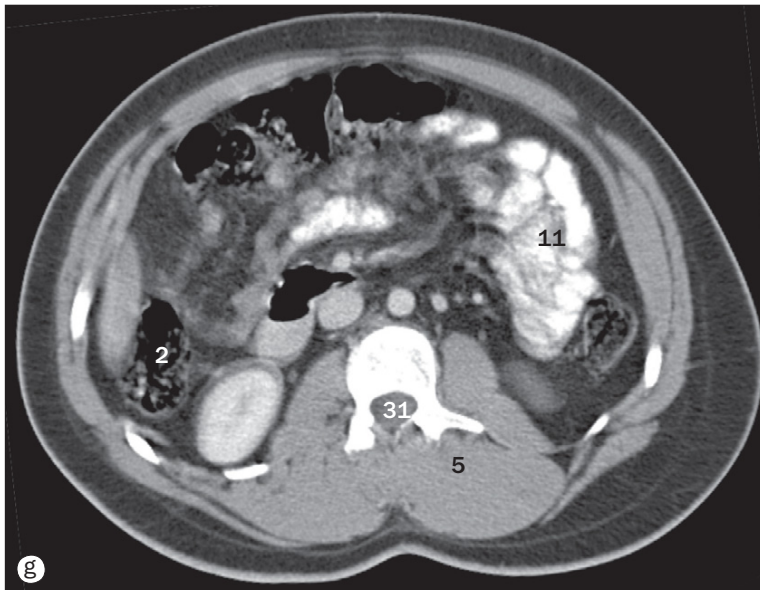
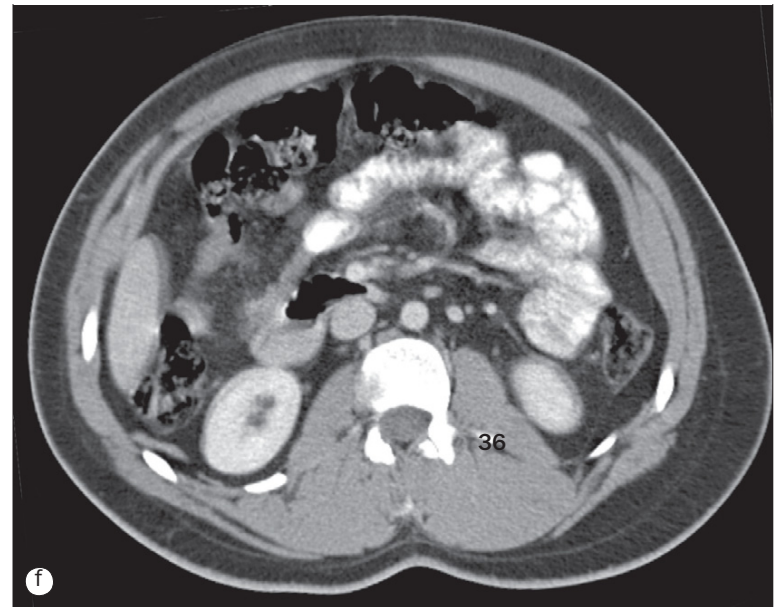
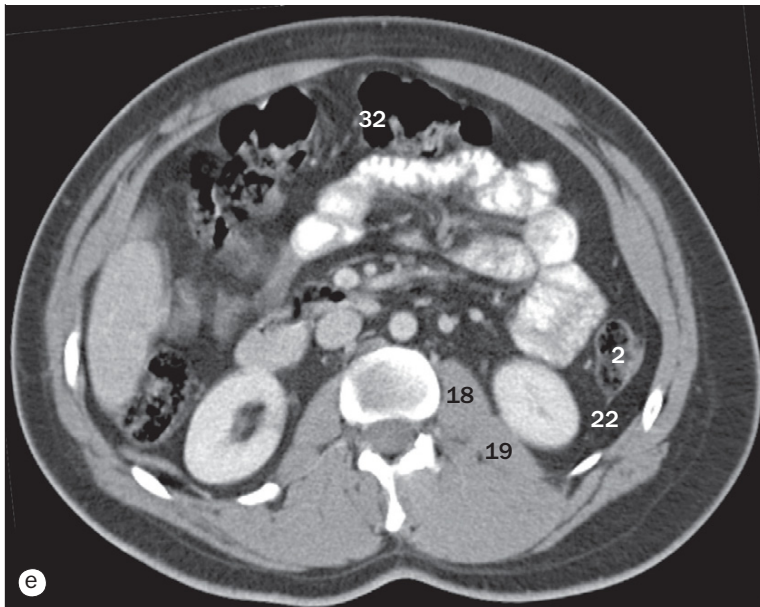
40 Right colic (hepatic) flexure
 41 Right crus of diaphragm
 42 Right hepatic vein
 43 Right kidney
 44 Right lobe of liver
 45 Right renal artery
 46 Right renal vein
 47 Right suprarenal gland
 48 Serratus anterior muscle

49 Splenic vein
 50 Superior (first) part of duodenum
 51 Superior mesenteric artery
 52 Superior mesenteric vein
 53 Tail of pancreas
 54 Thecal sac
 55 Transverse colon
 56 Renal sinus fat
 57 Pylorus



(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

- | | | |
|--|---------------------------------|------------------------------|
| 1 Aorta | 8 Ileum | 15 Left kidney |
| 2 Ascending colon | 9 Inferior vena cava | 16 Pararenal fat |
| 3 Descending (second) part of duodenum | 10 Internal oblique muscle | 17 Perirenal fat |
| 4 Descending colon | 11 Jejunum | 18 Psoas major muscle |
| 5 Erector spinae muscle | 12 Latissimus dorsi muscle | 19 Quadratus lumborum muscle |
| 6 External oblique muscle | 13 Left colic (splenic) flexure | 20 Rectus abdominis muscle |
| 7 Horizontal (third) part of duodenum | 14 Left crus of diaphragm | 21 Renal cortex |

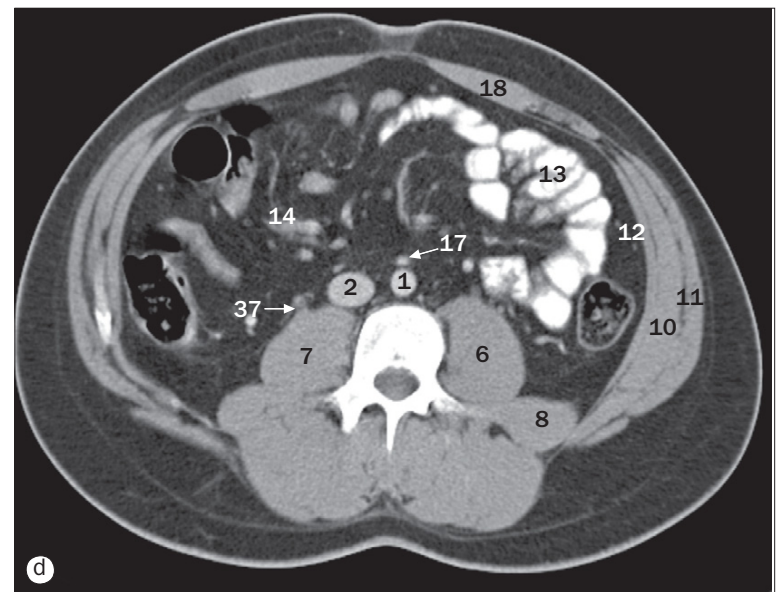
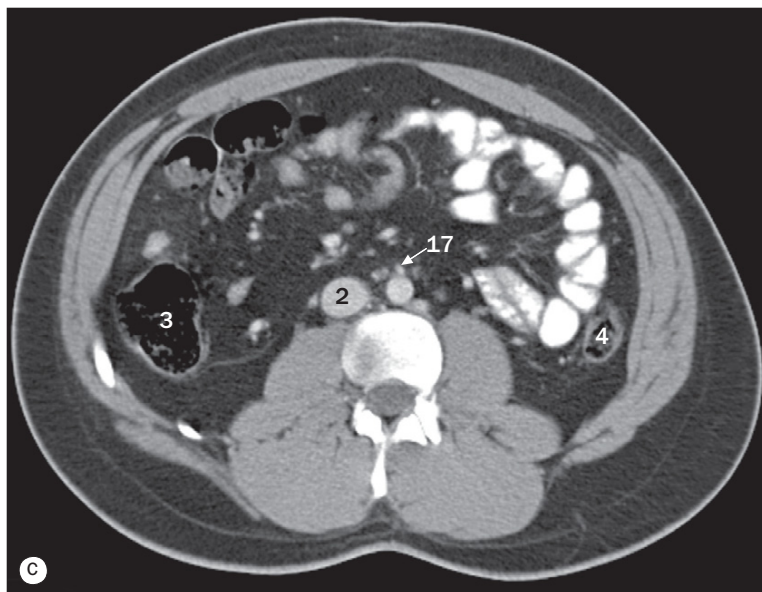
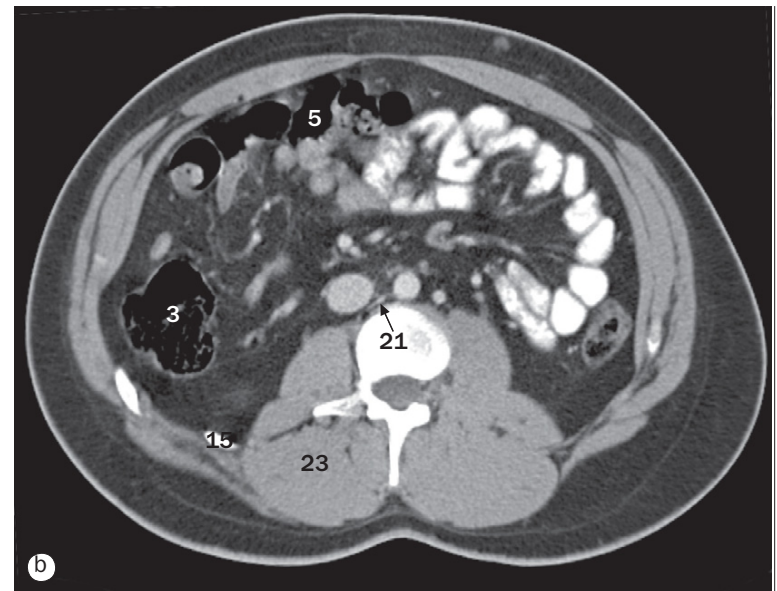
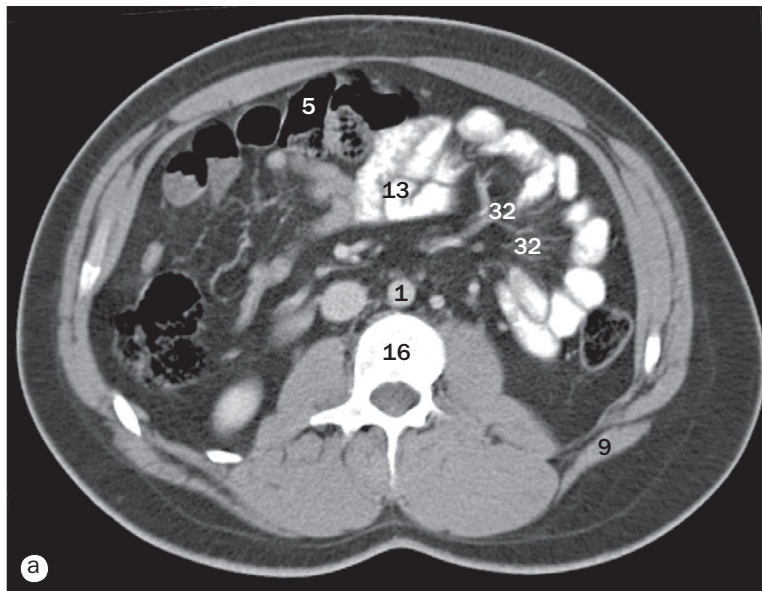


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

22 Renal fascia
23 Renal pelvis
24 Right colic (hepatic) flexure
25 Right crus of diaphragm
26 Right kidney
27 Right renal artery

28 Right renal vein
29 Superior mesenteric artery
30 Superior mesenteric vein
31 Thecal sac
32 Transverse colon
33 Left testicular artery

34 Left testicular vein
35 Transversus abdominis muscle
36 Twelfth rib
37 Subcutaneous fascia
38 Fourth (ascending) part of duodenum
39 Duodenal-jejunal flexure

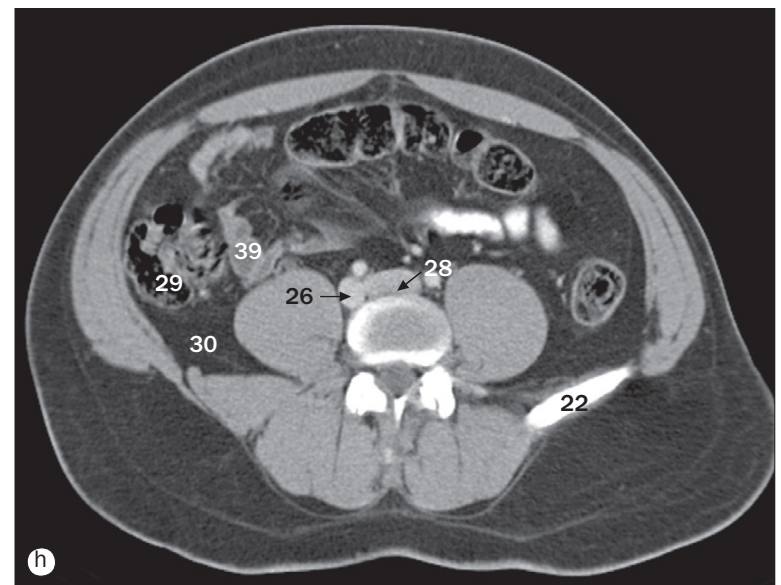
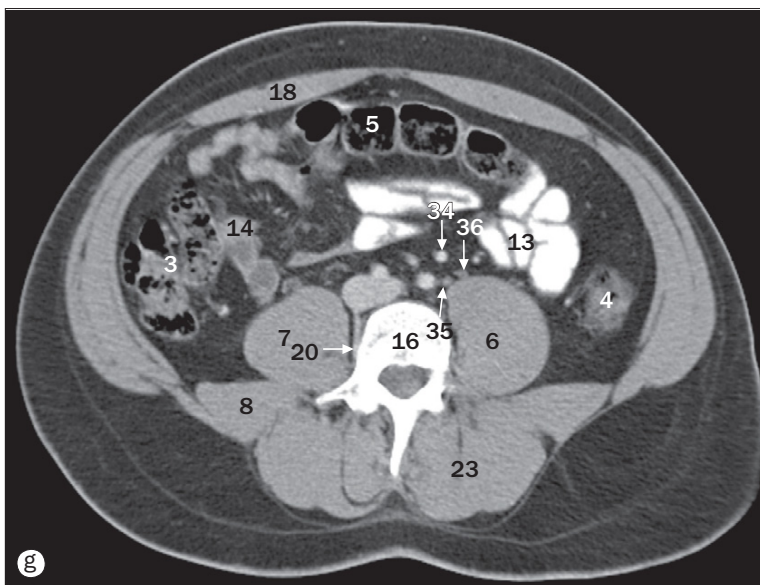
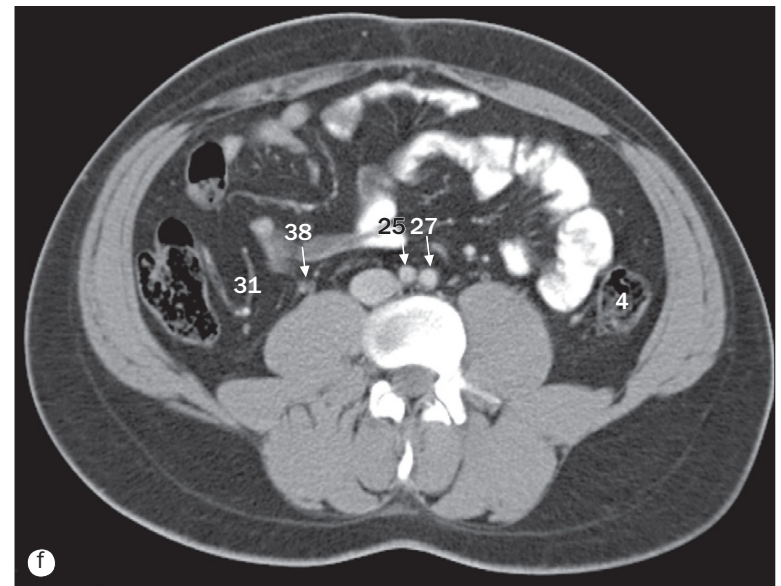
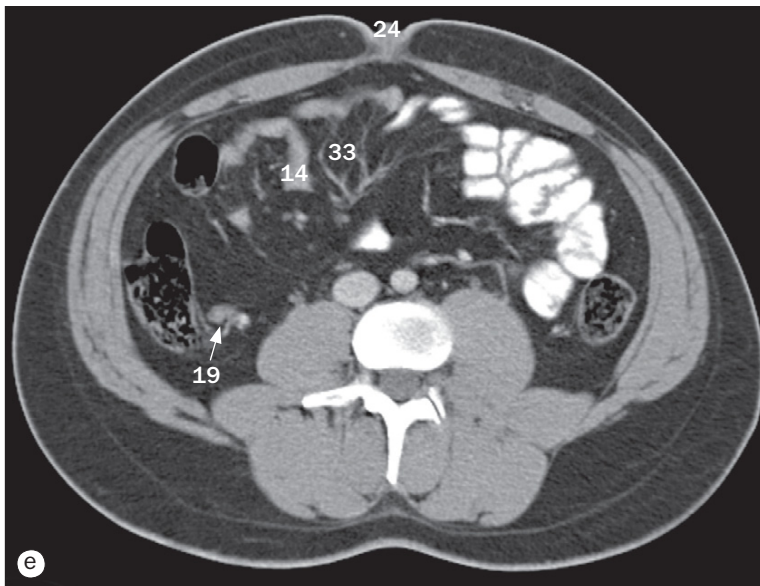


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

- 1 Aorta
- 2 Inferior vena cava
- 3 Ascending colon
- 4 Descending colon
- 5 Transverse colon
- 6 Left psoas muscle
- 7 Right psoas muscle

- 8 Quadratus lumborum muscle
- 9 Latissimus dorsi muscle
- 10 Internal oblique muscle
- 11 External oblique muscle
- 12 Transversus abdominis muscle
- 13 Jejunum
- 14 Ileum

- 15 Twelfth rib
- 16 Vertebral body
- 17 Inferior mesenteric artery
- 18 Rectus abdominis muscle
- 19 Appendicular artery
- 20 Lumbar vein
- 21 Lumbar artery

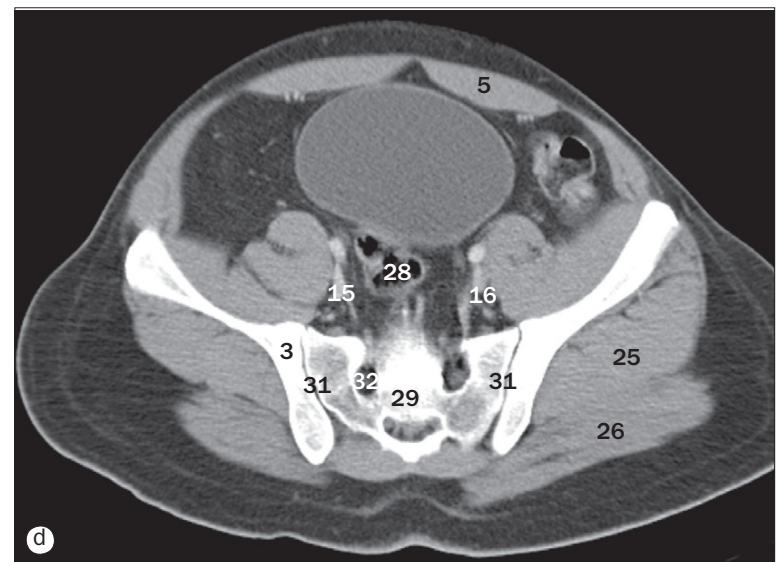
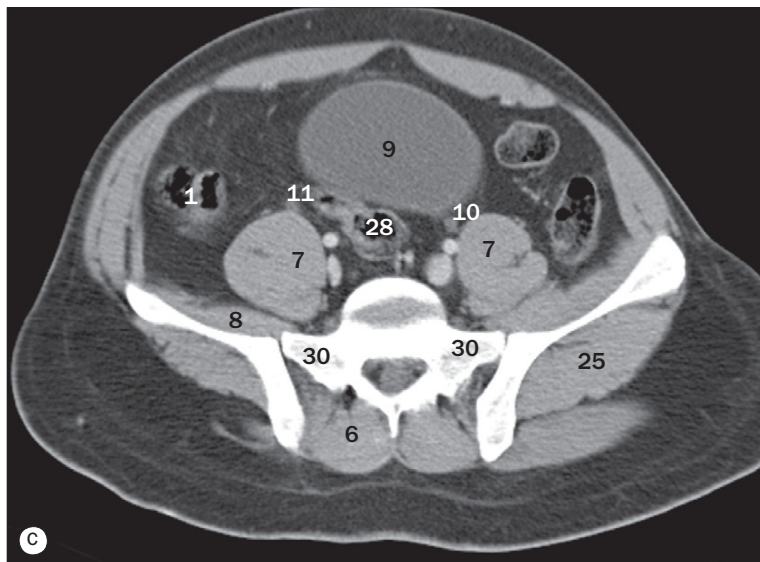
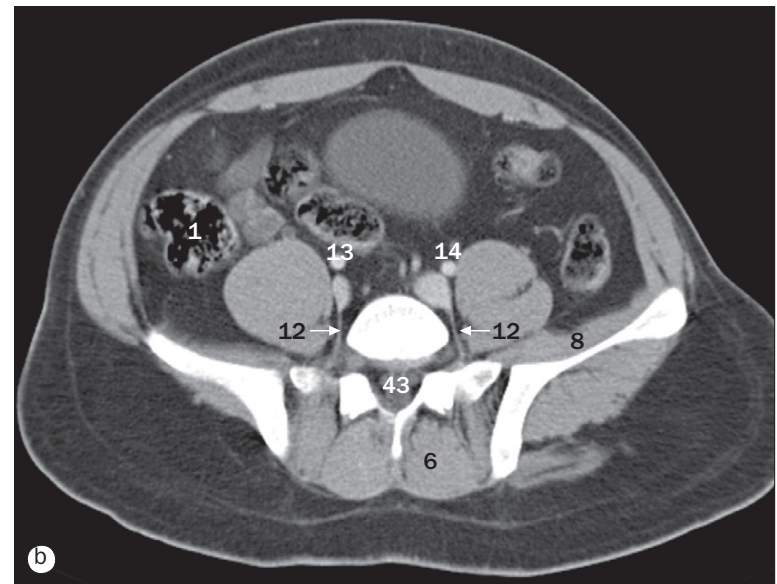
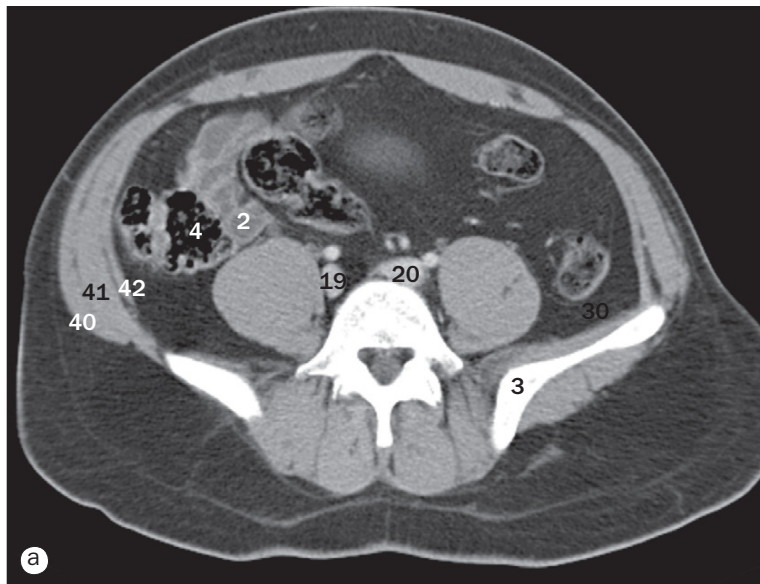


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

22 Ilium
23 Erector spinae muscles
24 Umbilicus
25 Right common iliac artery
26 Right common iliac vein
27 Left common iliac artery
28 Left common iliac vein

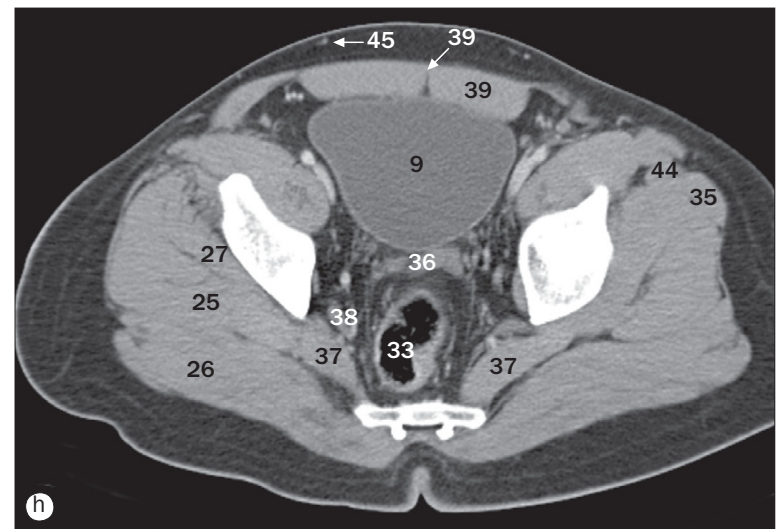
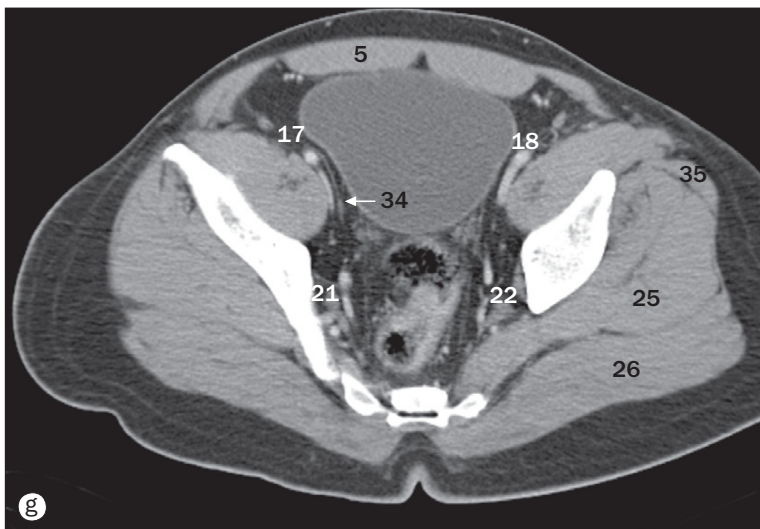
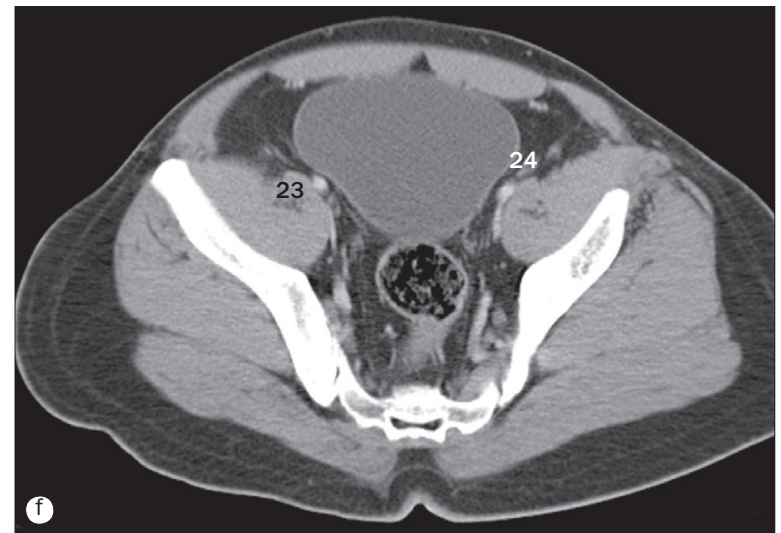
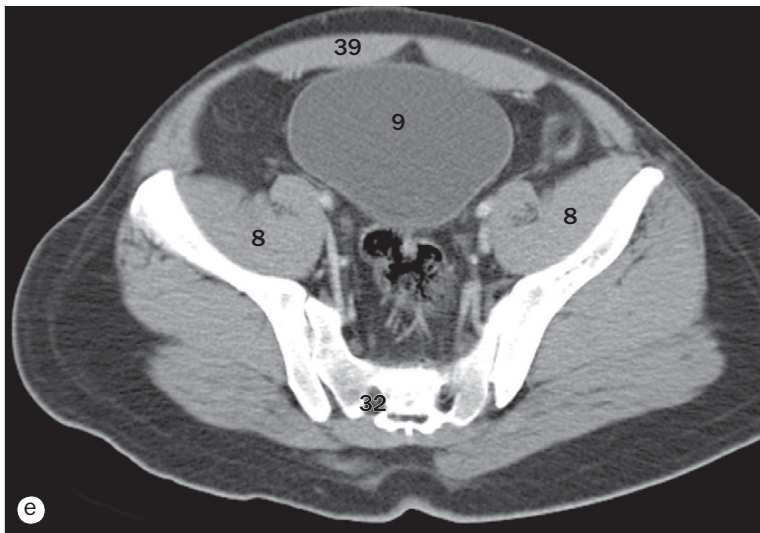
29 Caecum
30 Appendix
31 Ileocolic artery
32 Jejunal branches of superior mesenteric artery
33 Ileal branches of superior mesenteric artery

34 Left testicular artery
35 Left testicular vein
36 Left ureter
37 Right ureter
38 Right testicular vessels
39 Terminal ileum



(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

- | | | |
|---------------------------|--------------------------------|--------------------------------|
| 1 Caecum | 9 Urinary bladder | 17 Right external iliac artery |
| 2 Terminal ileum | 10 Left ureter | 18 Left external iliac artery |
| 3 Ilium | 11 Right ureter | 19 Right common iliac vein |
| 4 Ascending colon | 12 Lumbar veins | 20 Left common iliac vein |
| 5 Rectus abdominis muscle | 13 Right common iliac artery | 21 Right internal iliac vein |
| 6 Erector spinae muscles | 14 Left common iliac artery | 22 Left internal iliac vein |
| 7 Psoas major muscle | 15 Right internal iliac artery | 23 Right external iliac vein |
| 8 Iliacus muscle | 16 Left internal iliac artery | 24 Left external iliac vein |

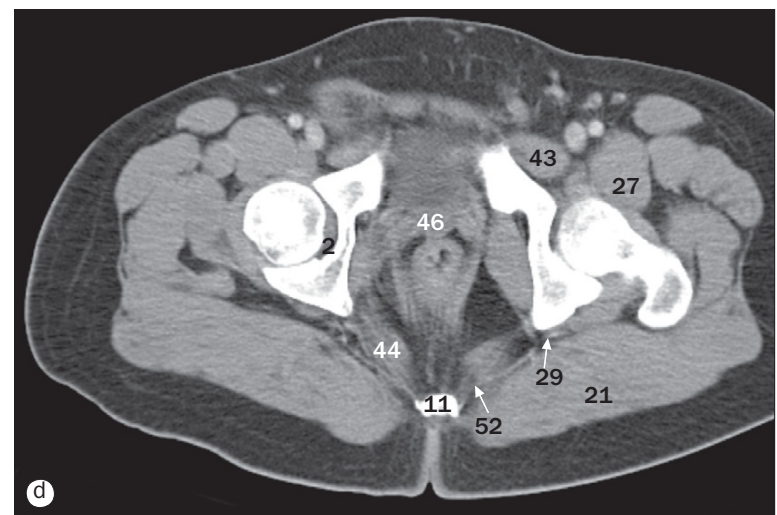
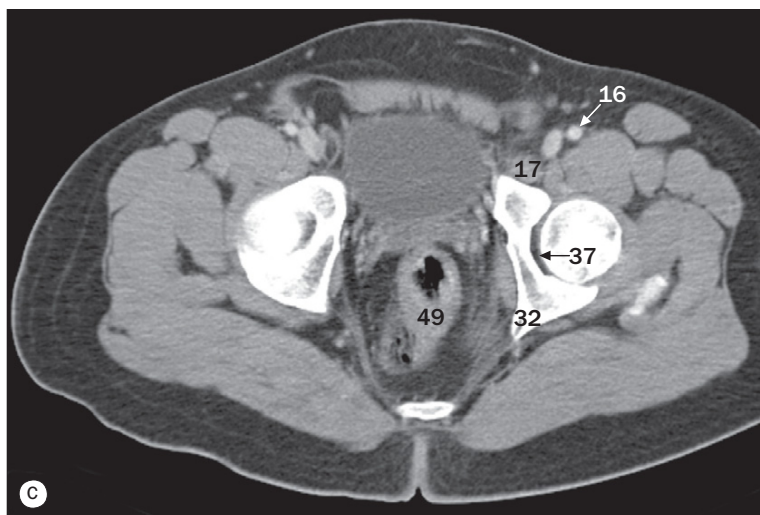
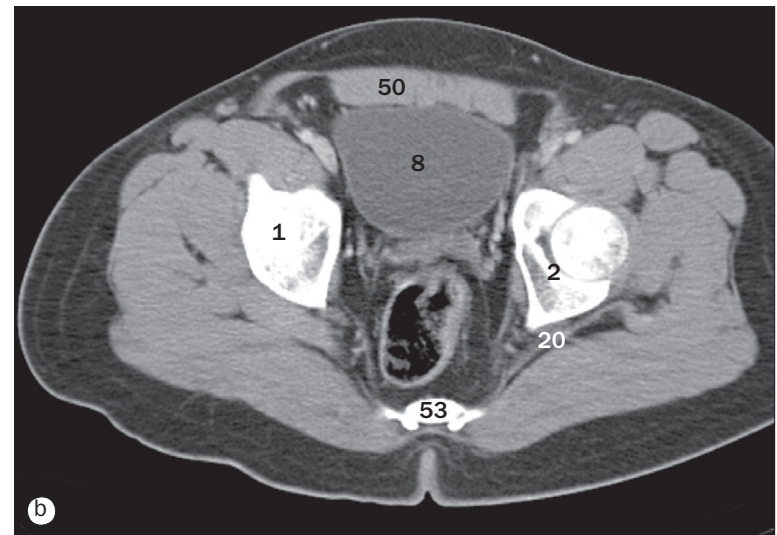
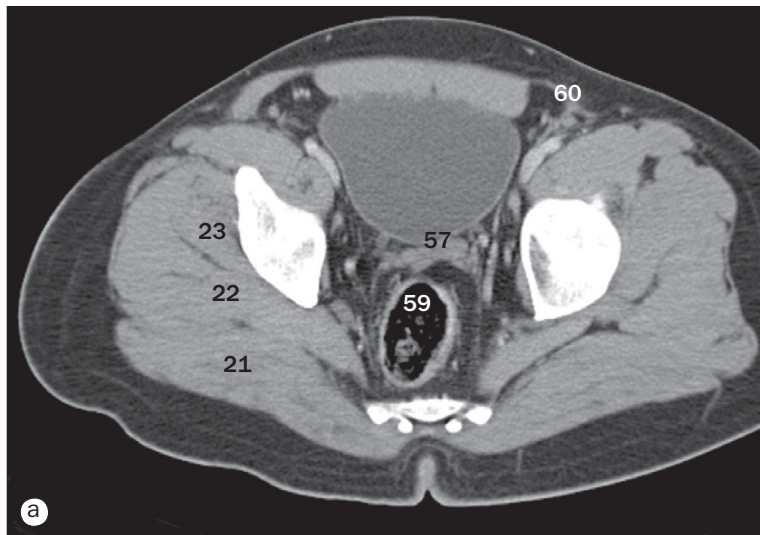


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

25 Gluteus medius muscle
26 Gluteus maximus muscle
27 Gluteus minimus muscle
28 Sigmoid colon
29 Sacrum
30 Sacral alium
31 Sacroiliac joint

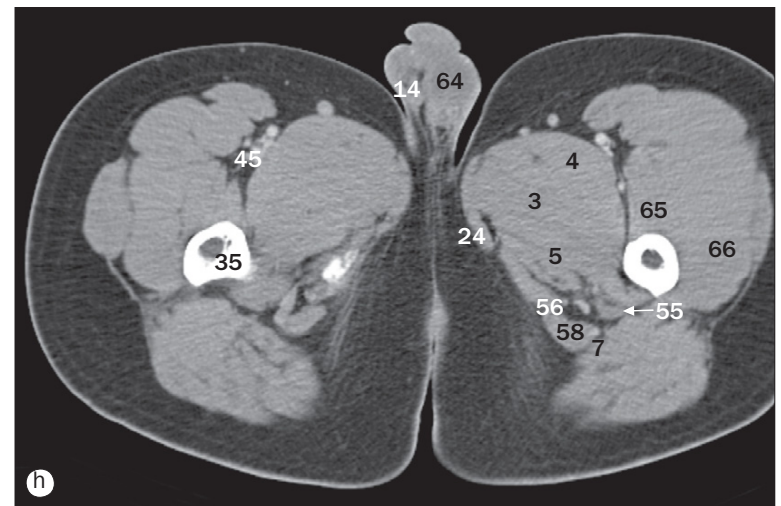
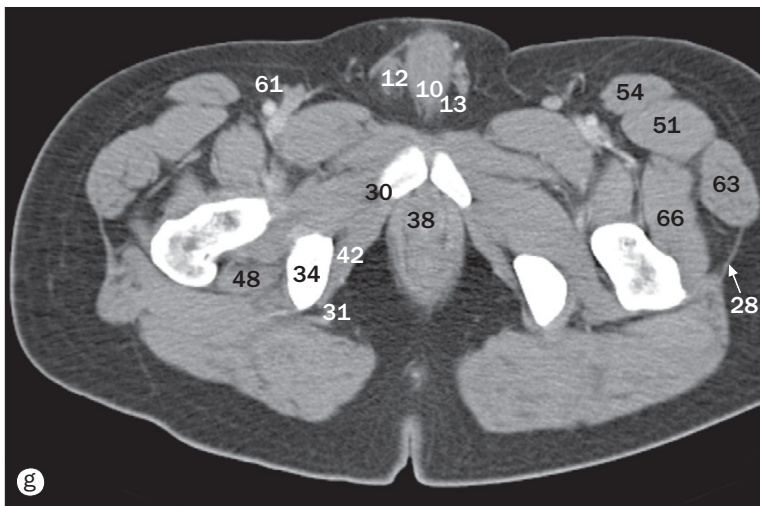
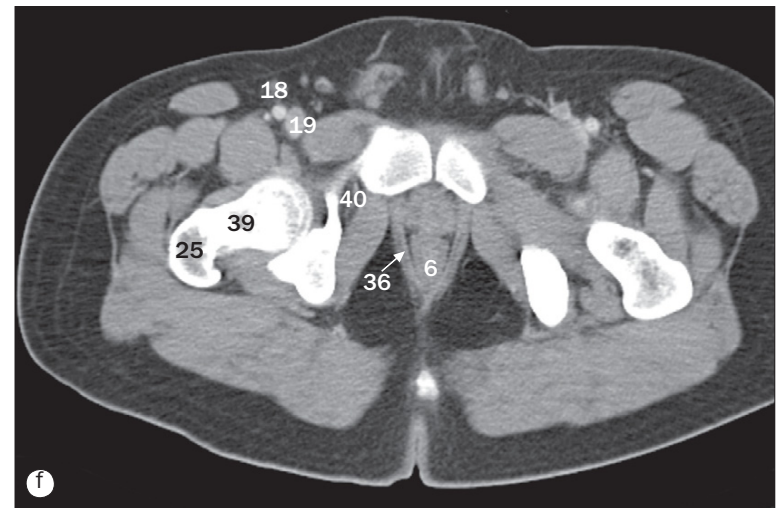
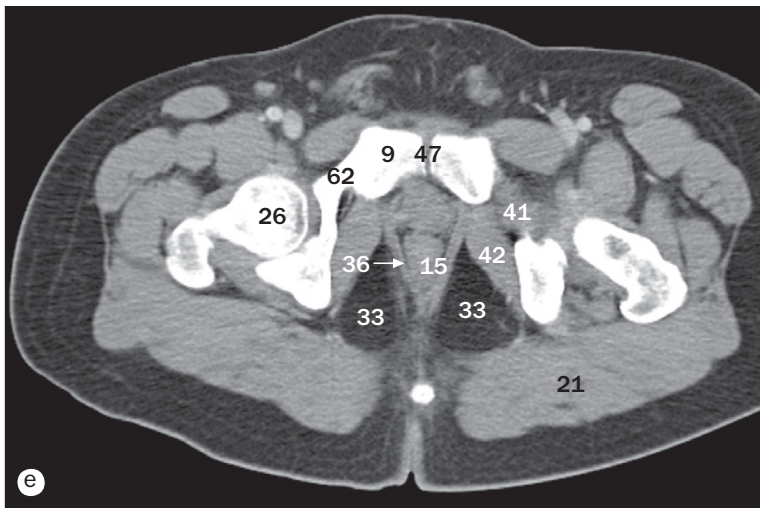
32 Sacral foramen
33 Rectum
34 Vas deferens
35 Tensor fasciae latae muscle
36 Seminal vesicle
37 Piriformis muscle
38 Superior gluteal artery and vein

39 Linea alba
40 External oblique muscle
41 Internal oblique muscle
42 Transversus abdominis muscle
43 Thecal sac
44 Sartorius muscle
45 Superficial inferior epigastric artery



(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

- | | | |
|--------------------------|------------------------------|--------------------------------------|
| 1 Acetabular roof | 12 Corpus cavernosum | 23 Gluteus minimus muscle |
| 2 Acetabulum | 13 Crus of corpus cavernosum | 24 Gracilis muscle |
| 3 Adductor brevis muscle | 14 Epididymis | 25 Greater trochanter of femur |
| 4 Adductor longus muscle | 15 External anal sphincter | 26 Head of femur |
| 5 Adductor magnus muscle | 16 External iliac artery | 27 Iliopsoas muscle |
| 6 Anal canal | 17 External iliac vein | 28 Iliotibial tract |
| 7 Biceps femoris muscle | 18 Femoral artery | 29 Inferior gluteal artery and vein |
| 8 Bladder | 19 Femoral vein | 30 Inferior ramus of pubis |
| 9 Body of pubis | 20 Gemellus muscle | 31 Internal pudendal artery and vein |
| 10 Bulb of penis | 21 Gluteus maximus muscle | 32 Ischial spine |
| 11 Coccyx | 22 Gluteus medius muscle | 33 Ischio-anal fossa |

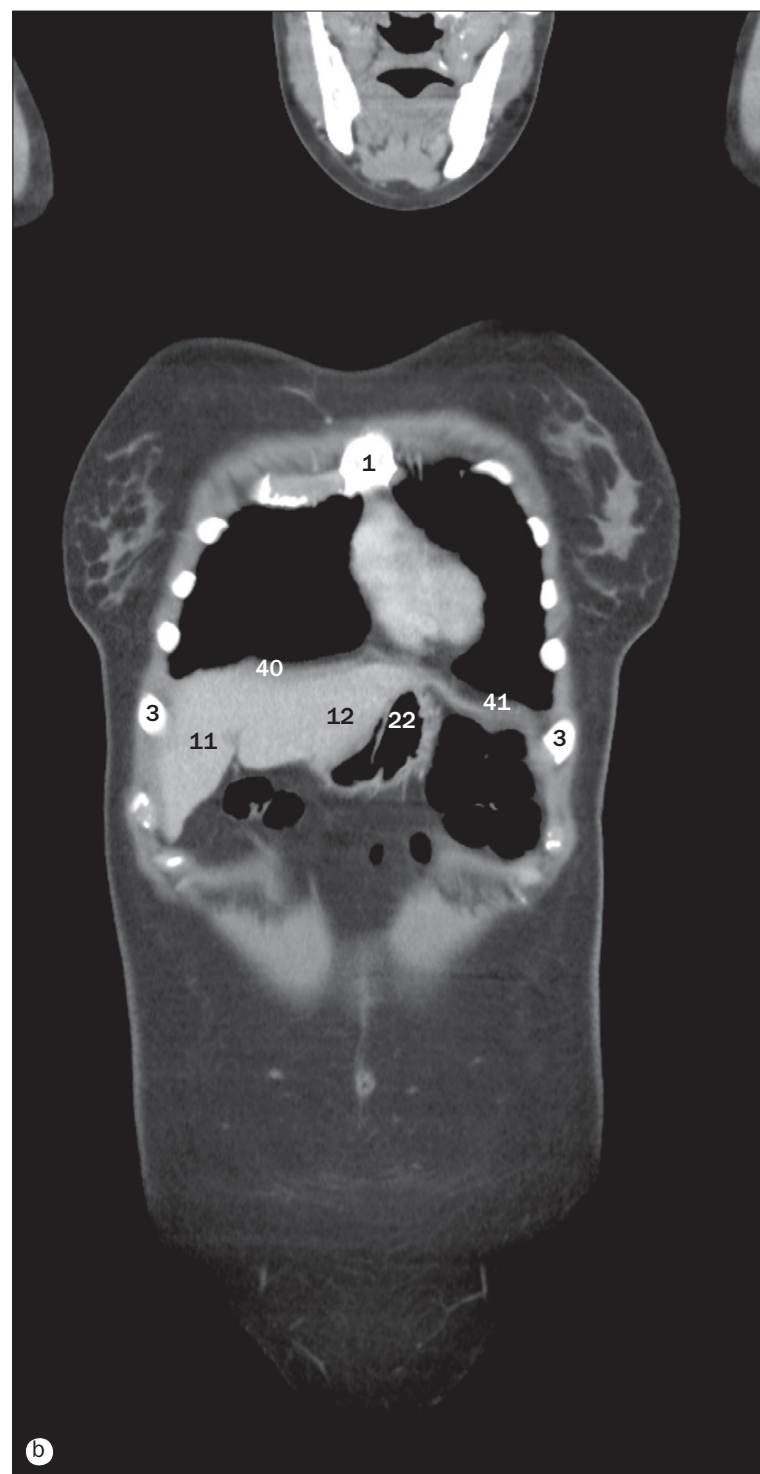


(a)–(h) Sequential axial CT images of abdomen and pelvis in a male, from superior to inferior.

34 Ischium
35 Lesser trochanter of femur
36 Levator ani muscle
37 Ligament of head of femur
38 Membranous urethra
39 Neck of femur
40 Obturator artery and vein
41 Obturator externus muscle
42 Obturator internus muscle
43 Pectineus muscle
44 Piriformis muscle

45 Profunda femoris artery
46 Prostate
47 Pubic symphysis
48 Quadratus femoris muscle
49 Rectum
50 Rectus abdominis muscle
51 Rectus femoris muscle
52 Sacrospinous ligament
53 Sacrum
54 Sartorius muscle
55 Sciatic nerve

56 Semimembranosus muscle
57 Seminal vesicle
58 Semitendinosus muscle
59 Sigmoid colon
60 Spermatic cord
61 Superficial femoral artery
62 Superior ramus of pubis
63 Tensor fasciae latae muscle
64 Testis
65 Vastus intermedius muscle
66 Vastus lateralis muscle

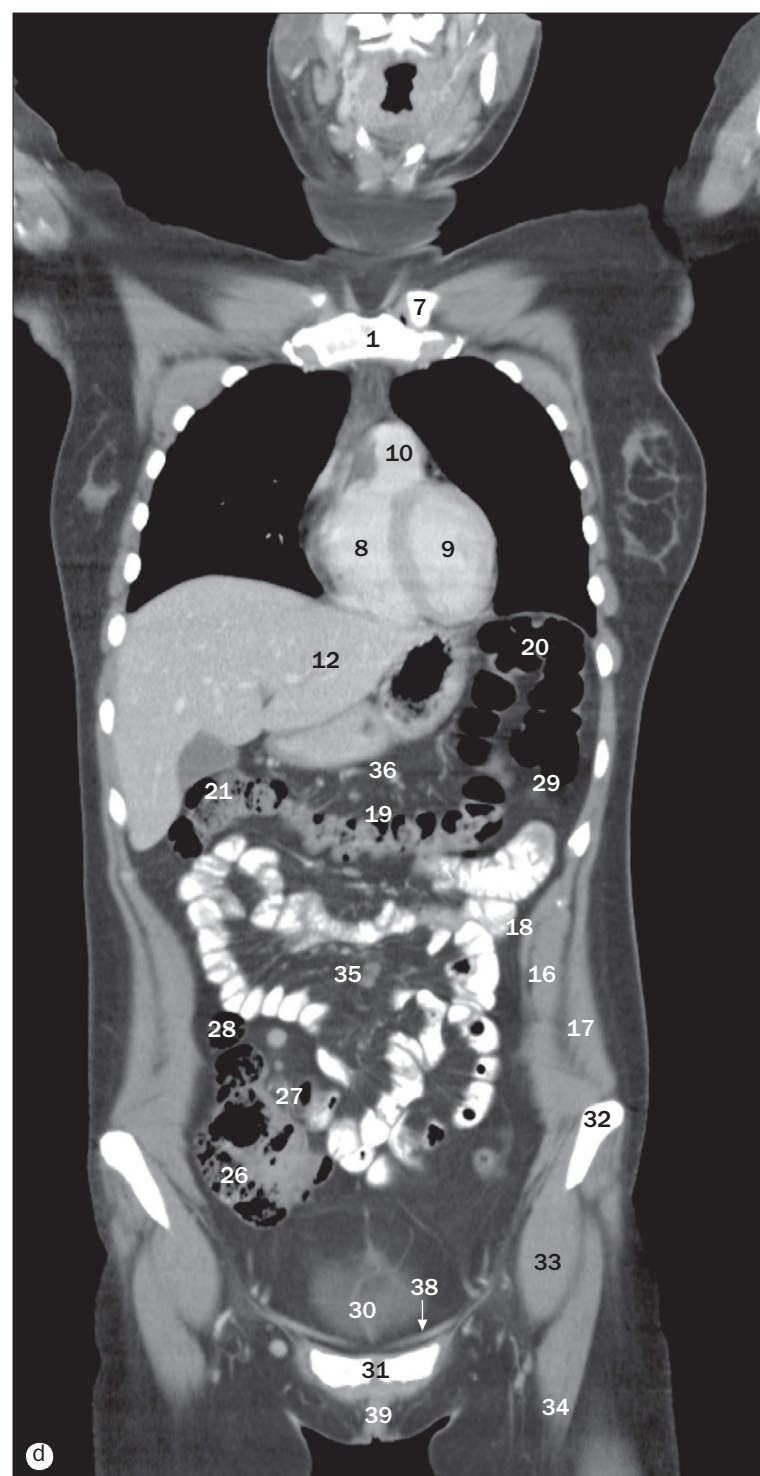
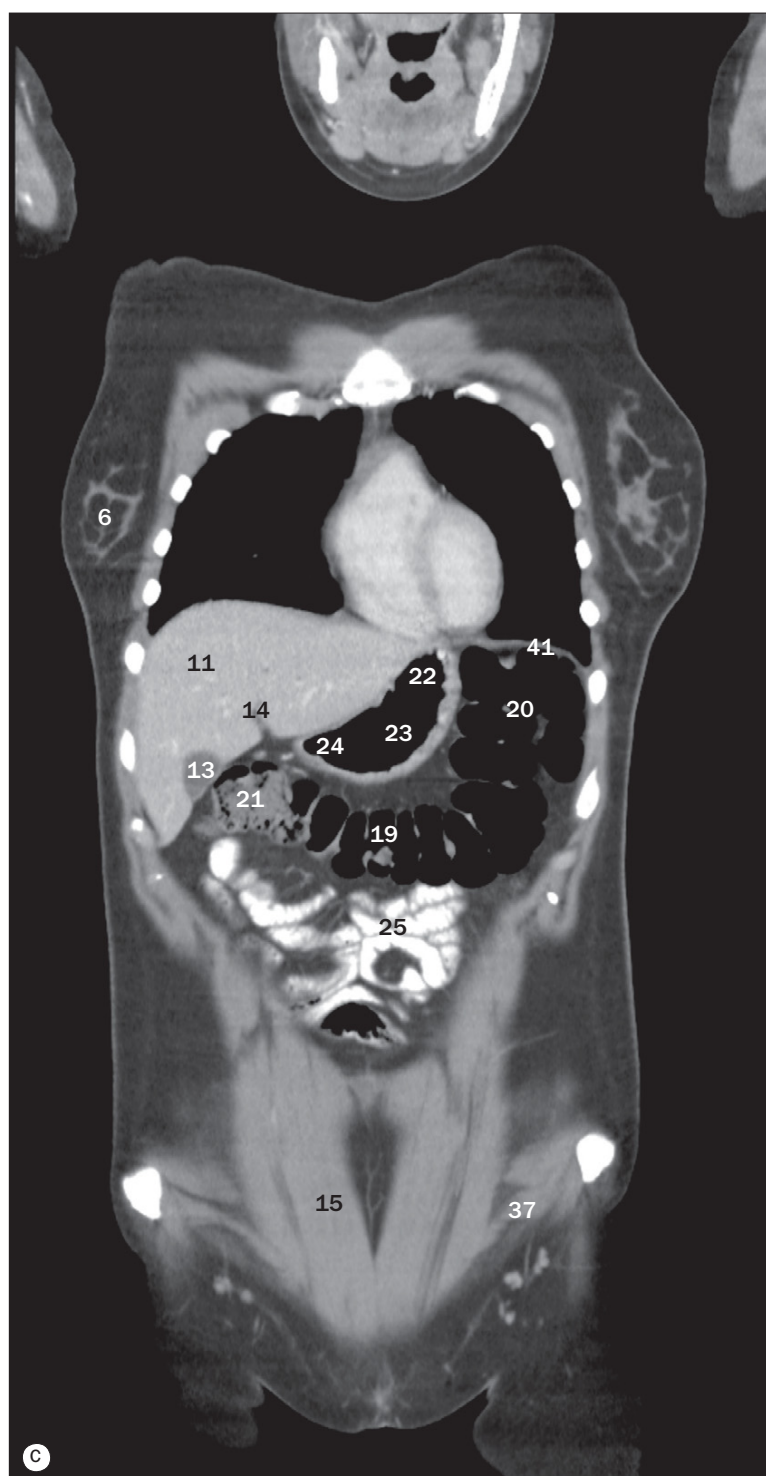


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.
 Note: pages 136–145 show sequential images of the same female patient.

1 Manubrium
 2 Body of sternum
 3 Rib
 4 Costal cartilage
 5 Xiphisternum
 6 Breast
 7 Clavicle

8 Right ventricle
 9 Left ventricle
 10 Pulmonary conus
 11 Right lobe of liver
 12 Left lobe of liver
 13 Gall bladder
 14 Fissure for ligamentum venosum

15 Rectus abdominis muscle
 16 Internal oblique muscle
 17 External oblique muscle
 18 Transversus abdominis muscle
 19 Transverse colon
 20 Left colic flexure
 21 Right colic flexure

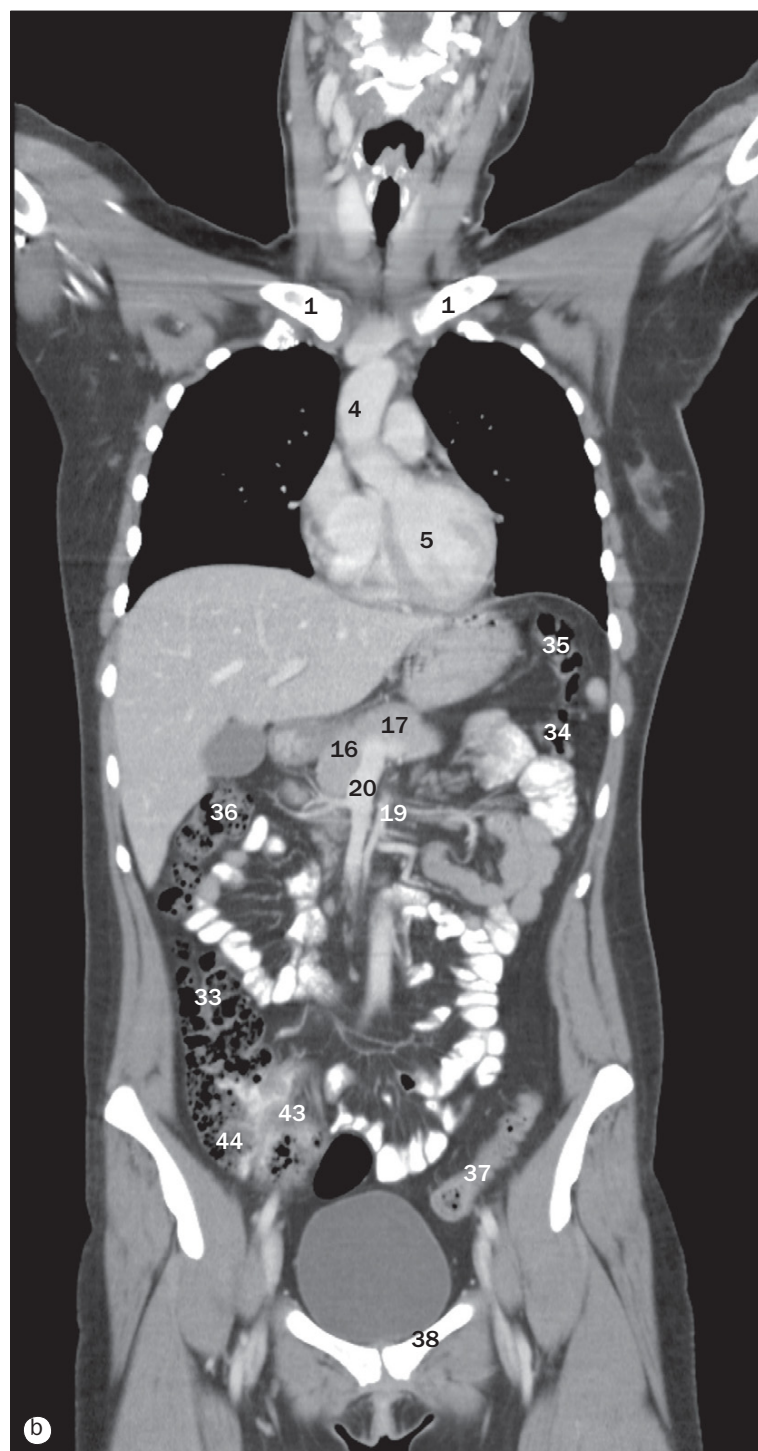
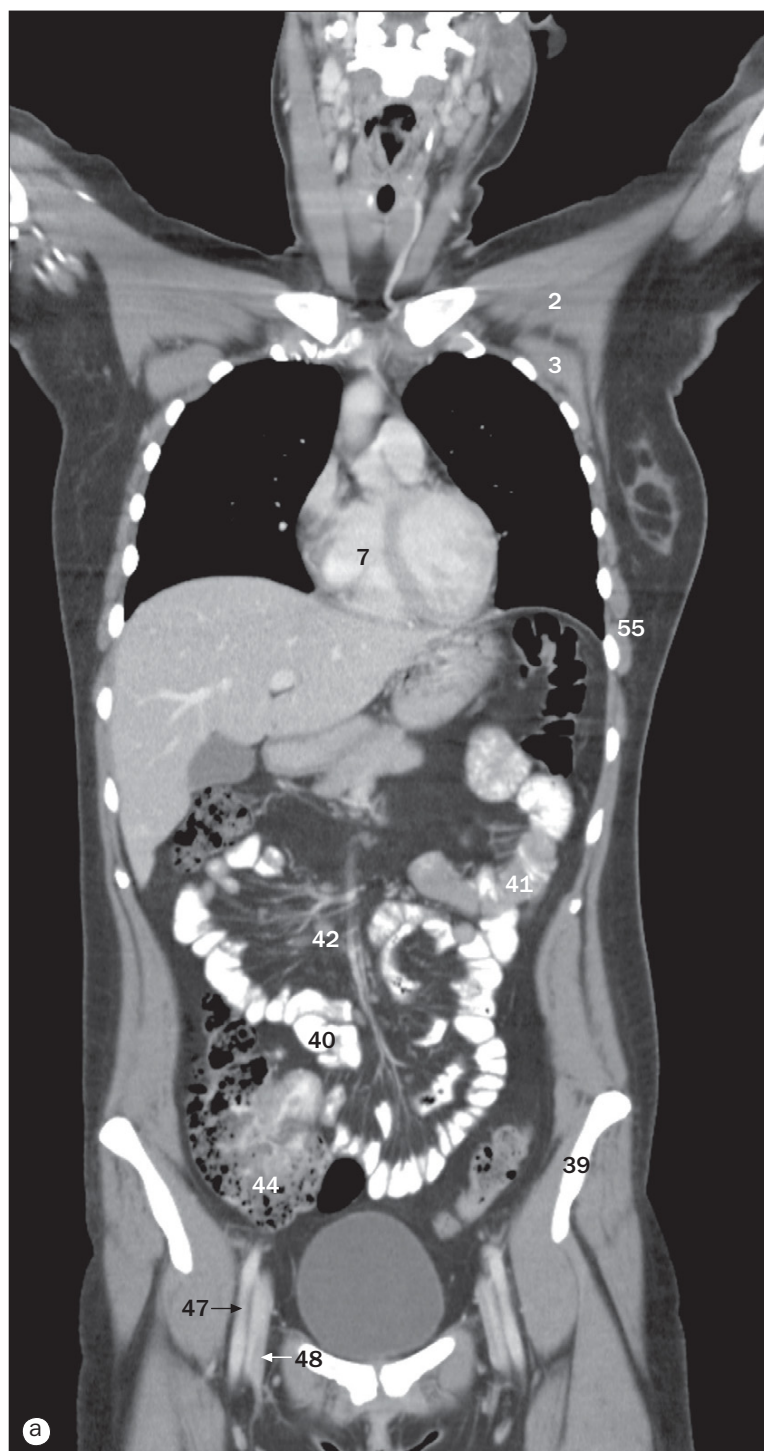


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

22 Fundus of stomach
23 Body of stomach
24 Antrum of stomach
25 Jejunum
26 Caecum
27 Ileum
28 Ascending colon

29 Descending colon
30 Urinary bladder
31 Pubic symphysis
32 Iliac crest
33 Iliopsoas muscle
34 Sartorius muscle
35 Small bowel mesentery

36 Transverse mesocolon
37 Pectineus muscle
38 Levator ani muscle
39 Labium majus
40 Right hemidiaphragm
41 Left hemidiaphragm

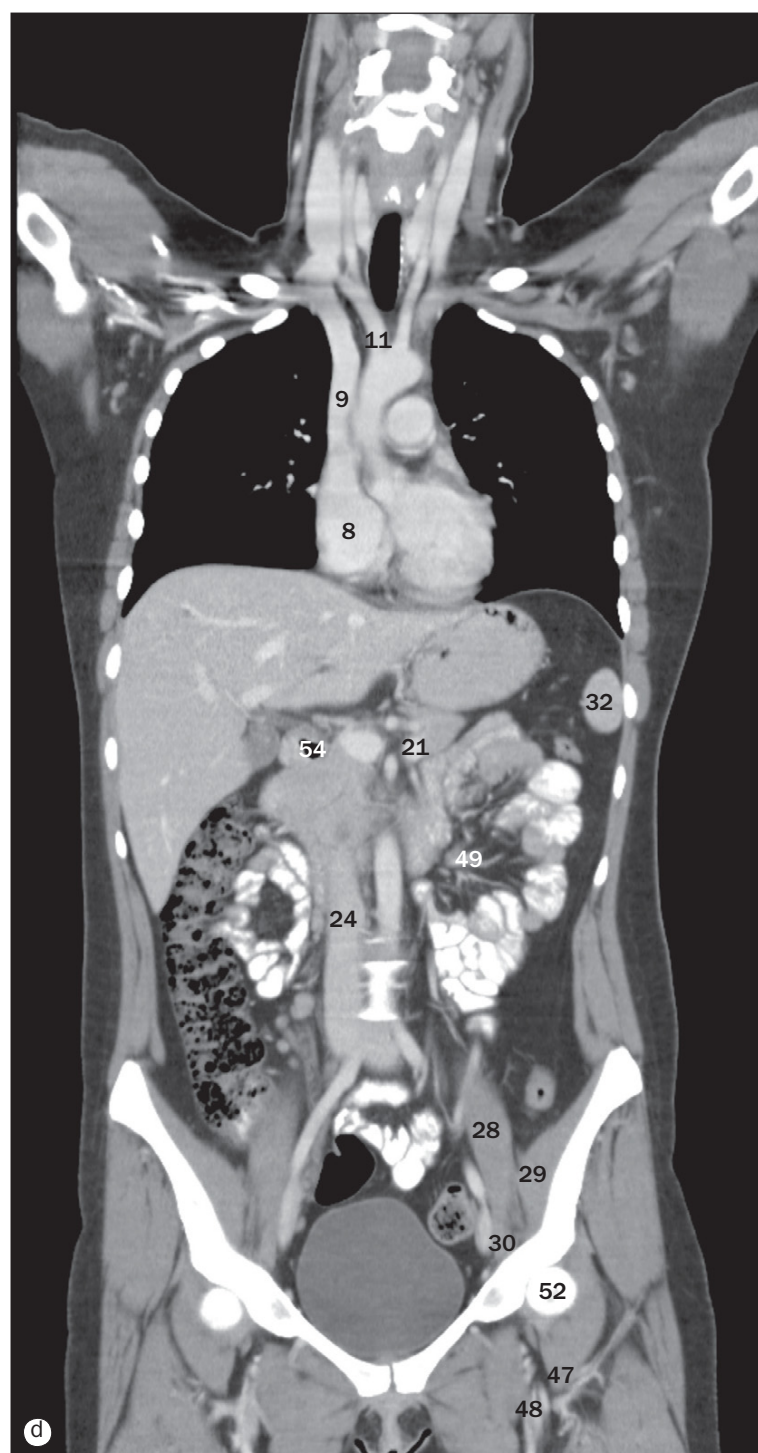
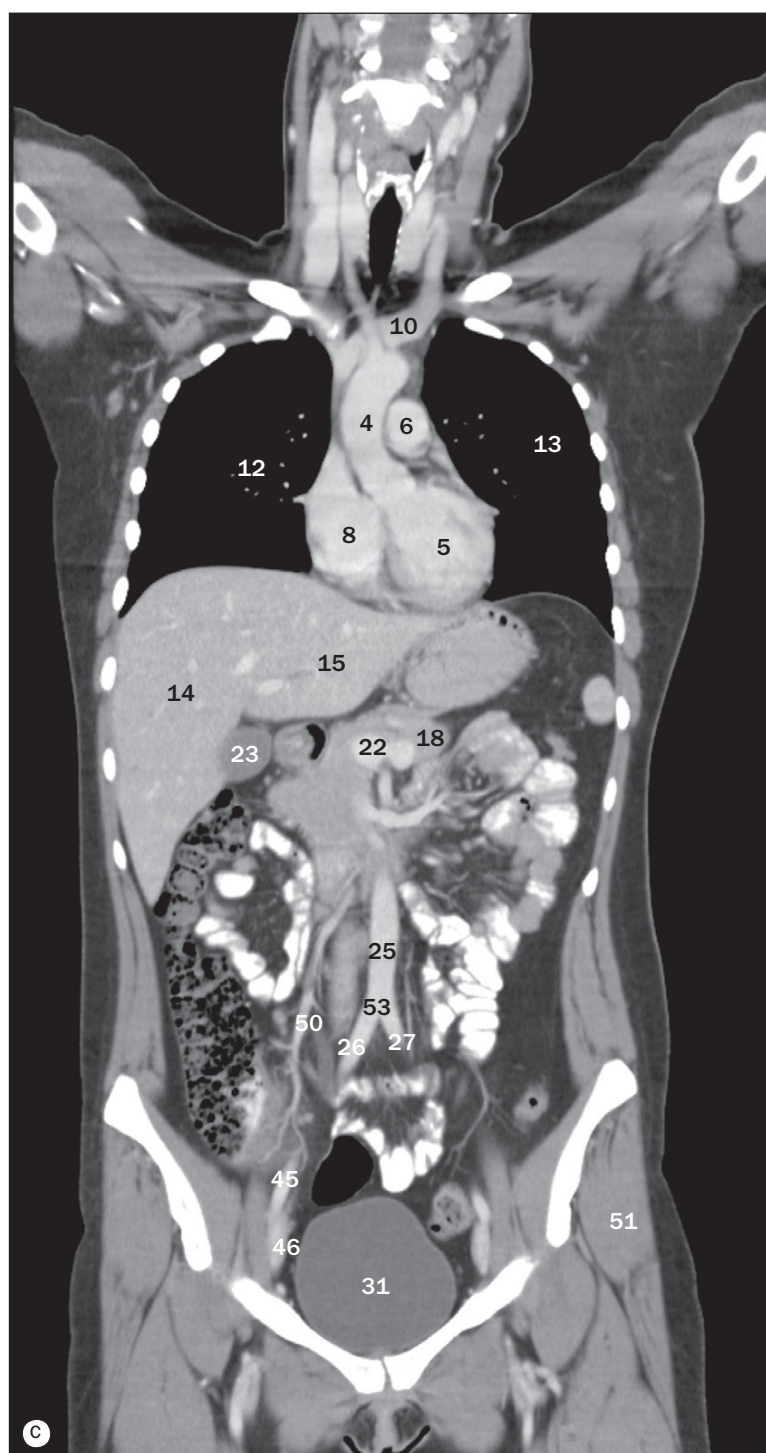


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

1 Clavicle
2 Pectoralis major muscle
3 Pectoralis minor muscle
4 Ascending aorta
5 Left ventricle
6 Pulmonary artery
7 Right ventricle
8 Right atrium
9 Superior vena cava
10 Left brachiocephalic vein

11 Brachiocephalic trunk
12 Right lung
13 Left lung
14 Right lobe of liver
15 Left lobe of liver
16 Head of pancreas
17 Neck of pancreas
18 Body of pancreas
19 Superior mesenteric artery (SMA)
20 Superior mesenteric vein (SMV)

21 Splenic vein
22 Portal vein
23 Gall bladder
24 Inferior vena cava
25 Aorta
26 Right common iliac artery
27 Left common iliac artery
28 Psoas muscle
29 Iliacus muscle
30 Iliopsoas muscle

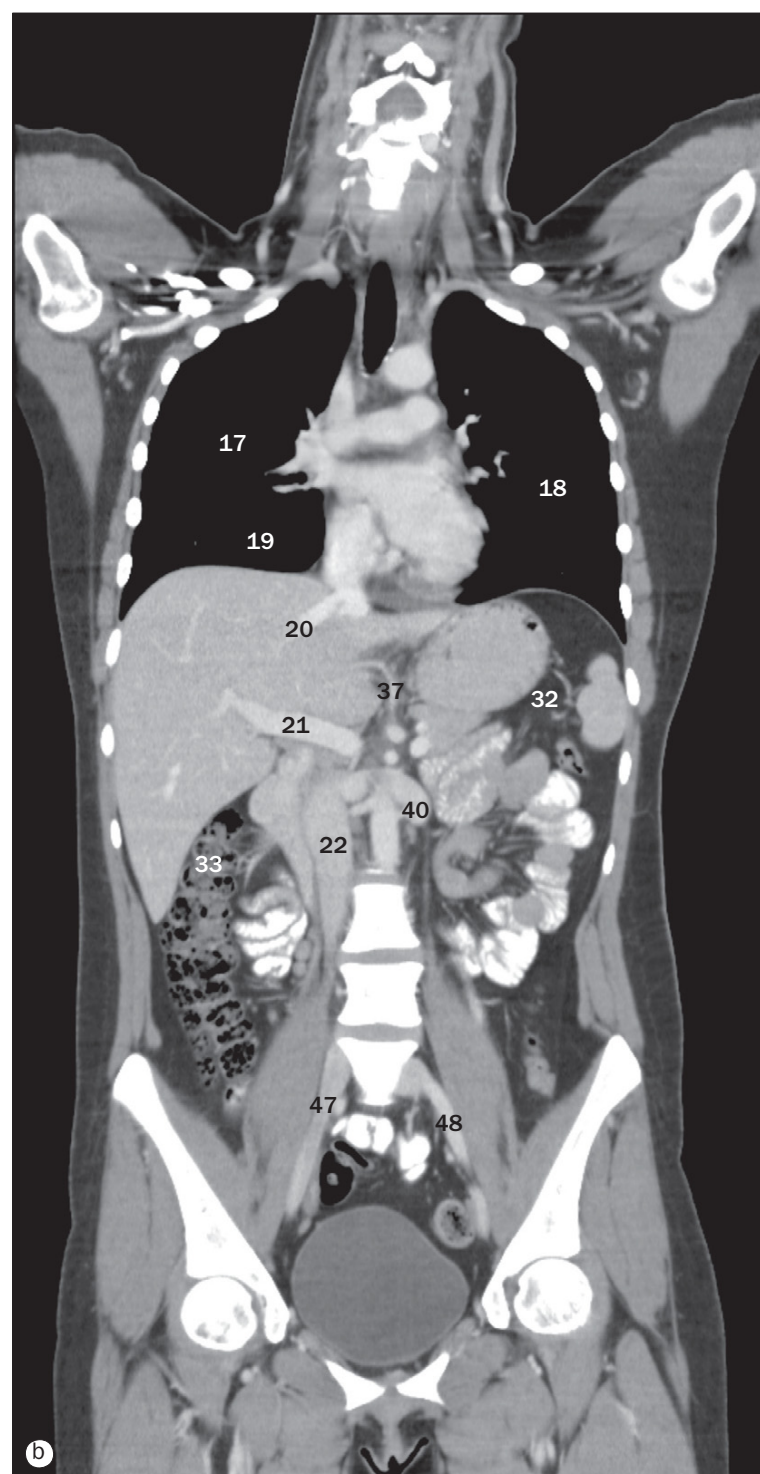
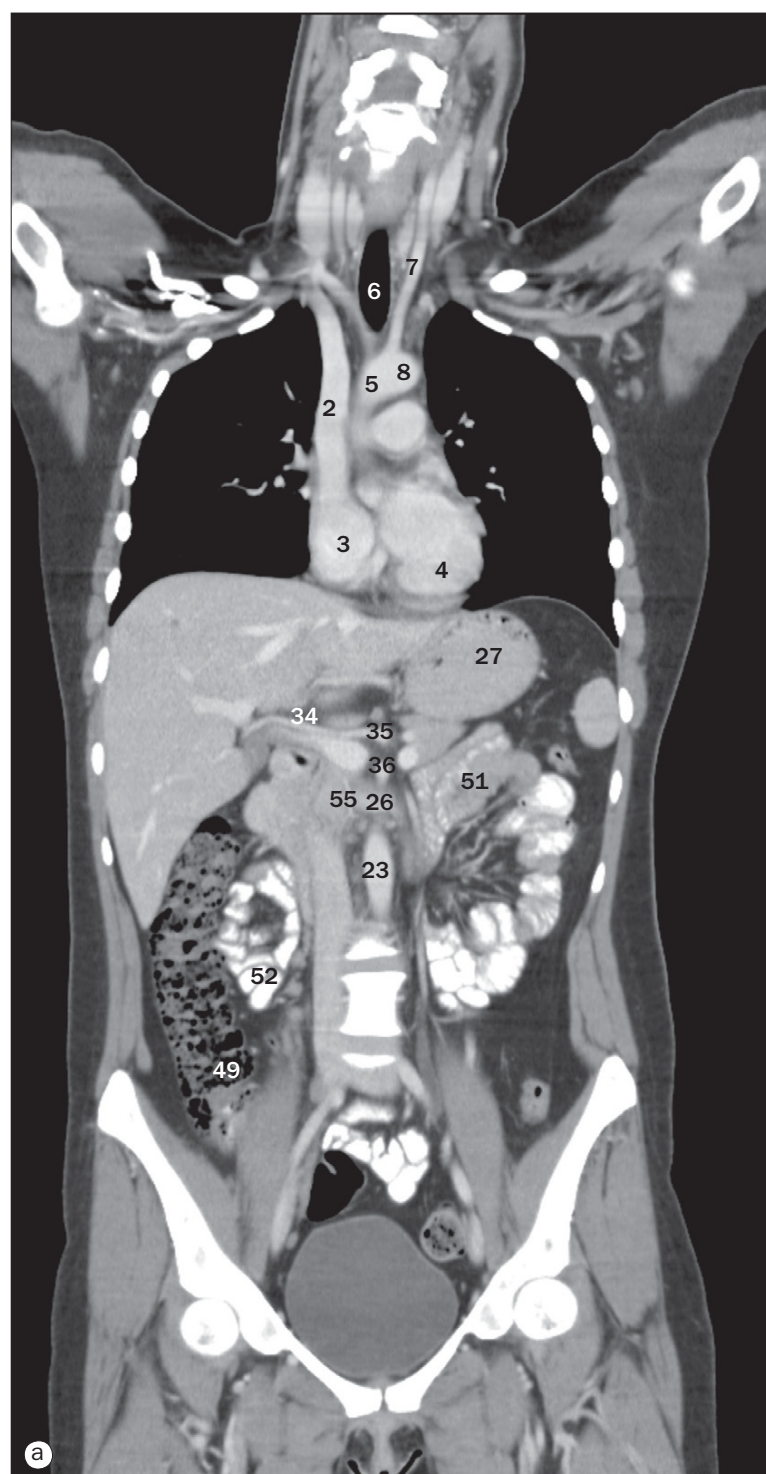


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

31 Urinary bladder
32 Spleen
33 Ascending colon
34 Descending colon
35 Left colic flexure
36 Right colic flexure
37 Sigmoid colon
38 Superior pubic ramus
39 Ilium

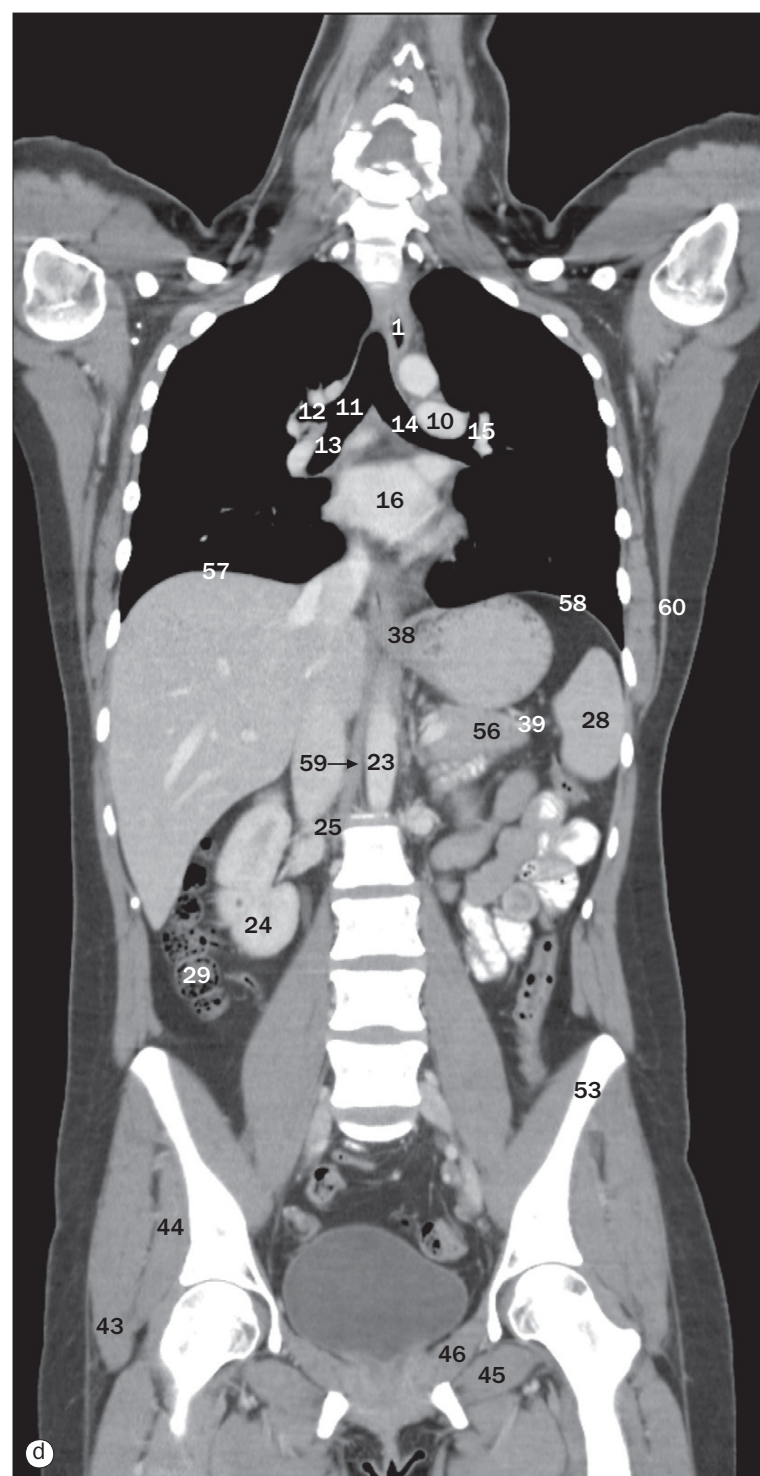
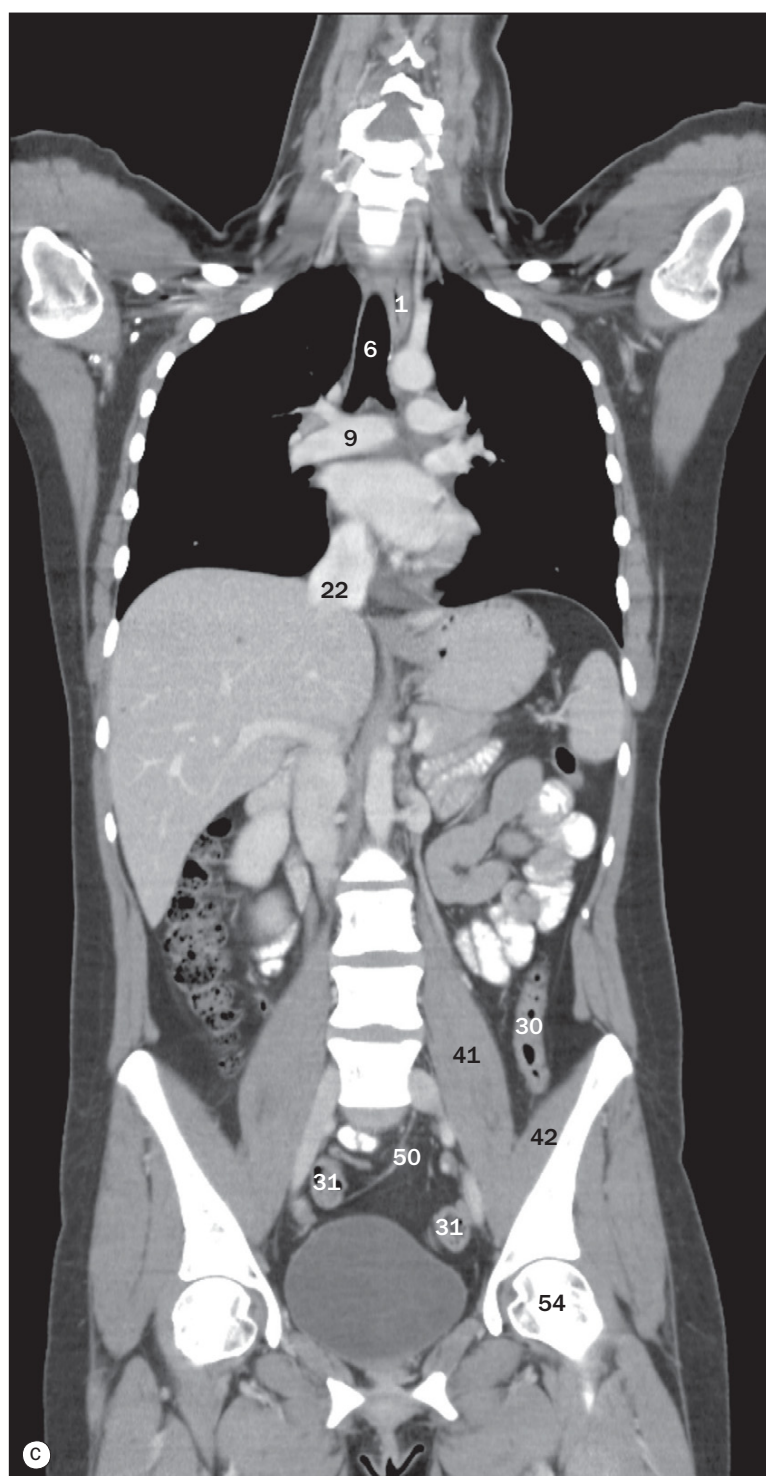
40 Ileum
41 Jejunum
42 Small bowel mesentery
43 Terminal ileum
44 Caecum
45 External iliac artery
46 External iliac vein
47 Femoral artery
48 Femoral vein

49 Jejunal branches of SMA
50 Ileal branches of SMA
51 Gluteus medius muscle
52 Head of femur
53 Aortic bifurcation
54 First part of duodenum
55 Serratus anterior muscle



(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

- | | | |
|------------------------------|------------------------------|------------------------|
| 1 Oesophagus | 12 Right upper lobe bronchus | 23 Aorta |
| 2 Superior vena cava | 13 Bronchus intermedius | 24 Right kidney |
| 3 Right atrium | 14 Left main bronchus | 25 Right renal artery |
| 4 Left ventricle | 15 Left upper lobe bronchus | 26 Left renal vein |
| 5 Ascending aorta | 16 Left atrium | 27 Fundus of stomach |
| 6 Trachea | 17 Right lung | 28 Spleen |
| 7 Left common carotid artery | 18 Left lung | 29 Ascending colon |
| 8 Aortic arch | 19 Right lower lobe | 30 Descending colon |
| 9 Right pulmonary artery | 20 Hepatic vein | 31 Sigmoid colon |
| 10 Left pulmonary artery | 21 Portal vein | 32 Left colic flexure |
| 11 Right main bronchus | 22 Inferior vena cava | 33 Right colic flexure |

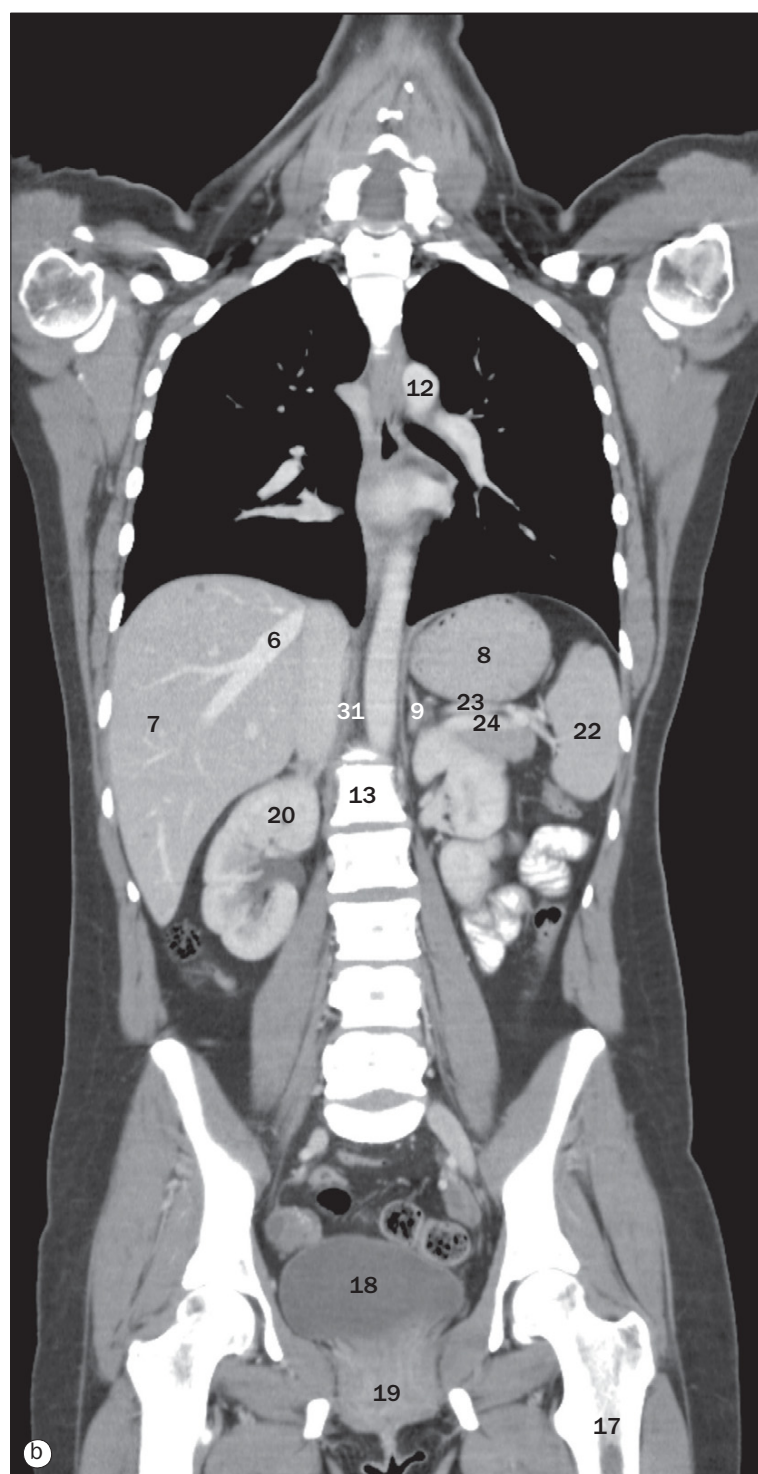
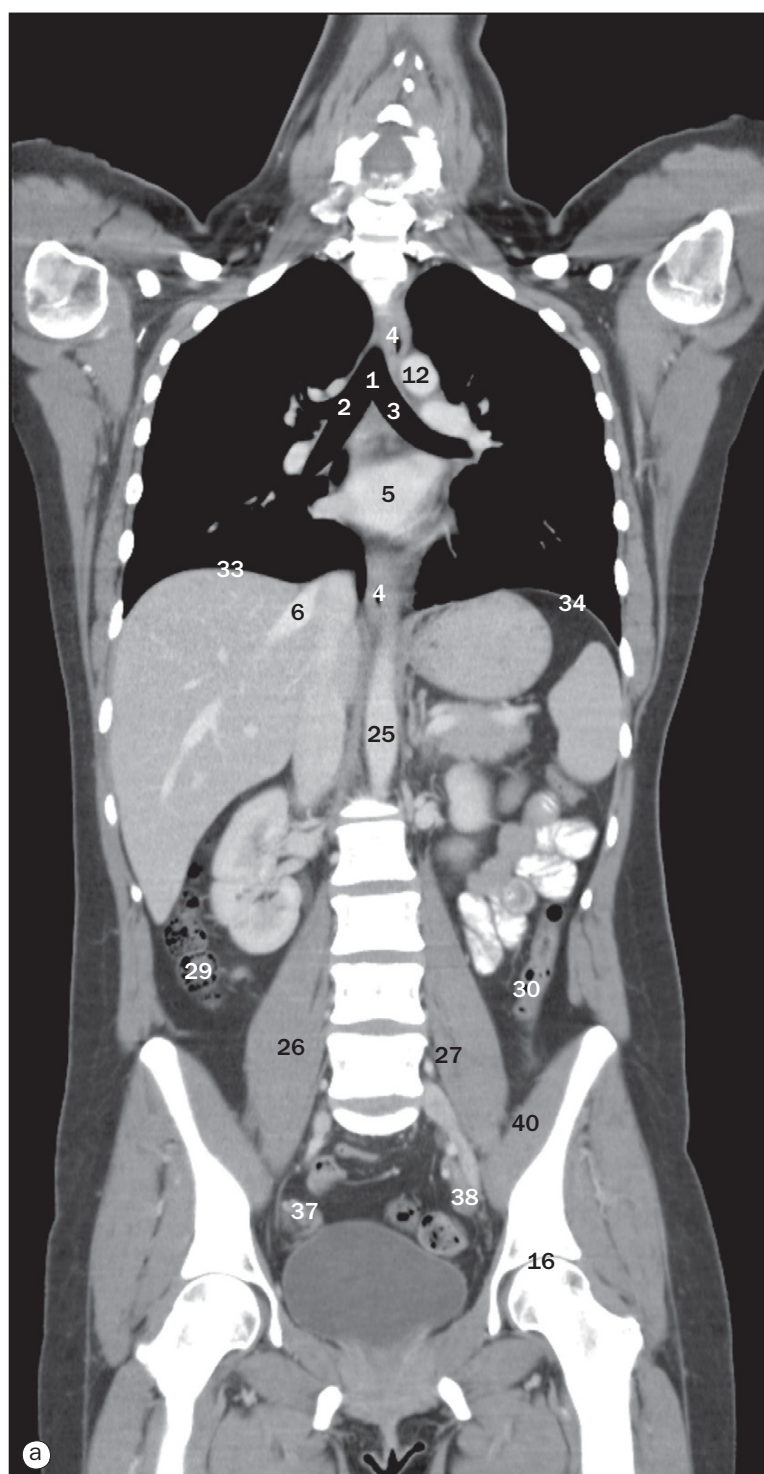


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

34 Common hepatic artery
35 Coeliac axis
36 Superior mesenteric artery
37 Left gastric artery
38 Oesophagogastric junction
39 Splenic artery
40 Left renal artery
41 Psoas muscle
42 Iliacus muscle
43 Gluteus maximus muscle

44 Gluteus medius muscle
45 Obturator externus muscle
46 Obturator internus muscle
47 Right common iliac vein
48 Left common iliac vein
49 Caecum
50 Sigmoid arteries (from inferior mesenteric artery)
51 Jejunum
52 Ileum

53 Iliac bone
54 Head of femur
55 Body of pancreas
56 Tail of pancreas
57 Right hemidiaphragm
58 Left hemidiaphragm
59 Right crus of diaphragm
60 Latissimus dorsi muscle

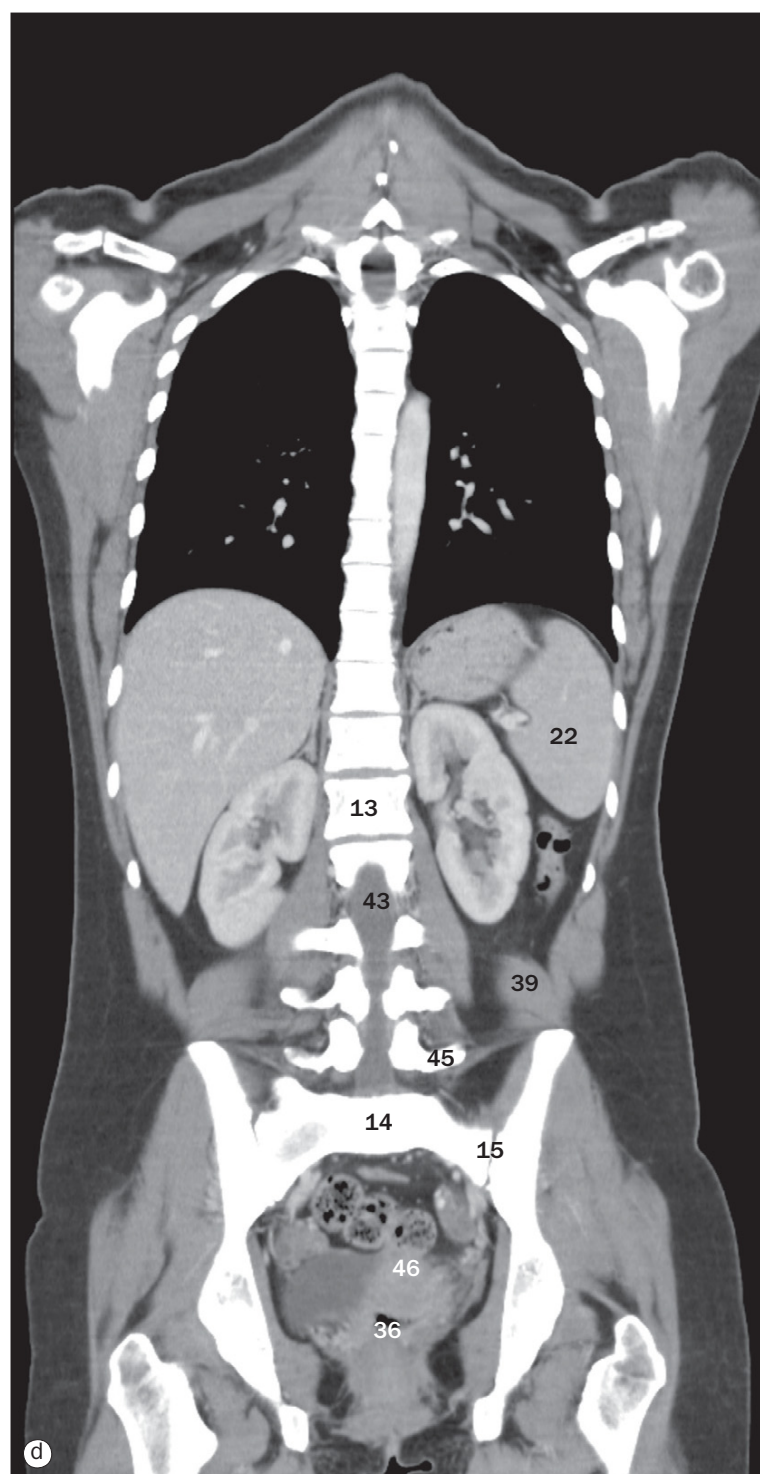
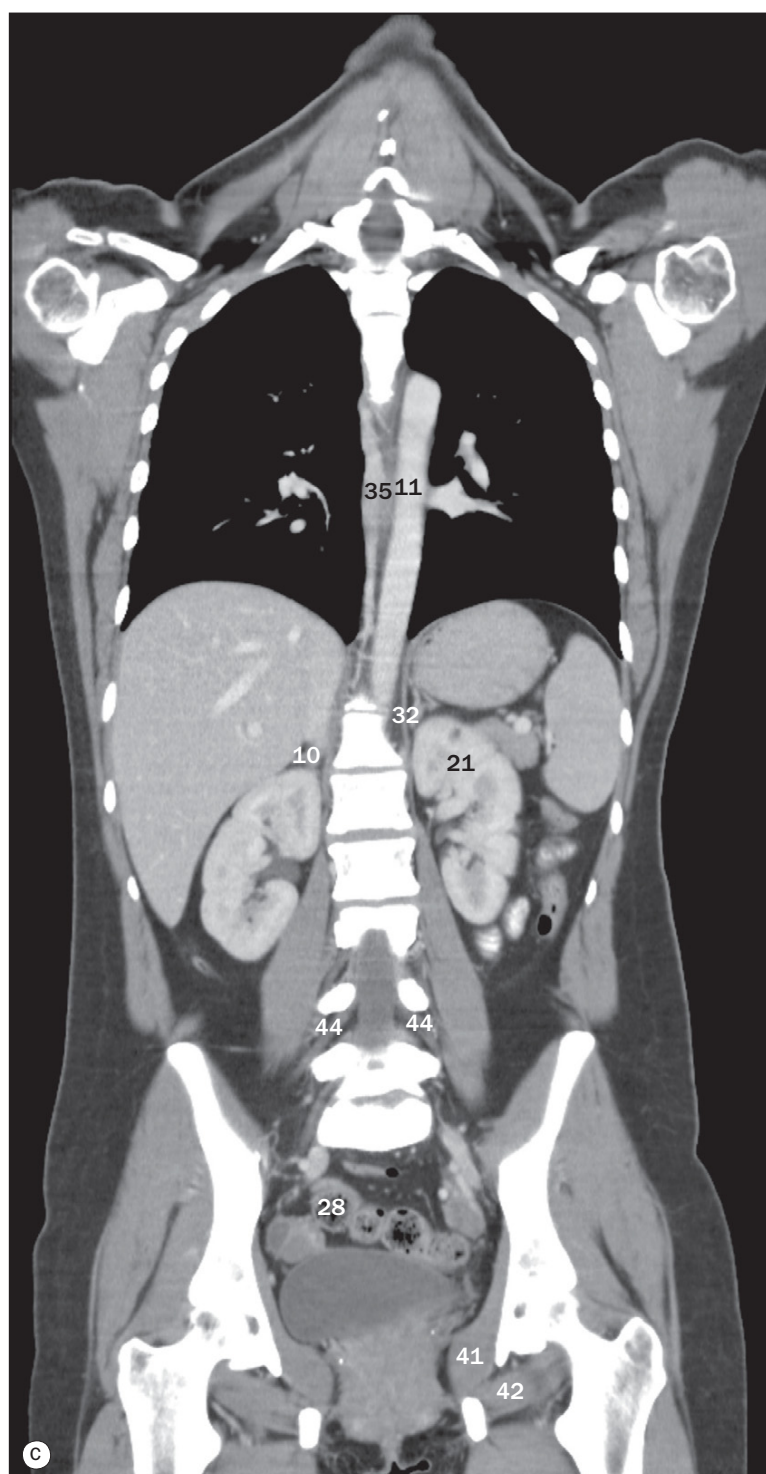


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

1 Carina
2 Right main bronchus
3 Left main bronchus
4 Oesophagus
5 Left atrium
6 Hepatic vein
7 Right lobe of liver
8 Fundus of stomach

9 Left suprarenal gland
10 Right suprarenal gland
11 Descending thoracic aorta
12 Aortic arch (knuckle)
13 Vertebral body of L1
14 Sacrum
15 Sacroiliac joint
16 Acetabulum

17 Femur
18 Urinary bladder
19 Vagina
20 Right kidney
21 Left kidney
22 Spleen
23 Splenic artery
24 Splenic vein

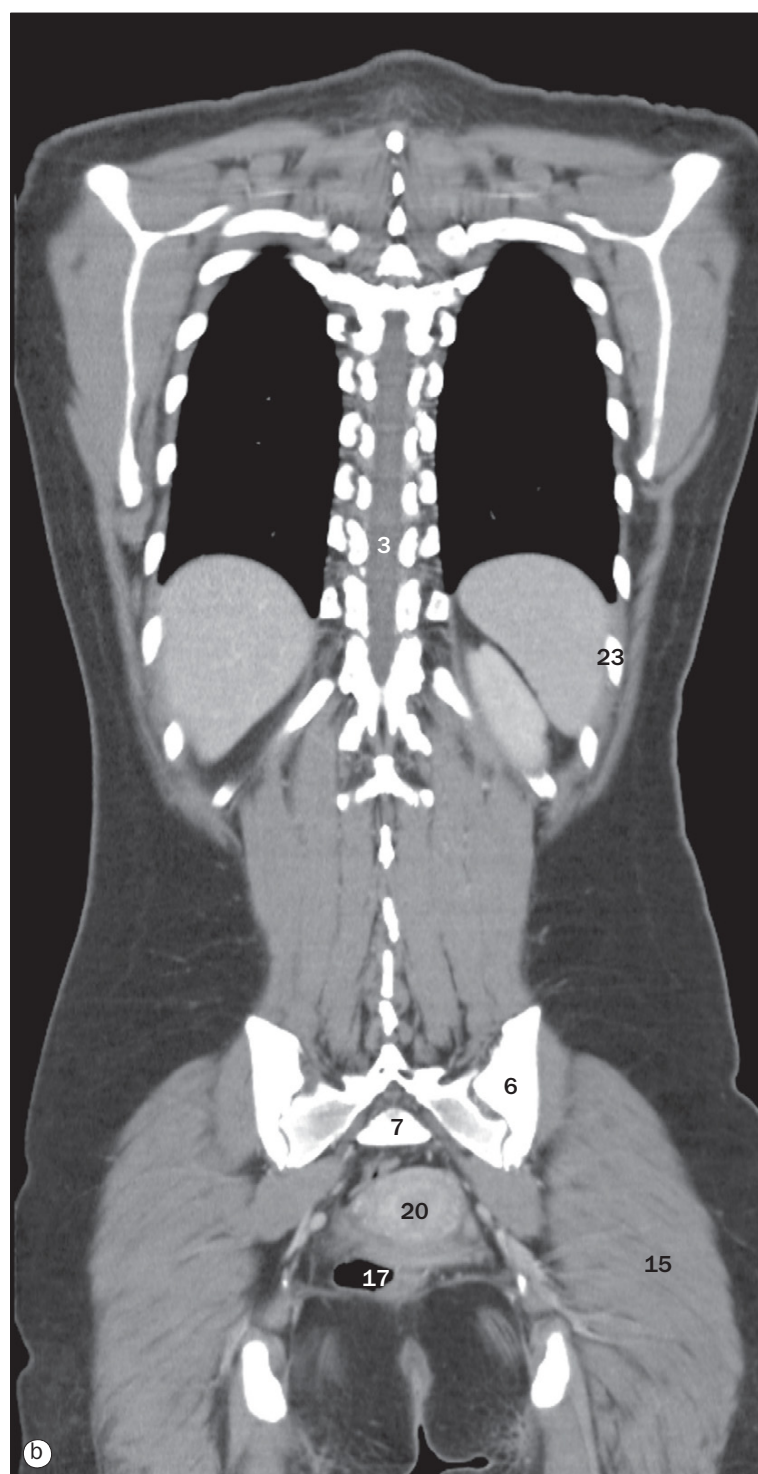
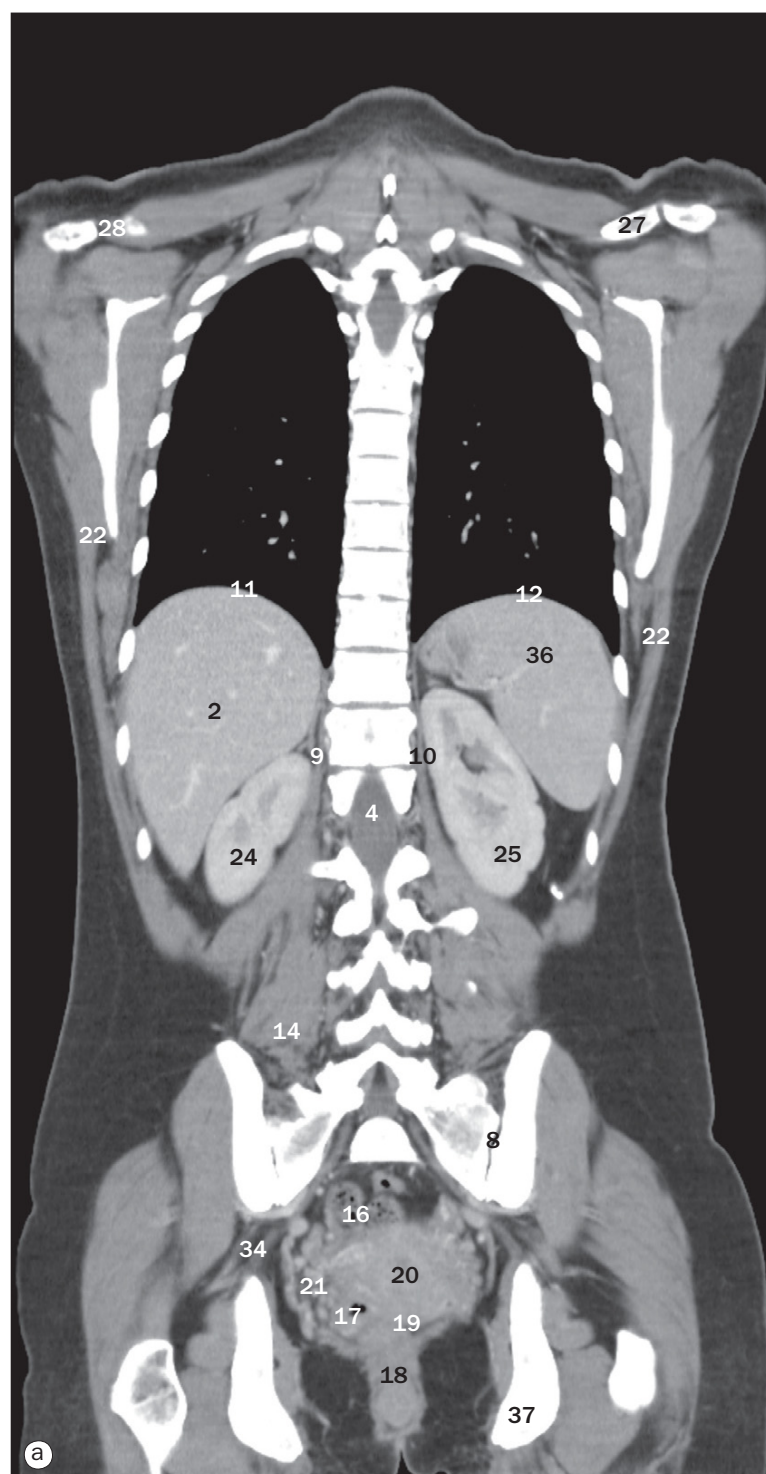


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

25 Abdominal aorta
26 Psoas major muscle
27 Psoas minor muscle
28 Sigmoid colon
29 Ascending colon
30 Descending colon
31 Right crus of diaphragm
32 Left crus of diaphragm

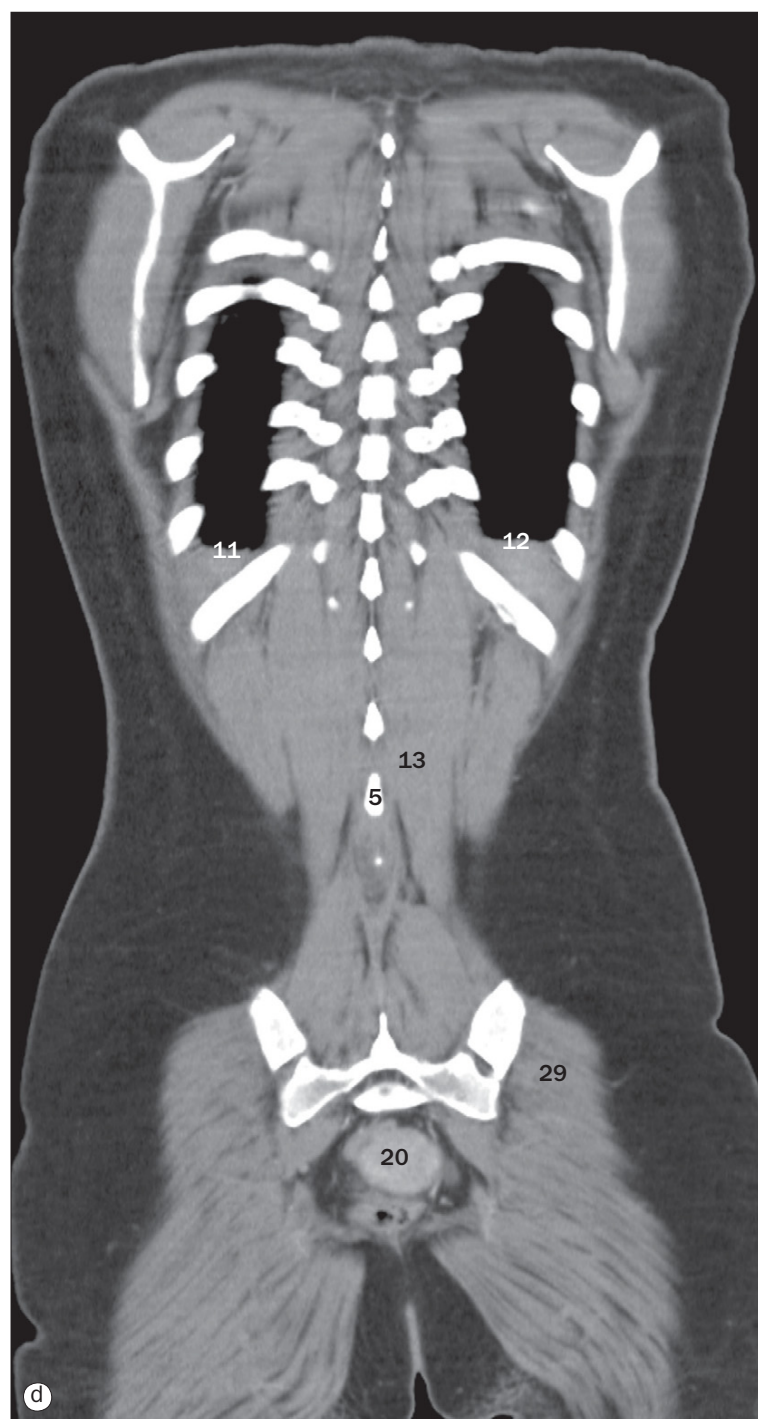
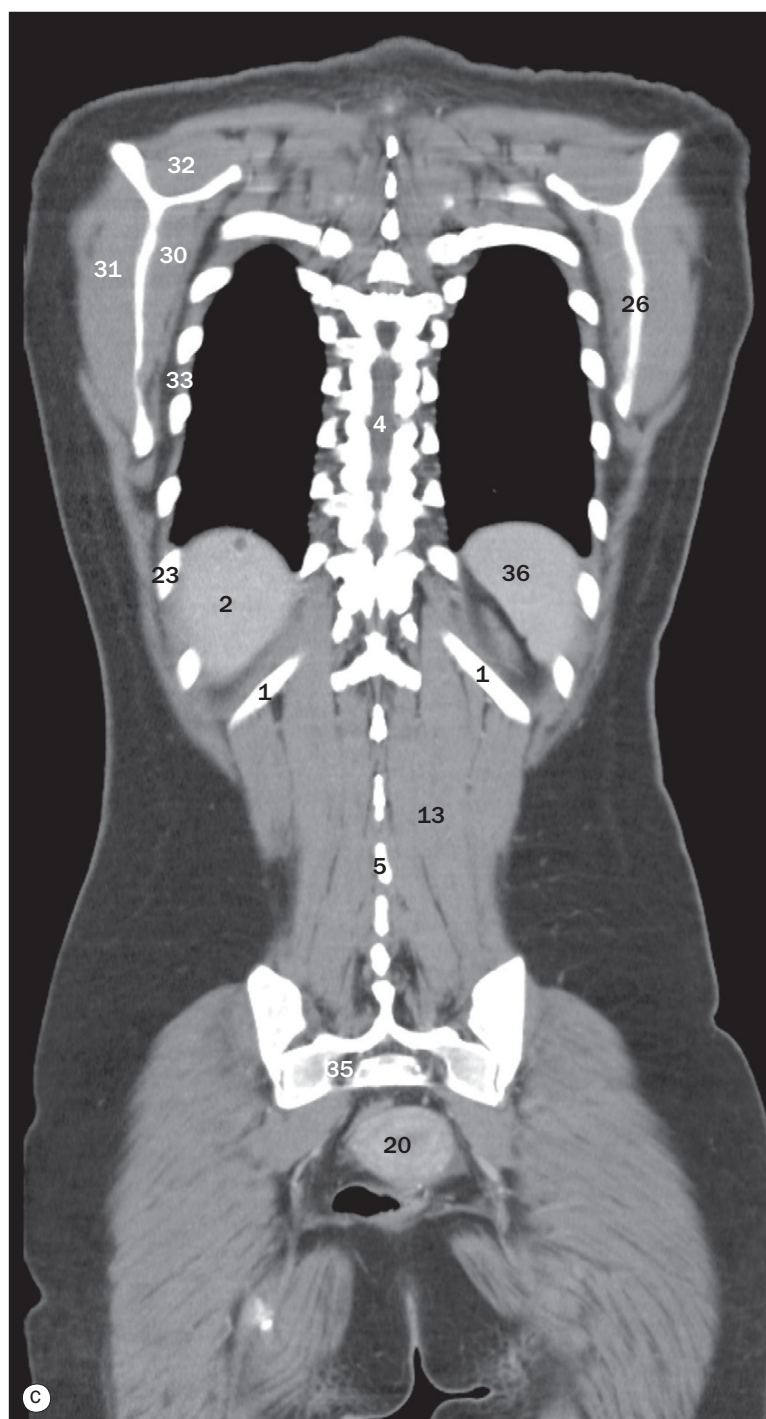
33 Right hemidiaphragm
34 Left hemidiaphragm
35 Azygos vein
36 Rectum
37 Right internal iliac vessels
38 Left internal iliac vessels
39 Quadratus lumborum muscle
40 Iliacus muscle

41 Obturator internus muscle
42 Obturator externus muscle
43 Spinal canal
44 Lumbar nerve roots
45 Transverse process of L5
46 Uterus



(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

- | | | |
|-------------------|------------------------------|---------------------------|
| 1 Twelfth rib | 8 Sacroiliac joint | 15 Gluteus maximus muscle |
| 2 Liver | 9 Right crus of diaphragm | 16 Sigmoid colon |
| 3 Spinal cord | 10 Left crus of diaphragm | 17 Rectum |
| 4 Spinal canal | 11 Right hemidiaphragm | 18 Vagina |
| 5 Spinous process | 12 Left hemidiaphragm | 19 Cervix |
| 6 Ilium | 13 Erector spinae muscles | 20 Uterus |
| 7 Sacrum | 14 Quadratus lumborum muscle | 21 Uterine veins |

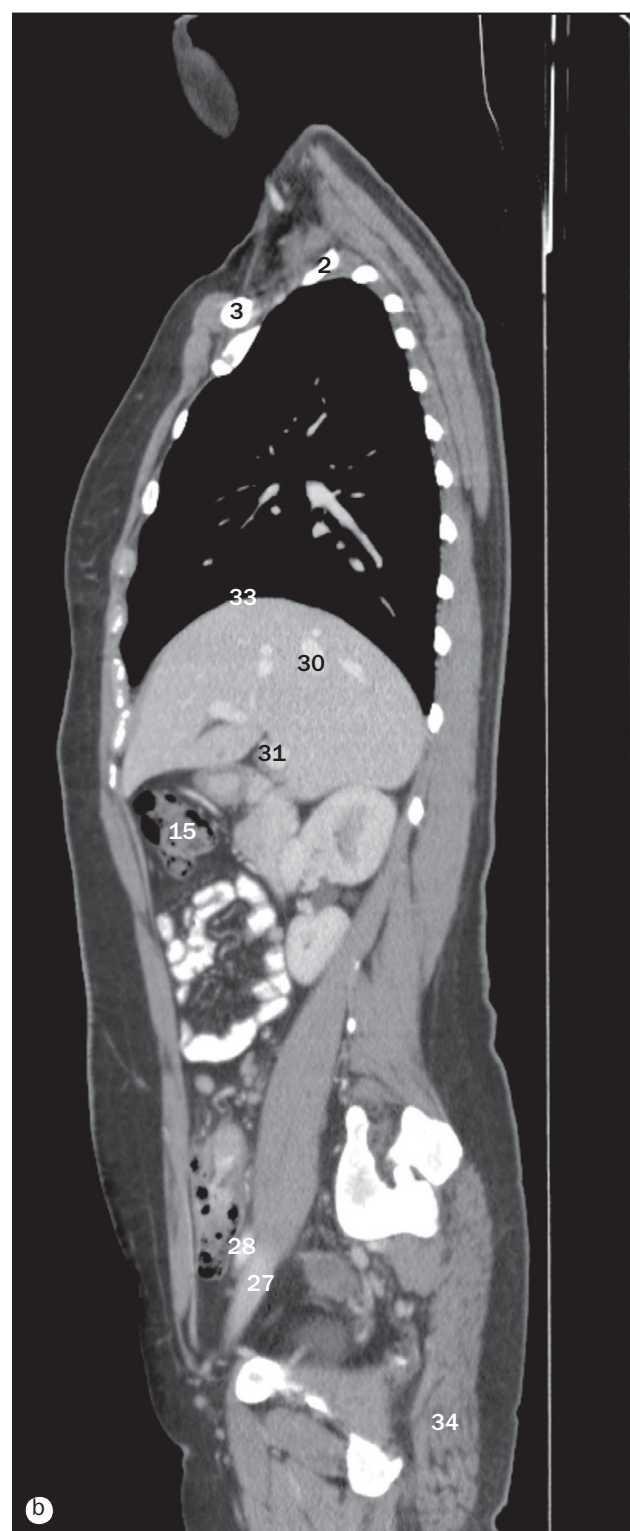
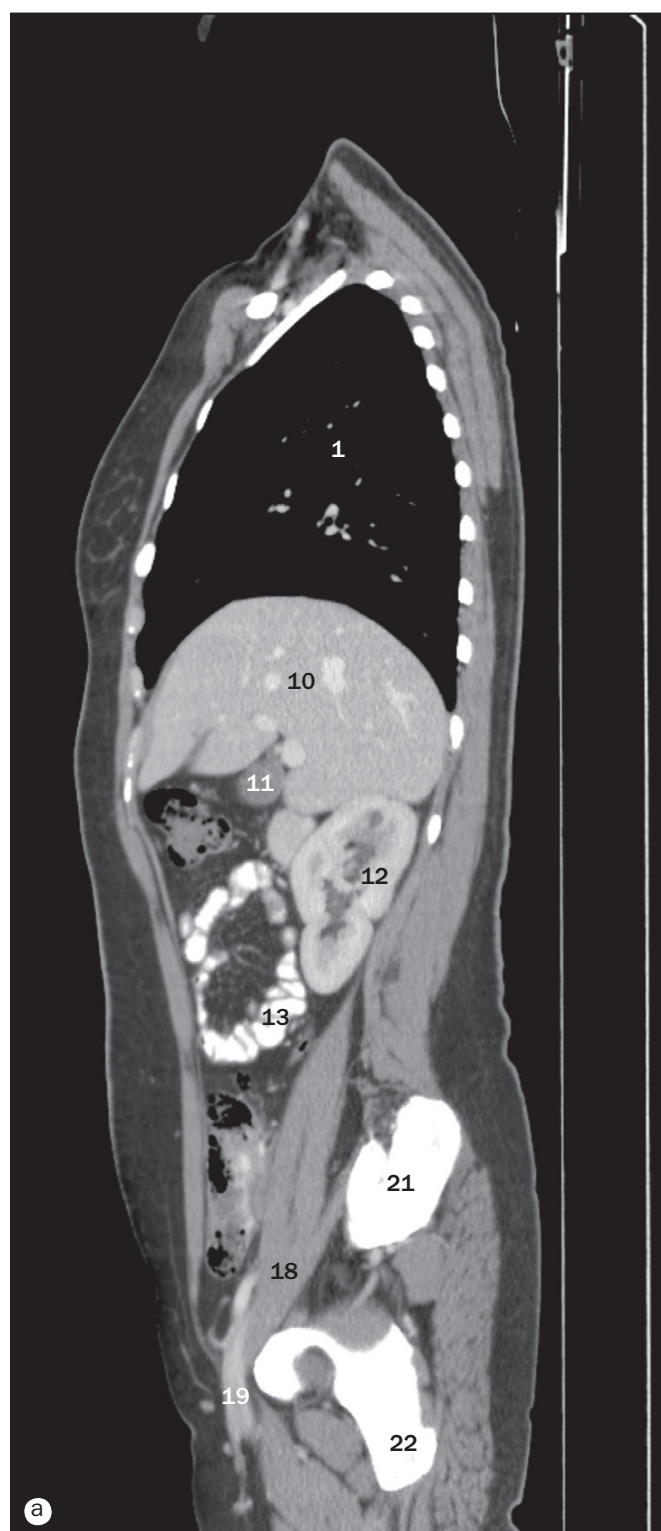


(a)–(d) Sequential coronal CT images of the chest, abdomen and pelvis in a female, from anterior to posterior.

22 Latissimus dorsi muscle
23 Tenth rib
24 Right kidney
25 Left kidney
26 Scapula
27 Clavicle

28 Acromioclavicular joint
29 Gluteus medius muscle
30 Subscapularis muscle
31 Infraspinatus muscle
32 Supraspinatus muscle
33 Intercostal muscle

34 Sciatic nerve
35 Sacral nerve foramen
36 Spleen
37 Ischium

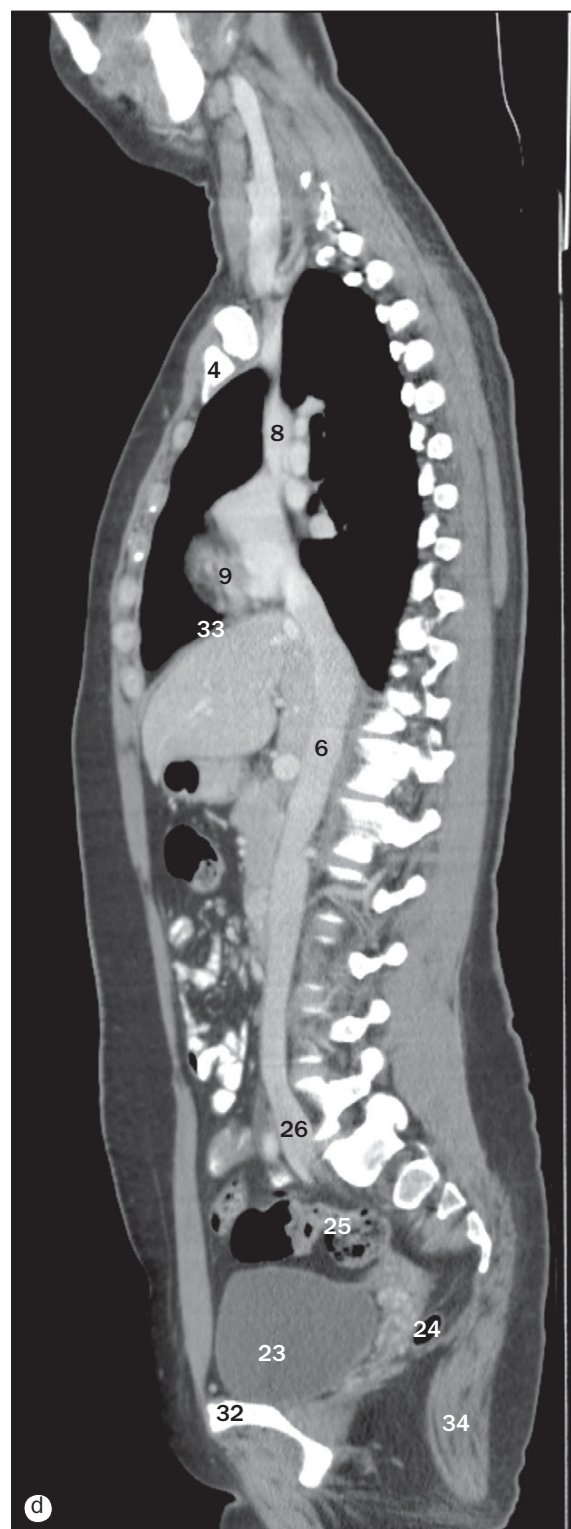
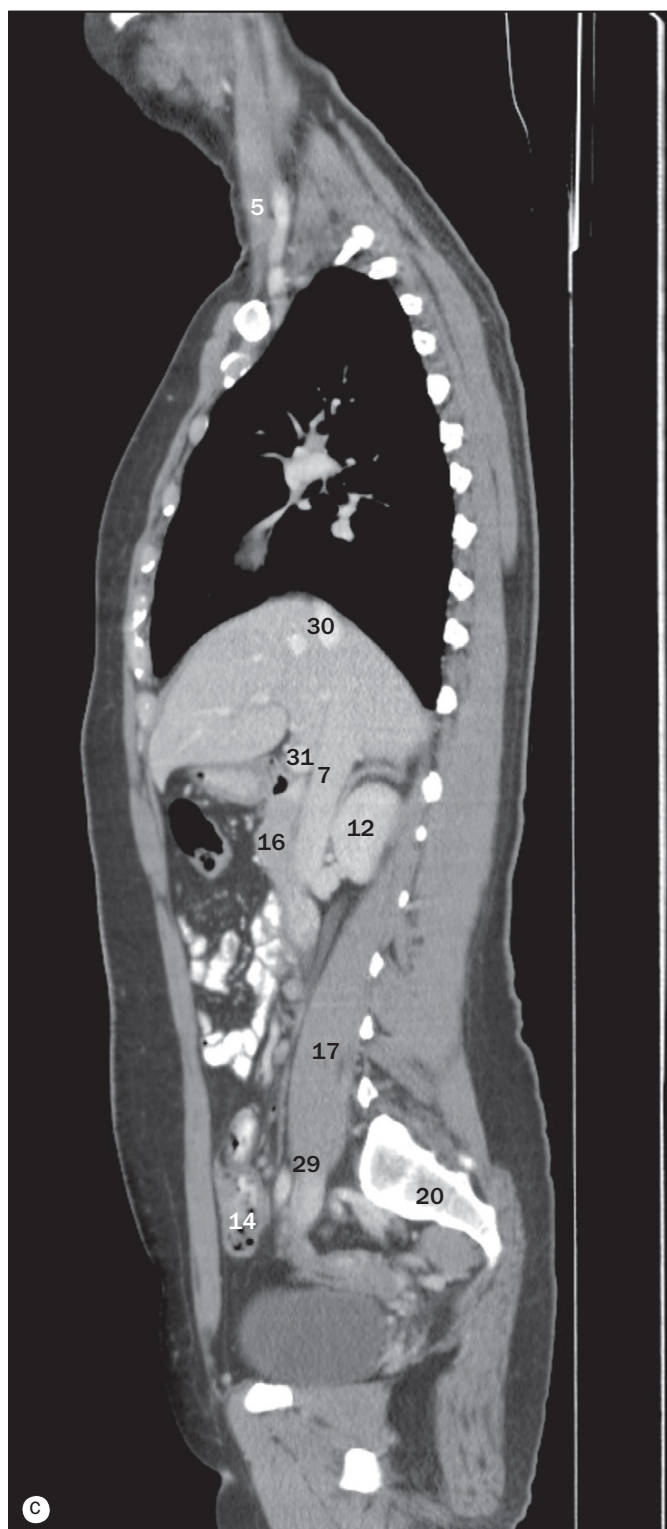


(a)–(d) Sequential sagittal CT images of the chest, abdomen and pelvis in a female, from right to left.
Note: pages 146–149 show sequential images of the same female patient.

1 Right lung
2 Right first rib
3 Right clavicle
4 Manubrium
5 Right internal jugular vein
6 Aorta

7 Inferior vena cava
8 Superior vena cava
9 Right atrium
10 Right lobe of liver
11 Gall bladder
12 Right kidney

13 Jejunum
14 Ileum
15 Right colic flexure
16 Pancreas
17 Psoas major muscle
18 Iliopsoas muscle

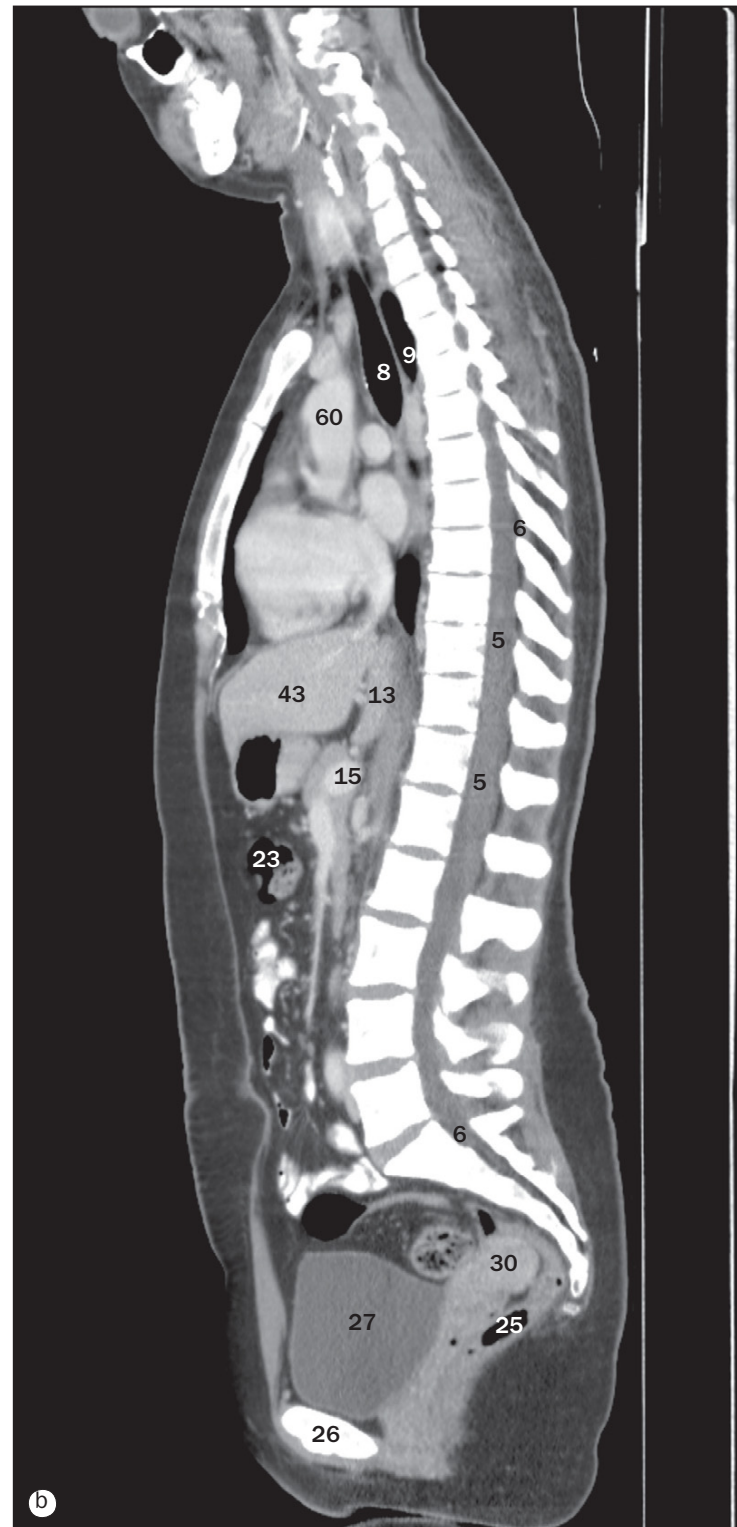
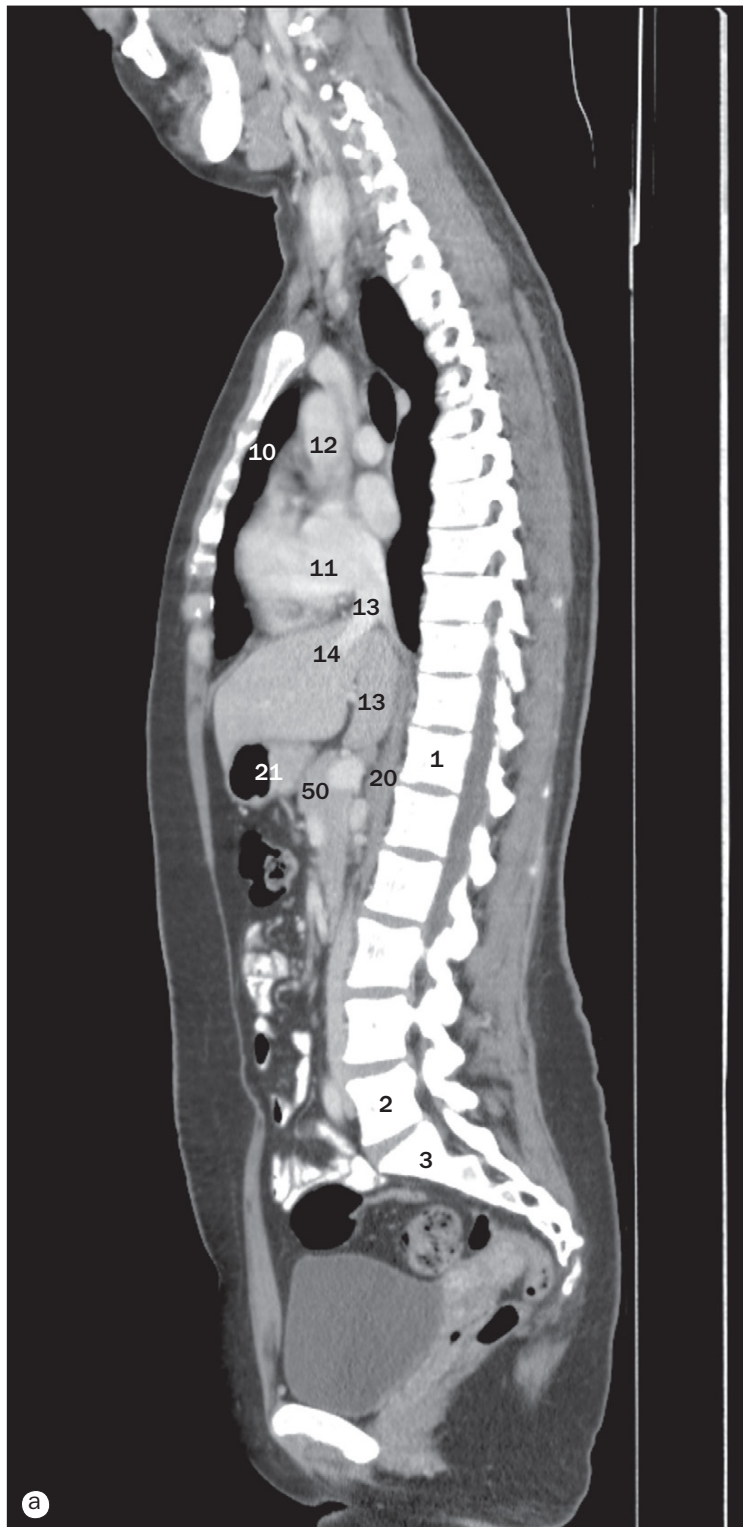


(a)–(d) Sequential sagittal CT images of the chest, abdomen and pelvis in a female, from right to left.

19 Common femoral vessels
20 Sacrum
21 Ilium
22 Ischium
23 Urinary bladder
24 Rectum

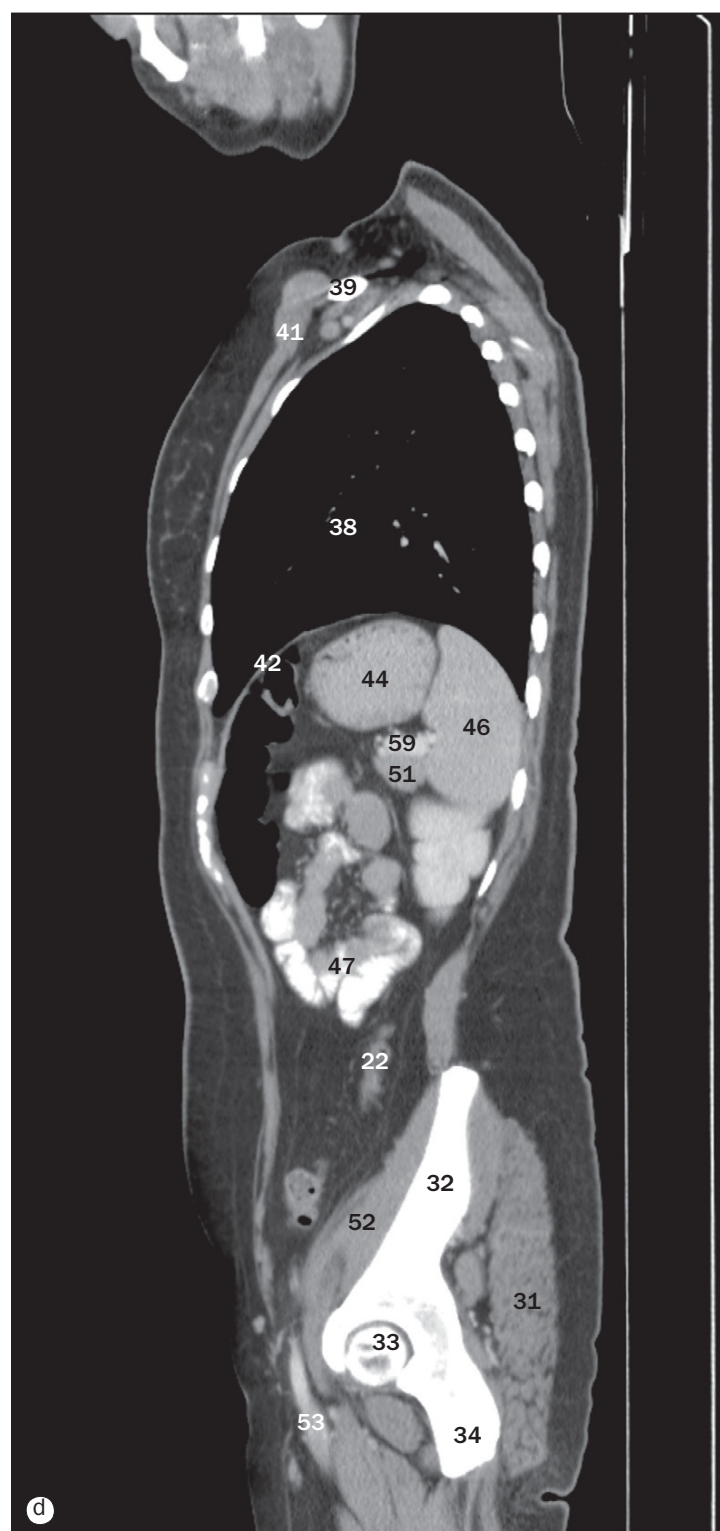
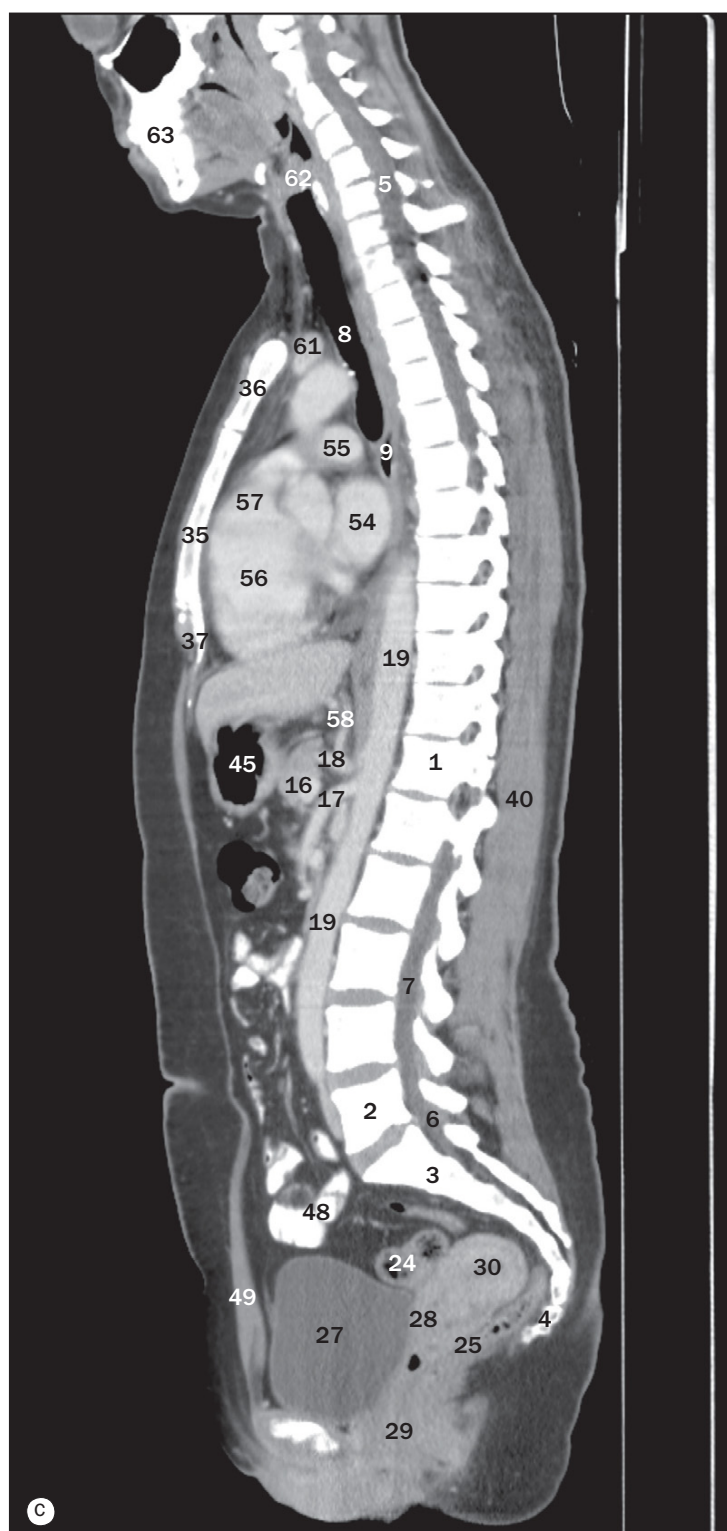
25 Sigmoid colon
26 Right common iliac artery
27 Right external iliac vein
28 Right external iliac artery
29 Right common iliac vein
30 Hepatic vein

31 Portal vein
32 Pubic bone
33 Right hemidiaphragm
34 Gluteus maximus muscle



(a)–(d) Sequential sagittal CT images of the chest, abdomen and pelvis in a female, from right to left.

- | | | |
|------------------------|-------------------------------|---------------------|
| 1 Body of T12 vertebra | 11 Right atrium | 21 Stomach |
| 2 Body of L5 vertebra | 12 Superior vena cava | 22 Descending colon |
| 3 Sacrum | 13 Inferior vena cava | 23 Transverse colon |
| 4 Coccyx | 14 Hepatic vein | 24 Sigmoid colon |
| 5 Spinal cord | 15 Splenic vein | 25 Rectum |
| 6 Spinal canal | 16 Superior mesenteric vein | 26 Pubic bone |
| 7 Filum terminale | 17 Superior mesenteric artery | 27 Urinary bladder |
| 8 Trachea | 18 Coeliac axis | 28 Cervix |
| 9 Oesophagus | 19 Aorta | 29 Vagina |
| 10 Right lung | 20 Right crus of diaphragm | 30 Uterus |

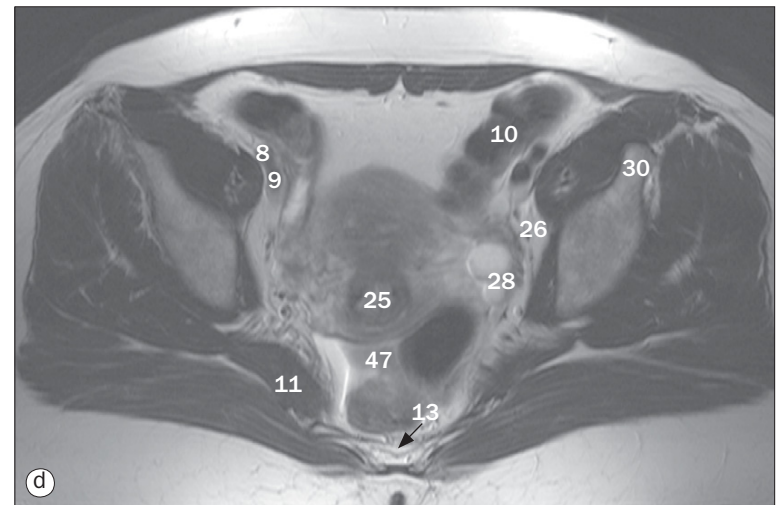
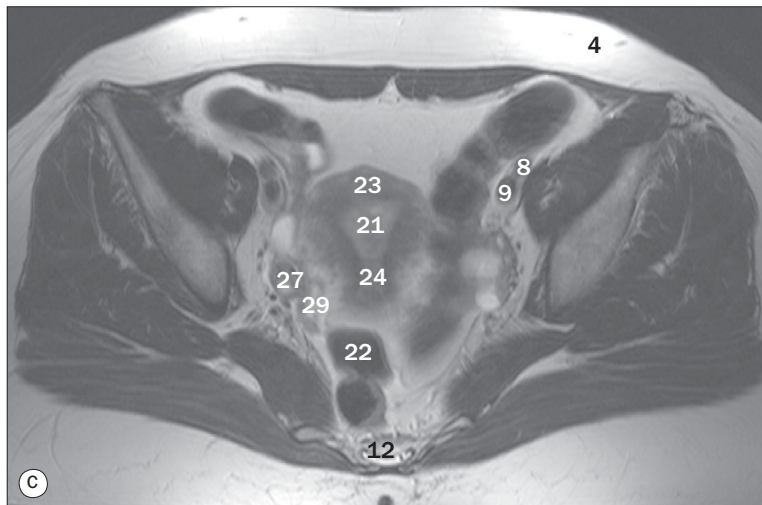
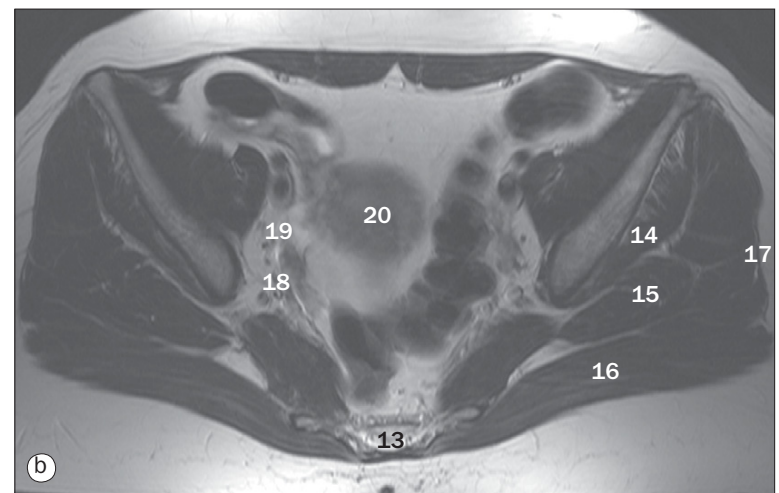
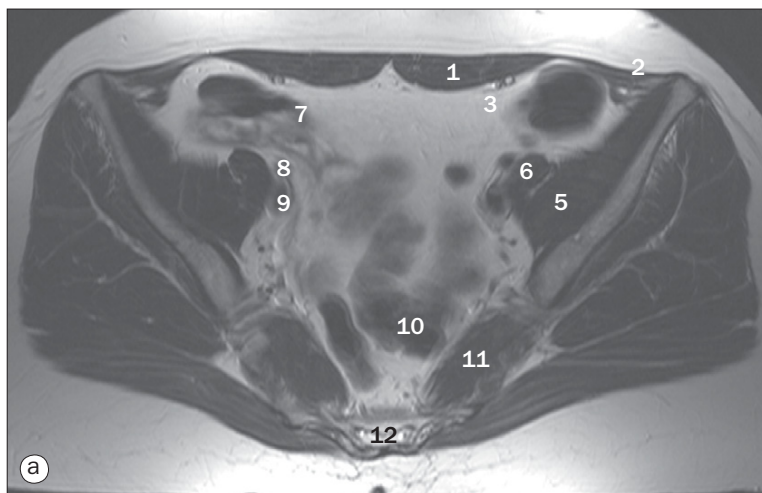


(a)–(d) Sequential sagittal CT images of the chest, abdomen and pelvis in a female, from right to left.

31 Gluteus maximus muscle
32 Ilium
33 Head of femur
34 Ischium
35 Sternum
36 Manubrium
37 Xiphisternum
38 Left lung
39 Left clavicle
40 Erector spinae muscles
41 Left pectoralis major muscle

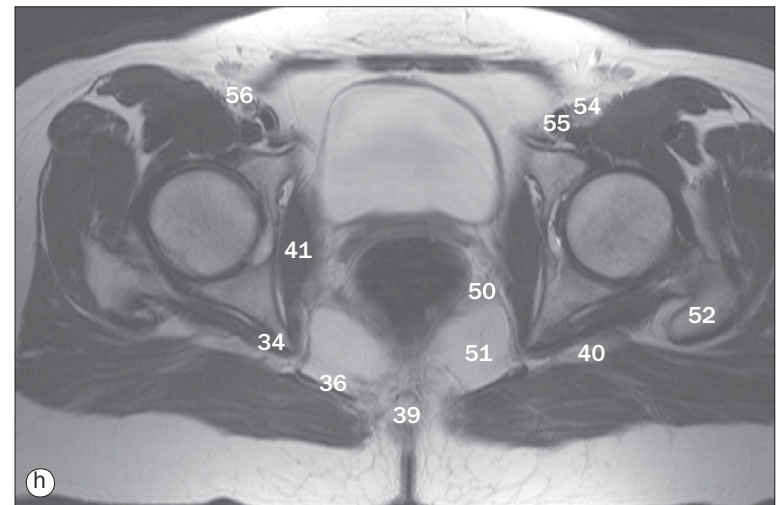
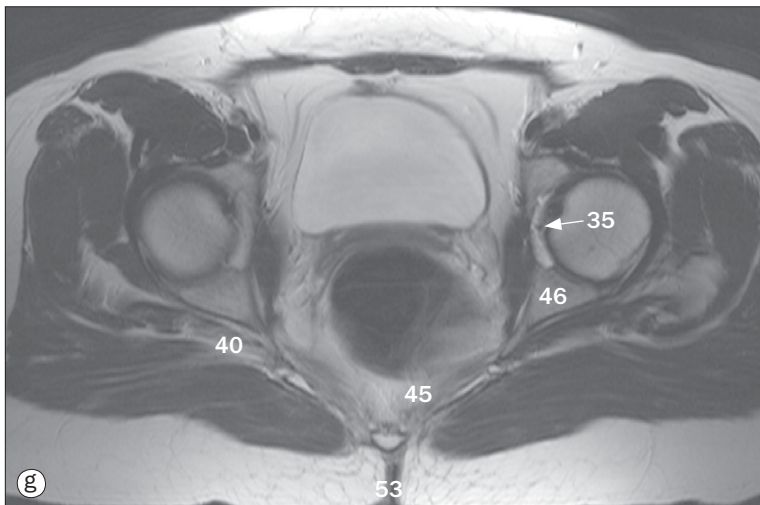
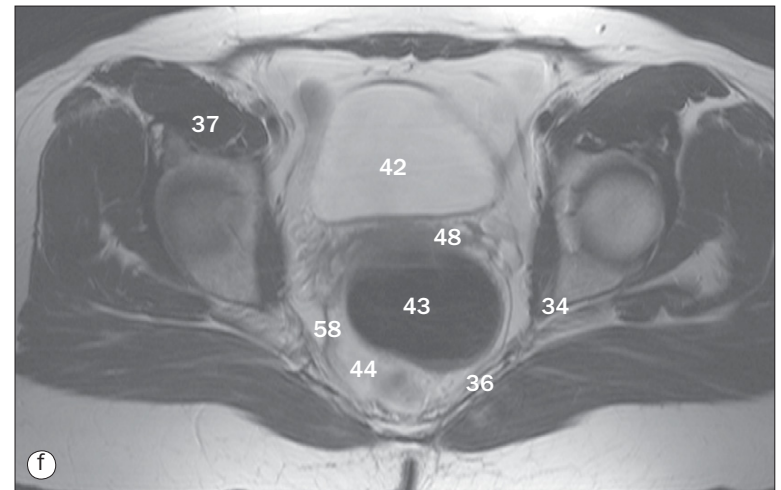
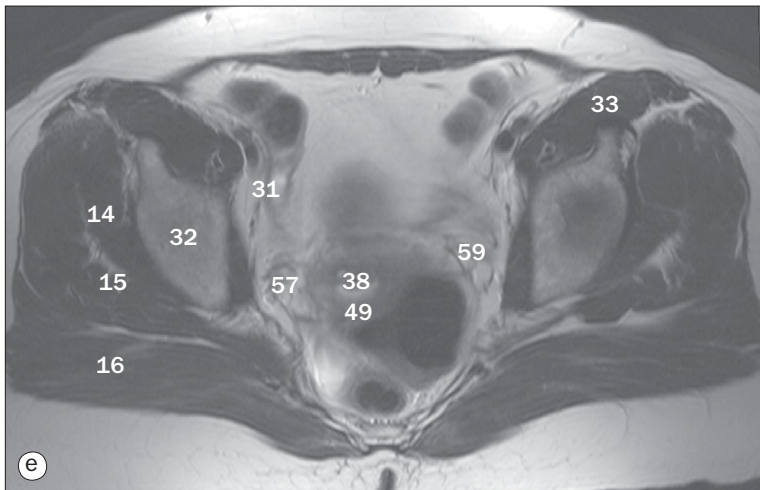
42 Left hemidiaphragm
43 Liver
44 Fundus of stomach
45 Body of stomach
46 Spleen
47 Jejunum
48 Ileum
49 Rectus abdominis muscle
50 Body of pancreas
51 Tail of pancreas
52 Iliacus muscle

53 Left femoral vessels
54 Left atrium
55 Right pulmonary artery
56 Right ventricle
57 Pulmonary outflow tract
58 Common hepatic artery
59 Splenic artery
60 Ascending thoracic aorta
61 Left brachiocephalic vein
62 Larynx
63 Mandible



(a)–(p) Sequential axial T2w MR images of the female pelvis, from superior to inferior.

- | | | |
|----------------------------------|-----------------------------|--------------------------------|
| 1 Rectus abdominis muscle | 11 Piriformis muscle | 21 Uterine cavity |
| 2 External oblique aponeurosis | 12 Sacrum | 22 Rectosigmoid junction |
| 3 Inferior epigastric vessels | 13 Central sacral canal | 23 Myometrium of uterus |
| 4 Superficial epigastric vessels | 14 Gluteus minimus muscle | 24 Internal cervical os |
| 5 Iliacus muscle | 15 Gluteus medius muscle | 25 External cervical os |
| 6 Psoas muscle | 16 Gluteus maximus muscle | 26 Obturator vessels |
| 7 Ileum | 17 Fascia lata | 27 Right ovary |
| 8 External iliac artery | 18 Superior gluteal vessels | 28 Left ovary |
| 9 External iliac vein | 19 Ovarian vessels | 29 Right uterine tube |
| 10 Sigmoid colon | 20 Uterine fundus | 30 Antero-inferior iliac spine |

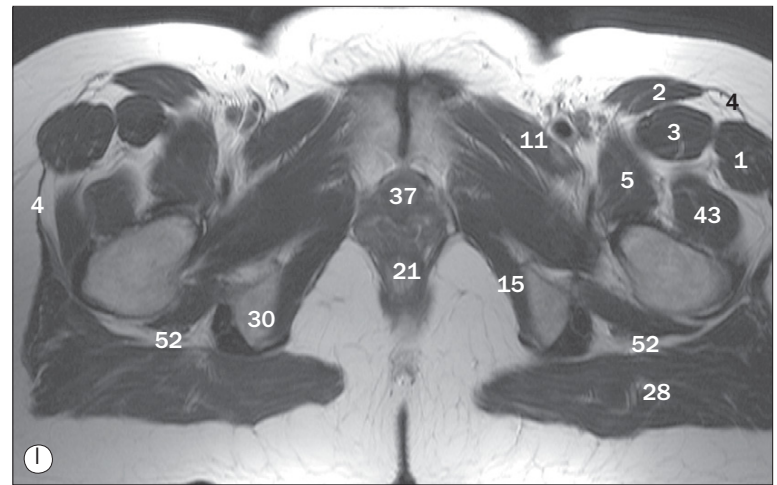
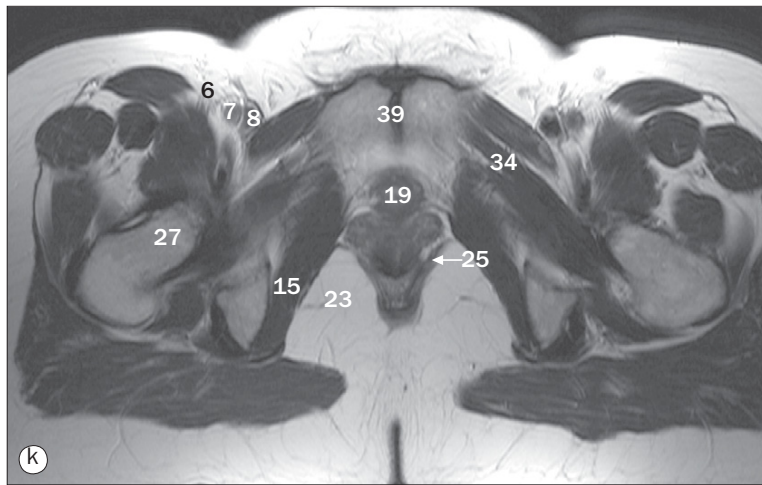
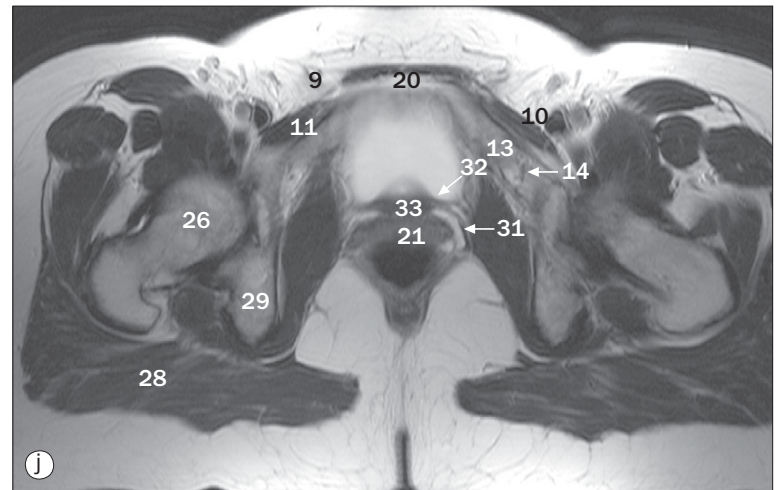
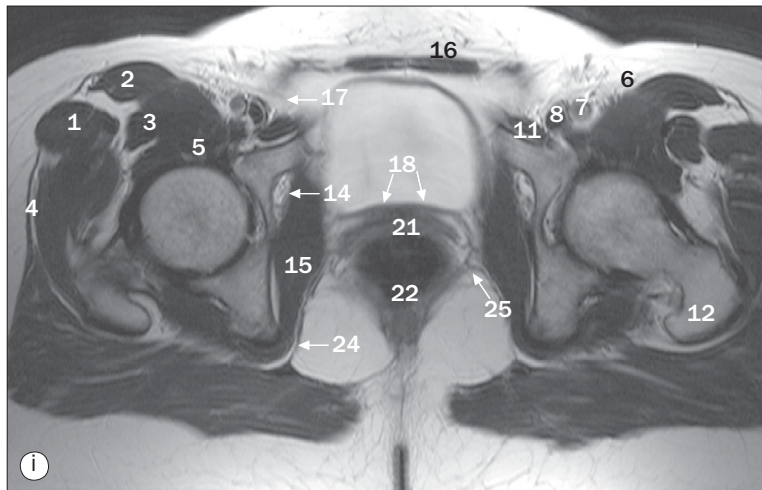


(a)–(p) Sequential axial T2w MR images of the female pelvis, from superior to inferior.

31 Round ligament of uterus
32 Acetabular roof
33 Rectus femoris muscle
34 Ischial spine
35 Ligamentum teres
36 Sacrospinous ligament
37 Iliopsoas muscle
38 Cervical wall
39 Coccyx
40 Sciatic nerve

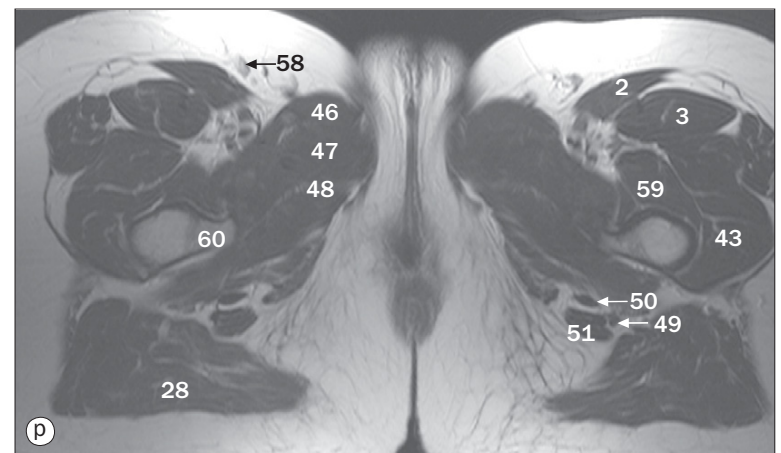
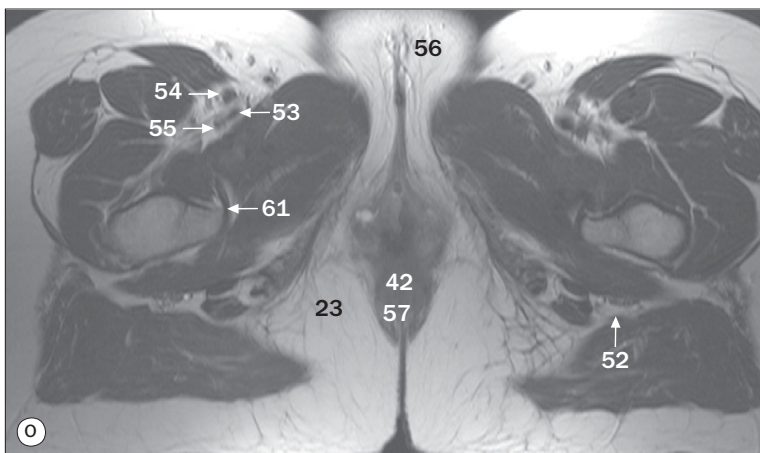
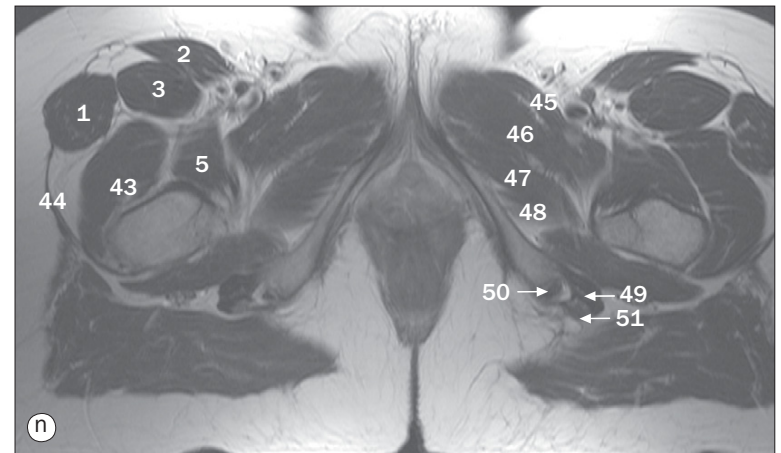
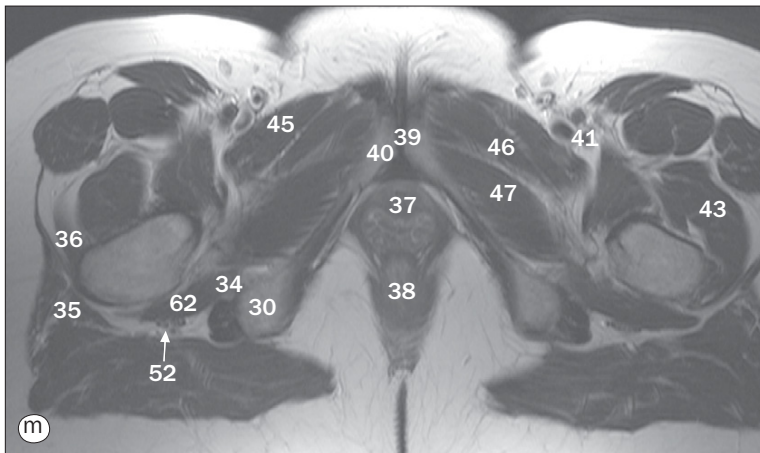
41 Obturator internus muscle
42 Bladder
43 Rectum
44 Mesorectum
45 Waldeyer's fascia
46 Ischium
47 Recto-uterine pouch (of Douglas)
48 Posterior vaginal fornix
49 Cervical os
50 Levator ani muscle (puborectalis)

51 Ischio-anal fossa
52 Greater trochanter of femur
53 Natal cleft
54 Common femoral artery
55 Common femoral vein
56 Femoral nerve branches
57 Transverse cervical ligament
58 Uterosacral ligament
59 Broad ligament



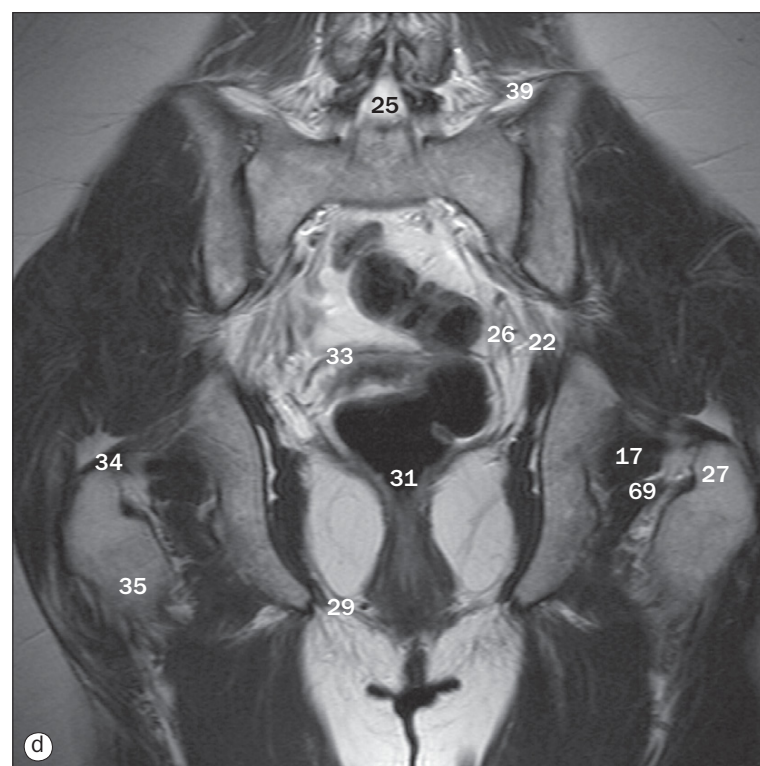
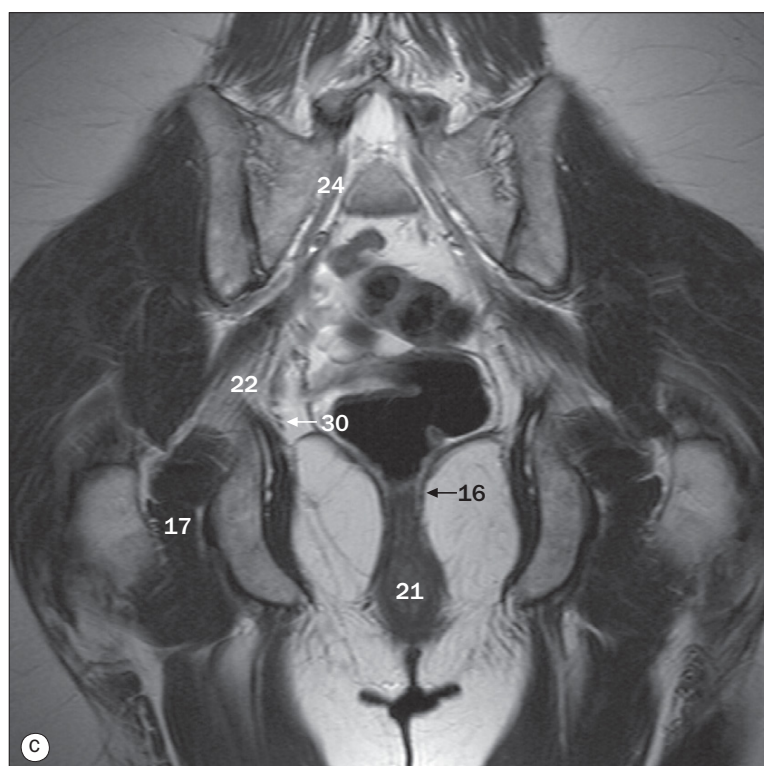
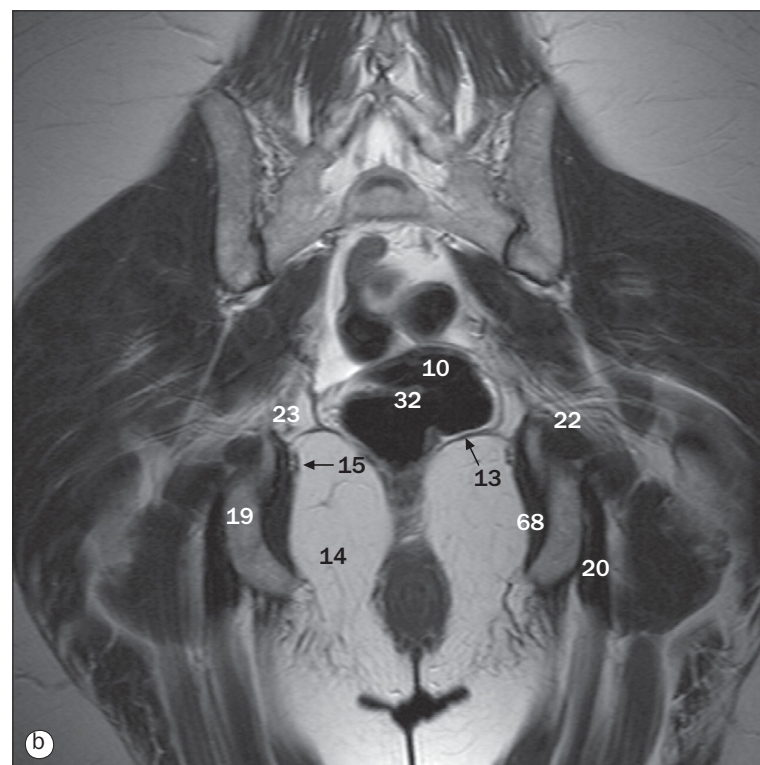
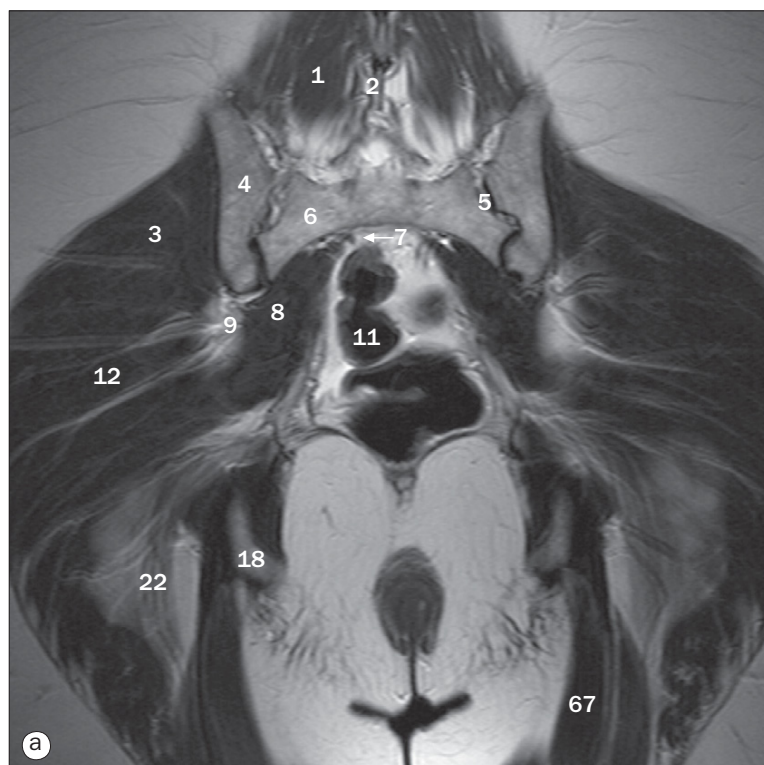
(a)–(p) Sequential axial T2w MR images of the female pelvis, from superior to inferior.

- | | | |
|--------------------------------|--|---|
| 1 Tensor fasciae latae muscle | 11 Pectineus | 21 Vagina |
| 2 Sartorius muscle | 12 Greater trochanter of femur | 22 Rectum |
| 3 Rectus femoris muscle | 13 Superior pubic ramus | 23 Ischio-anal fossa |
| 4 Fascia lata | 14 Obturator vessels | 24 Pudendal neurovascular bundle (Alcock's canal) |
| 5 Iliopsoas muscle | 15 Obturator internus muscle | 25 Puborectalis muscle |
| 6 Femoral nerve branches | 16 Rectus abdominis muscle | 26 Femoral head |
| 7 Common femoral artery | 17 Inguinal ligament | 27 Femoral neck |
| 8 Common femoral vein | 18 Bladder base | 28 Gluteus maximus muscle |
| 9 Round ligament of the uterus | 19 Bladder neck | 29 Ischium |
| 10 Femoral canal | 20 Extraperitoneal fat (cave of Retzius) | |



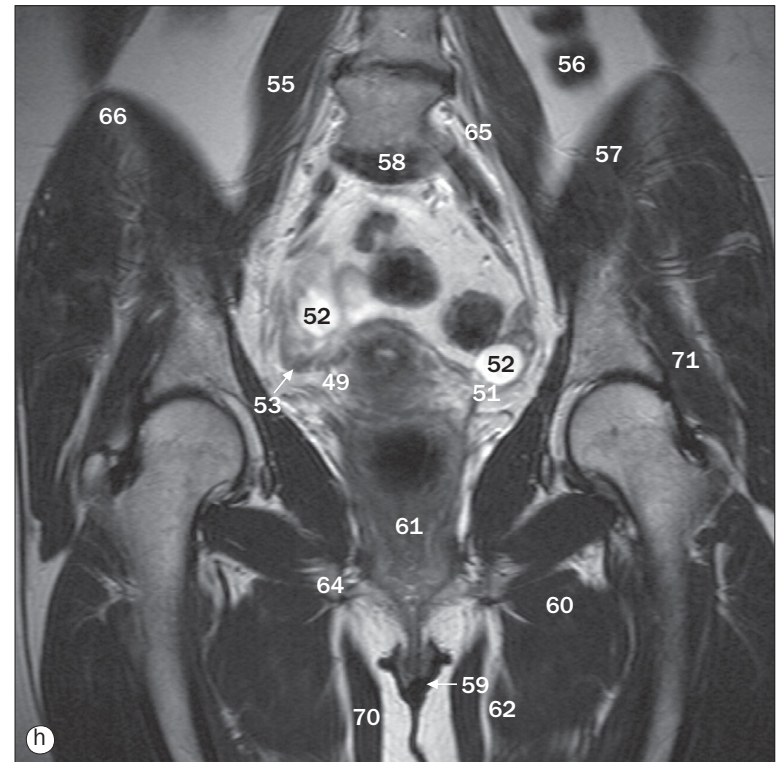
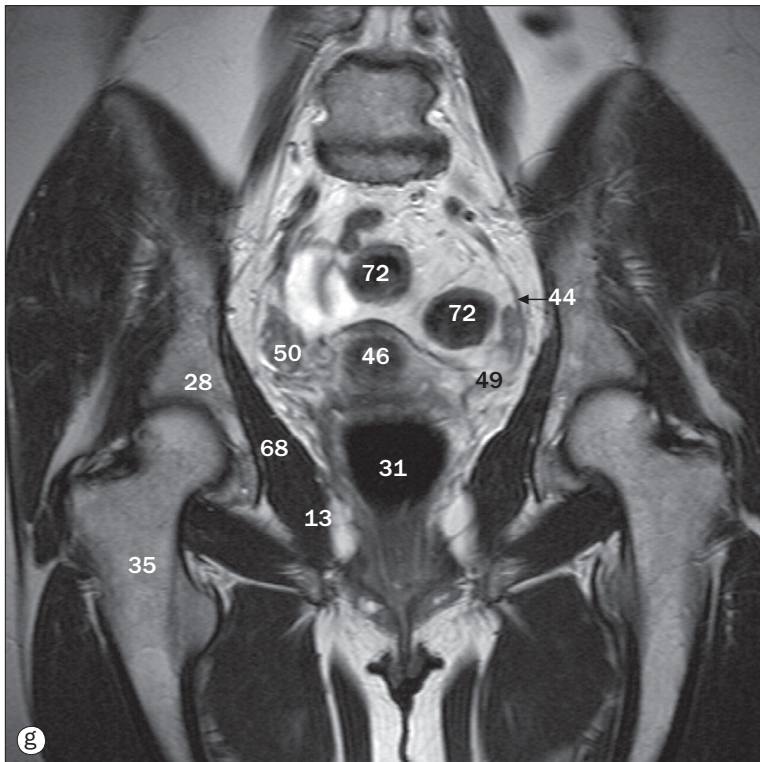
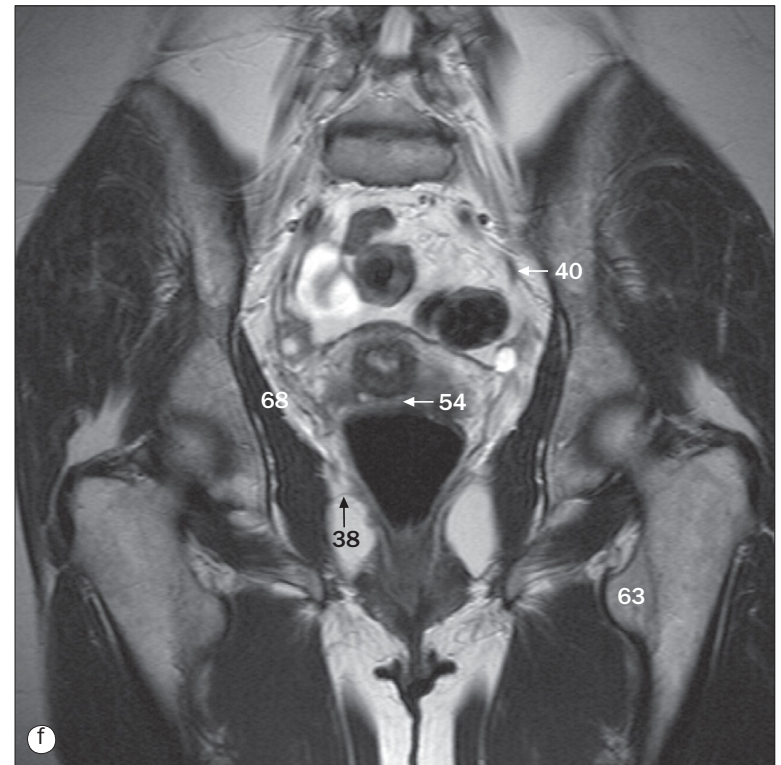
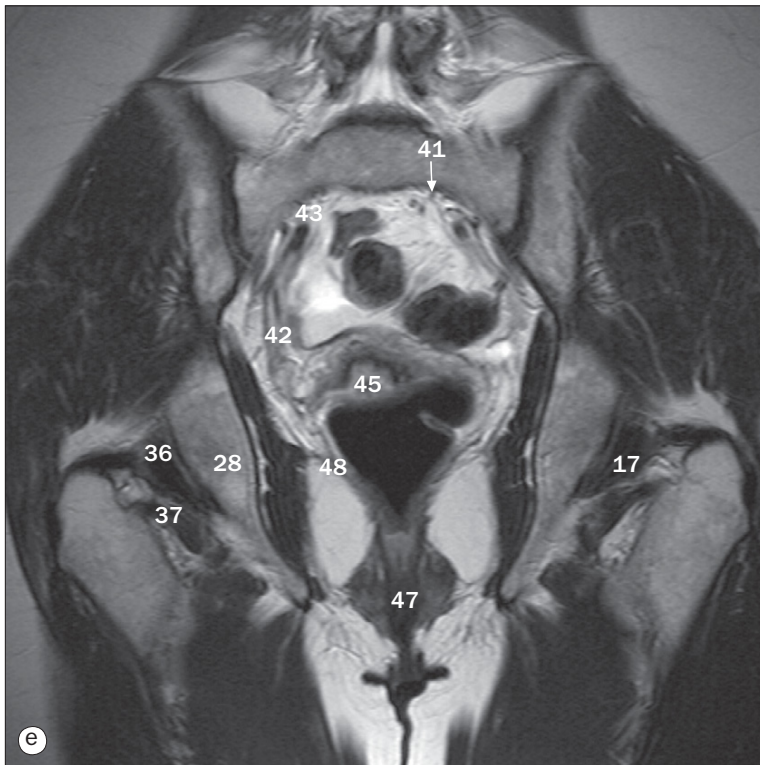
(a)–(p) Sequential axial T2w MR images of the female pelvis, from superior to inferior.

- | | | |
|---|----------------------------|-------------------------------|
| 30 Ischial tuberosity | 41 Profunda femoris artery | 52 Sciatic nerve |
| 31 Ureter | 42 Perineal body | 53 Superficial femoral vein |
| 32 Vesico-ureteric junction | 43 Vastus lateralis muscle | 54 Superficial femoral artery |
| 33 Trigone of bladder | 44 Iliotibial tract | 55 Profunda femoris vessels |
| 34 Obturator externus muscle | 45 Pectineus muscle | 56 Labium majorum |
| 35 Gluteus medius muscle | 46 Adductor longus muscle | 57 Anal canal |
| 36 Gluteus minimis muscle (tendinous insertion) | 47 Adductor brevis muscle | 58 Long saphenous vein |
| 37 Urethra | 48 Adductor magnus muscle | 59 Vastus intermedius muscle |
| 38 Anorectal junction | 49 Semimembranosus muscle | 60 Lesser trochanter of femur |
| 39 Symphysis pubis | 50 Semitendinosus muscle | 61 Iliopsoas insertion |
| 40 Pubic body | 51 Biceps femoris muscle | 62 Quadratus femoris muscle |



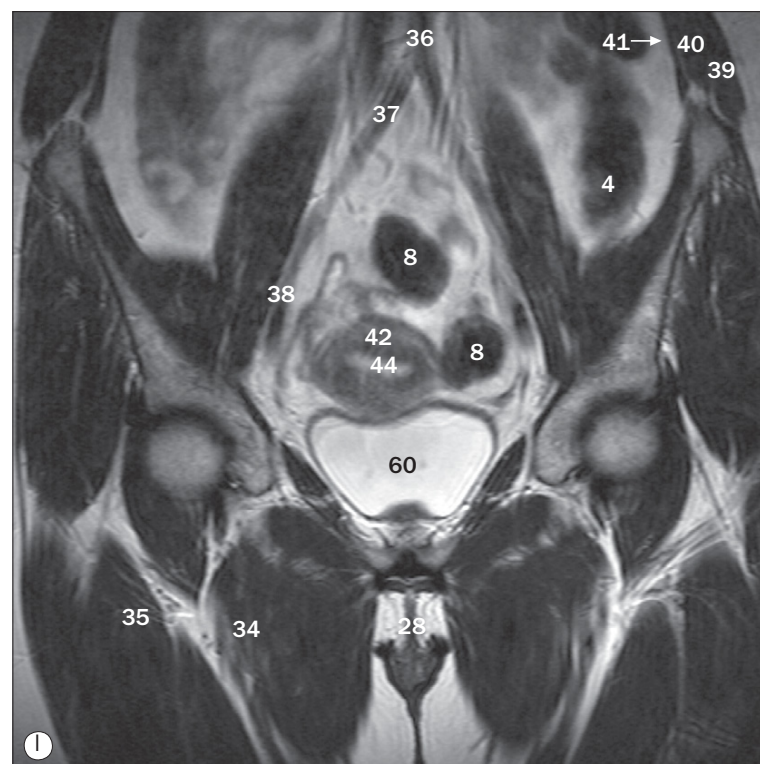
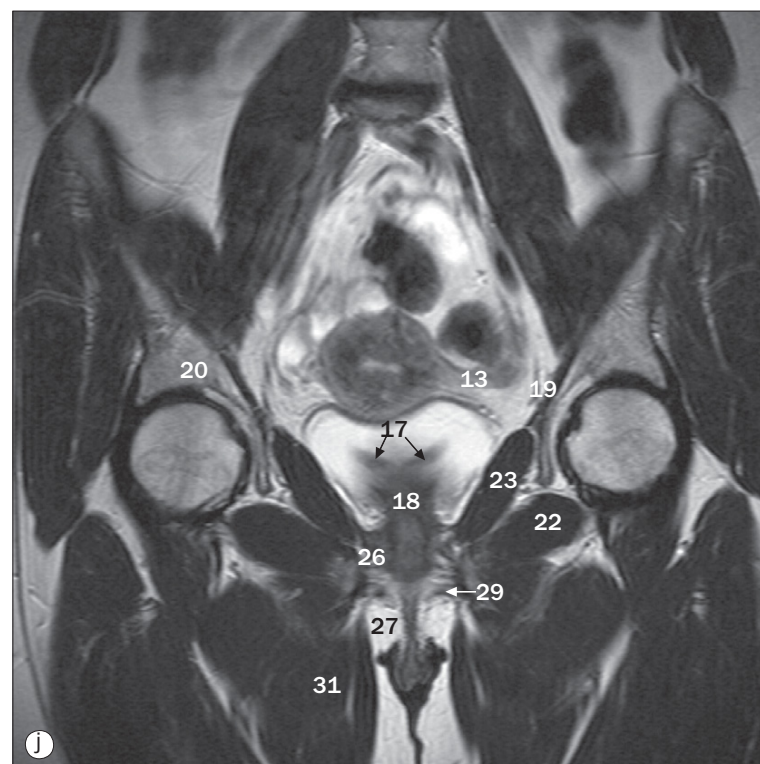
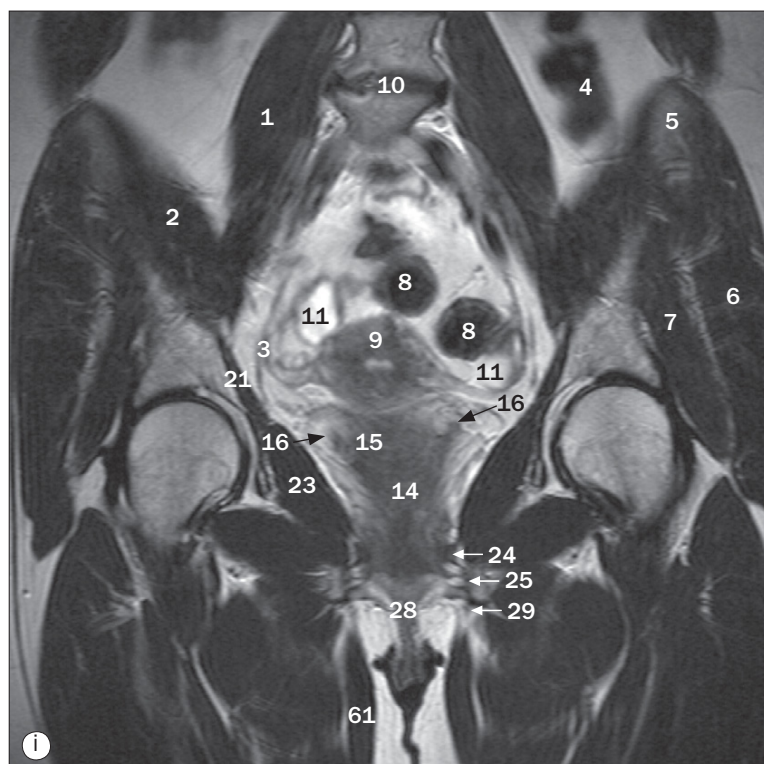
(a)–(p) Coronal T2w MR images of the female pelvis, from posterior to anterior.

- | | | |
|----------------------------|--|--|
| 1 Erector spinae muscle | 13 Levator ani muscle | 24 Sacral nerve (S1) |
| 2 Spinous process L5 | 14 Ischio-anal fossa | 25 Thecal sac |
| 3 Gluteus maximus muscle | 15 Internal pudendal neurovascular bundle (Alcock's canal) | 26 Superior rectal vessels |
| 4 Ilium | 16 External anal sphincter | 27 Greater trochanter of femur |
| 5 Sacro-iliac joint | 17 Obturator externus muscle | 28 Acetabulum |
| 6 Sacral ala | 18 Ischial tuberosity | 29 Urogenital diaphragm |
| 7 Lumbosacral trunk | 19 Ischium | 30 Obturator neurovascular bundle |
| 8 Piriformis muscle | 20 Common hamstring origin | 31 Rectal ampulla |
| 9 Superior gluteal vessels | 21 Anal canal | 32 Transverse rectal fold (of Houston) |
| 10 Rectum | 22 Sciatic nerve | 33 Middle rectal vessels |
| 11 Rectosigmoid junction | 23 Inferior gluteal vessels | 34 Piriformis muscle (insertion) |
| 12 Gluteus medius muscle | | 35 Intertrochanteric part of femur |



(a)–(p) Coronal T2w MR images of the female pelvis, from posterior to anterior.

- | | | |
|---|--|-------------------------------|
| 36 Obturator externus muscle | 49 Broad ligament of uterus | 61 Vagina (posterior wall) |
| 37 Gemelli muscle | 50 Right ovary | 62 Adductor longus muscle |
| 38 Inferior rectal neurovascular bundle | 51 Left ovary | 63 Lesser trochanter of femur |
| 39 Iliolumbar ligament | 52 Physiological cyst of ovary (corpus luteum) | 64 Inferior pubic ramus |
| 40 Ureter | 53 Uterine tube | 65 Lumbar plexus |
| 41 Sympathetic chain | 54 Recto-uterine pouch (of Douglas) | 66 Iliac crest |
| 42 Internal iliac vessel branches | 55 Psoas major muscle | 67 Biceps femoris muscle |
| 43 Common iliac vessel bifurcation | 56 Descending colon | 68 Obturator internus muscle |
| 44 Gonadal vessels | 57 Iliacus muscle | 69 Quadratus femoris muscle |
| 45 Cervix of uterus | 58 Intervertebral disc at L5/S1 | 70 Gracilis muscle |
| 46 Uterine cavity | 59 Labium minorum | 71 Gluteus minimis muscle |
| 47 Perineal body | 60 Adductor brevis muscle | 72 Sigmoid colon |
| 48 Puborectalis muscle | | |

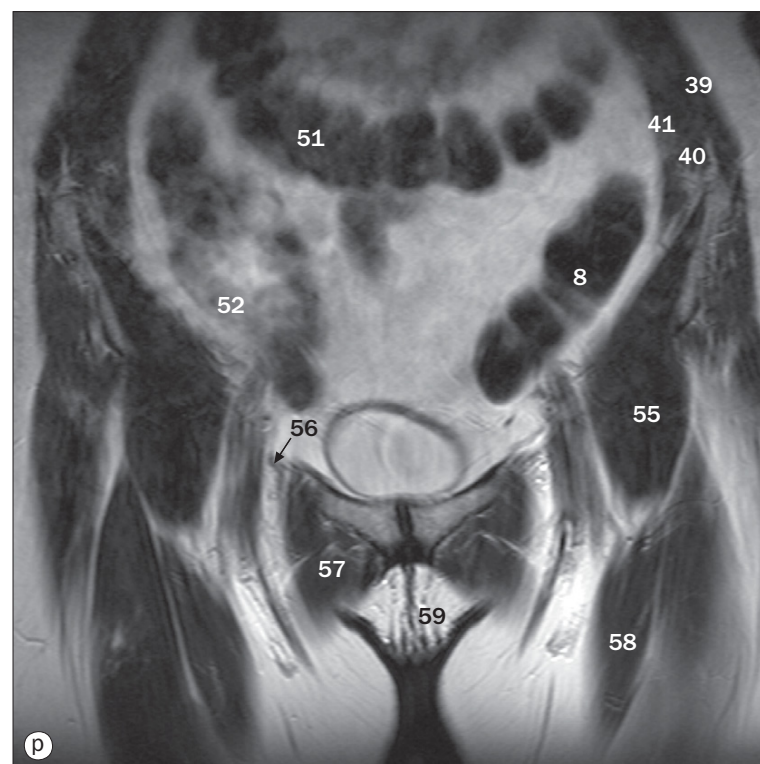
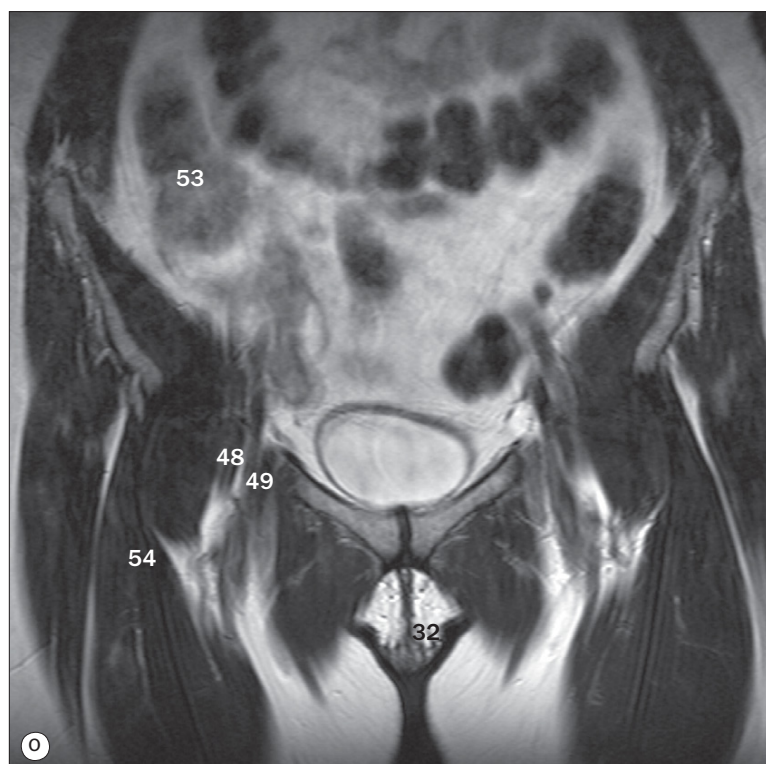
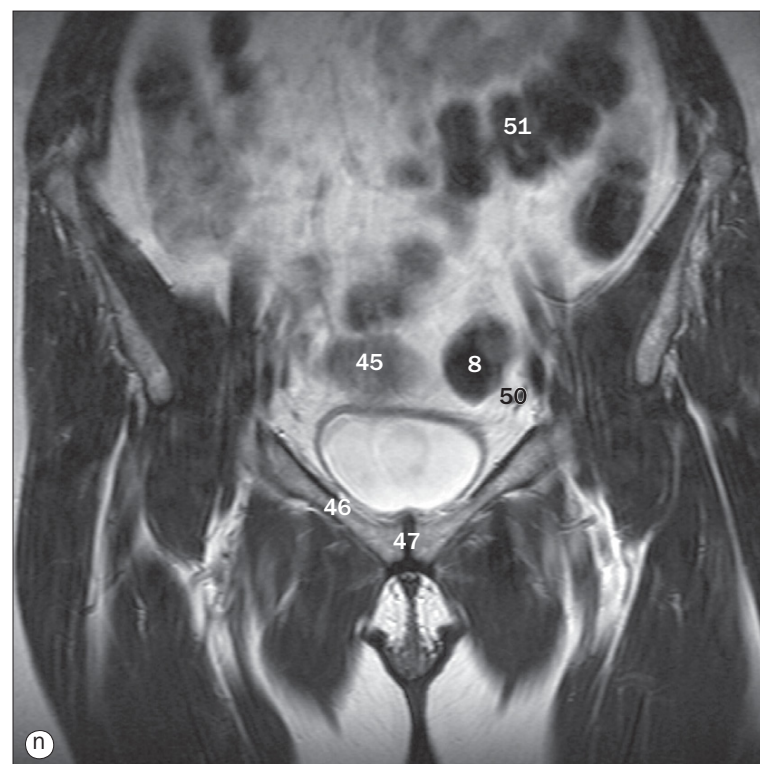
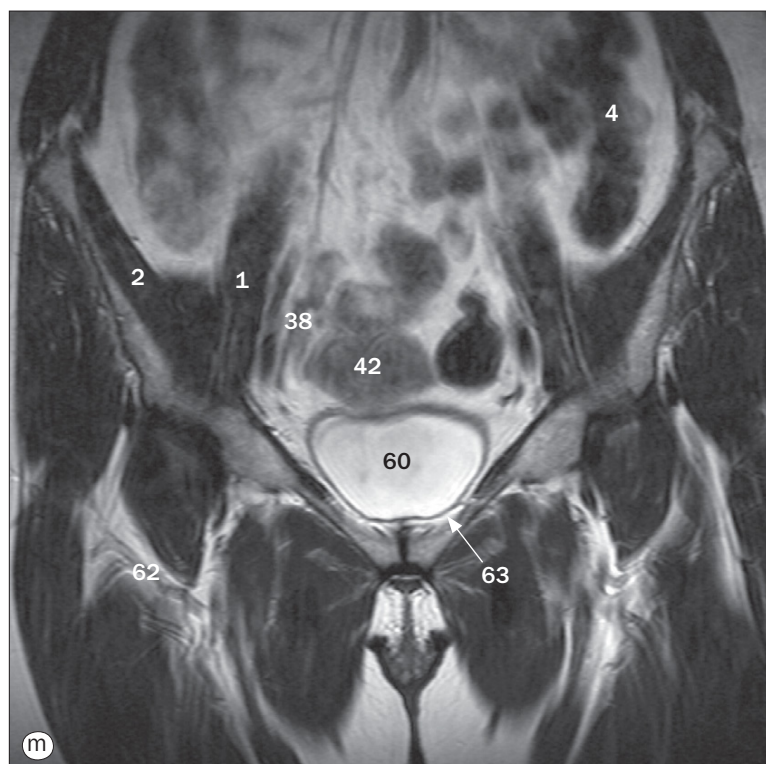


(a)–(p) Coronal T2w MR images of the female pelvis, from posterior to anterior.

1 Psoas major muscle
2 Iliacus muscle
3 Internal iliac artery branches
4 Descending colon
5 Iliac crest
6 Gluteus medius muscle
7 Gluteus minimus muscle
8 Sigmoid colon
9 Uterine myometrium
10 Intervertebral disc at L4/5

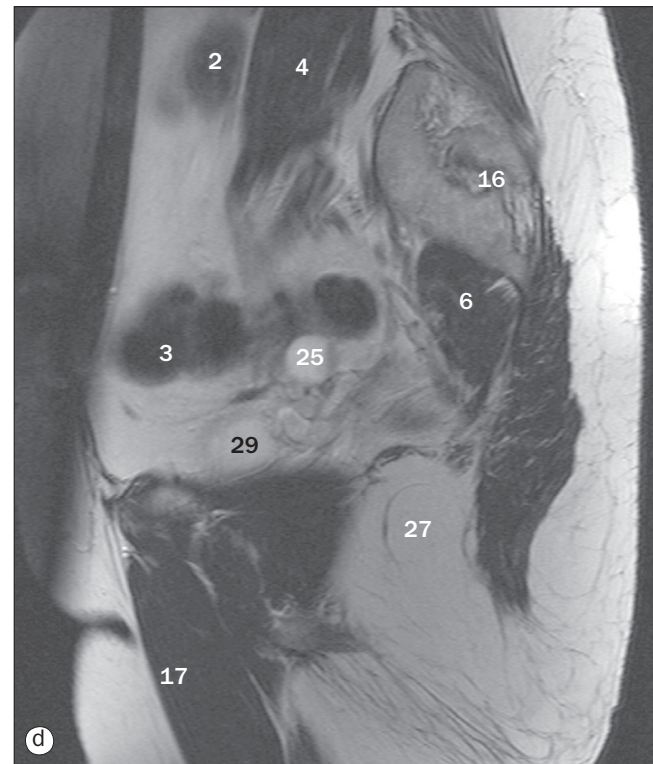
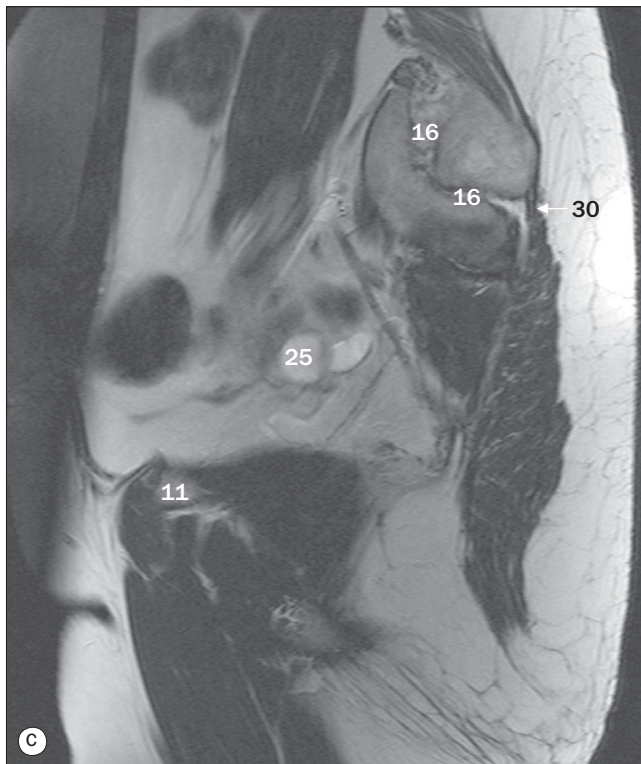
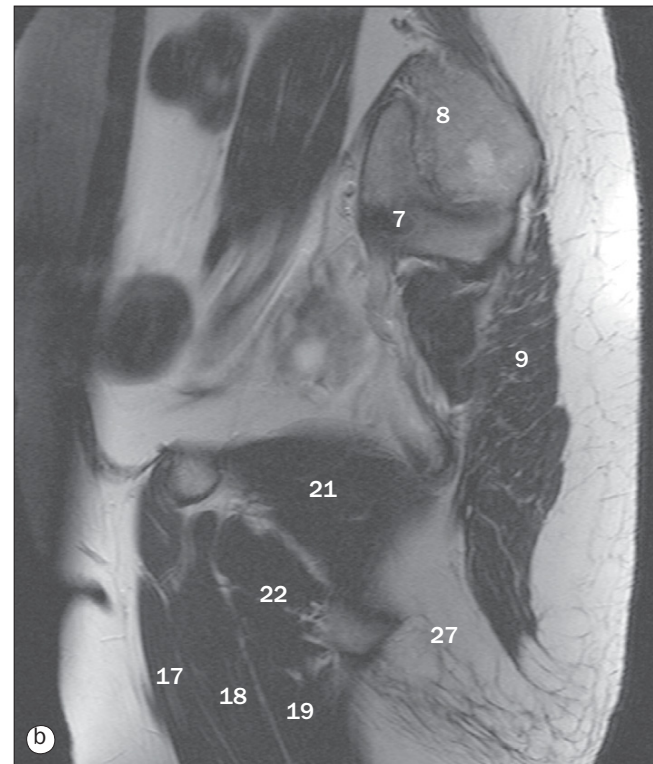
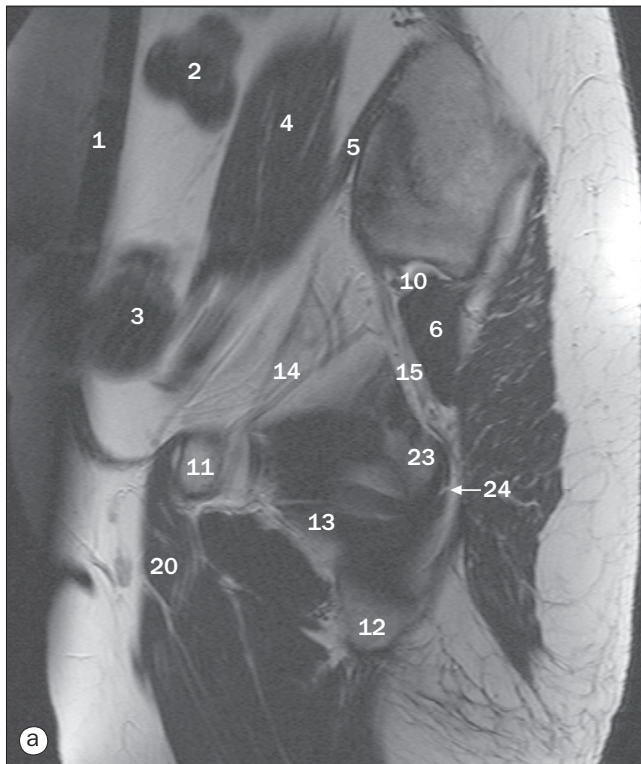
11 Ovaries (corpora luteal cysts)
12 Broad ligament of uterus
13 Uterine tubes
14 Vagina
15 Posterior fornix of vagina
16 Ureter
17 Ureteric orifice
18 Trigone of bladder
19 Obturator neurovascular bundle
20 Acetabular roof

21 Obturator internus muscle
22 Obturator externus muscle
23 Levator ani muscle
24 Pubovaginalis muscle
25 Transverse perineii (urogenital diaphragm)
26 Deep perineal pouch
27 Superficial perineal pouch
28 Urethra
29 Sphincter urethralis
30 Inferior pubic ramus



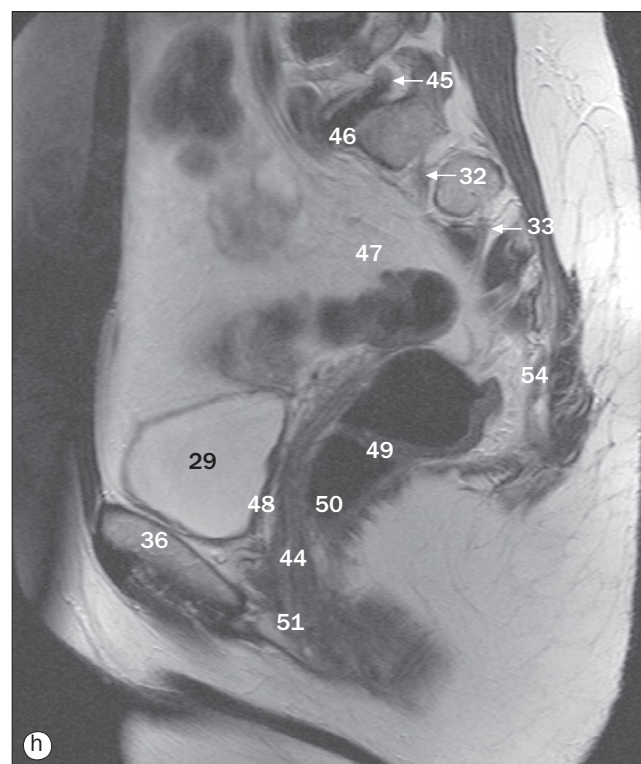
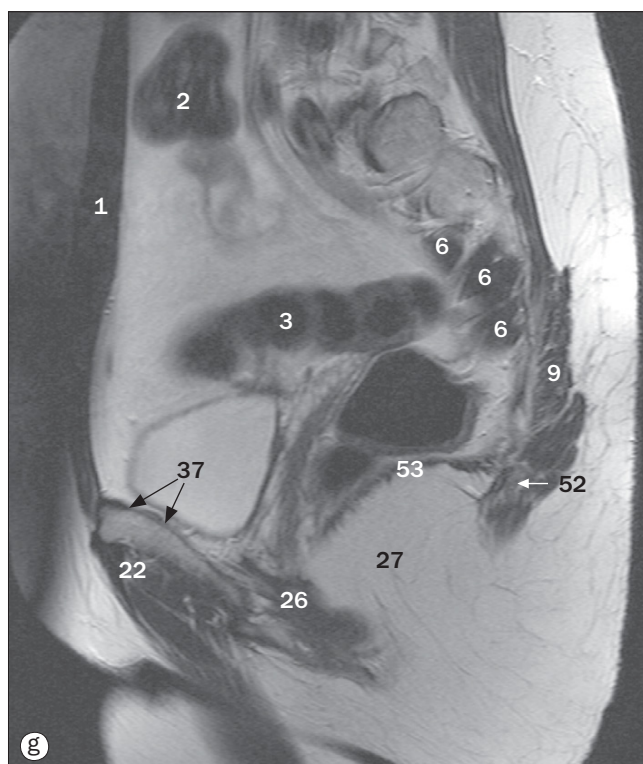
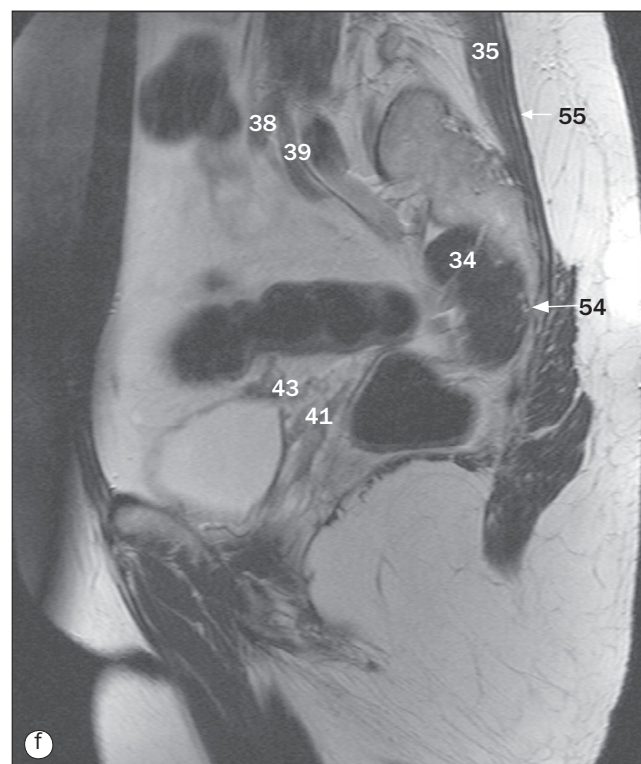
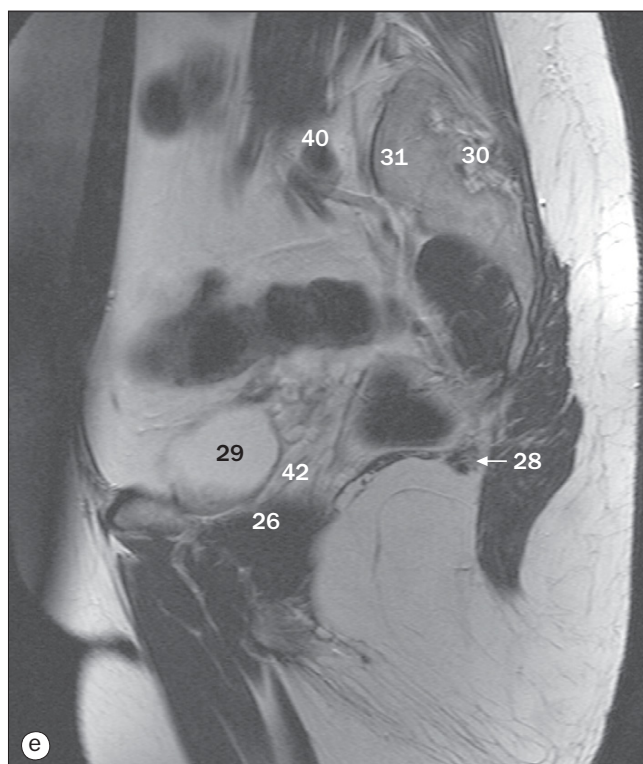
(a)–(p) Coronal T2w MR images of the female pelvis, from posterior to anterior.

- | | | |
|----------------------------------|-----------------------------|---------------------------------|
| 31 Adductor longus muscle | 42 Uterine myometrium | 53 Caecum |
| 32 Labia minora | 43 Uterine endometrium | 54 Rectus femoris muscle |
| 33 Internal sphincter of bladder | 44 Uterine cavity | 55 Iliopsoas muscle |
| 34 Vastus medialis muscle | 45 Uterine fundus | 56 Femoral canal |
| 35 Vastus lateralis muscle | 46 Superior pubic ramus | 57 Adductor brevis muscle |
| 36 Aorta | 47 Symphysis pubis | 58 Sartorius muscle |
| 37 Common iliac artery | 48 Common femoral artery | 59 Labius majorum |
| 38 External iliac artery | 49 Common femoral vein | 60 Bladder |
| 39 External oblique muscle | 50 Superior vesical vessels | 61 Gracilis muscle |
| 40 Internal oblique muscle | 51 Transverse colon | 62 Circumflex femoral vessels |
| 41 Transversus abdominis muscle | 52 Small bowel | 63 Retropubic cave (of Retzius) |



(a)–(p) Sequential sagittal T2w MR images of a female pelvis, from right to left through the midline.

- | | | |
|---------------------------|-----------------------------------|-------------------------------------|
| 1 Rectus abdominis muscle | 10 Superior gluteal vessels | 19 Adductor magnus muscle |
| 2 Transverse colon | 11 Superior pubic ramus | 20 Iliopsoas muscle |
| 3 Sigmoid colon | 12 Inferior pubic ramus | 21 Obturator internus muscle |
| 4 Psoas major muscle | 13 Obturator externus muscle | 22 Pectineus muscle |
| 5 Iliacus muscle | 14 Obturator neurovascular bundle | 23 Ischial tuberosity |
| 6 Piriformis muscle | 15 Sciatic nerve | 24 Hamstring origin |
| 7 Sacral ala | 16 Sacro-iliac joint | 25 Right ovary (corpus luteal cyst) |
| 8 Ilium | 17 Adductor longus muscle | 26 Levator ani muscle |
| 9 Gluteus maximus muscle | 18 Adductor brevis muscle | 27 Ischio-anal fossa |



(a)–(p) Sequential sagittal T2w MR images of a female pelvis, from right to left through the midline.

28 Internal pudendal neurovascular bundle (Alcock's canal)

29 Bladder

30 Dorsal sacro-iliac ligaments

31 Sacral body

32 First sacral root

33 Second sacral root

34 Rectosigmoid junction

35 Erector spinae muscle

36 Pubic body

37 Retropubic space (cave of Retzius, extraperitoneal fat)

38 External iliac artery

39 Internal iliac artery

40 Internal iliac vein

41 Broad ligament of uterus

42 Transverse (cardinal) cervical ligament

43 Uterine tube

44 Vagina

45 Fifth lumbar root

46 Intervertebral disc at L5/S1

47 Mesosigmoid

48 Trigone of bladder

49 Transverse rectal fold (valve of Houston)

50 Rectal ampulla

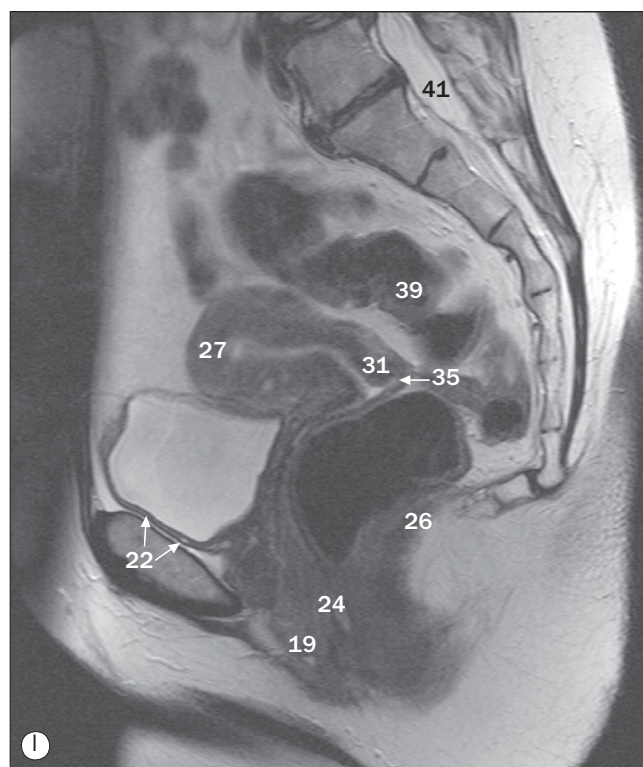
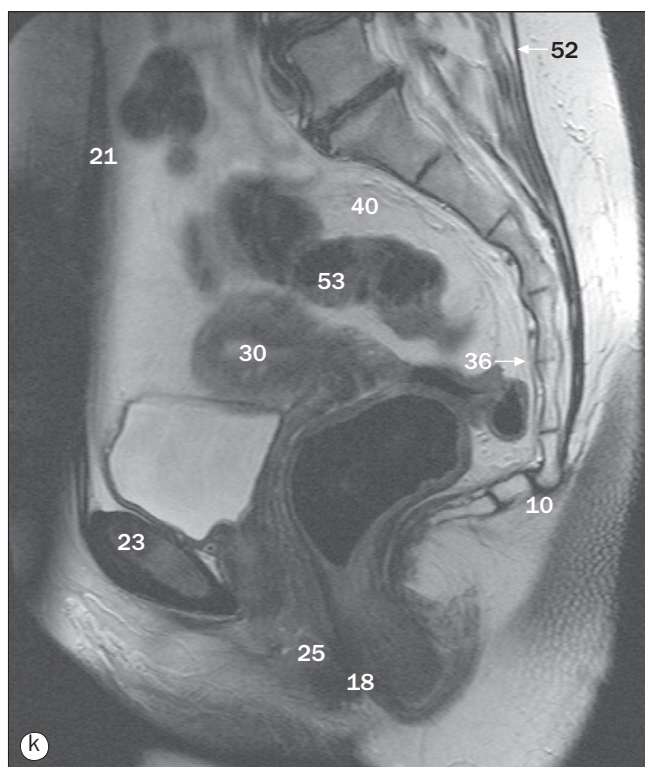
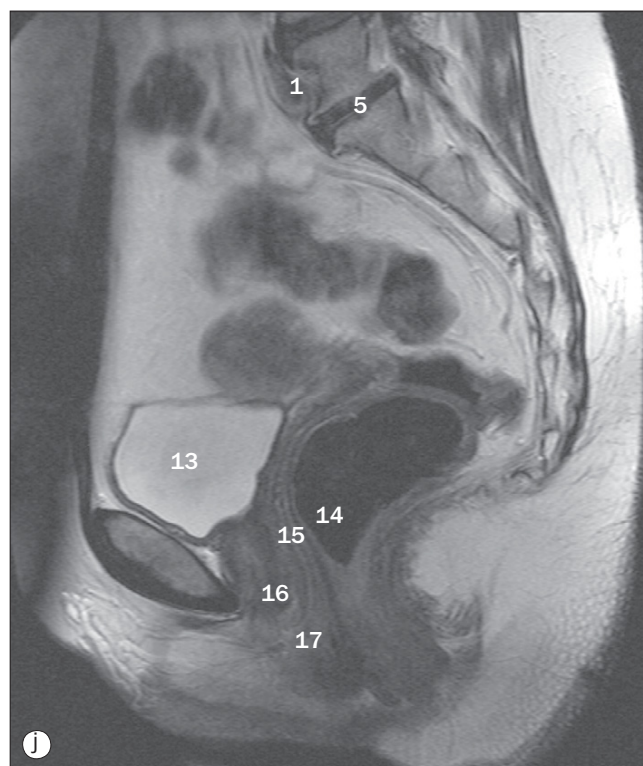
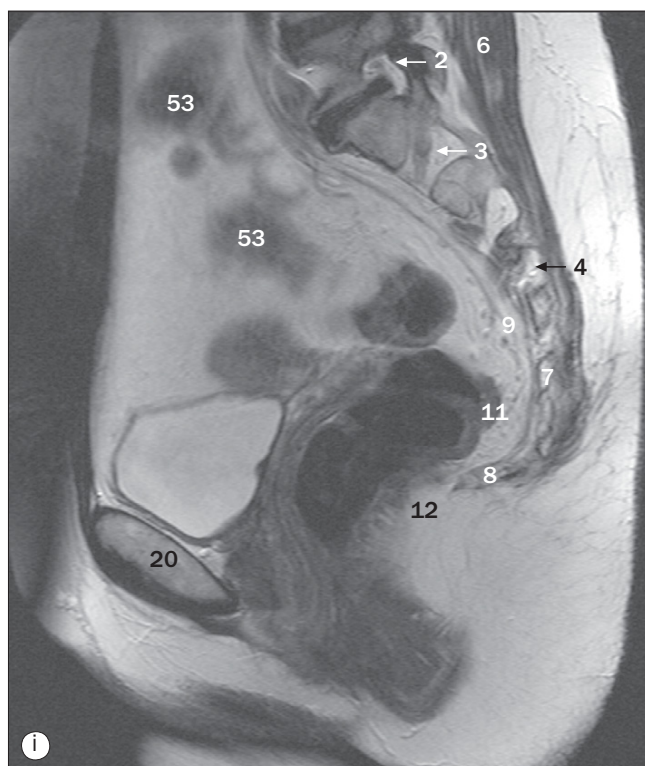
51 Transverse perineii muscle (urogenital diaphragm)

52 Coccyx

53 Coccygeus muscle

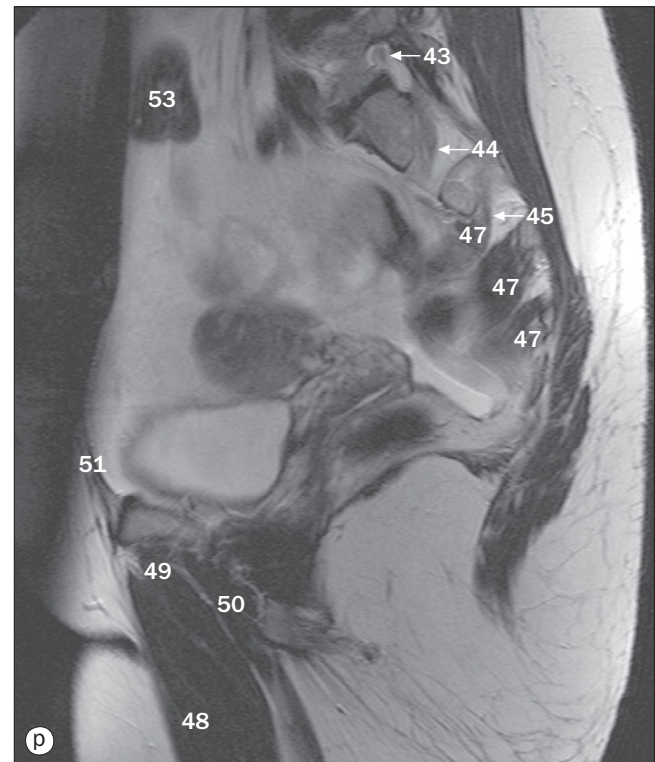
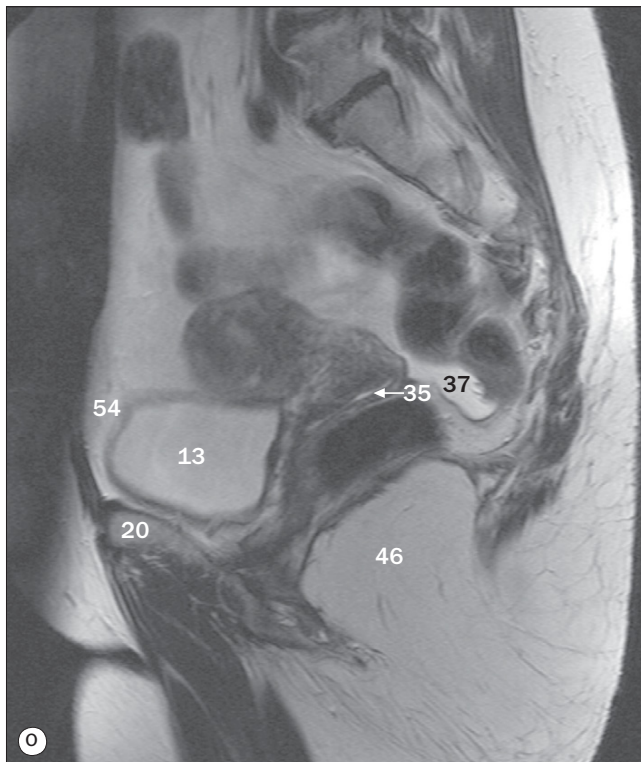
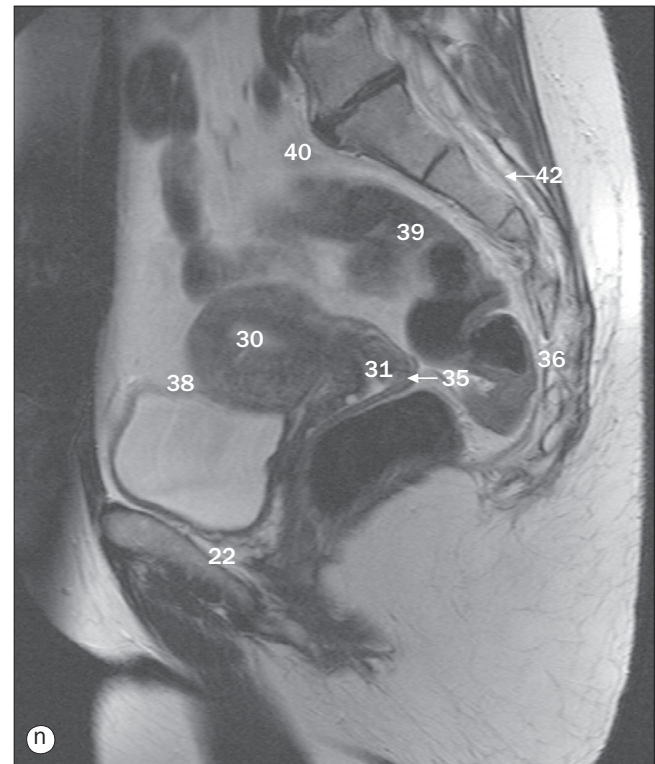
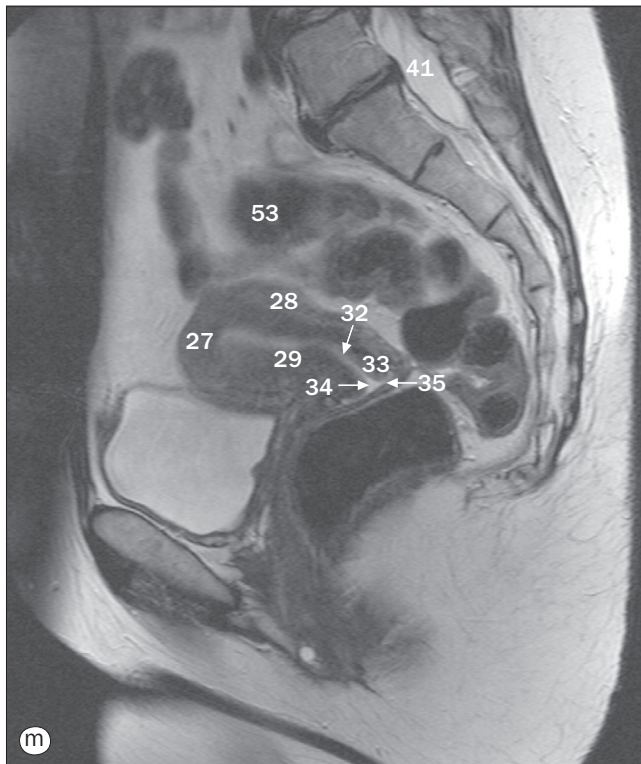
54 Waldeyer's fascia

55 Thoracolumbar fascia



(a)–(p) Sequential sagittal T2w MR images of a female pelvis, from right to left through the midline.

- | | | |
|------------------------------------|-----------------------------|--|
| 1 Left common iliac vein | 10 Sacro-coccygeal junction | 19 External anal sphincter |
| 2 L5 root (intervertebral foramen) | 11 Levator ani muscle | 20 Pubic body |
| 3 S1 root | 12 Puborectalis muscle | 21 Rectus abdominis muscle |
| 4 S3 root | 13 Bladder | 22 Retropubic space (extraperitoneal fat, cave of Retzius) |
| 5 Intervertebral disc at L5/S1 | 14 Rectal ampulla | 23 Symphysis pubis |
| 6 Erector spinae muscle | 15 Vagina | 24 Anal canal |
| 7 Fifth sacral segment | 16 Urethra | 25 Perineal body |
| 8 Coccyx | 17 Vaginal introitus | 26 Anococcygeal raphe |
| 9 Sacral plexus | 18 Anus | |

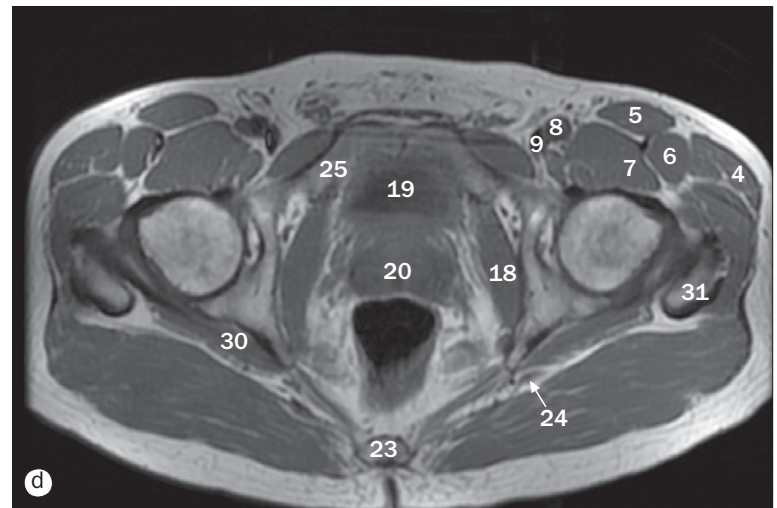
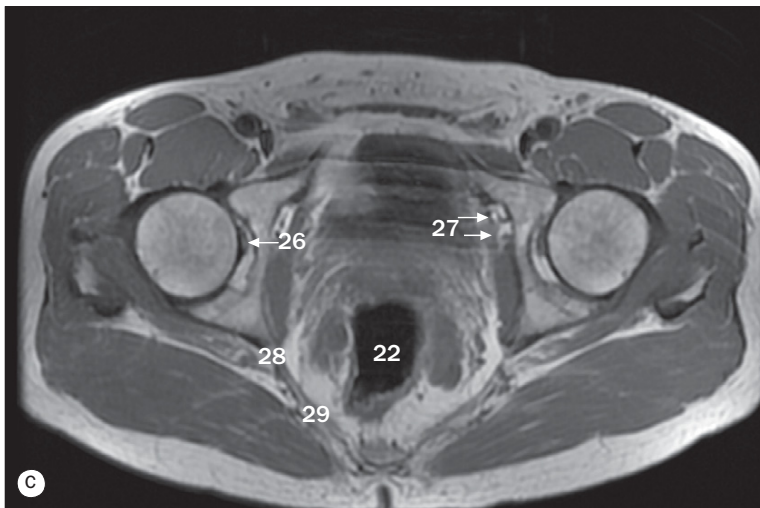
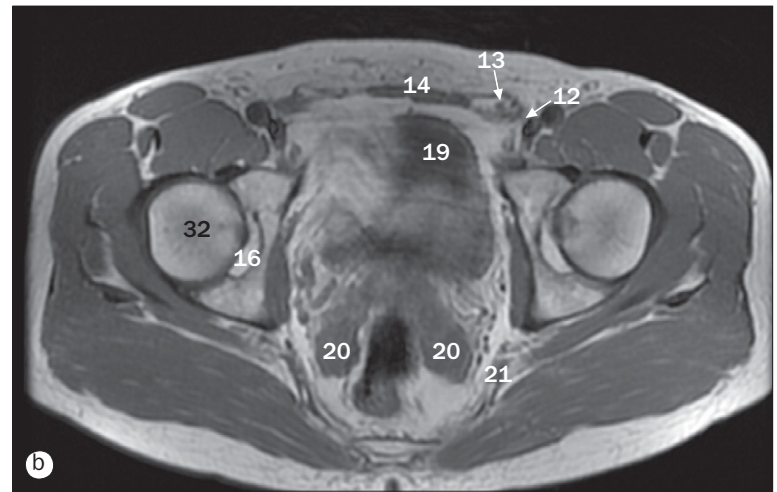
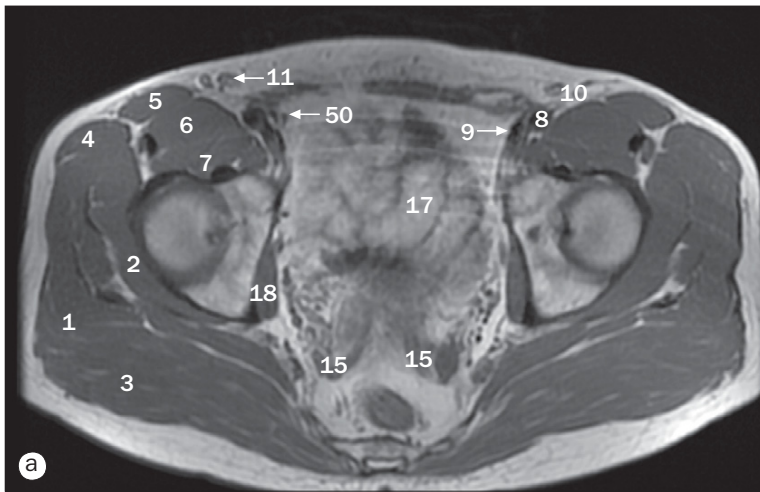


(a)–(p) Sequential sagittal T2w MR images of a female pelvis, from right to left through the midline.

27 Uterine fundus
28 Uterine myometrium
29 Uterine endometrium
30 Uterine cavity
31 Cervix
32 Internal cervical os
33 Cervical wall
34 External os of cervix
35 Posterior fornix of vagina
36 Waldeyer's fascia

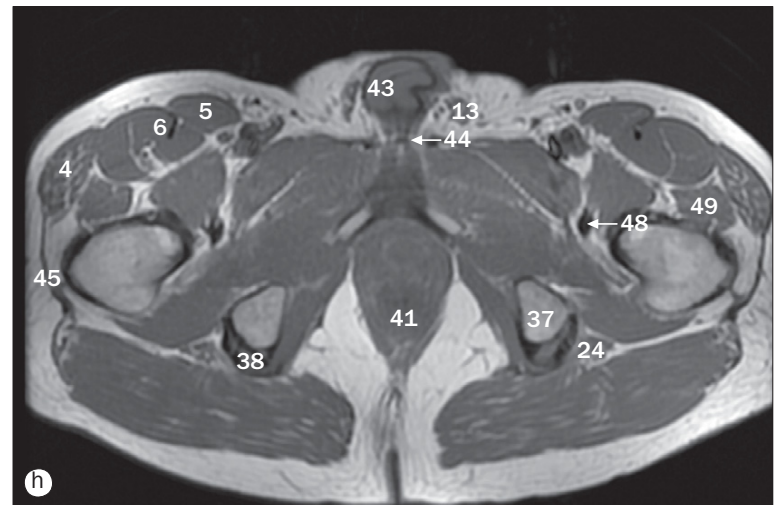
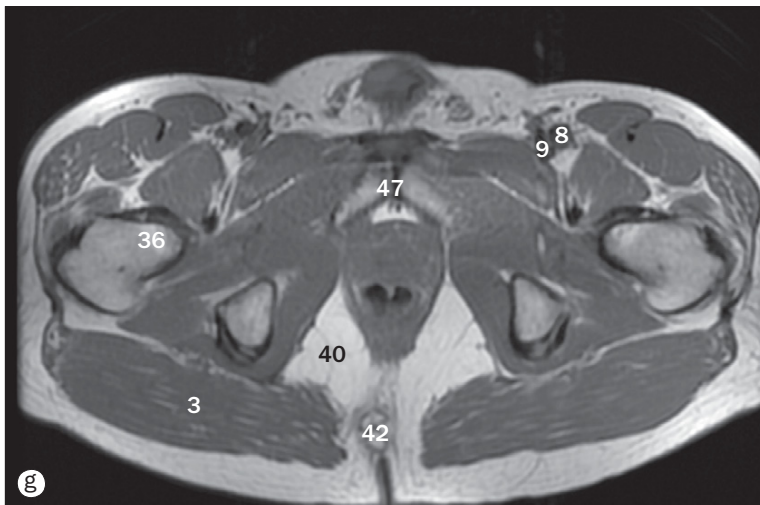
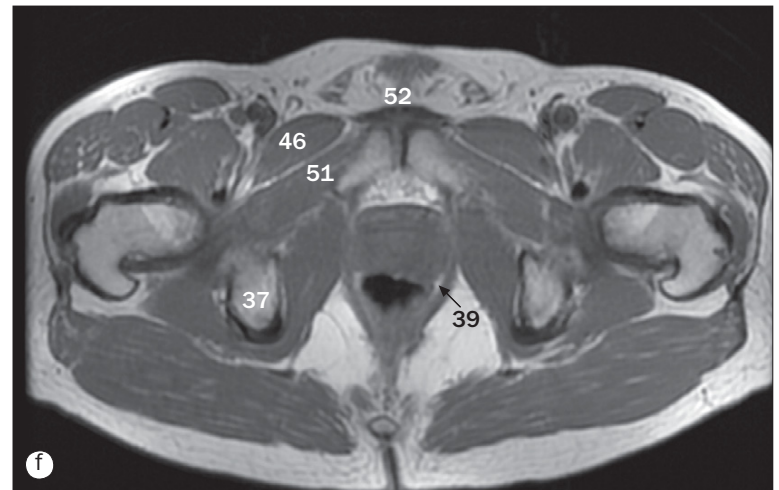
37 Recto-uterine pouch (of Douglas)
38 Uterovesical pouch
39 Rectosigmoid junction
40 Mesosigmoid
41 Thecal sac
42 Filum terminale
43 Left L5 root
44 Left S1 root
45 Left S2 root

46 Ischio-anal fossa
47 Piriformis (slips of origin)
48 Adductor longus muscle
49 Adductor brevis muscle
50 Adductor magnus muscle
51 Rectus sheath
52 Thoracolumbar fascia
53 Sigmoid colon
54 Extraperitoneal fat



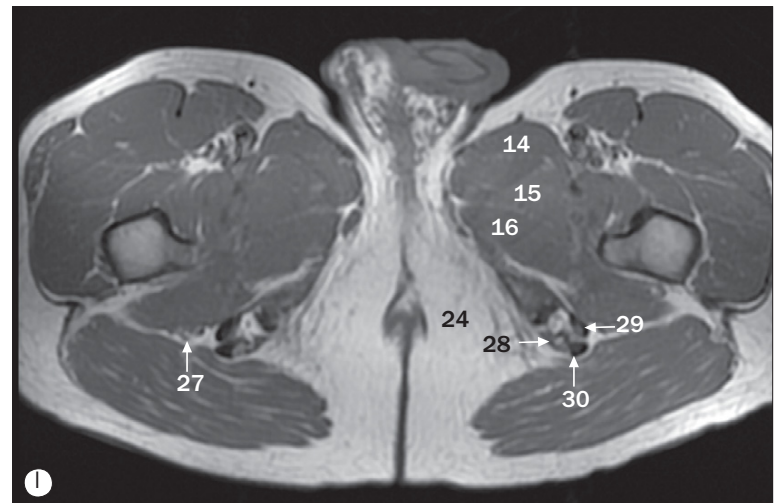
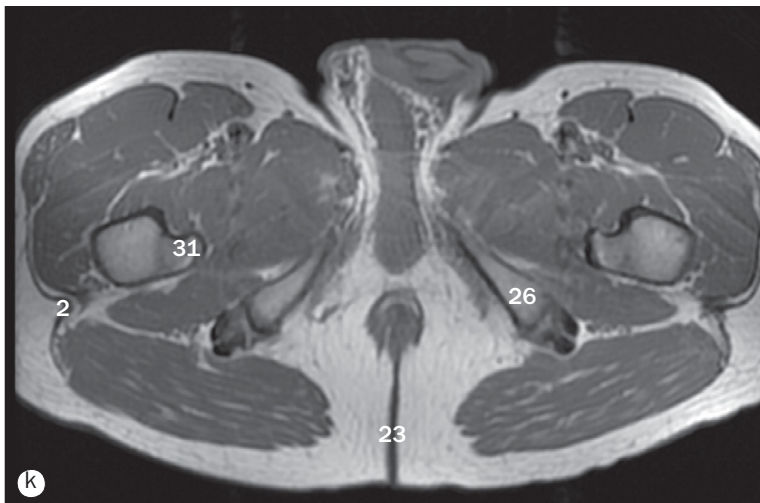
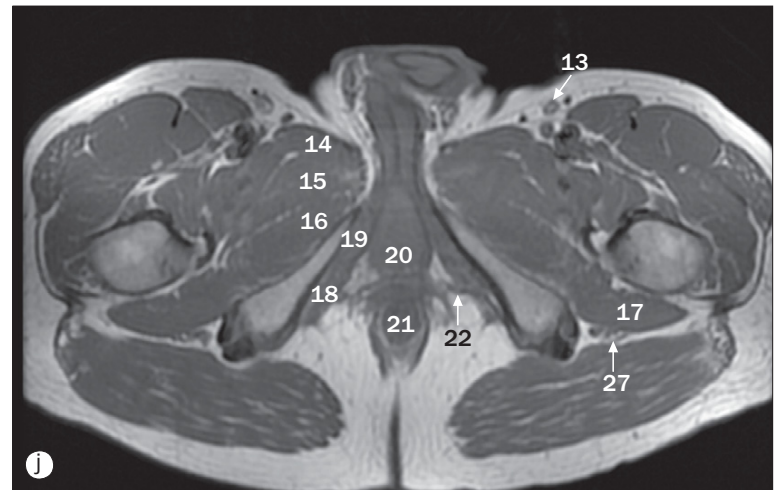
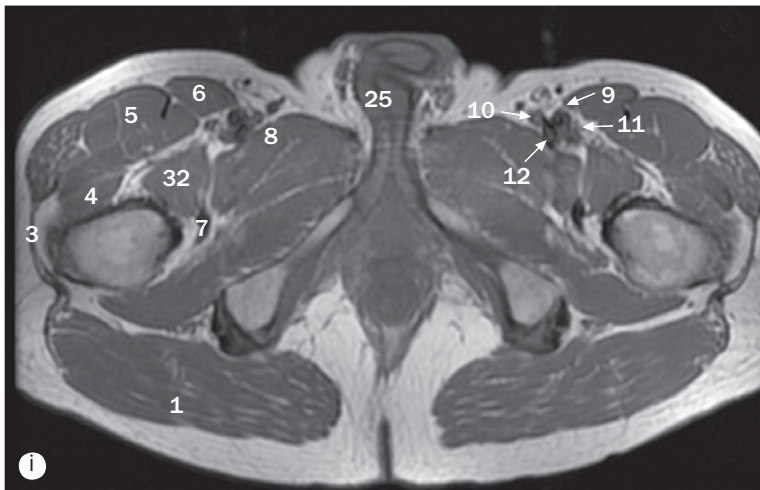
(a)–(d) Sequential axial T2w MR images of a male pelvis, from superior to inferior.

- | | | |
|-------------------------------|----------------------------|------------------------------|
| 1 Gluteus medius muscle | 9 Common femoral vein | 17 Small bowel |
| 2 Gluteus minimus muscle | 10 Femoral nerve branches | 18 Obturator internus muscle |
| 3 Gluteus maximus muscle | 11 Long saphenous vein | 19 Bladder |
| 4 Tensor fasciae latae muscle | 12 Femoral canal | 20 Seminal vesicle |
| 5 Sartorius muscle | 13 Spermatic cord | 21 Inferior gluteal vessels |
| 6 Rectus femoris muscle | 14 Rectus abdominis muscle | 22 Rectum |
| 7 Iliopsoas muscle | 15 Ductus (vas) deferens | 23 Sacrum |
| 8 Common femoral artery | 16 Acetabulum | 24 Sciatic nerve |



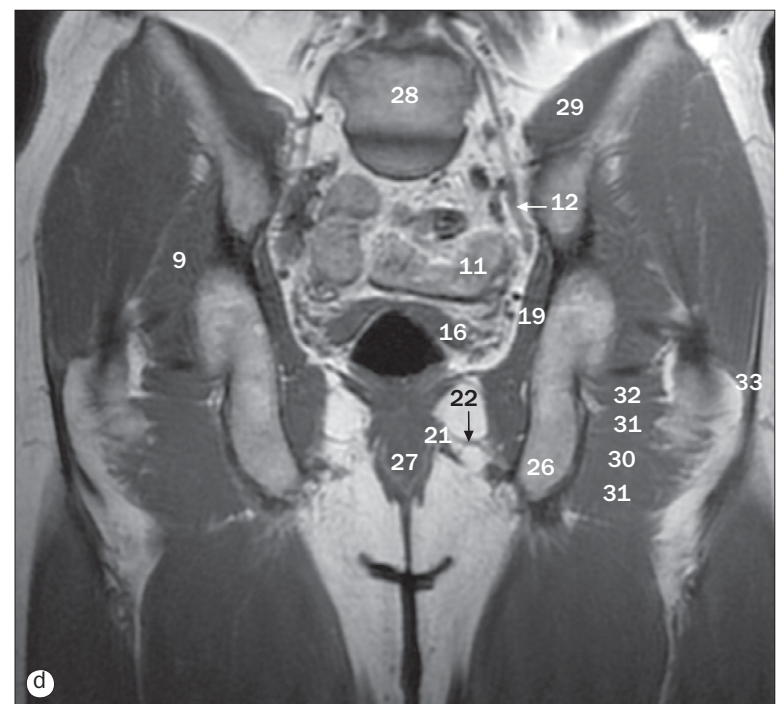
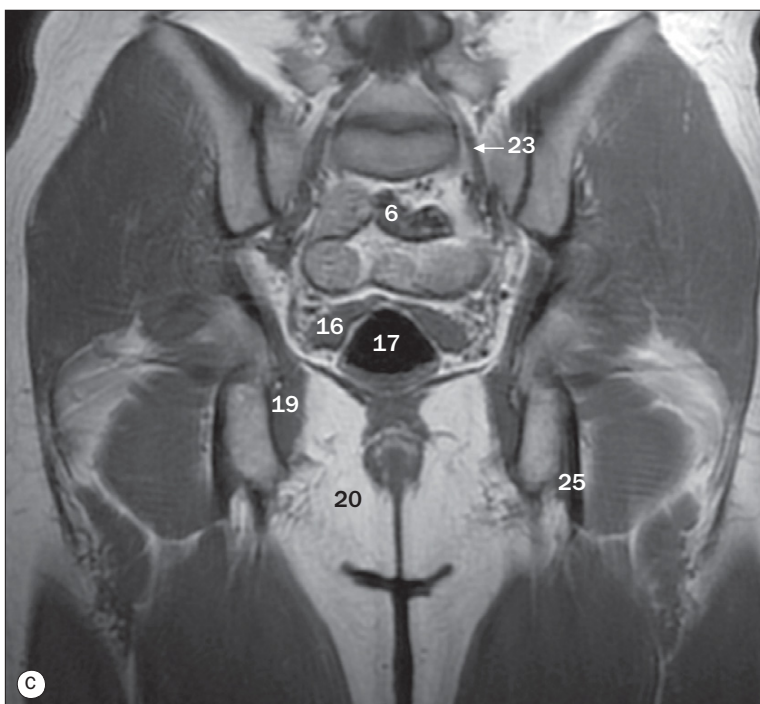
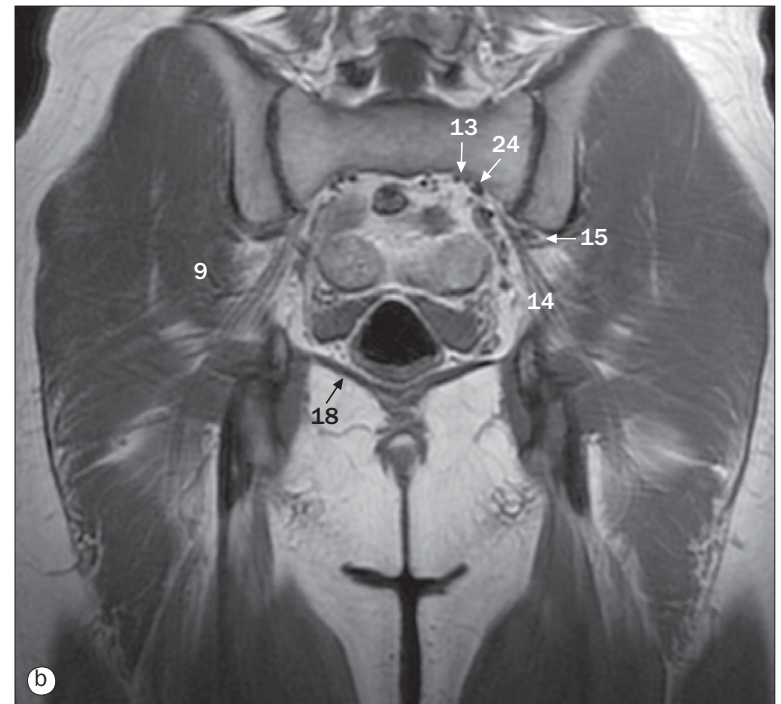
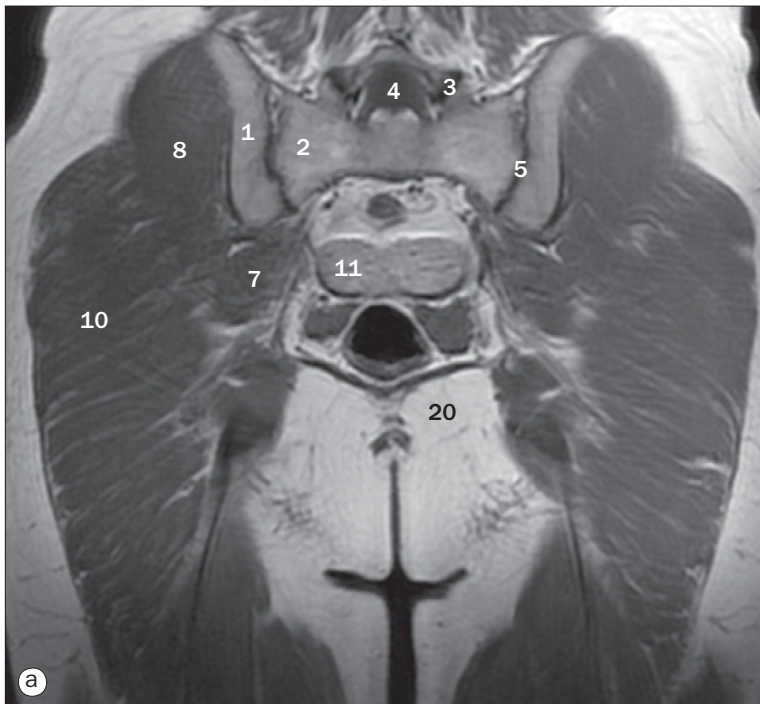
(a)–(l) Sequential axial T2w MR images of a male pelvis, from superior to inferior.

- | | | |
|--------------------------------------|---|--------------------------------|
| 25 Superior pubic ramus | 35 Femoral neck | 44 Dorsal penile vessels |
| 26 Ligamentum teres | 36 Lesser trochanter of femur | 45 Fascia lata |
| 27 Obturator vessels and nerve | 37 Ischial tuberosity | 46 Pectineus muscle |
| 28 Ischial spine | 38 Hamstrings (common tendinous origin) | 47 Symphysis pubis |
| 29 Sacrospinous ligament | 39 Levator ani muscle (puborectalis) | 48 Iliopsoas tendon |
| 30 Obturator externus muscle | 40 Ischio-anal fossa | 49 Vastus lateralis muscle |
| 31 Greater trochanter of femur | 41 Anorectal junction | 50 Inferior epigastric vessels |
| 32 Femoral head | 42 Coccyx | 51 Adductor longus muscle |
| 33 Prostate | 43 Corpus cavernosum | 52 Transverse pubic ligament |
| 34 Inferior rectal vessels and nerve | | |



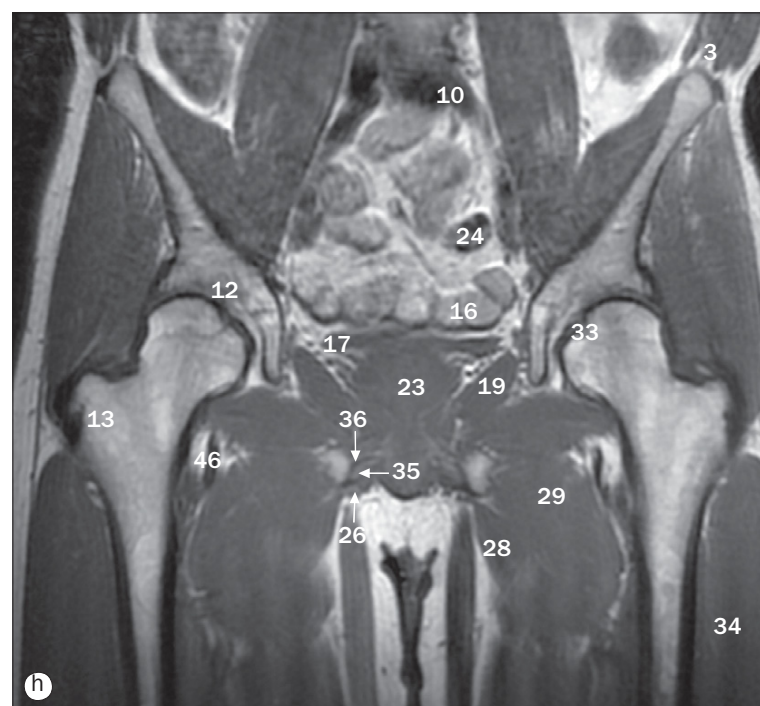
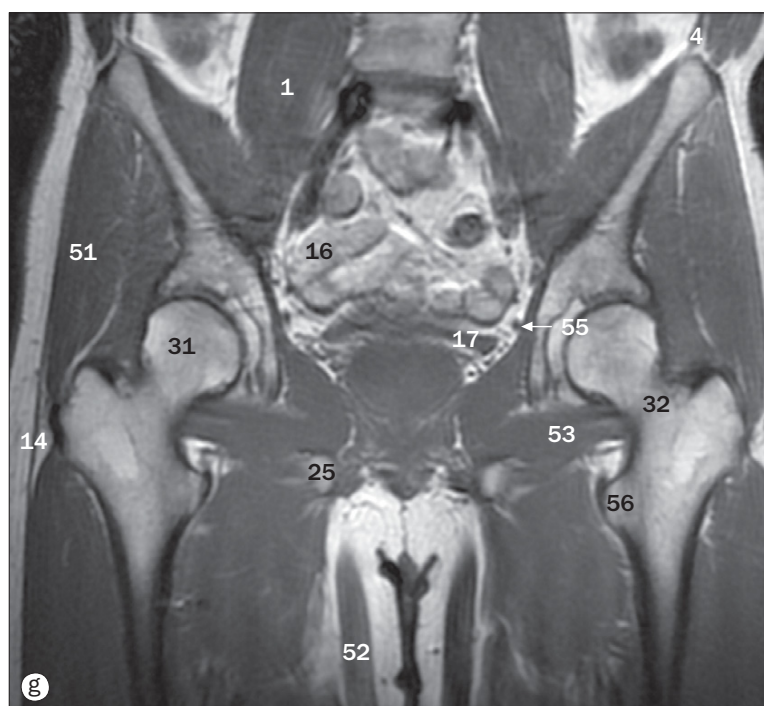
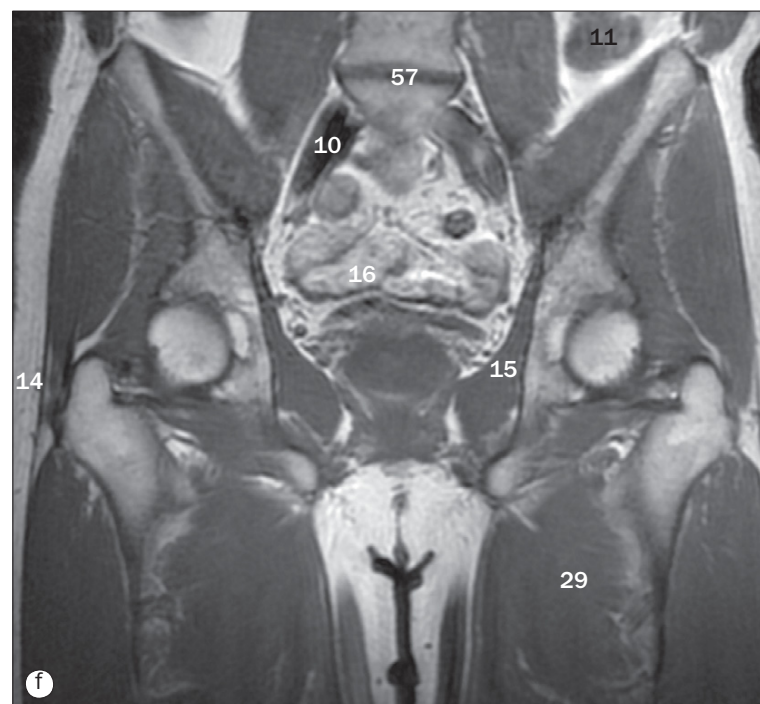
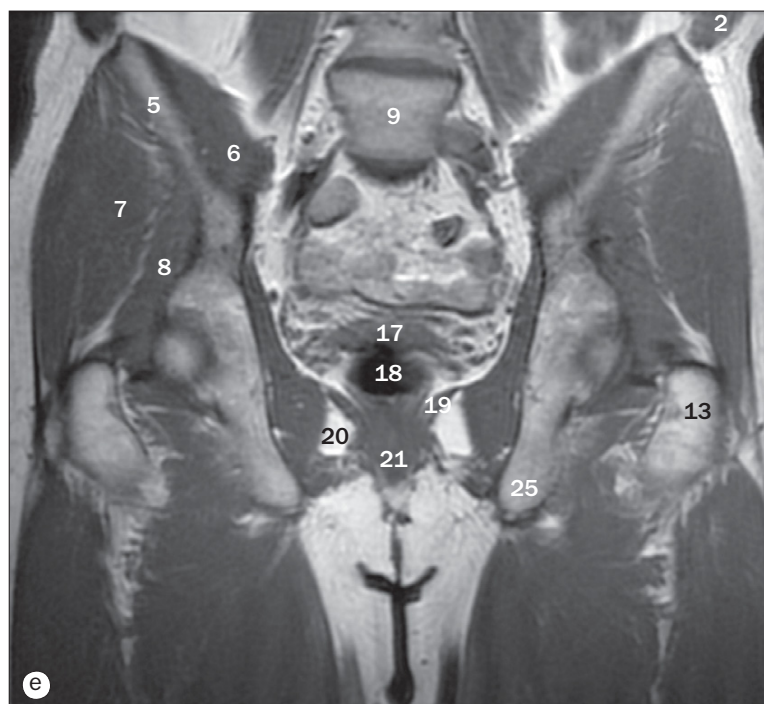
(a)–(l) Sequential axial T2w MR images of a male pelvis, from superior to inferior.

- | | | |
|------------------------------|---|-------------------------------------|
| 1 Gluteus maximus muscle | 12 Profunda femoris vein | 23 Natal cleft |
| 2 Fascia lata | 13 Long saphenous vein | 24 Ischio-anal fossa |
| 3 Iliotibial tract | 14 Adductor longus muscle | 25 Corpus cavernosum |
| 4 Vastus lateralis muscle | 15 Adductor brevis muscle | 26 Ischial tuberosity |
| 5 Rectus femoris muscle | 16 Adductor magnus muscle | 27 Sciatic nerve |
| 6 Sartorius muscle | 17 Quadratus femoris muscle | 28 Semitendinosus tendinous origin |
| 7 Iliopsoas tendon | 18 Ischiocavernosus muscle | 29 Semimembranosus tendinous origin |
| 8 Pectineus muscle | 19 Crus of penis | 30 Biceps femoris tendinous origin |
| 9 Superficial femoral artery | 20 Bulb of penis | 31 Lesser trochanter of femur |
| 10 Superficial femoral vein | 21 Anus | 32 Iliopsoas muscle |
| 11 Profunda femoris artery | 22 Inferior rectal neurovascular bundle | |



(a)–(p) Sequential coronal T2w MR images of a male pelvis, from posterior to anterior.

- | | | |
|---------------------------|---|--|
| 1 Ilium | 12 Ureter | 23 Fifth lumbar root |
| 2 Sacral ala | 13 Gonadal vessels | 24 Lumbosacral trunk |
| 3 Facet joint (L5/S1) | 14 Sciatic nerve | 25 Common hamstring origin |
| 4 Thecal sac | 15 Superior gluteal vessels | 26 Ischial tuberosity |
| 5 Sacro-iliac joint | 16 Seminal vesicle | 27 Anal canal |
| 6 Rectosigmoid junction | 17 Rectal ampulla | 28 L5 vertebral body |
| 7 Piriformis muscle | 18 Levator ani muscle | 29 Iliacus muscle |
| 8 Gluteus medius muscle | 19 Obturator internus muscle | 30 Quadratus femoris muscle |
| 9 Gluteus minimus muscle | 20 Ischio-anal fossa | 31 Gemelli muscles (superior and inferior) |
| 10 Gluteus maximus muscle | 21 External anal sphincter | 32 Obturator externus muscle |
| 11 Small bowel | 22 Inferior rectal neurovascular bundle | 33 Fascia lata |

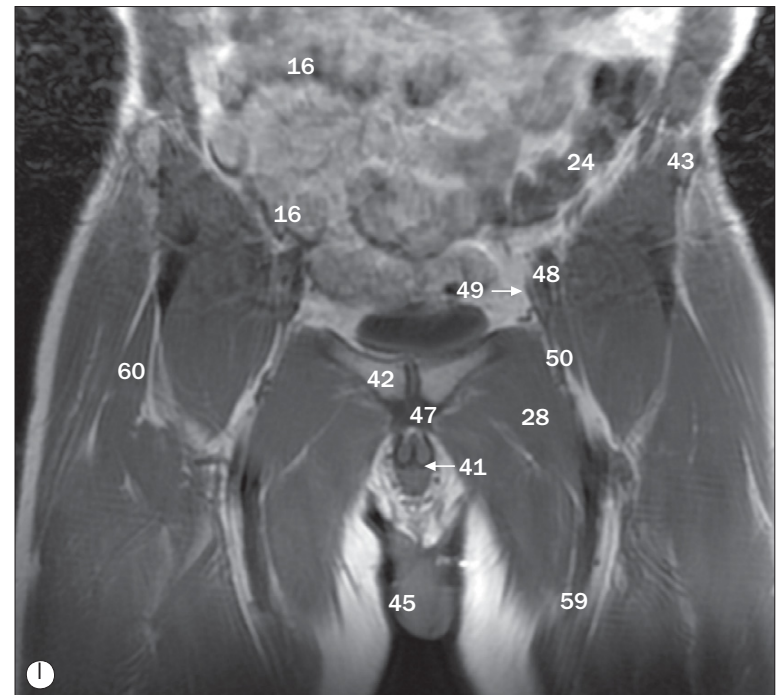
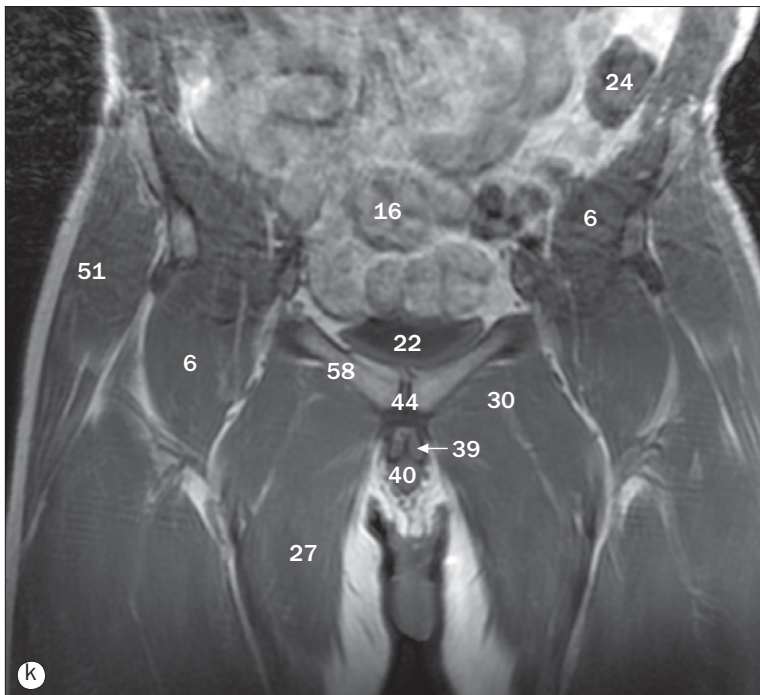
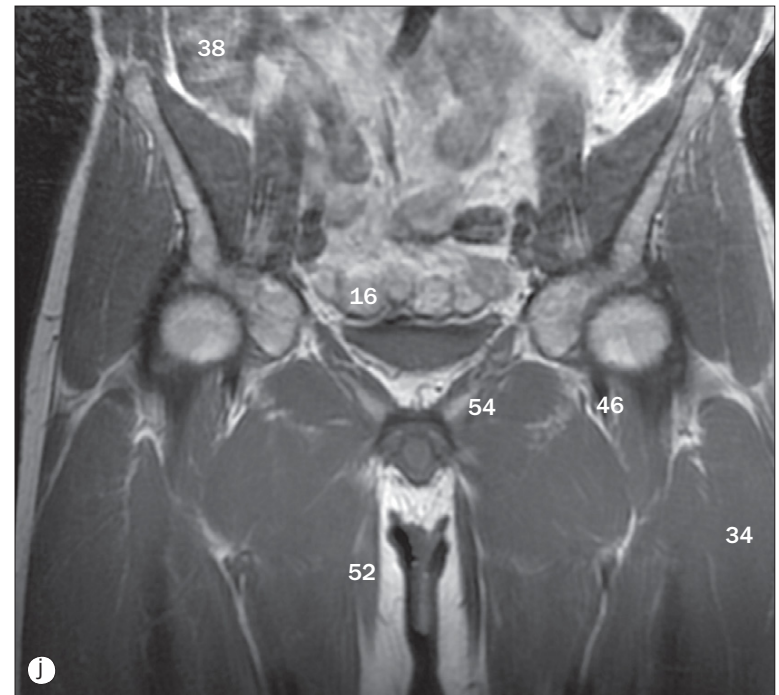
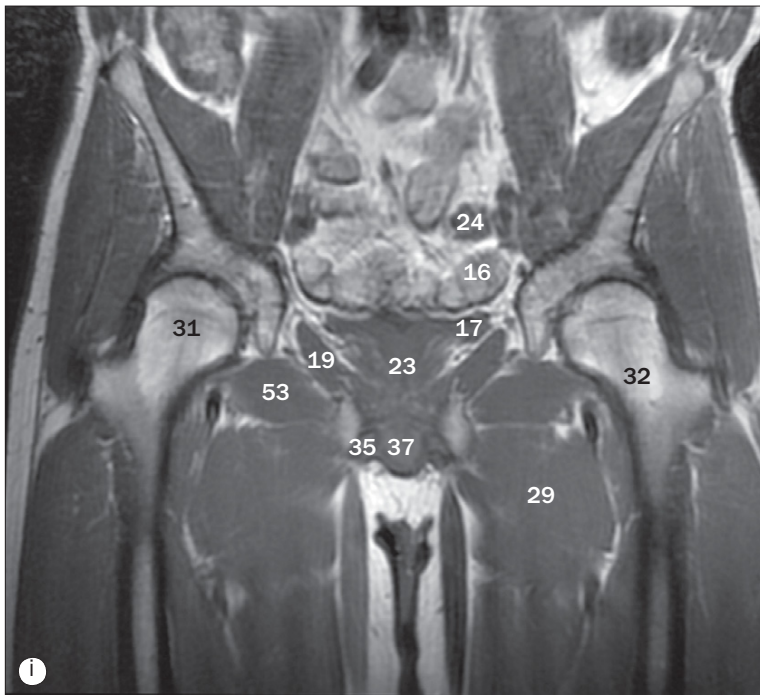


(a)–(p) Sequential coronal T2w MR images of a male pelvis, from posterior to anterior.

1 Psoas major muscle
2 External oblique muscle
3 Internal oblique muscle
4 Transversus abdominis muscle
5 Ilium
6 Iliacus muscle
7 Gluteus medius muscle
8 Gluteus minimis muscle

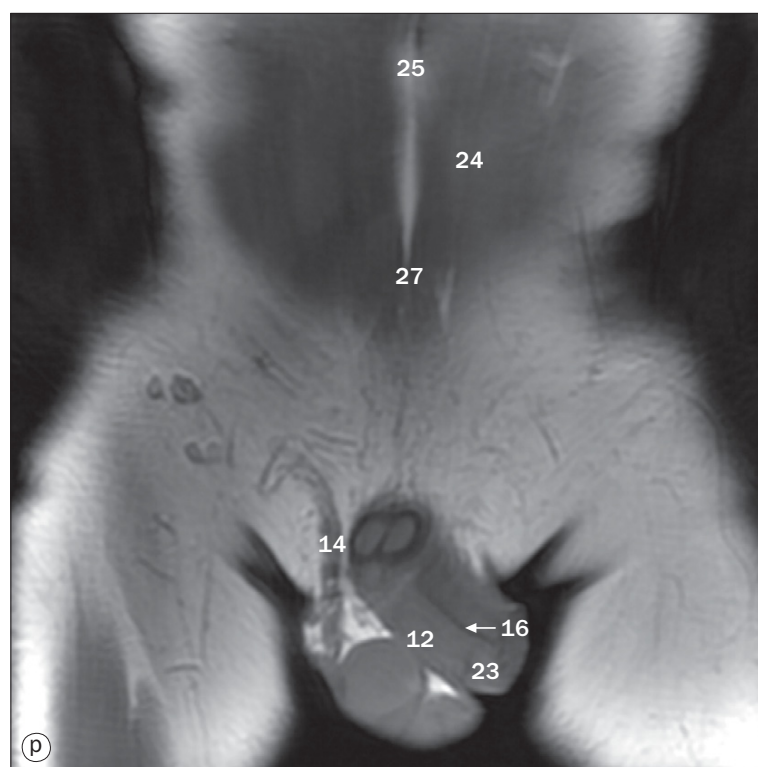
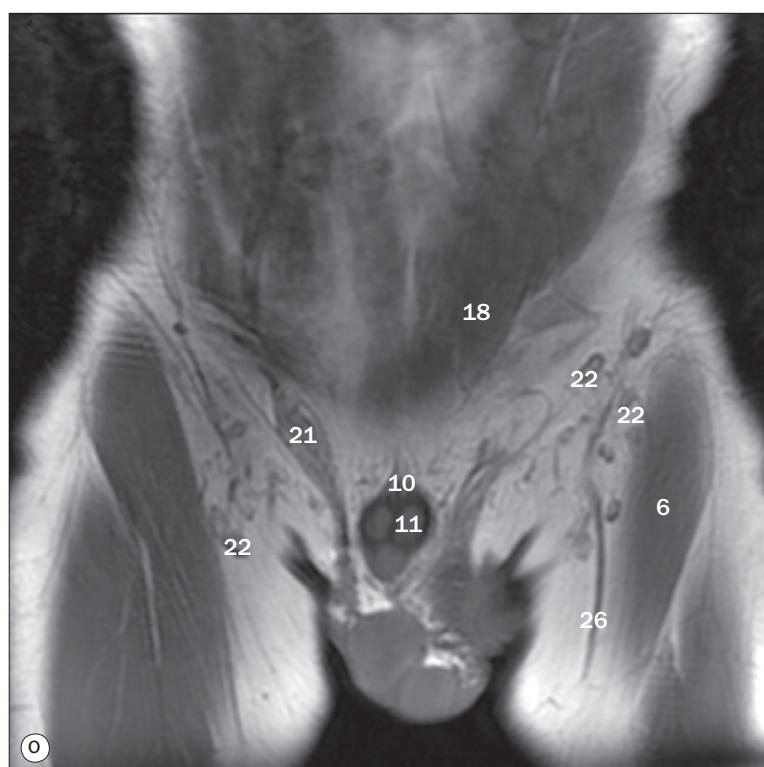
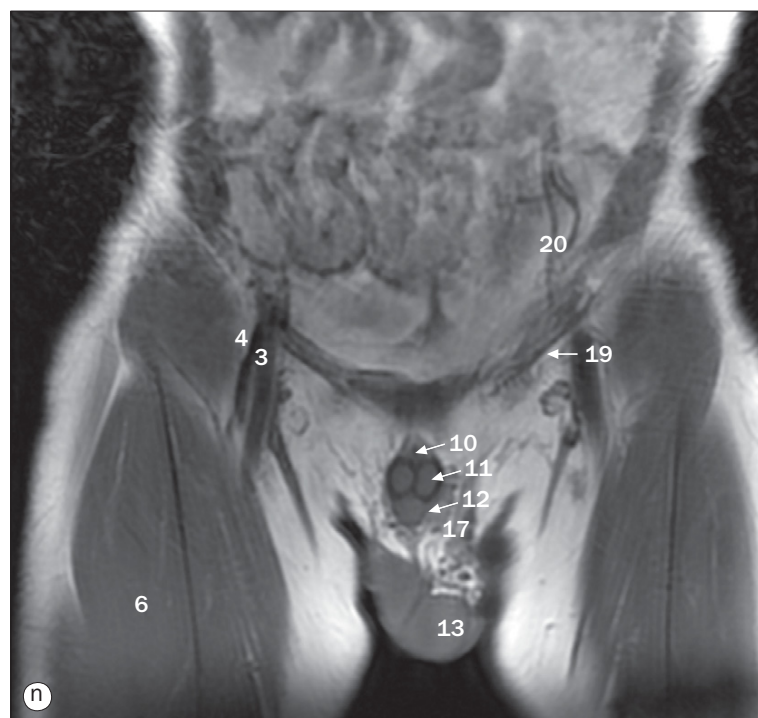
9 Fifth lumbar vertebral body
10 Common iliac vessels
11 Descending colon
12 Acetabulum
13 Greater trochanter of femur
14 Fascia lata
15 Obturator internus muscle
16 Small bowel

17 Seminal vesicle
18 Rectum
19 Levator ani muscle
20 Ischio-anal fossa
21 Anal canal
22 Bladder
23 Prostate
24 Sigmoid colon



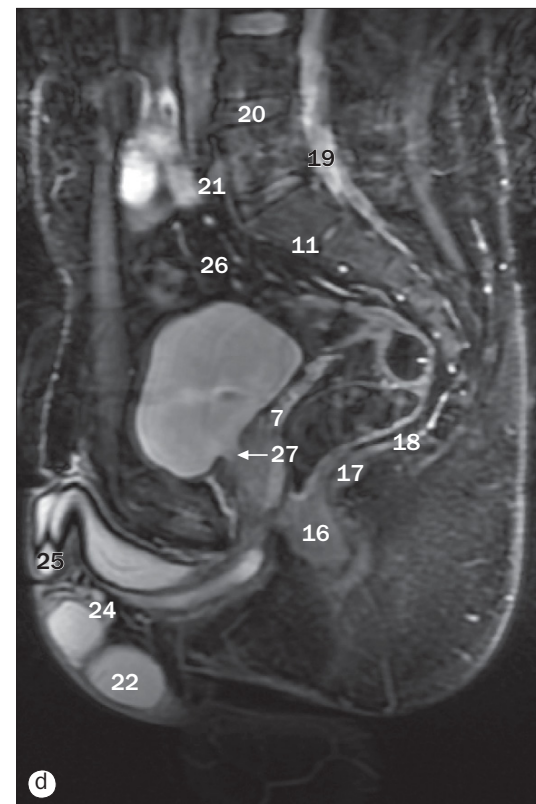
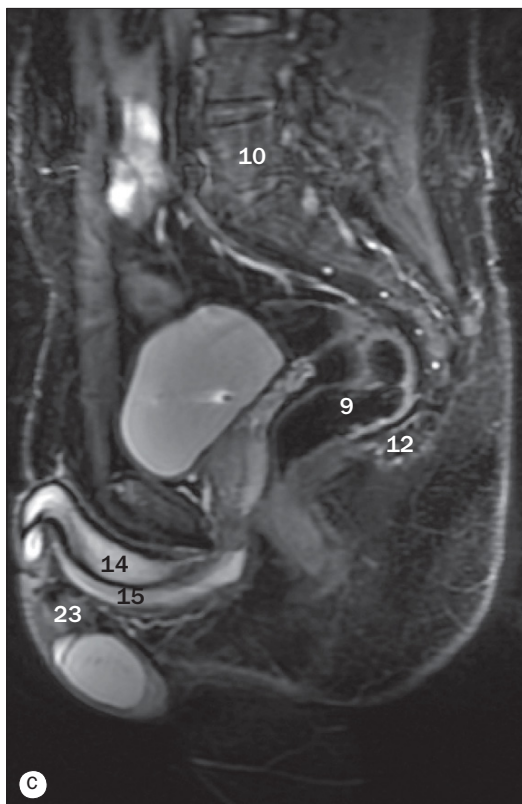
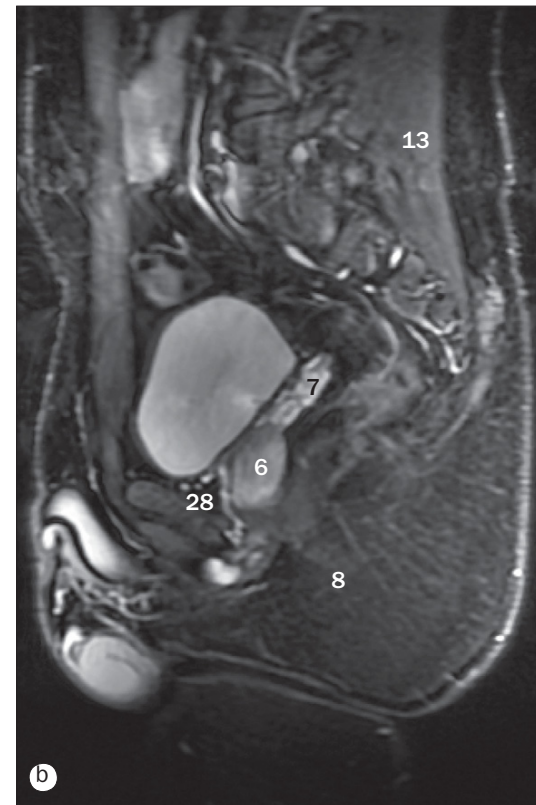
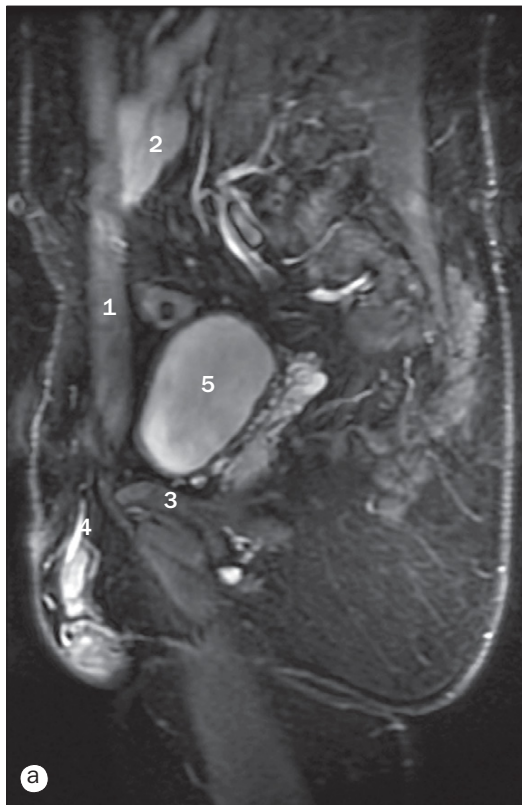
(a)–(p) Sequential coronal T2w MR images of a male pelvis, from posterior to anterior.

- | | | |
|-------------------------------|----------------------------------|-----------------------------------|
| 25 Ischium | 37 Bulb of penis | 49 External iliac vein |
| 26 Transverse perineii muscle | 38 Caecum | 50 Common femoral vessels |
| 27 Adductor longus muscle | 39 Corpus cavernosus | 51 Gluteus maximus muscle |
| 28 Adductor brevis muscle | 40 Corpus spongiosus | 52 Gracilis muscle |
| 29 Adductor magnus muscle | 41 Penile (spongy) urethra | 53 Obturator externus muscle |
| 30 Pectineus muscle | 42 Pubic body | 54 Inferior pubic ramus |
| 31 Femoral head | 43 Anterior superior iliac spine | 55 Obturator neurovascular bundle |
| 32 Femoral neck | 44 Symphysis pubis | 56 Lesser trochanter of femur |
| 33 Fovea capitalis of femur | 45 Testicle | 57 Intervertebral disc at L4/5 |
| 34 Vastus lateralis muscle | 46 Profunda femoris vessels | 58 Superior pubic ramus |
| 35 Crus of penis | 47 Suspensory ligament of penis | 59 Superficial femoral vessels |
| 36 Ischiocavernosus | 48 External iliac artery | 60 Tensor fasciae latae muscle |



(a)–(p) Sequential coronal T2w MR images of a male pelvis, from posterior to anterior.

- | | | |
|-------------------------|---------------------------------|-------------------------------------|
| 1 Small bowel | 10 Suspensory ligament of penis | 19 Inguinal ligament |
| 2 Sigmoid colon | 11 Corpus cavernosum of penis | 20 Inferior epigastric vessels |
| 3 Common femoral vein | 12 Corpus spongiosum of penis | 21 Inguinal canal (external ring) |
| 4 Common femoral artery | 13 Testicle | 22 Superficial inguinal lymph nodes |
| 5 Femoral canal | 14 Spermatic cord | 23 Glans penis |
| 6 Rectus femoris muscle | 15 Epididymal head | 24 Rectus abdominis muscle |
| 7 Pectineus muscle | 16 Penile (spongy) urethra | 25 Umbilicus |
| 8 Pubic body | 17 Pampiniform plexus | 26 Long saphenous vein |
| 9 Symphysis pubis | 18 External oblique muscle | 27 Linea alba |



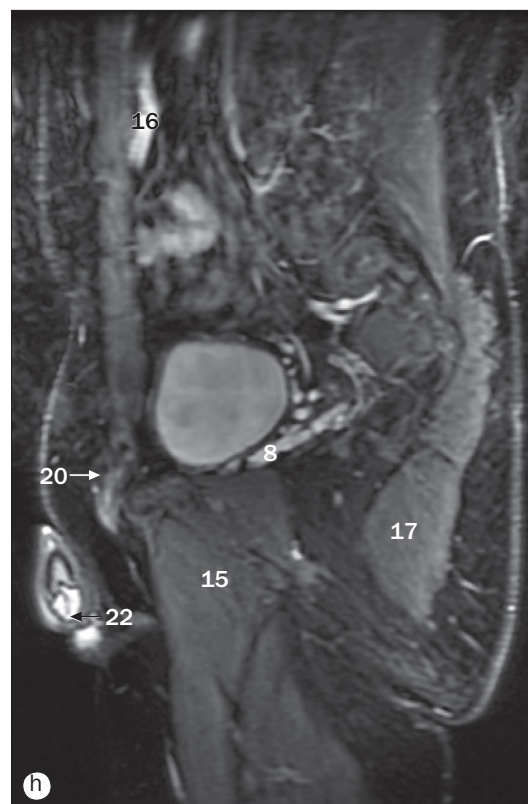
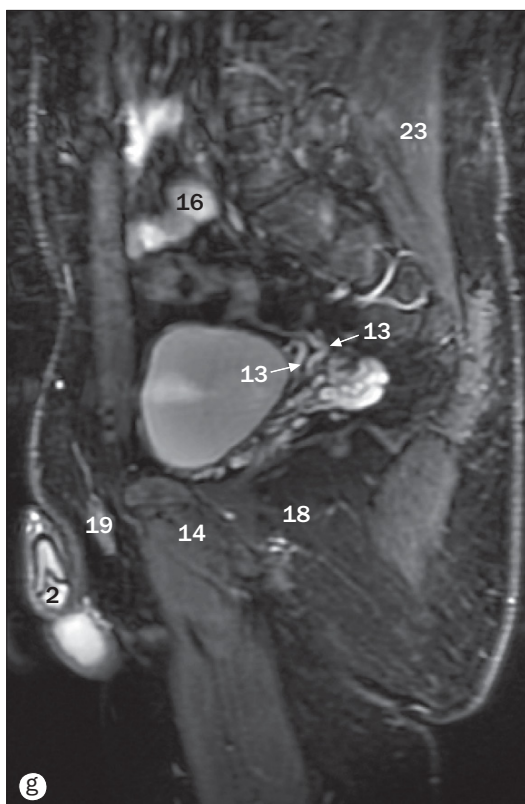
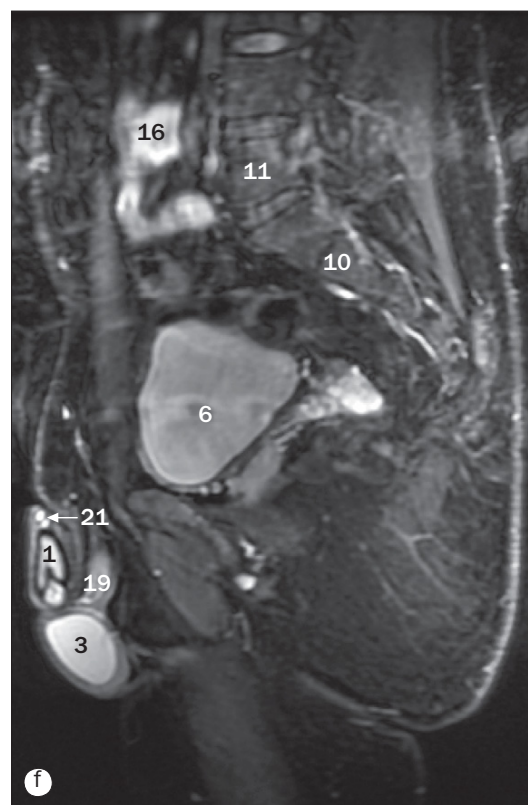
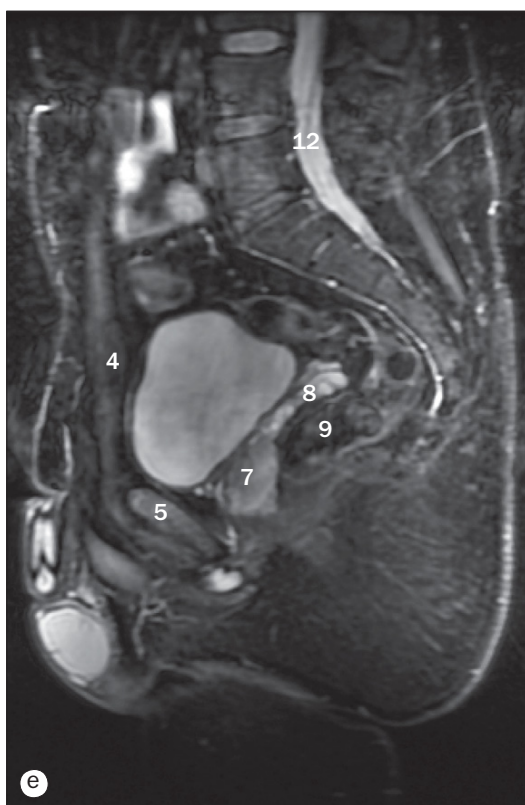
(a)–(h) Sequential sagittal MR images of a male pelvis, from right to left, through the midline (T2 Fat Sat images).

1 Rectus abdominis muscle
2 Small bowel
3 Pubic body
4 Spermatic cord
5 Bladder
6 Prostate
7 Seminal vesicle
8 Ischio-anal fossa

9 Rectum
10 Fifth lumbar vertebra
11 Sacrum
12 Coccyx
13 Erector spinae muscle
14 Corpus cavernosum
15 Corpus spongiosum

16 Anal canal
17 Puborectalis muscle
18 Anococcygeal raphe
19 Thecal sac
20 Intervertebral disc (L4/5)
21 Common iliac vein
22 Testicle

23 Epididymal head
24 Epididymal body
25 Glans penis
26 Sigmoid colon
27 Prostatic urethra
28 Retropubic space (cave of Retzius)



(a)–(h) Sequential sagittal MR images of a male pelvis, from right to left, through the midline (T2 Fat Sat images).

1 Corpus cavernosum
2 Glans penis
3 Testicle
4 Rectus abdominis muscle
5 Pubic body
6 Bladder

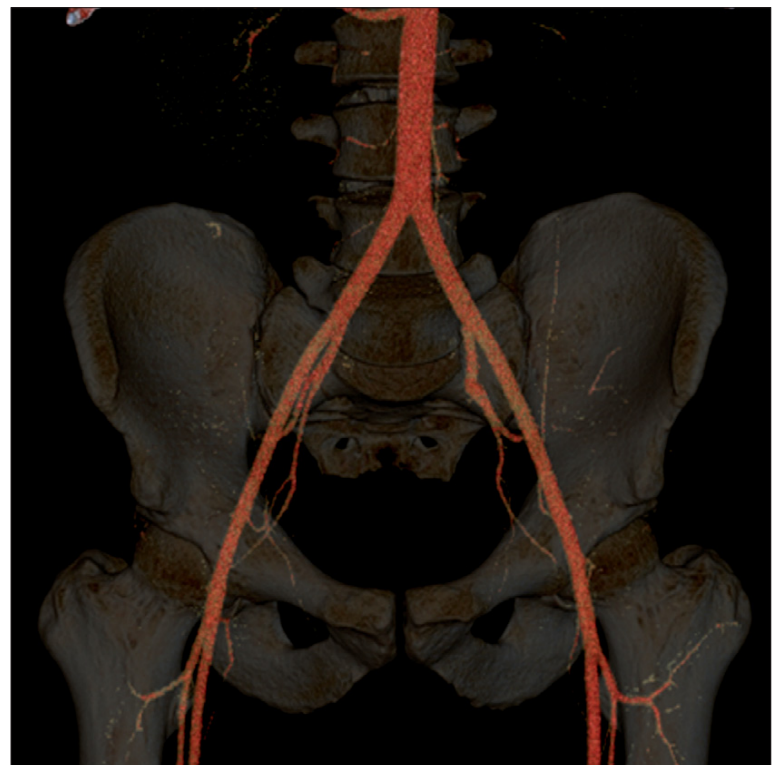
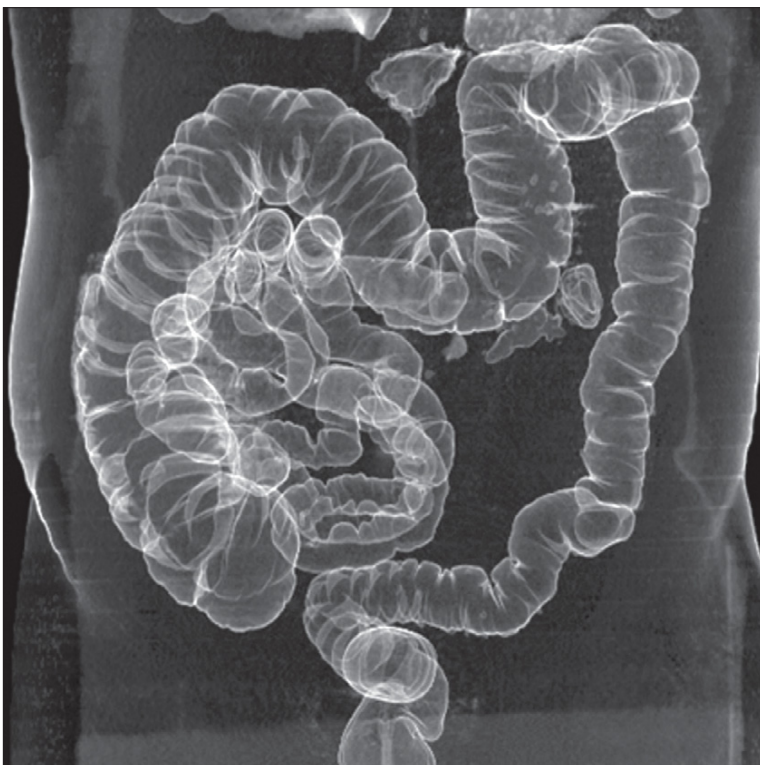
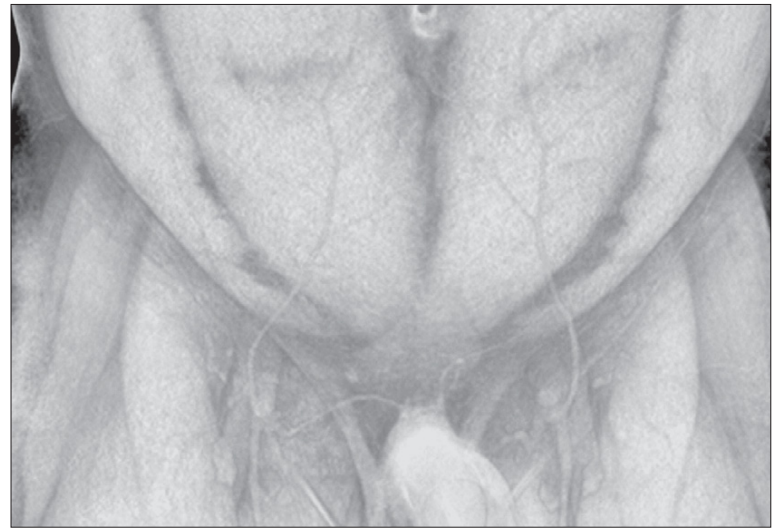
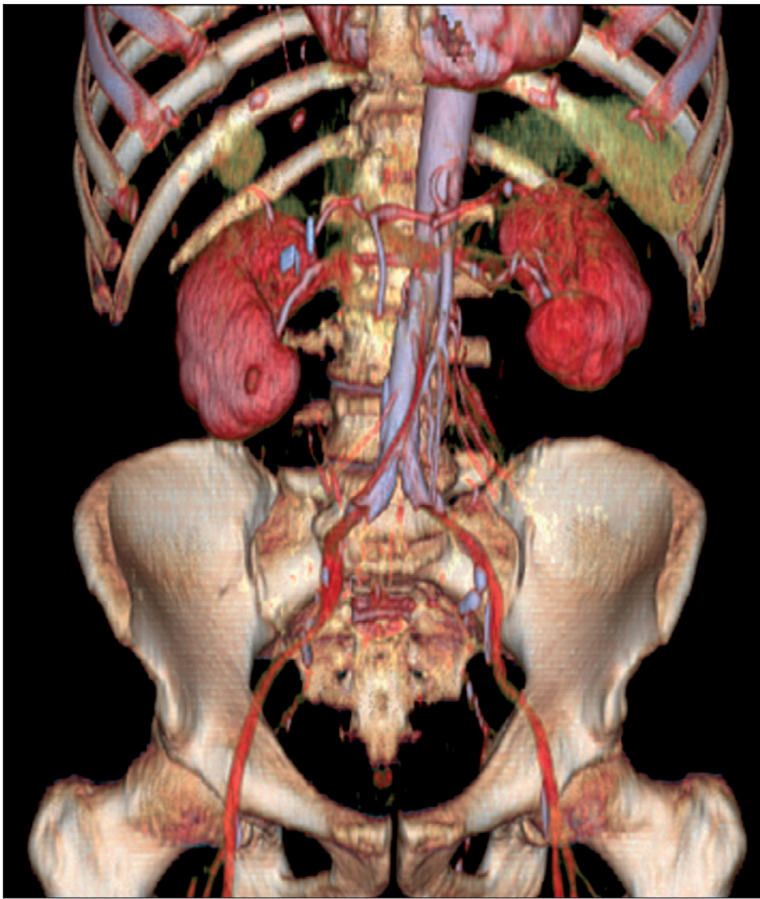
7 Prostate
8 Seminal vesicle
9 Rectum
10 Sacrum
11 Fifth lumbar vertebra
12 Thecal sac

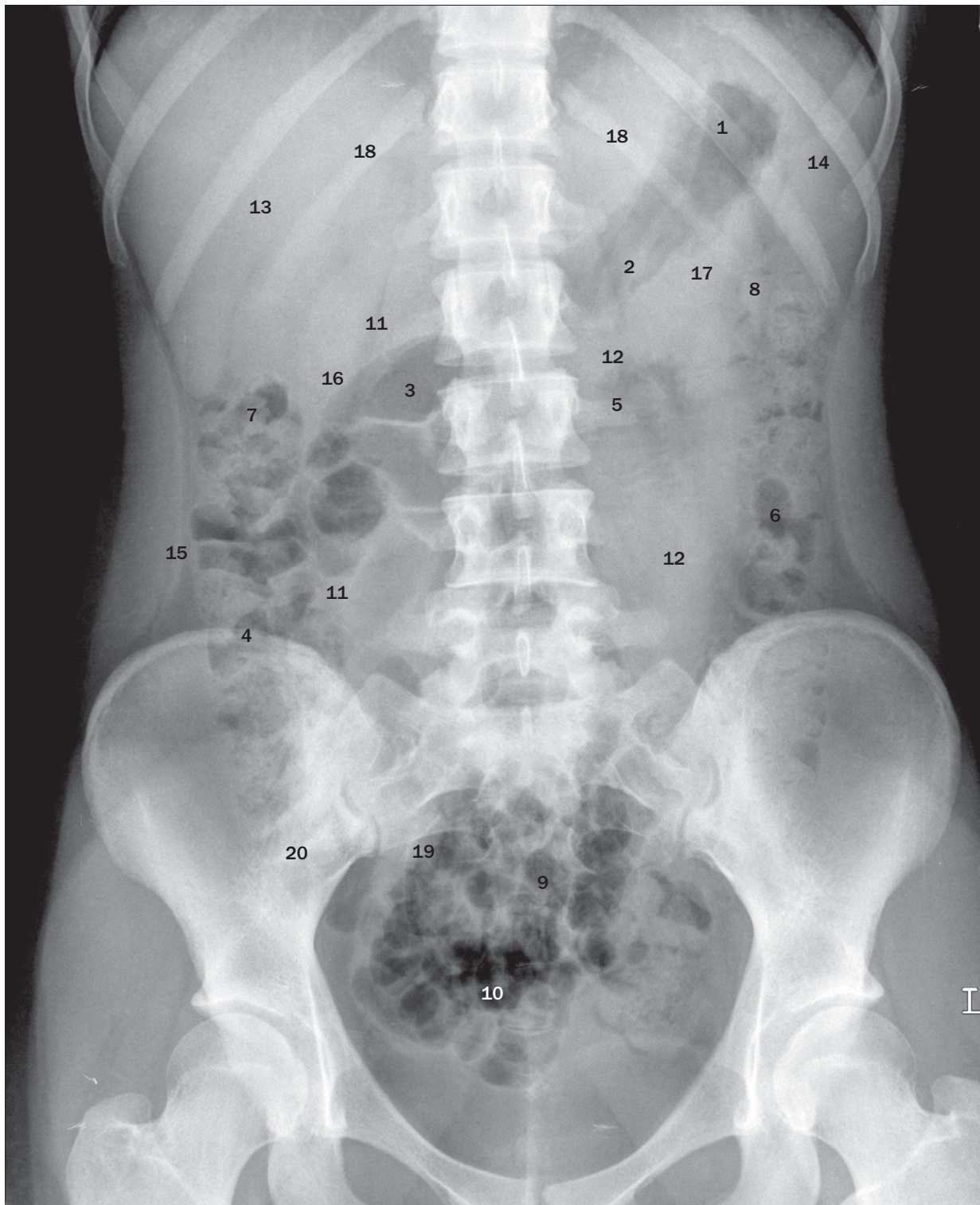
13 Ductus (vas) deferens
14 Pectineus muscle
15 Adductor brevis muscle
16 Small bowel
17 Gluteus maximus muscle
18 Ischio-anal fossa

19 Spermatic cord
20 Inguinal canal (external ring)
21 Dorsal vessels of penis
22 External meatus of urethra
23 Erector spinae muscle

6

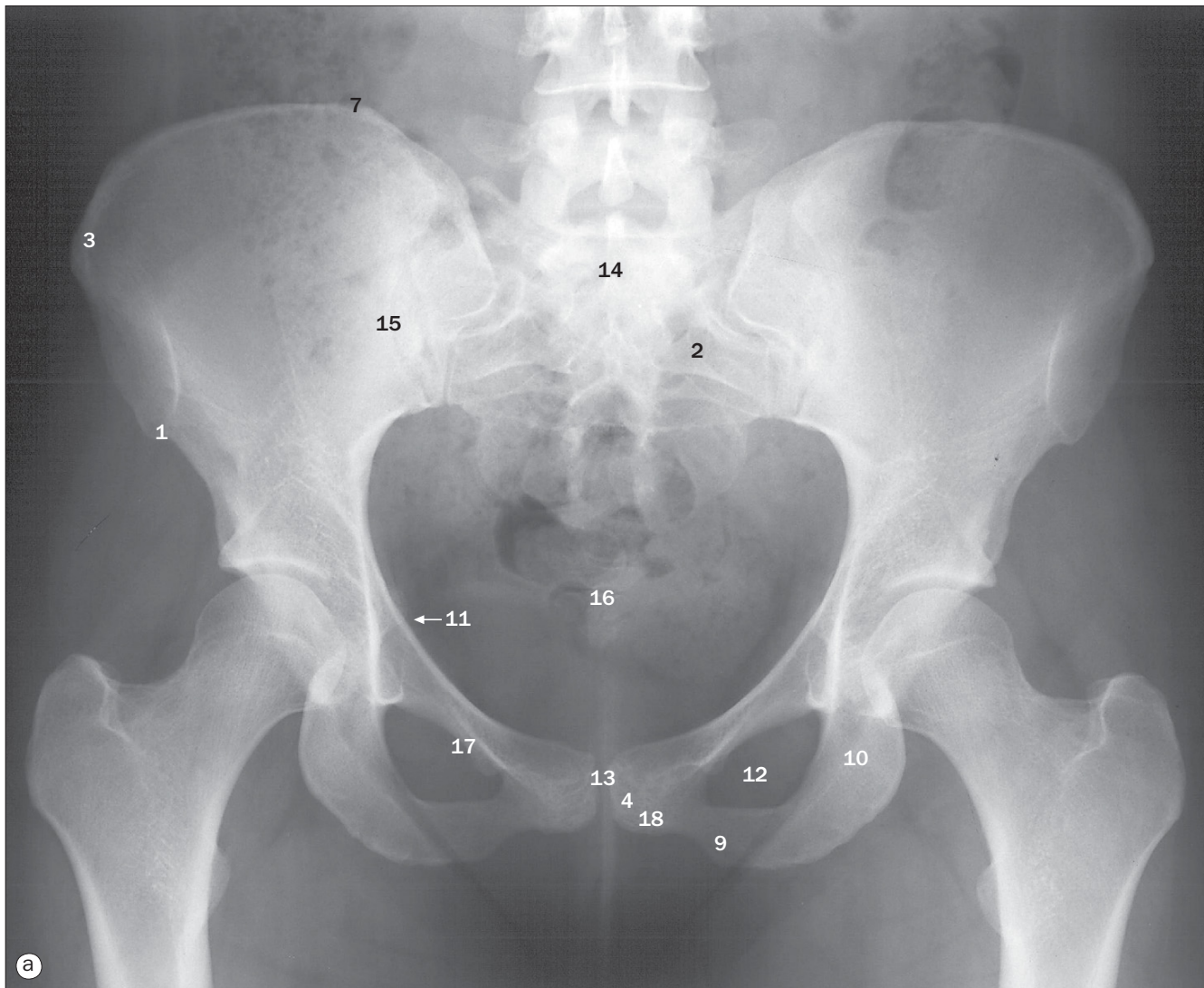
Abdomen and pelvis – Non cross-sectional





Supine abdominal radiograph.

- | | | |
|--|----------------------------|---------------------------|
| 1 Gas in fundus of stomach | 7 Hepatic flexure of colon | 14 Spleen |
| 2 Gas in body of stomach | 8 Splenic flexure of colon | 15 Properitoneal fat line |
| 3 Gas in first part of duodenum (duodenal cap) | 9 Sigmoid colon | 16 Right kidney |
| 4 Ascending colon | 10 Rectum | 17 Left kidney |
| 5 Transverse colon | 11 Right psoas margin | 18 Twelfth rib |
| 6 Descending colon | 12 Left psoas margin | 19 Gas in ileum |
| | 13 Liver | 20 Gas in caecum |

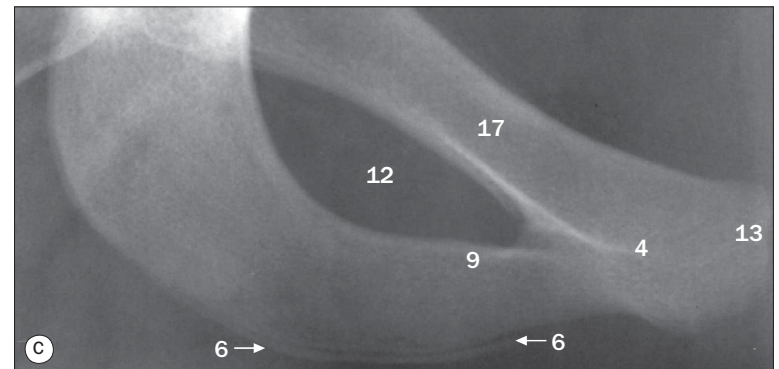
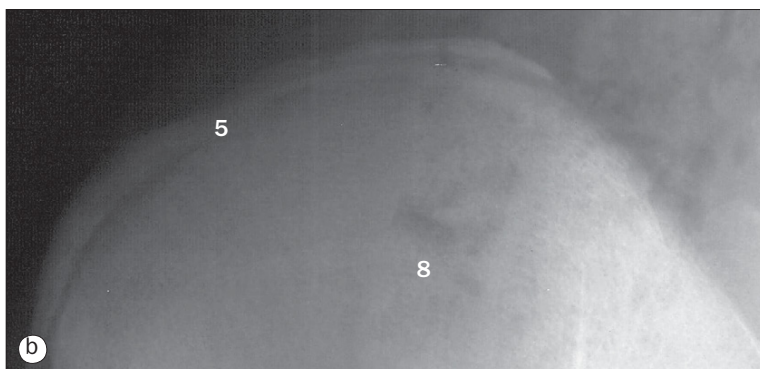


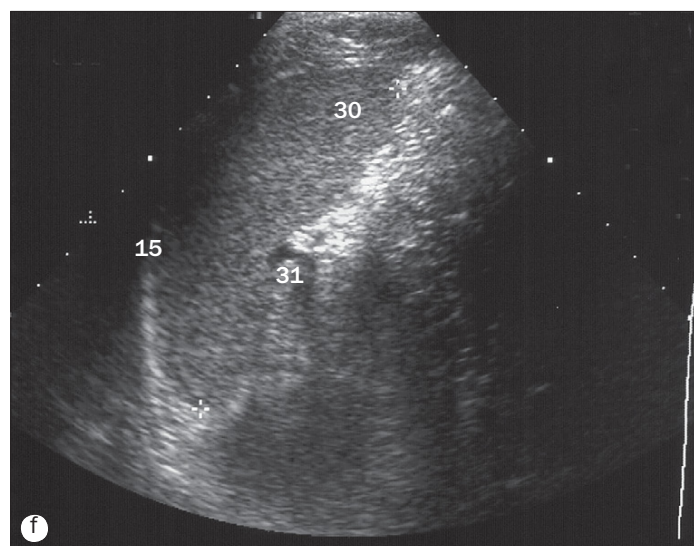
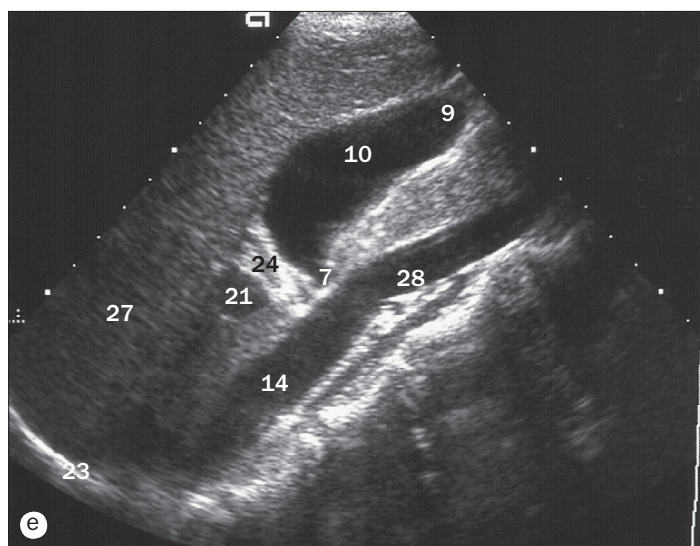
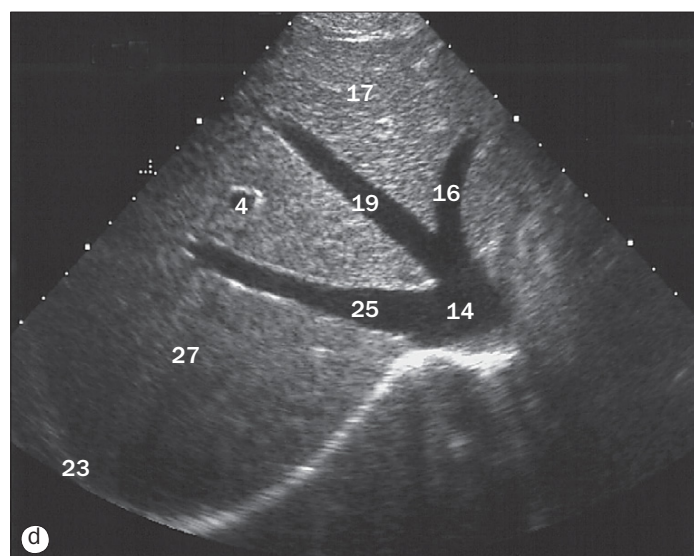
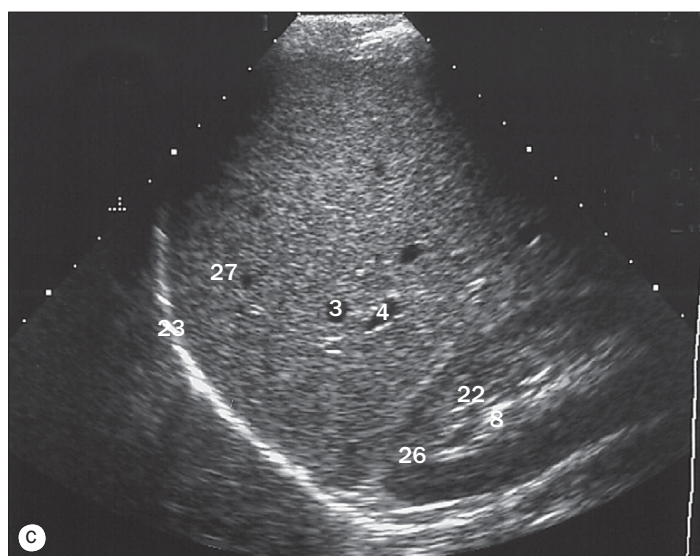
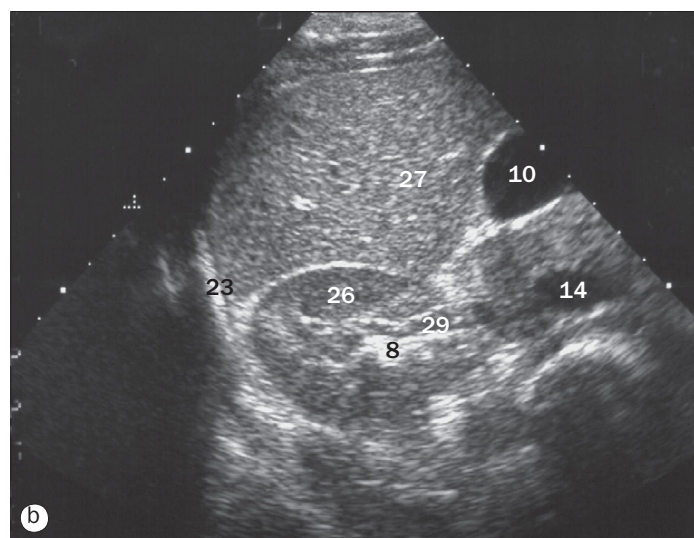
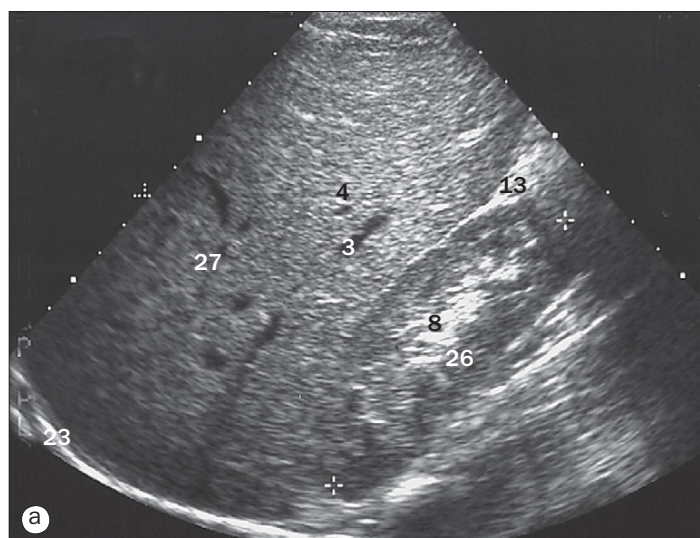
(a) Pelvis and hips of an adult female, anteroposterior projection.
(b) and (c) Pelvis of a 17-year-old male, anteroposterior projections.

- 1 Anterior inferior iliac spine
- 2 Anterior sacral foramen
- 3 Anterior superior iliac spine
- 4 Body of pubis
- 5 Centre for iliac crest
- 6 Centre for ischial tuberosity

- 7 Iliac crest
- 8 Ilium
- 9 Inferior ramus of pubis
- 10 Ischial ramus
- 11 Ischial spine
- 12 Obturator foramen

- 13 Pubic symphysis
- 14 Sacral crest
- 15 Sacro-iliac joint
- 16 Segment of coccyx
- 17 Superior ramus of pubis
- 18 Tubercle of pubis



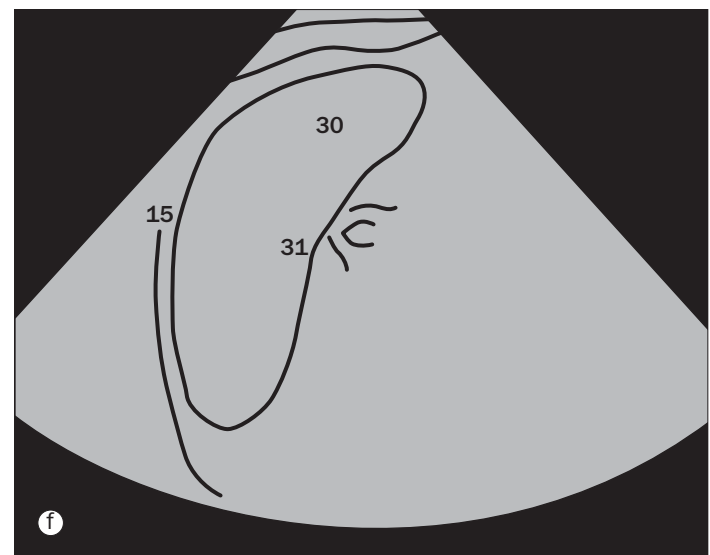
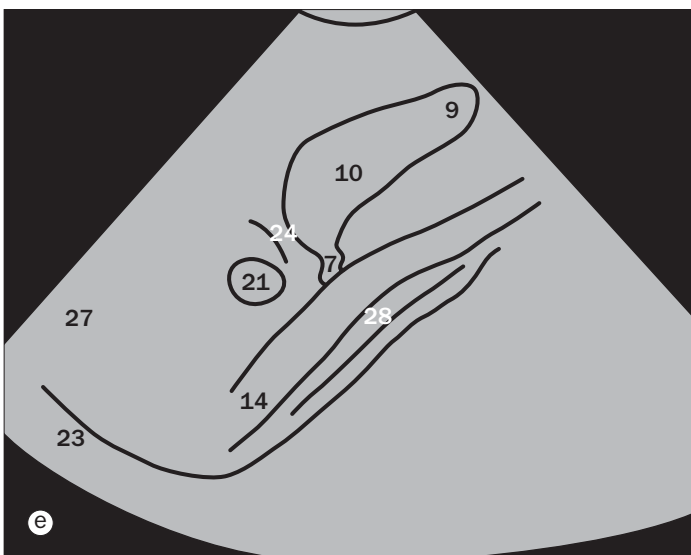
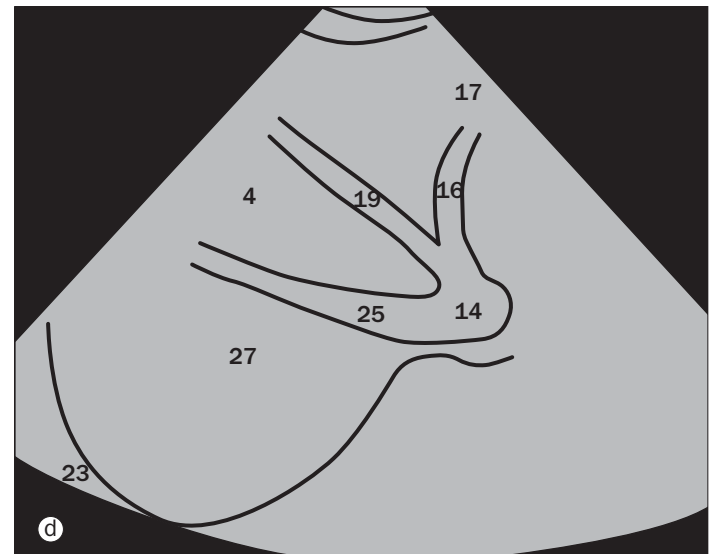
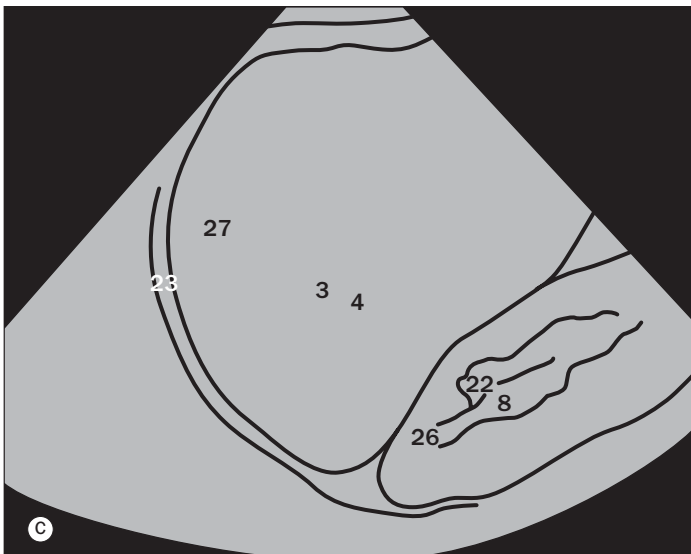
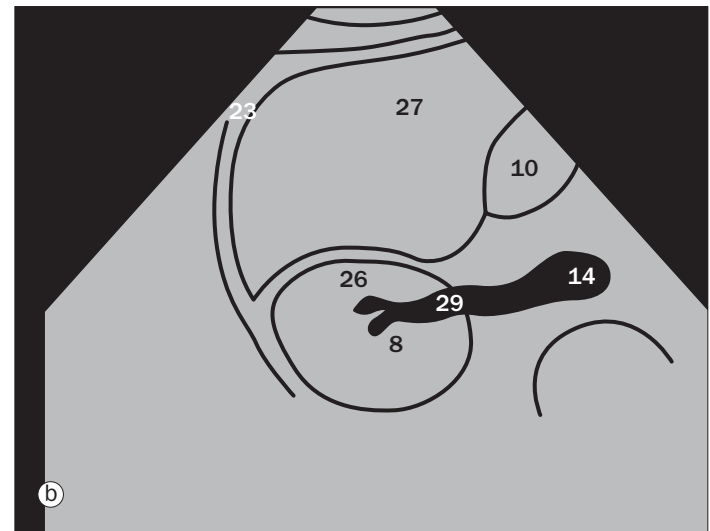
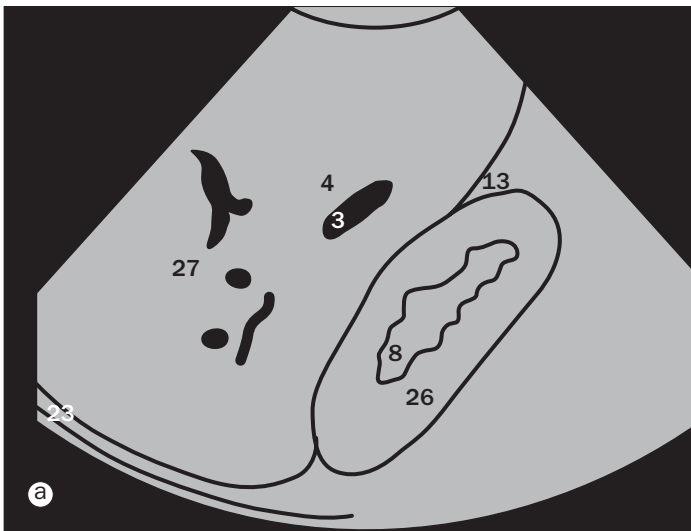


(a)–(f) Abdominal ultrasound, sagittal and parasagittal views.

1 Abdominal aorta
2 Body of pancreas
3 Branch of hepatic vein
4 Branch of portal vein
5 Coeliac trunk

6 Common bile duct
7 Cystic duct
8 Fat in renal sinus
9 Fundus of gall bladder
10 Gall bladder

11 Head of pancreas
12 Hepatic artery
13 Hepatorenal recess
14 Inferior vena cava
15 Left dome of diaphragm

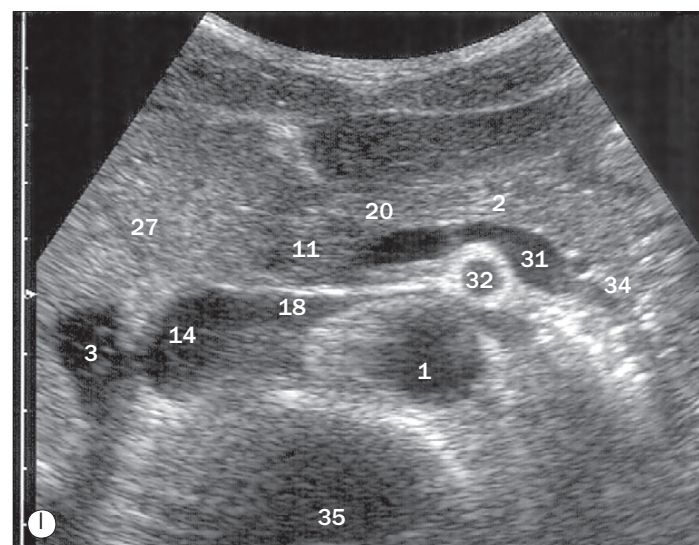
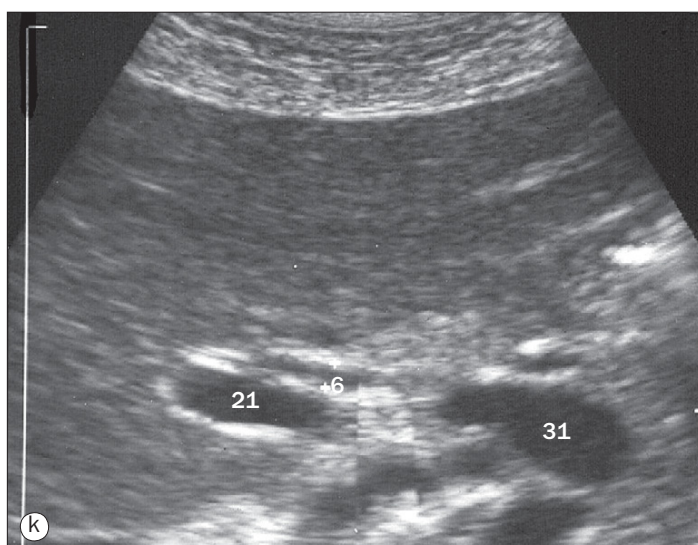
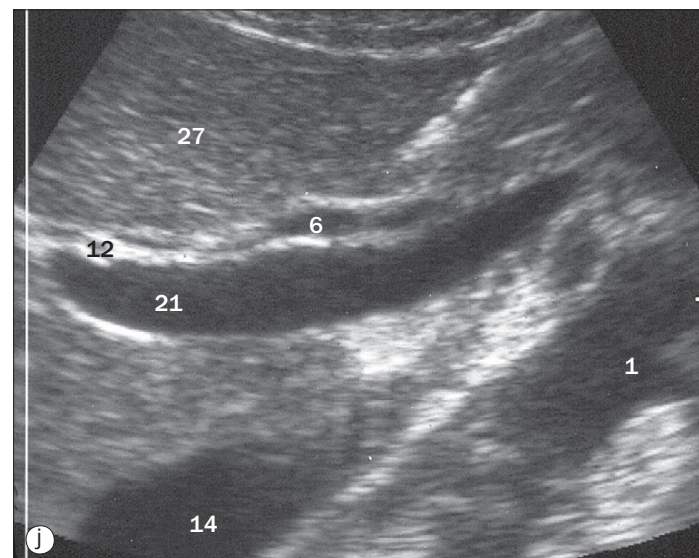
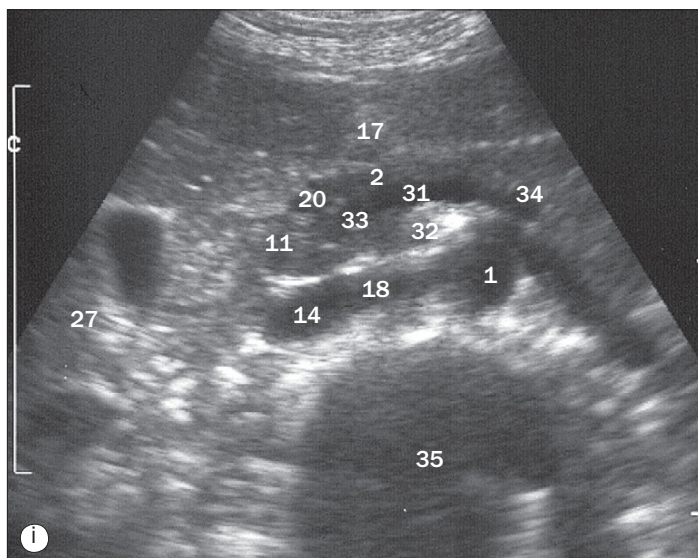
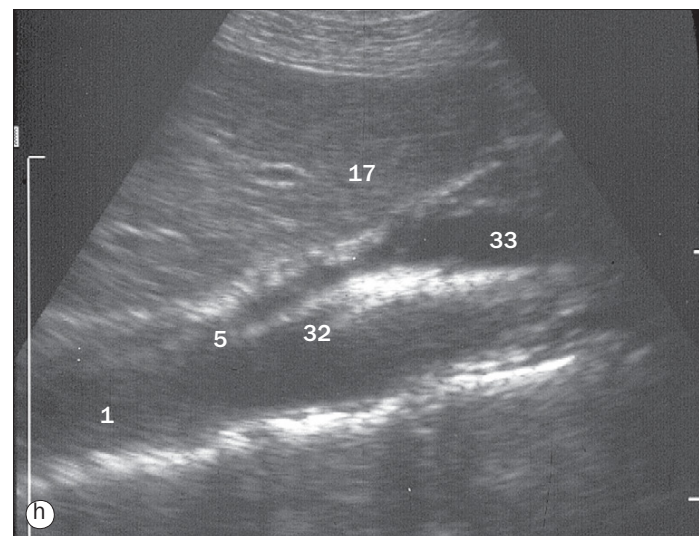
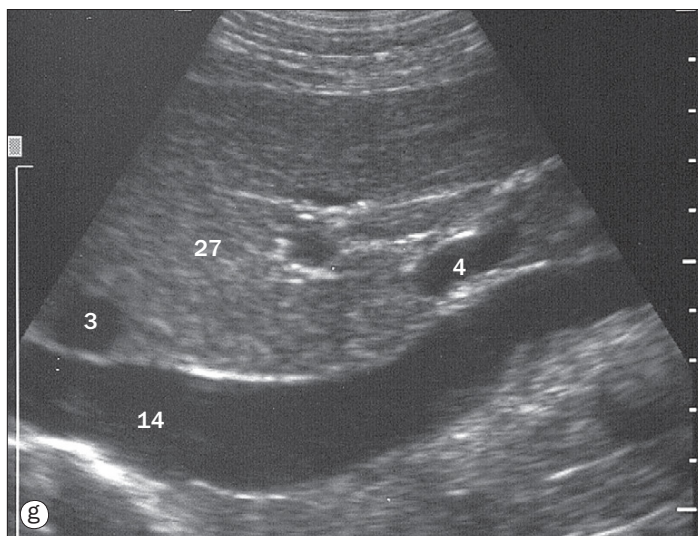


(a)–(f) Line diagrams of ultrasound images opposite.

16 Left hepatic vein
17 Left lobe of liver
18 Left renal vein
19 Middle hepatic vein
20 Neck of pancreas
21 Portal vein
22 Renal papilla

23 Right dome of diaphragm
24 Right hepatic artery
25 Right hepatic vein
26 Right kidney
27 Right lobe of liver
28 Right renal artery
29 Right renal vein

30 Spleen
31 Splenic vein
32 Superior mesenteric artery
33 Superior mesenteric vein
34 Tail of pancreas
35 Vertebral body

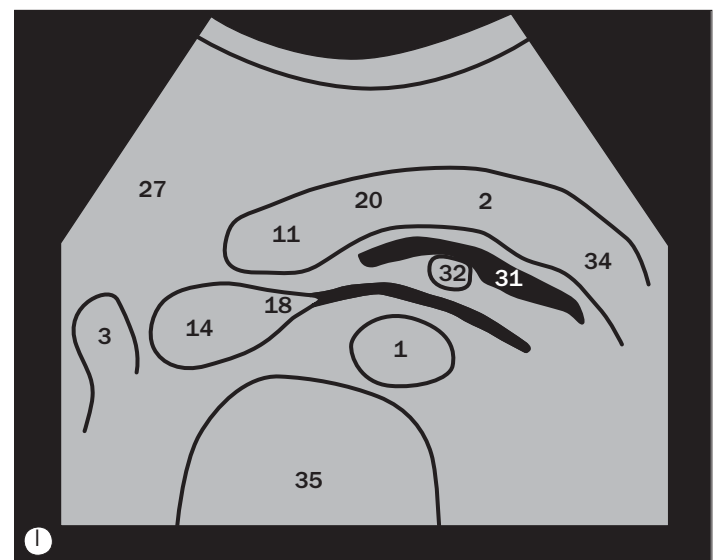
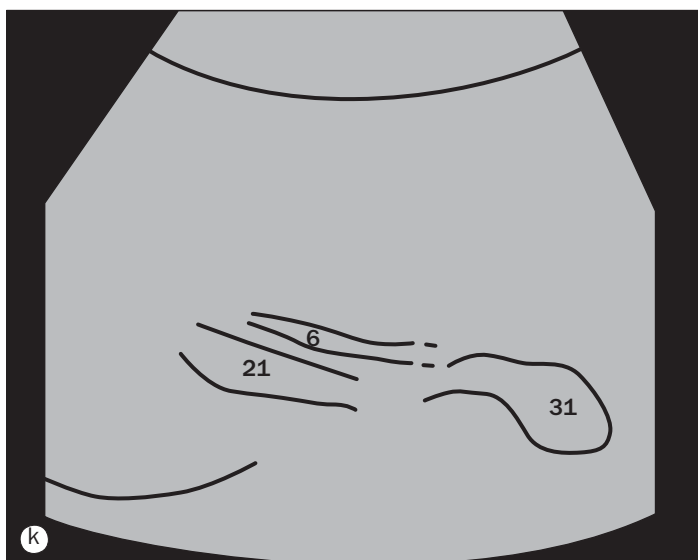
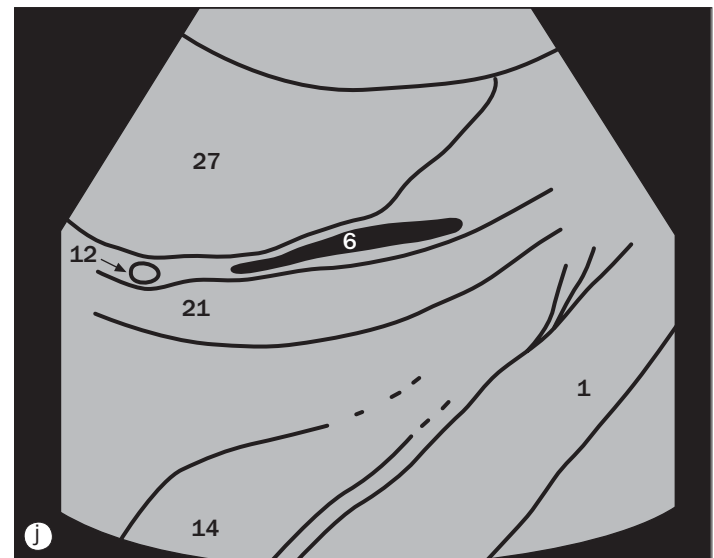
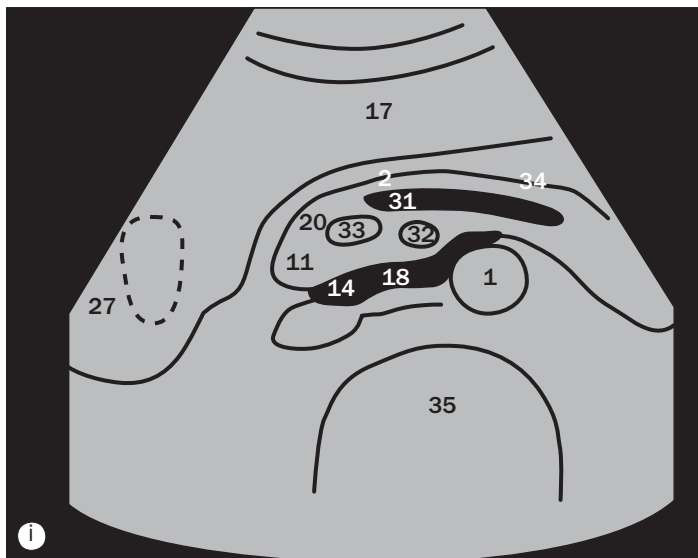
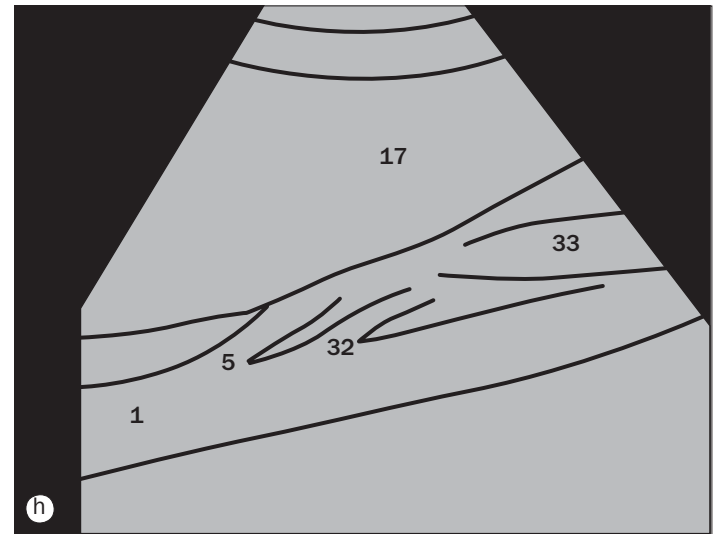
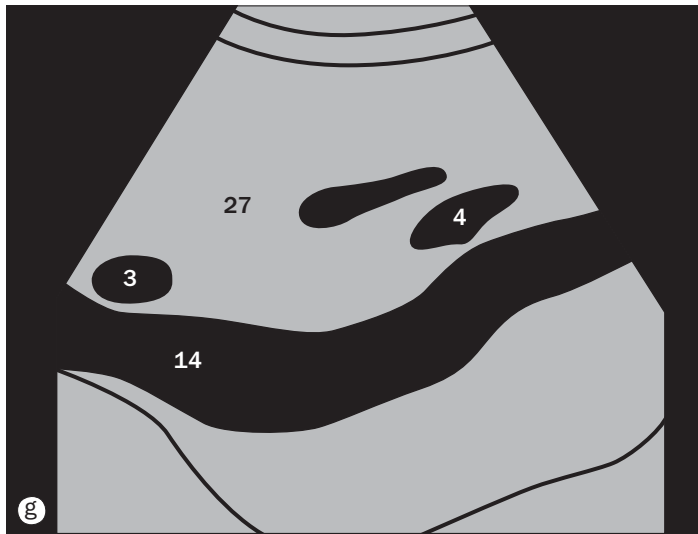


Abdominal ultrasound, (g)–(h) sagittal, (i)–(l) transverse and transverse oblique views.

- 1 Abdominal aorta
- 2 Body of pancreas
- 3 Branch of hepatic vein
- 4 Branch of portal vein
- 5 Coeliac trunk

- 6 Common bile duct
- 7 Cystic duct
- 8 Fat in renal sinus
- 9 Fundus of gall bladder
- 10 Gall bladder

- 11 Head of pancreas
- 12 Hepatic artery
- 13 Hepatorenal recess
- 14 Inferior vena cava
- 15 Left dome of diaphragm

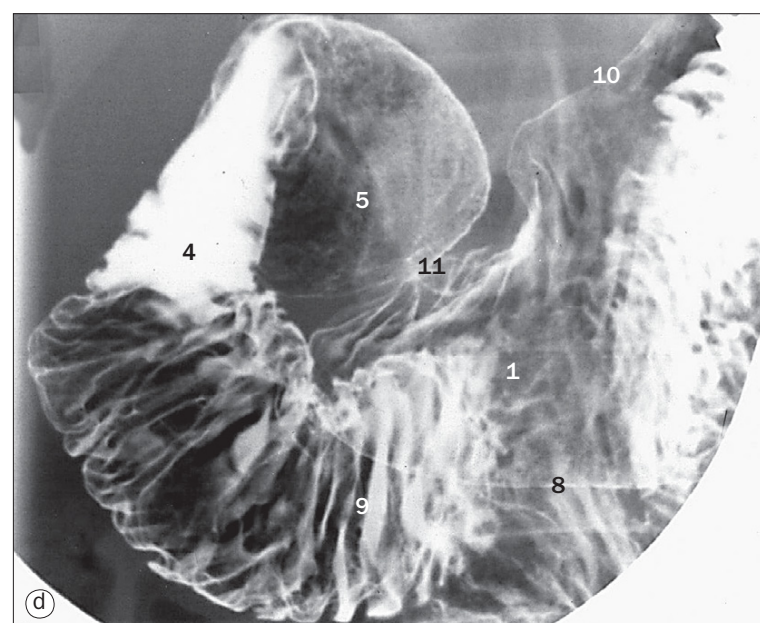
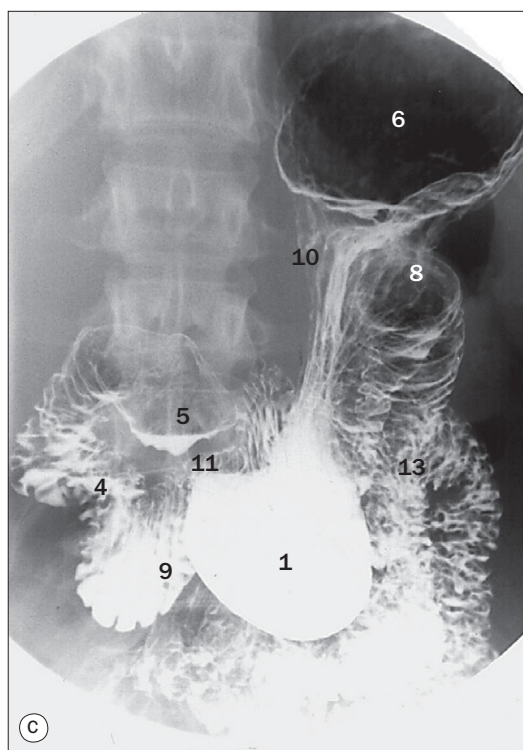
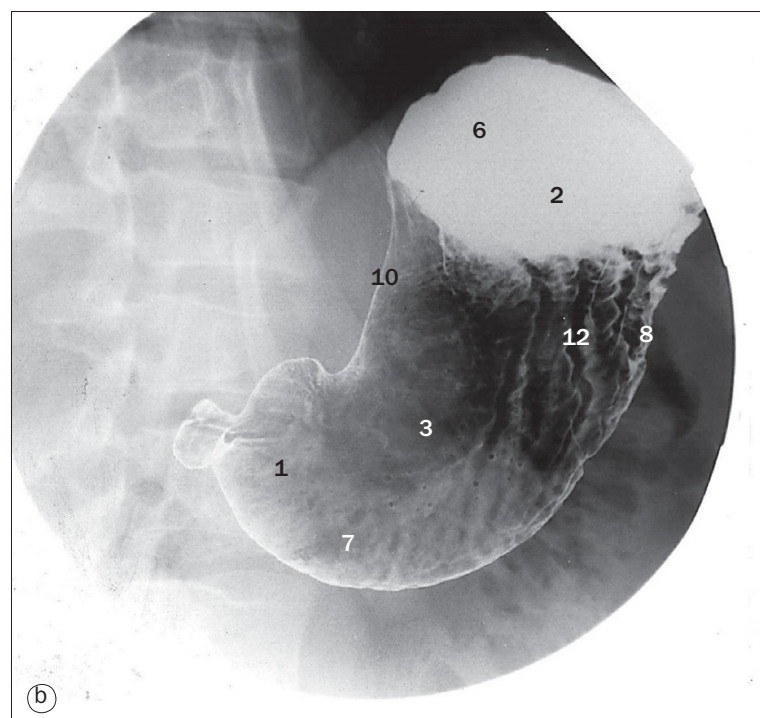
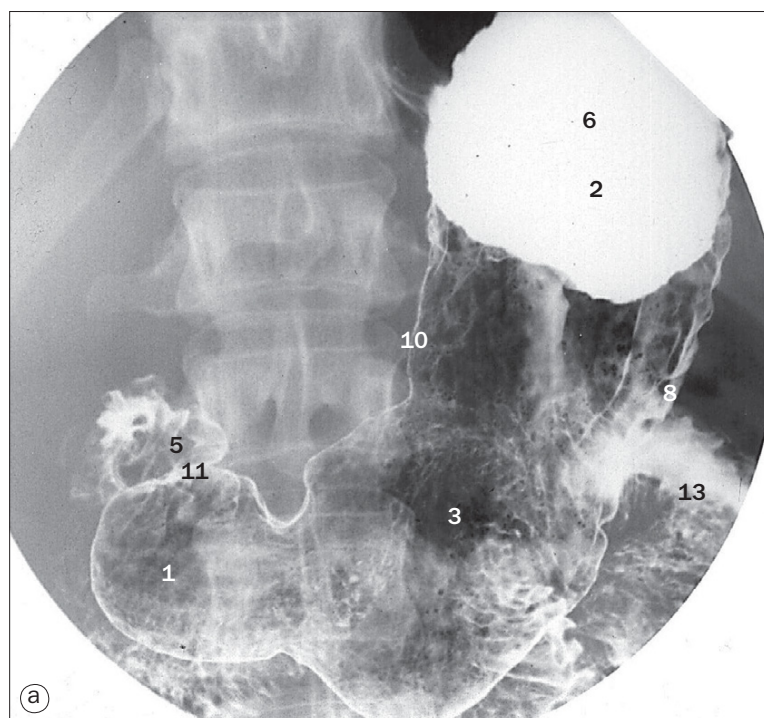


(g)–(l) Line diagrams of ultrasound images opposite.

16 Left hepatic vein
17 Left lobe of liver
18 Left renal vein
19 Middle hepatic vein
20 Neck of pancreas
21 Portal vein
22 Renal papilla

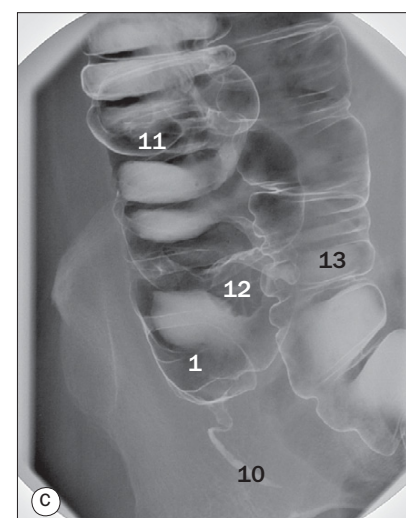
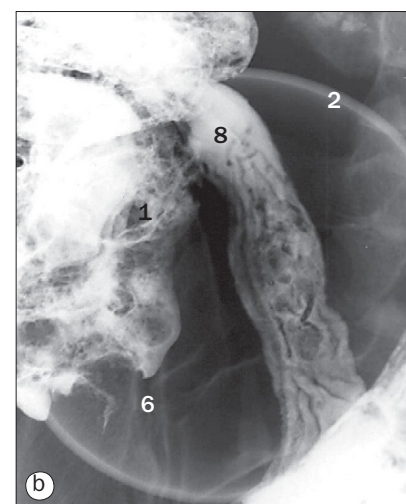
23 Right dome of diaphragm
24 Right hepatic artery
25 Right hepatic vein
26 Right kidney
27 Right lobe of liver
28 Right renal artery
29 Right renal vein

30 Spleen
31 Splenic vein
32 Superior mesenteric artery
33 Superior mesenteric vein
34 Tail of pancreas
35 Vertebral body



Abdomen. Double-contrast barium meals of stomach and duodenum, (a) and (b) with the patient supine (to show the mucosa of the stomach), (c) with the patient erect, (d) with the patient in a supine oblique position (to show the duodenum).

- | | |
|---|---------------------------------------|
| 1 Antrum of stomach | 7 Gas bubbles |
| 2 Barium pooling in fundus of stomach | 8 Greater curvature of stomach |
| 3 Body of stomach | 9 Horizontal (third) part of duodenum |
| 4 Descending (second) part of duodenum | 10 Lesser curvature of stomach |
| 5 Duodenal cap (superior or first part of duodenum) | 11 Region of pyloric canal |
| 6 Fundus of stomach | 12 Rugae of stomach |
| | 13 Small bowel |



Abdomen, barium follow-throughs, (a) with the patient supine, (b) showing a localised view of the terminal ileum and (c) ileocaecal valve. Anteroposterior radiographs.

- | | |
|--|---|
| 1 Caecum | 8 Terminal ileum |
| 2 Compression device | 9 Valvulae conniventes (plicae circulares) of jejunum |
| 3 Descending (second) part of duodenum | 10 Appendix |
| 4 Proximal ileum | 11 Ascending colon |
| 5 Proximal jejunum | 12 Ileocaecal valve |
| 6 Right sacro-iliac joint | 13 Transverse colon |
| 7 Stomach | |



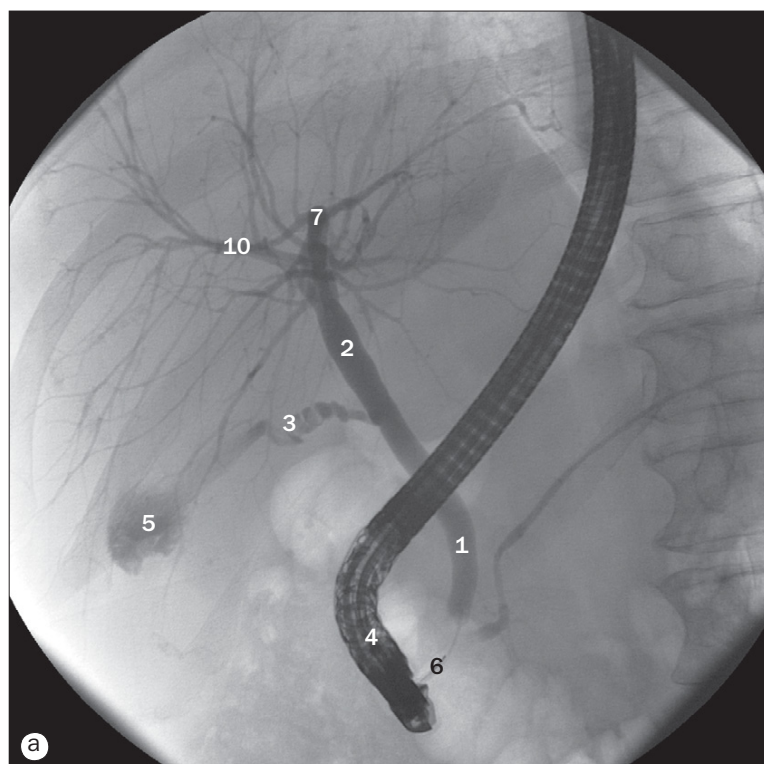
Abdomen, double-contrast barium enema of the large bowel (colon).

- | | |
|---|--|
| 1 Ascending portion of colon | 6 Right colic (hepatic) flexure of colon |
| 2 Caecum | 7 Sacculations (hastrations) of colon |
| 3 Descending portion of colon | 8 Sigmoid colon |
| 4 Left colic (splenic) flexure of colon | 9 Terminal ileum |
| 5 Rectum | 10 Transverse portion of colon |



CT colonography.

- | | |
|--------------------|---------------------------------|
| 1 Rectum | 6 Splenic flexure (left colic) |
| 2 Sigmoid colon | 7 Hepatic flexure (right colic) |
| 3 Ascending colon | 8 Caecum |
| 4 Descending colon | 9 Terminal ileum |
| 5 Transverse colon | |



(a) Endoscopic retrograde cholangiopancreatogram (ERCP).

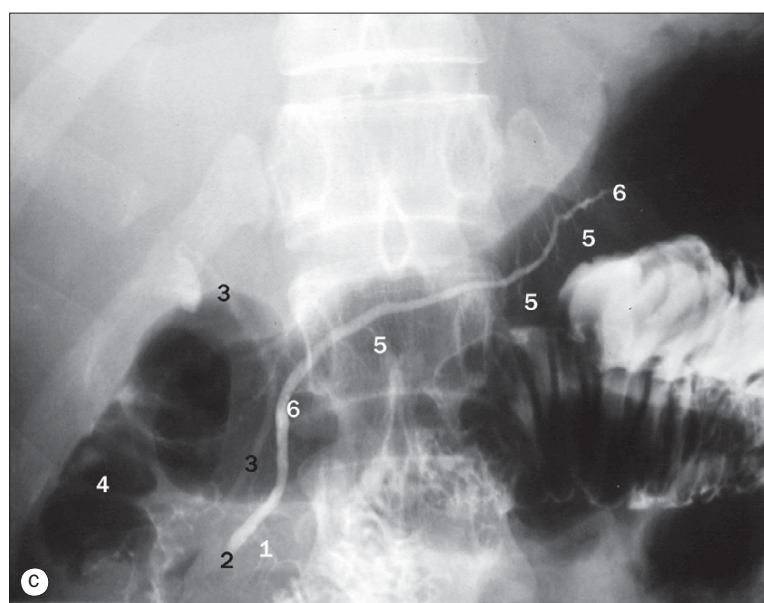


(b) Magnetic cholangiopancreatogram (MRCP).

- 1 Common bile duct
- 2 Common hepatic duct
- 3 Cystic duct
- 4 Endoscope in duodenum

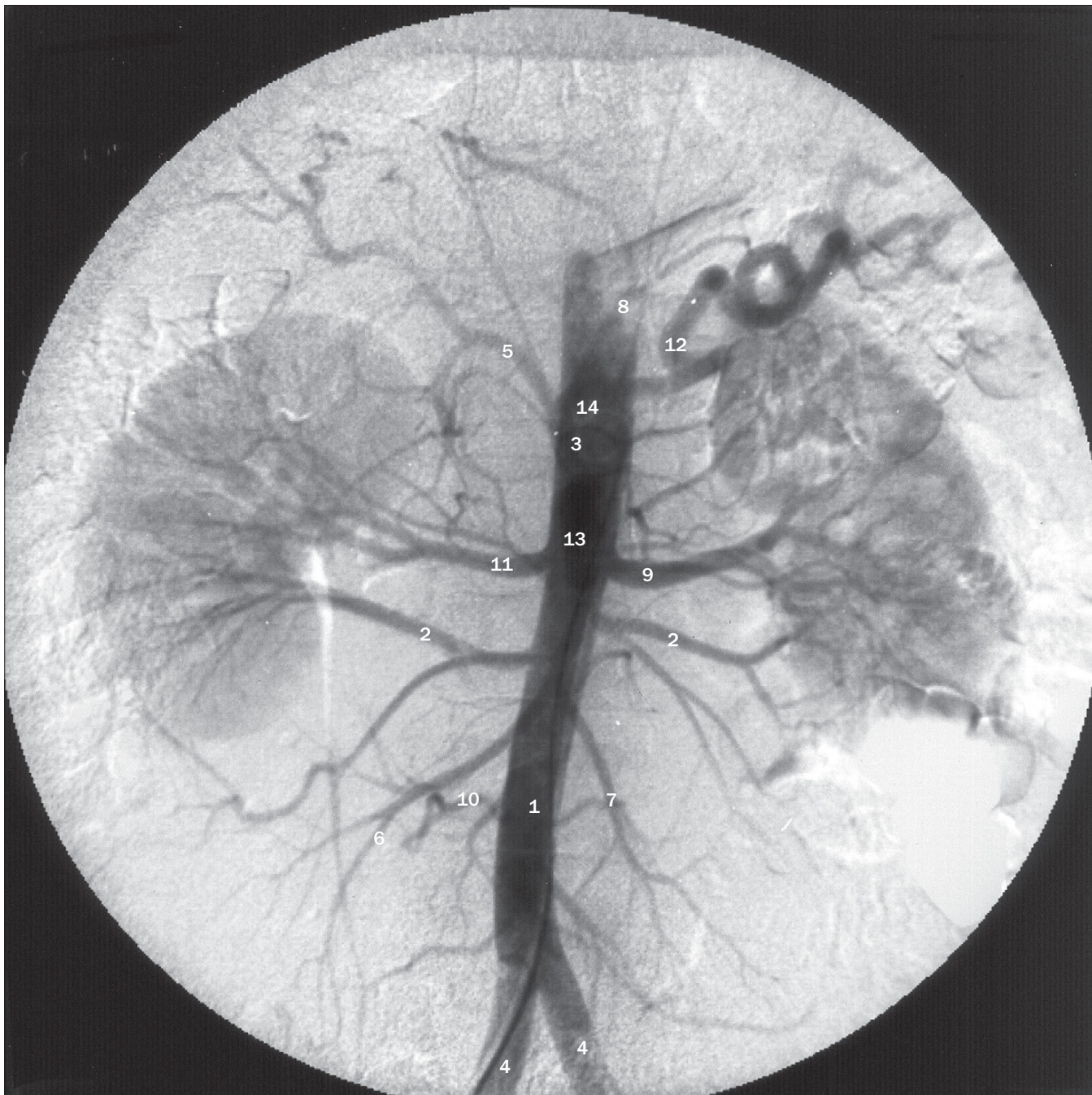
- 5 Gall bladder
- 6 Hepatopancreatic (Vater's) ampulla
- 7 Left hepatic duct

- 8 Neck of gall bladder
- 9 Pancreatic duct
- 10 Right hepatic duct



(c) ERCP.

- 1 Accessory pancreatic duct (Santonni's)
- 2 Ampullary part of pancreatic duct
- 3 Common bile duct
- 4 Contrast and gas in descending (second) part of duodenum
- 5 Intralobular ducts
- 6 Main pancreatic duct

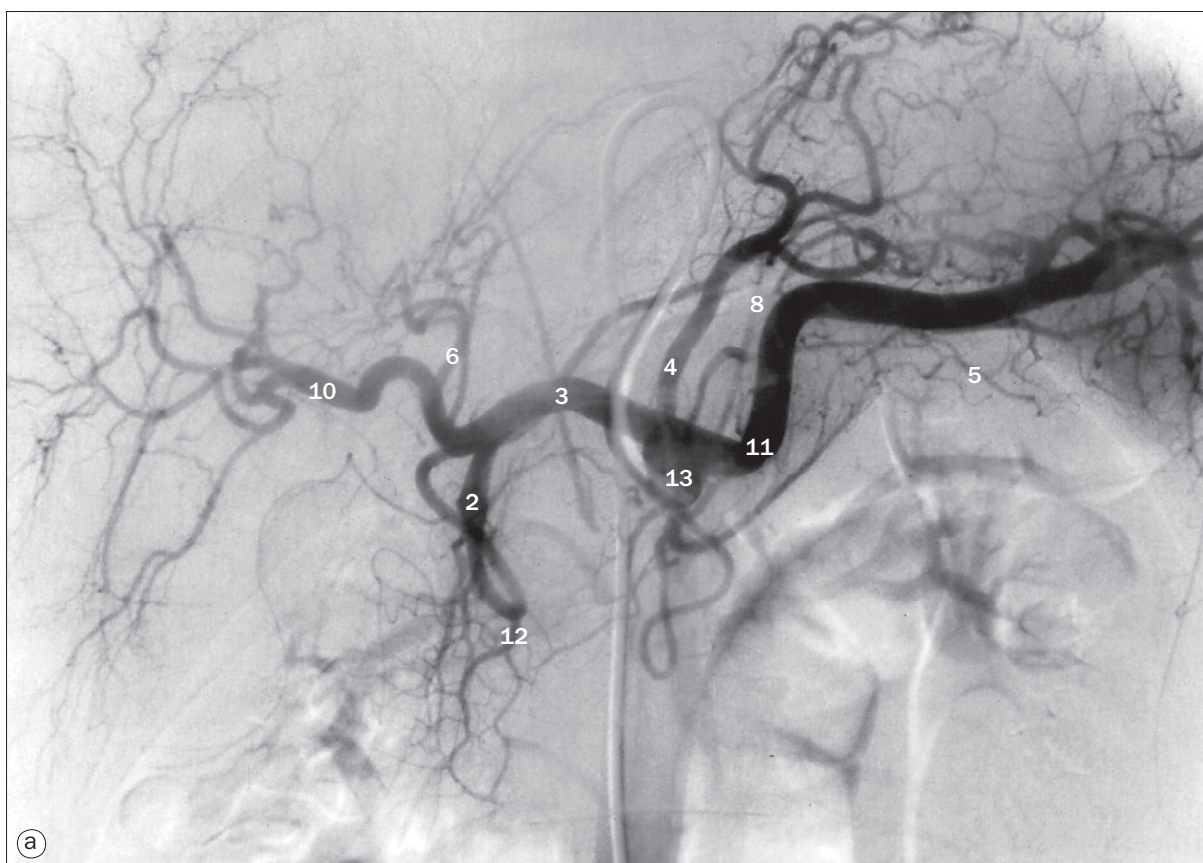


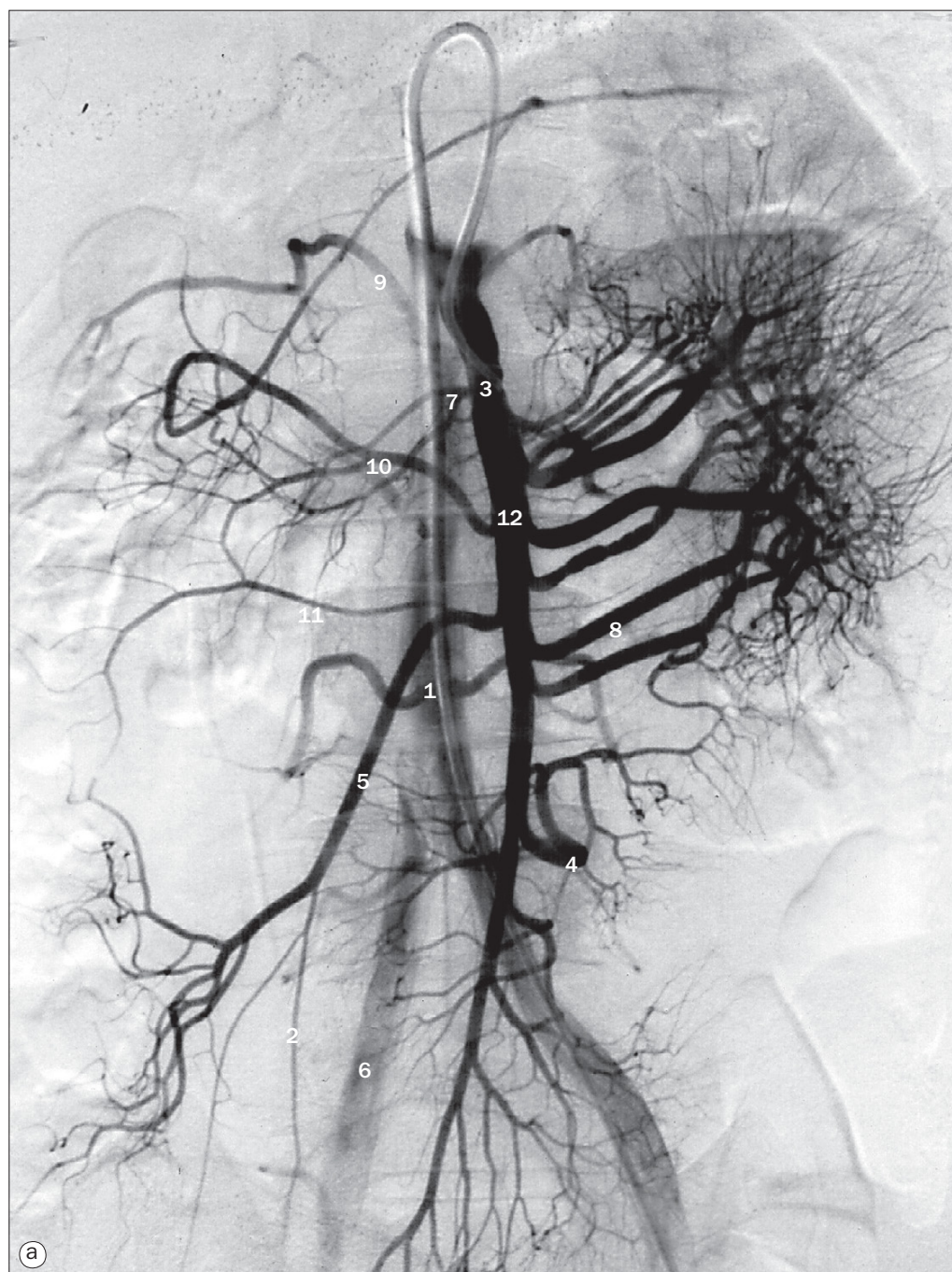
Abdominal aortogram.

- 1 Abdominal aorta
- 2 Accessory renal arteries
- 3 Coeliac trunk
- 4 Common iliac arteries
- 5 Hepatic artery
- 6 Ileocolic artery
- 7 Jejunal branches of superior mesenteric artery
- 8 Left gastric artery
- 9 Left renal artery
- 10 Lumbar arteries
- 11 Right renal artery
- 12 Splenic artery
- 13 Superior mesenteric artery
- 14 Tip of pigtail catheter in abdominal aorta

(a) and (b) Subtracted coeliac trunk arteriograms.

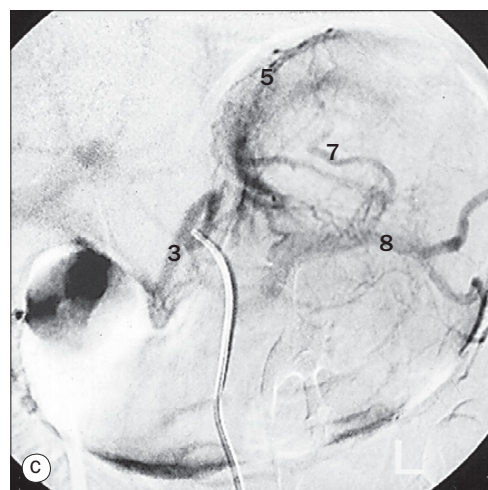
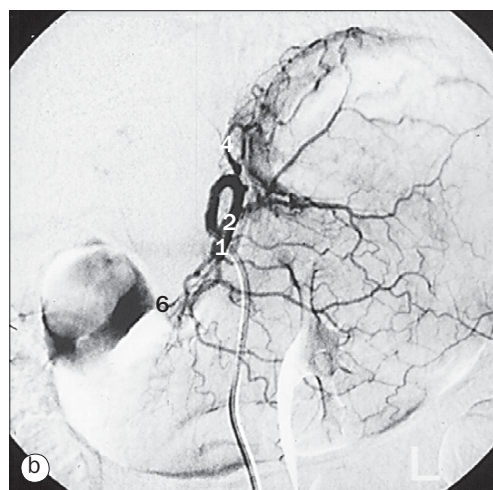
- 1 Dorsal pancreatic artery
- 2 Gastroduodenal artery
- 3 Hepatic artery
- 4 Left gastric artery
- 5 Left gastro-epiploic artery
- 6 Left hepatic artery
- 7 Pancreatica magna artery
- 8 Phrenic artery
- 9 Right gastro-epiploic artery
- 10 Right hepatic artery
- 11 Splenic artery
- 12 Superior pancreaticoduodenal artery
- 13 Tip of catheter in coeliac trunk
- 14 Transverse pancreatic artery





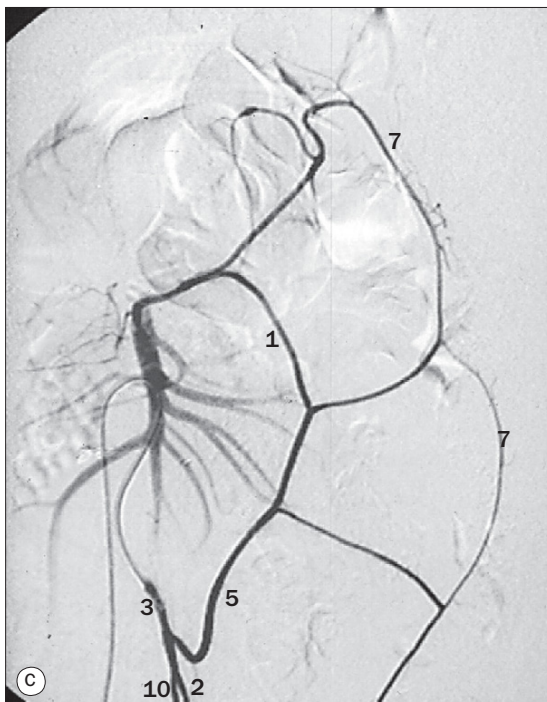
(a) Subtracted superior mesenteric arteriogram.

- 1 Aorta
- 2 Appendicular artery
- 3 Catheter with tip selectively in superior mesenteric artery
- 4 Ileal branches of superior mesenteric artery
- 5 Ileocolic artery
- 6 Iliac artery
- 7 Inferior pancreaticoduodenal artery
- 8 Jejunal branches of superior mesenteric artery
- 9 Lumbar arteries arising from abdominal aorta
- 10 Middle colic artery
- 11 Right colic artery
- 12 Superior mesenteric artery



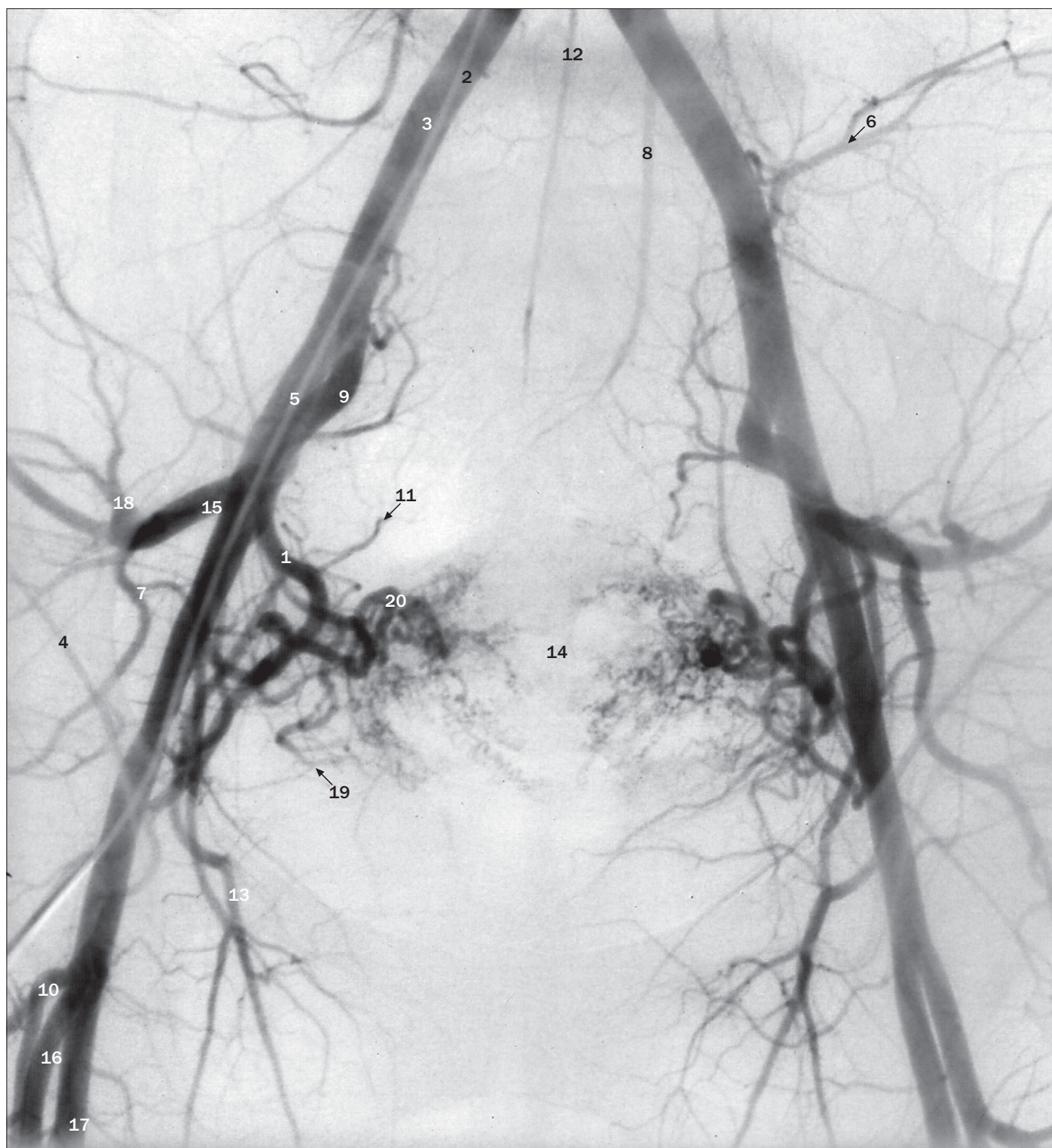
(b) Gastric arteries, (c) gastric veins.

- 1 Catheter in origin of left gastric artery
- 2 Left gastric artery
- 3 Left gastric vein
- 4 Oesophageal branch of left gastric artery
- 5 Oesophageal branches of left gastric vein
- 6 Right gastric artery
- 7 Short gastric veins
- 8 Splenic vein



- 1 Ascending branch of left colic artery
- 2 Descending branch of left colic artery
- 3 Inferior mesenteric artery
- 4 Inferior mesenteric vein
- 5 Left colic artery
- 6 Left colic vein
- 7 Marginal artery of Drummond
- 8 Sigmoid arteries
- 9 Sigmoid vein
- 10 Superior rectal artery
- 11 Superior rectal vein
- 12 Tip of catheter in inferior mesenteric artery

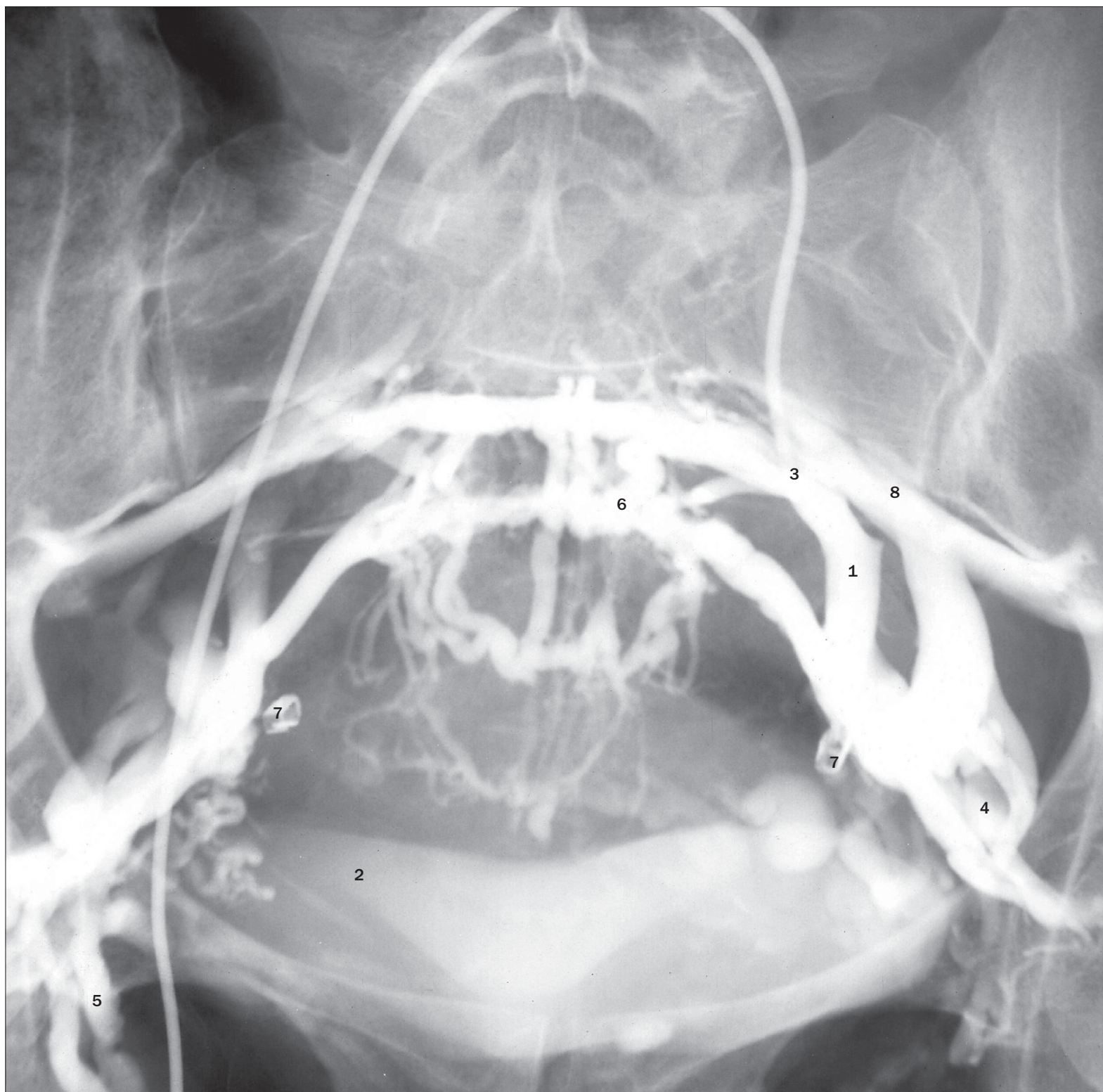
(a)–(c) Inferior mesenteric arteriograms.



Subtracted pelvic arteriogram.

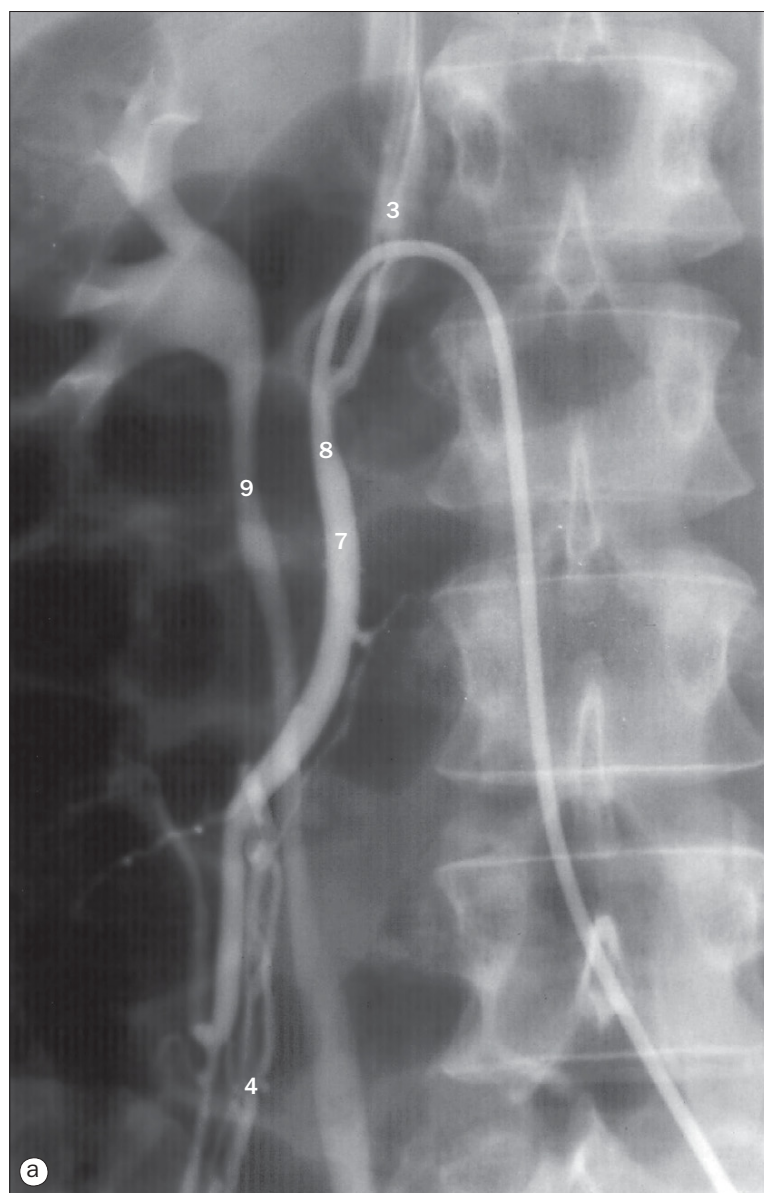
This anteroposterior film of the pelvis demonstrates both the internal and the external iliac arteries and their branches. Many of the vessels are superimposed: to see them more clearly oblique projections could be obtained. The contrast medium injected into the arteries is excreted by the kidneys, and a full bladder may obscure the branches. Selective catheterisation of the internal and external iliac arteries using a preshaped catheter gives better detail without superimposition of the vessels.

- | | |
|--|---|
| 1 Anterior trunk of internal iliac artery | 10 Lateral circumflex femoral artery |
| 2 Catheter introduced into distal abdominal aorta via right femoral artery | 11 Lateral sacral artery |
| 3 Common iliac artery | 12 Median sacral artery |
| 4 Deep circumflex iliac artery | 13 Obturator artery |
| 5 External iliac artery | 14 Position of uterus |
| 6 Iliolumbar artery | 15 Posterior trunk of internal iliac artery |
| 7 Inferior gluteal artery | 16 Profunda femoris artery |
| 8 Inferior mesenteric artery | 17 Superficial femoral artery |
| 9 Internal iliac artery | 18 Superior gluteal artery |
| | 19 Superior vesical artery |
| | 20 Uterine artery |



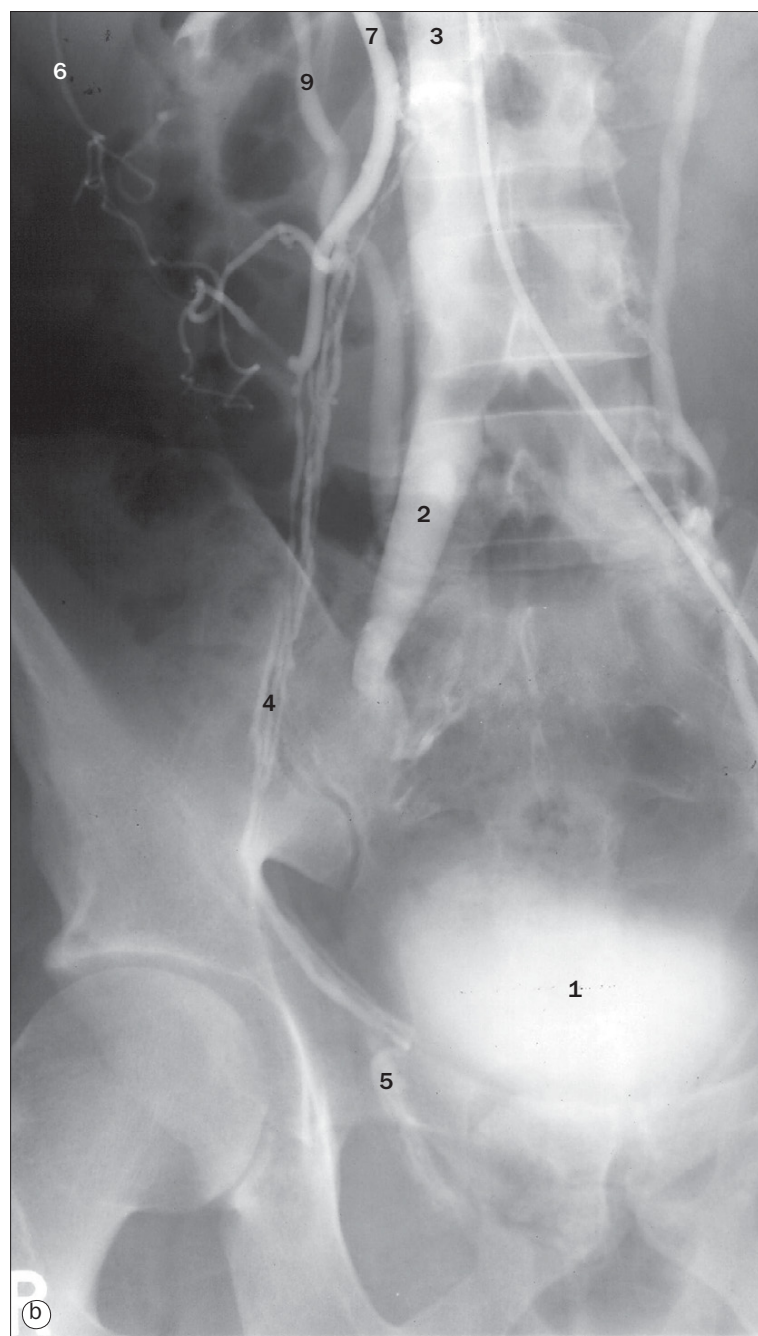
Female pelvic venogram.

- 1 Anterior division of internal iliac vein
- 2 Bladder containing contrast medium
- 3 Catheter introduced via right femoral vein, with tip in left internal iliac vein
- 4 Inferior gluteal veins
- 5 Obturator veins
- 6 Sacral plexus of veins
- 7 Sterilisation clips
- 8 Superior gluteal veins

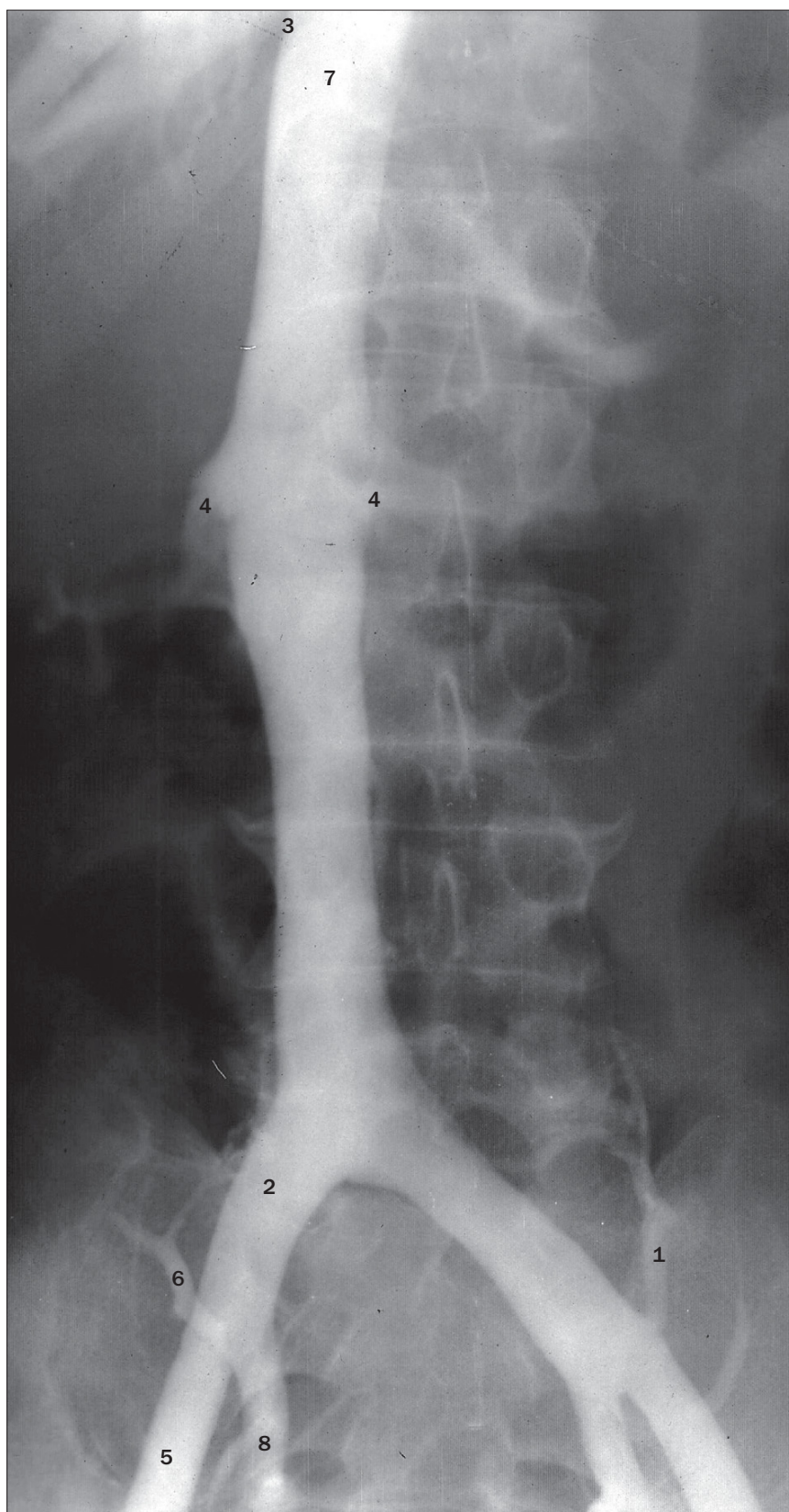


(a) and (b) Right testicular venograms.

The gonadal veins drain into one or two main veins via a venous plexus. On the left, the main vein drains into the left renal vein. It may occasionally communicate with the inferior mesenteric vein and drain into the portal venous system. On the right, the main vein usually drains into the inferior vena cava directly (as in the case illustrated), but it can drain into the right renal vein.

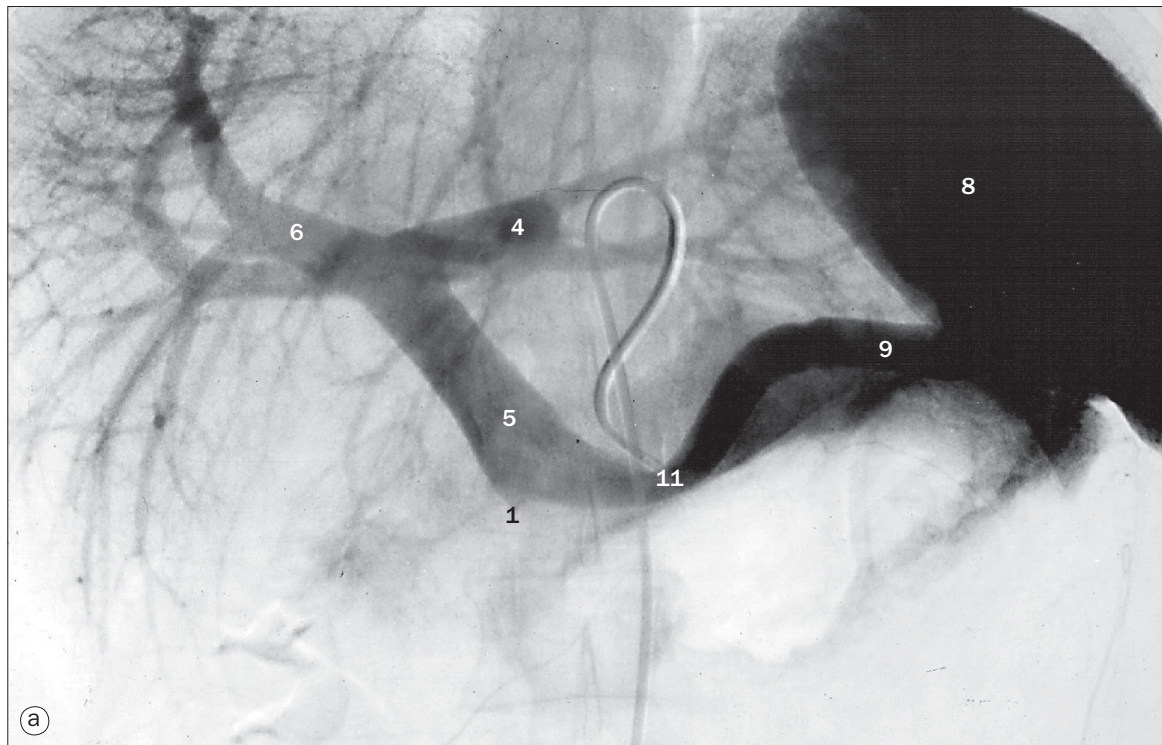


- 1 Bladder
- 2 Common iliac veins
- 3 Inferior vena cava
- 4 Pampiniform plexus of veins
- 5 Pampiniform plexus of veins (undescended testis in inguinal canal)
- 6 Renal capsular veins
- 7 Right testicular vein
- 8 Tip of catheter in right testicular vein, introduced via left femoral vein
- 9 Ureter



Inferior vena cavogram.

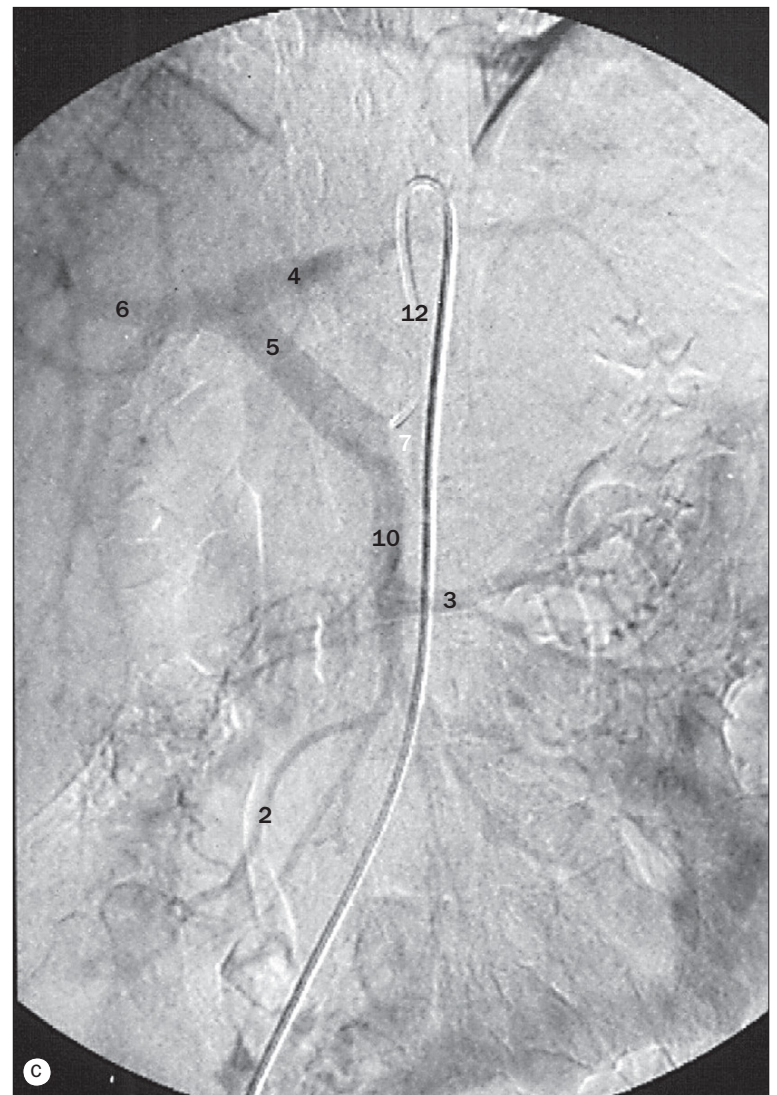
- 1 Ascending lumbar vein
- 2 Common iliac vein
- 3 Entrance of hepatic veins
- 4 Entrance of renal veins
- 5 External iliac vein
- 6 Iliolumbar vein
- 7 Inferior vena cava
- 8 Internal iliac vein

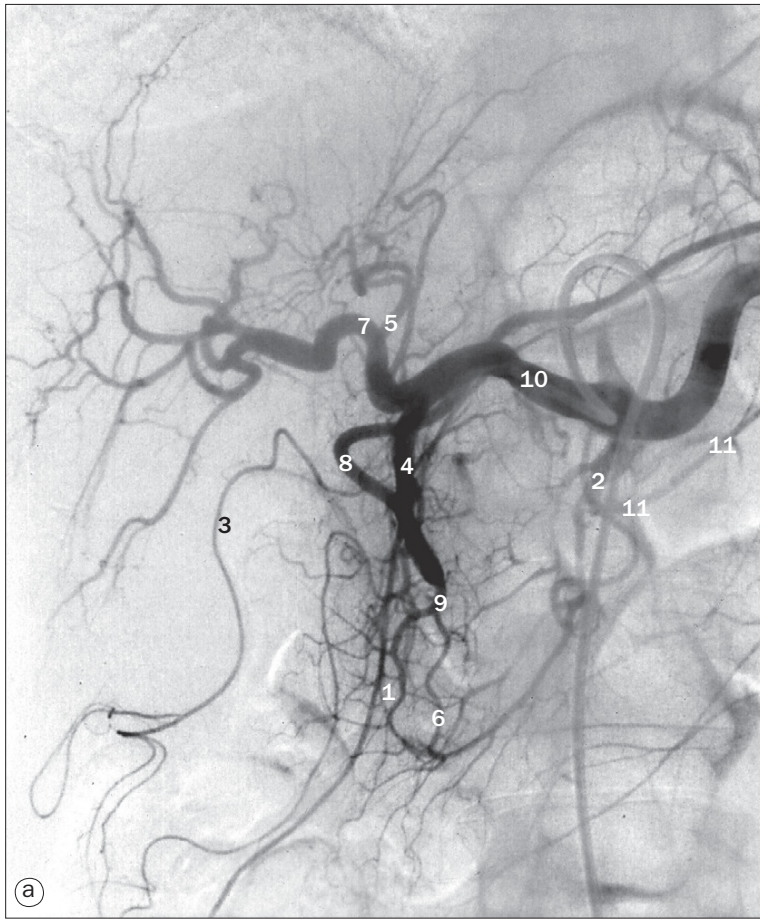


(a) Indirect splenoportogram.

(b) and (c) Venous phase of superior mesenteric arteriogram.

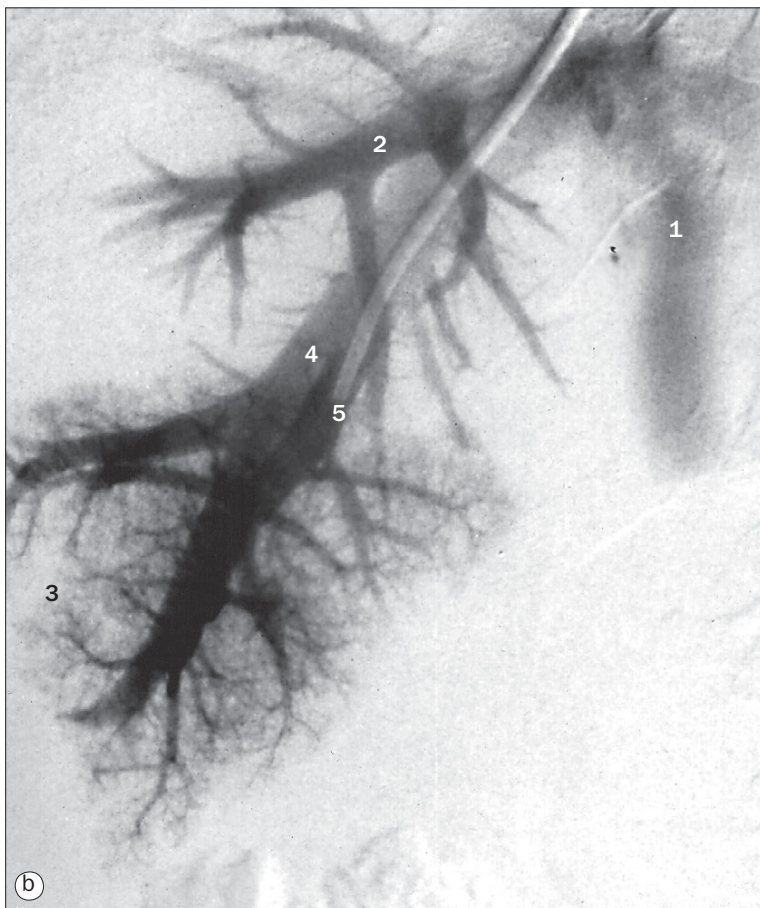
- 1 Entry of superior mesenteric vein
- 2 Ileocolic vein
- 3 Jejunal vein
- 4 Left branch of portal vein
- 5 Portal vein
- 6 Right branch of portal vein
- 7 Site of entry of splenic vein
- 8 Spleen
- 9 Splenic vein
- 10 Superior mesenteric vein
- 11 Tip of catheter in splenic artery
- 12 Tip of catheter in superior mesenteric artery





(a) Subtracted hepatic arteriogram.

- 1 Anterior branch of inferior pancreaticoduodenal artery
- 2 Dorsal pancreatic artery
- 3 Epiploic artery
- 4 Gastroduodenal artery
- 5 Left branch of hepatic artery
- 6 Posterior branch of superior pancreaticoduodenal artery
- 7 Right branch of hepatic artery
- 8 Right gastro-epiploic artery
- 9 Superior pancreaticoduodenal artery
- 10 Tip of catheter in hepatic artery
- 11 Transverse pancreatic artery



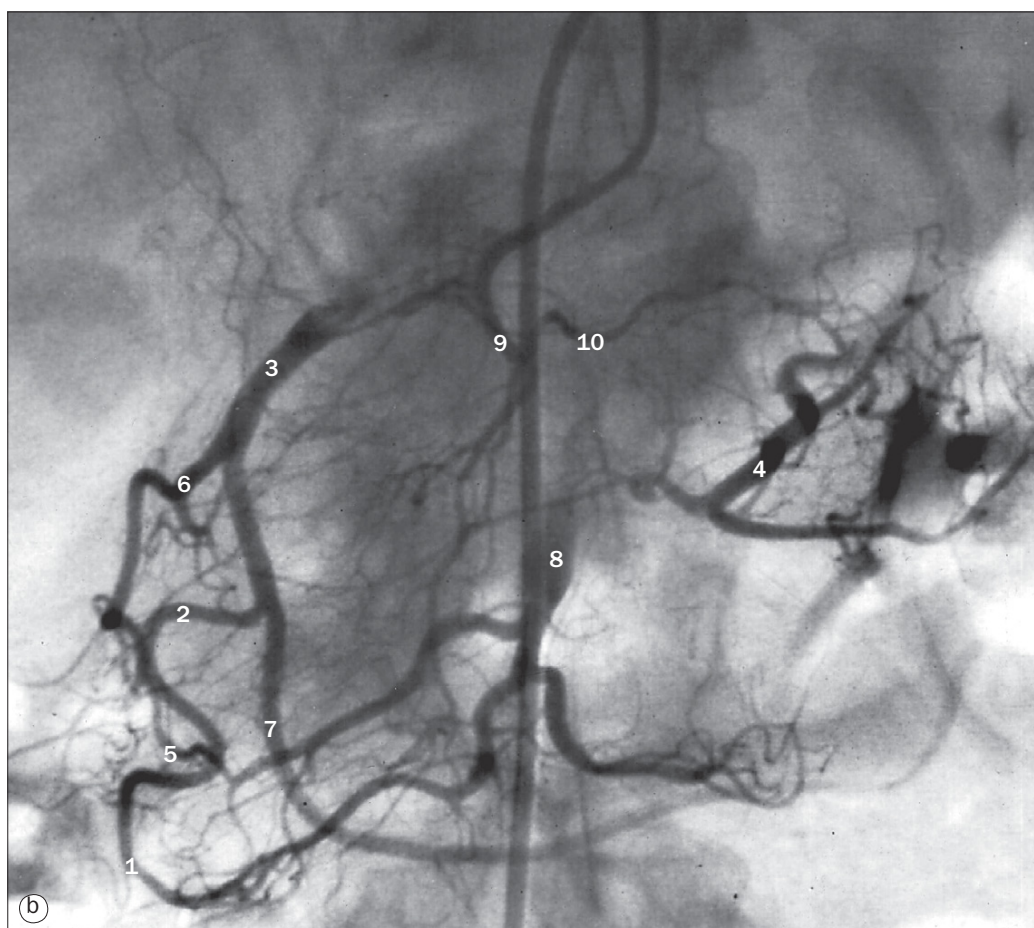
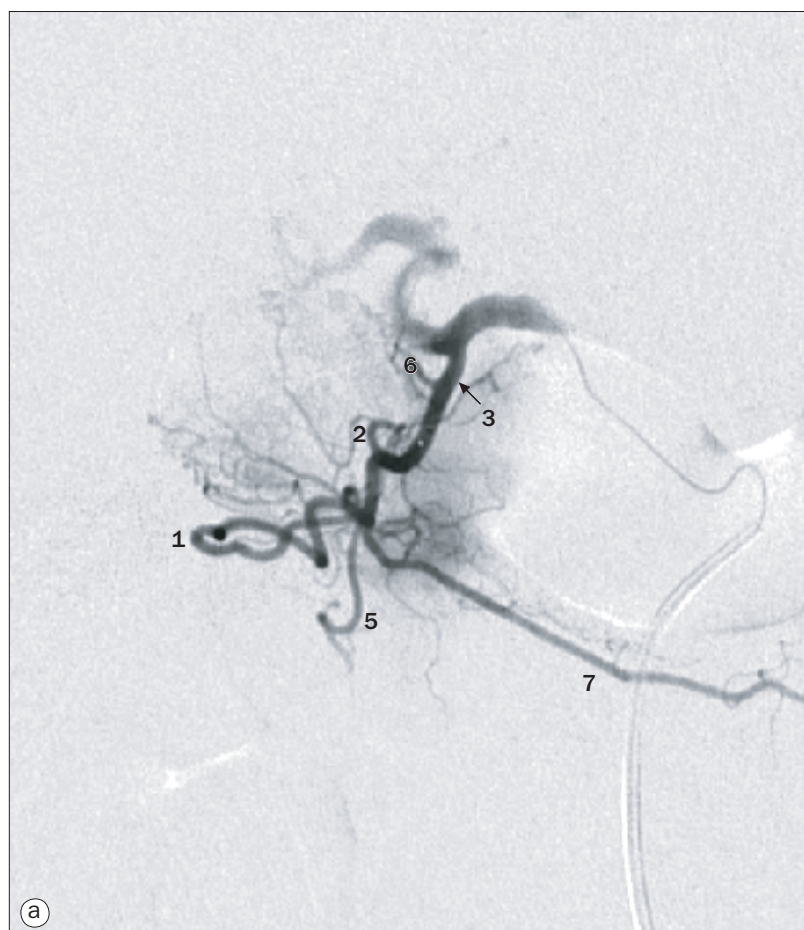
(b) Subtracted hepatic venogram.

- 1 Inferior vena cava
- 2 Middle hepatic vein
- 3 Parenchyma of liver
- 4 Right hepatic vein
- 5 Tip of catheter in hepatic vein

(a) Selective gastroduodenal arteriogram.

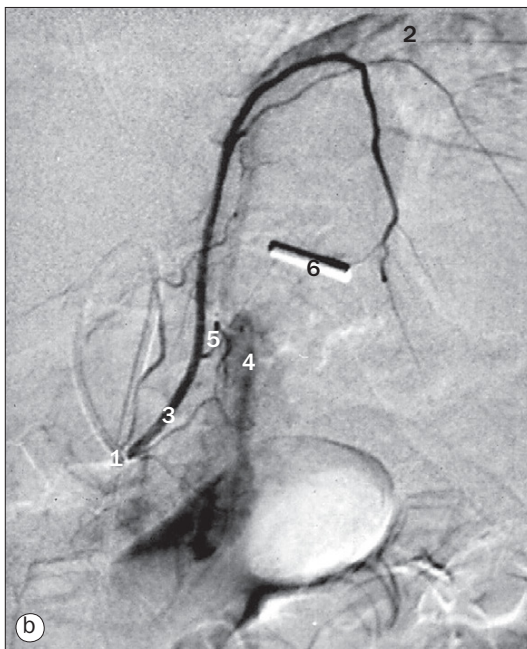
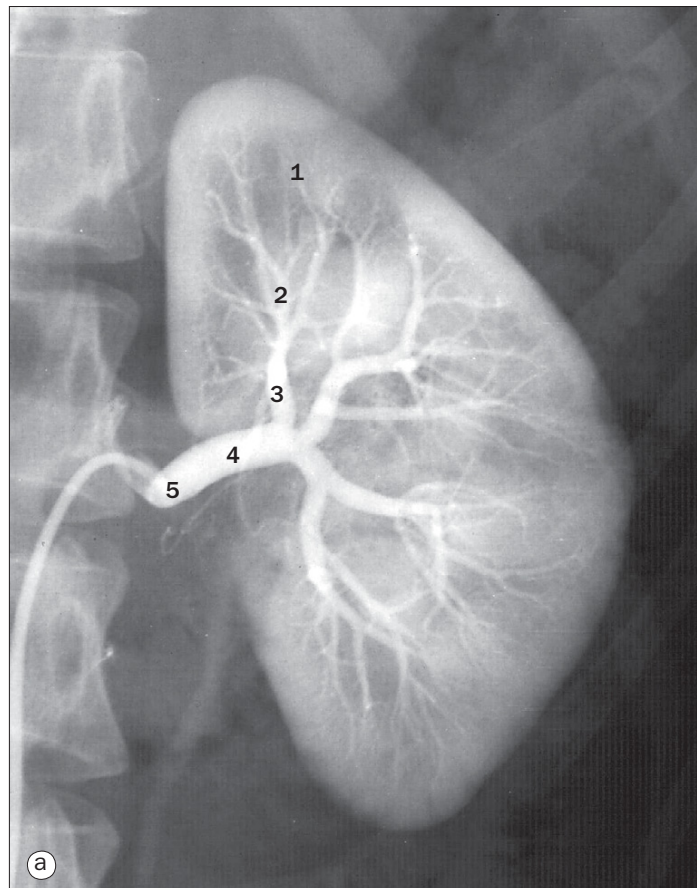
(b) Subtracted pancreatic arteriogram.

- 1 Anterior branch of inferior pancreaticoduodenal artery
- 2 Anterior branch of superior pancreaticoduodenal artery
- 3 Gastroduodenal artery
- 4 Left gastro-epiploic artery
- 5 Posterior branch of inferior pancreaticoduodenal artery
- 6 Posterior branch of superior pancreaticoduodenal artery
- 7 Right gastro-epiploic artery
- 8 Superior mesenteric artery
- 9 Tip of catheter in dorsal pancreatic artery
- 10 Transverse pancreatic artery



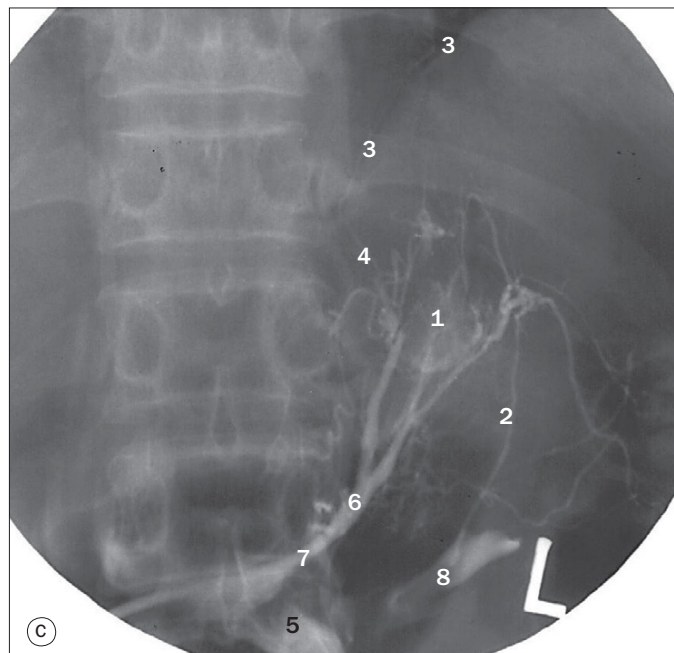
(a) Renal arteriogram.

- 1 Arcuate arteries
- 2 Interlobar arteries
- 3 Lobar arteries
- 4 Main renal artery
- 5 Tip of catheter in renal artery



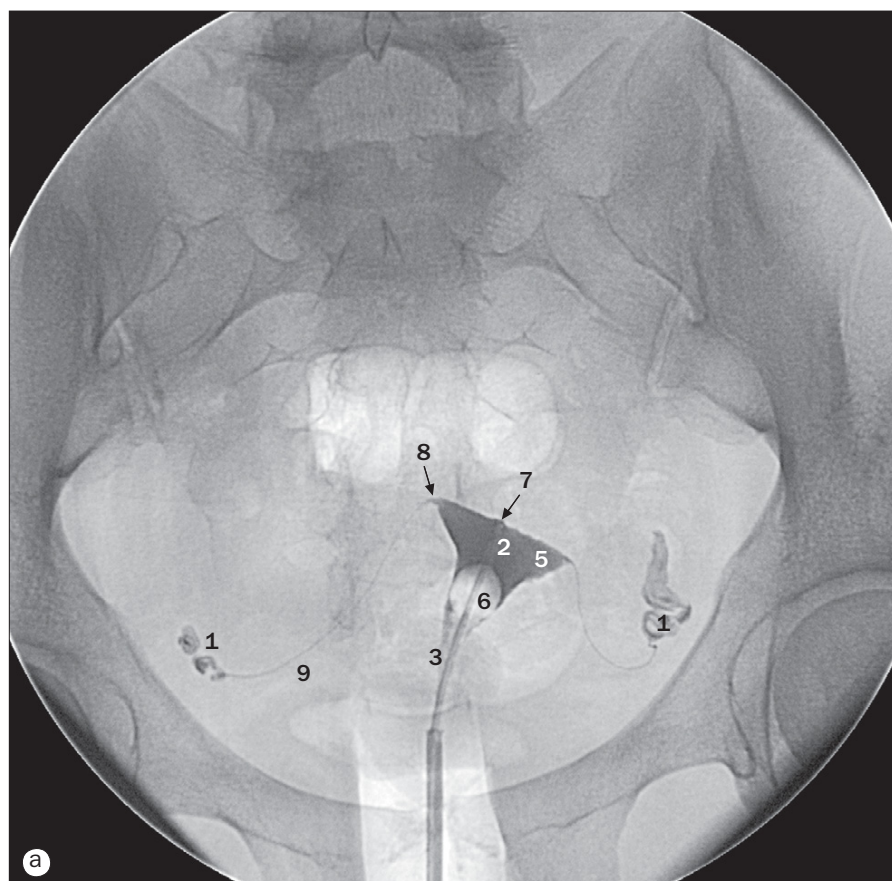
(b) Left suprarenal arteriogram.

- 1 Catheter in origin of inferior phrenic artery
- 2 Diaphragm
- 3 Inferior phrenic artery
- 4 Left suprarenal gland
- 5 Superior suprarenal arteries
- 6 Tip of nasogastric tube

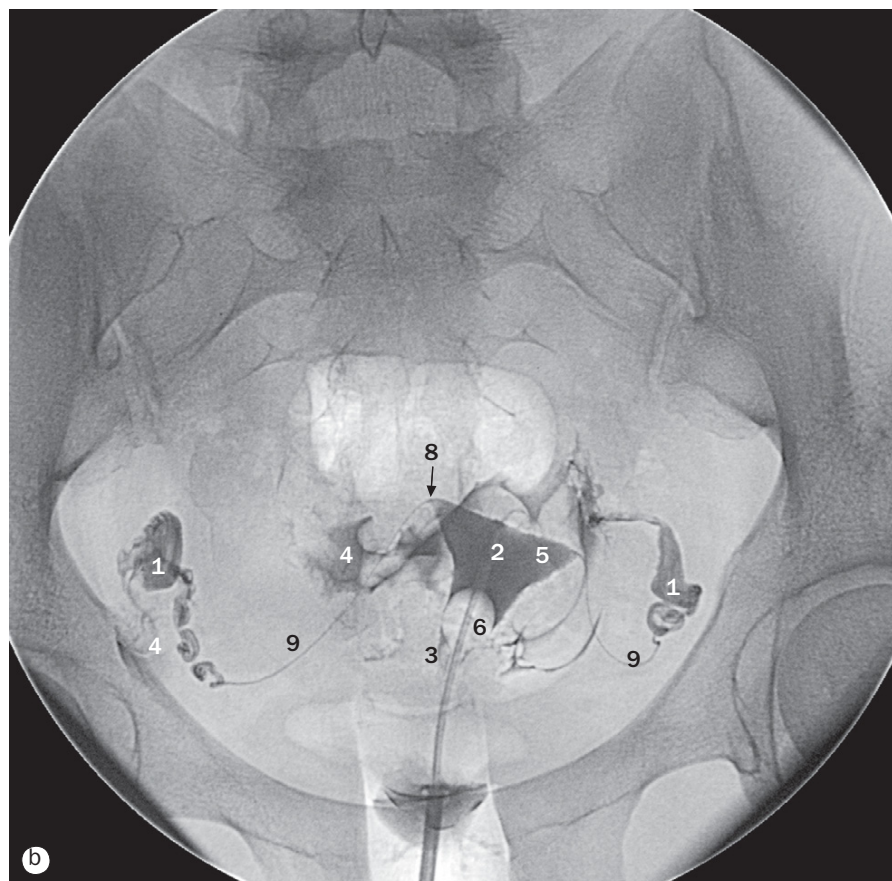


(c) Left suprarenal venogram.

- | | |
|-------------------------------|---|
| 1 Adenoma in suprarenal gland | 5 Left renal vein |
| 2 Capsular veins | 6 Left suprarenal vein |
| 3 Diaphragm | 7 Tip of catheter in left suprarenal vein |
| 4 Inferior phrenic vein | 8 Upper pole calyx |

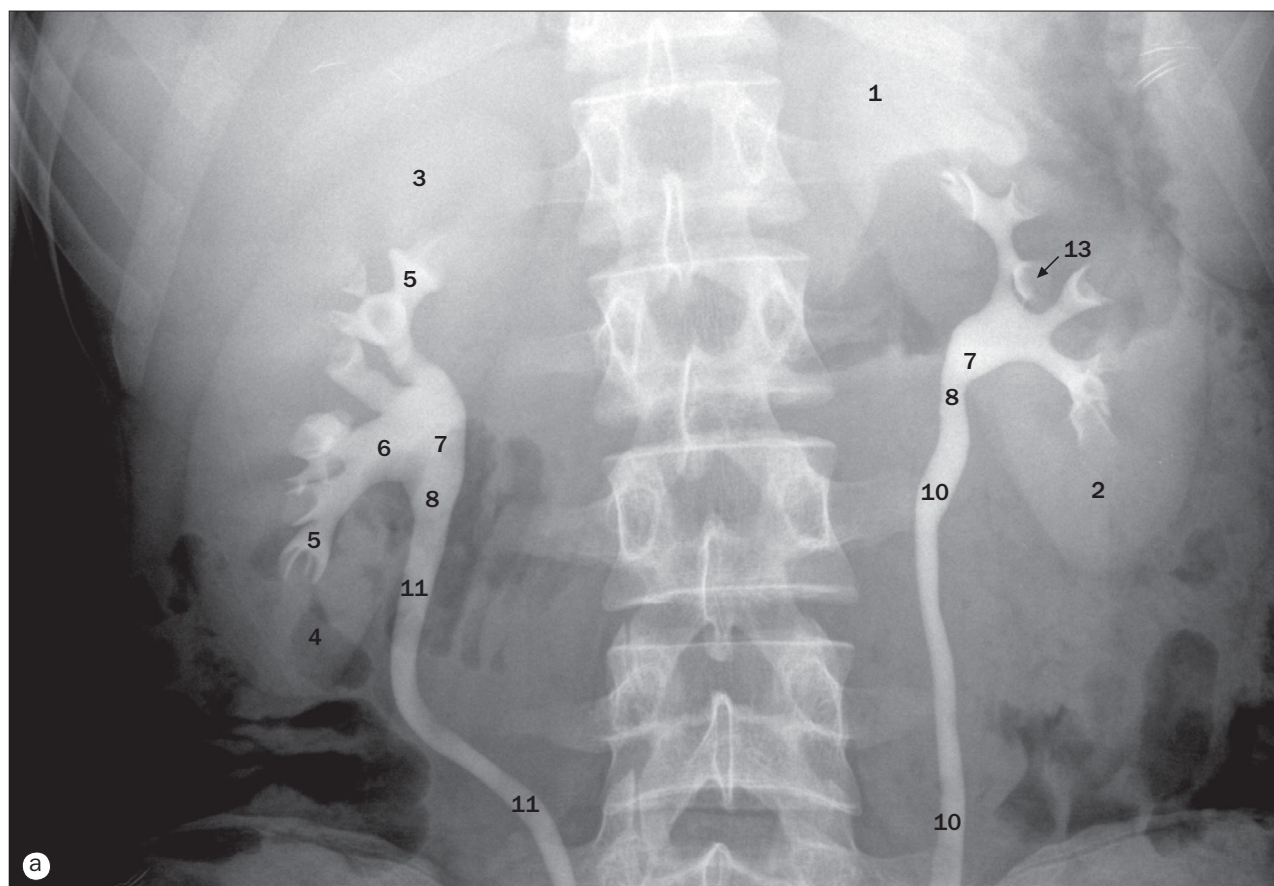


(a) Early phase of uterine filling.



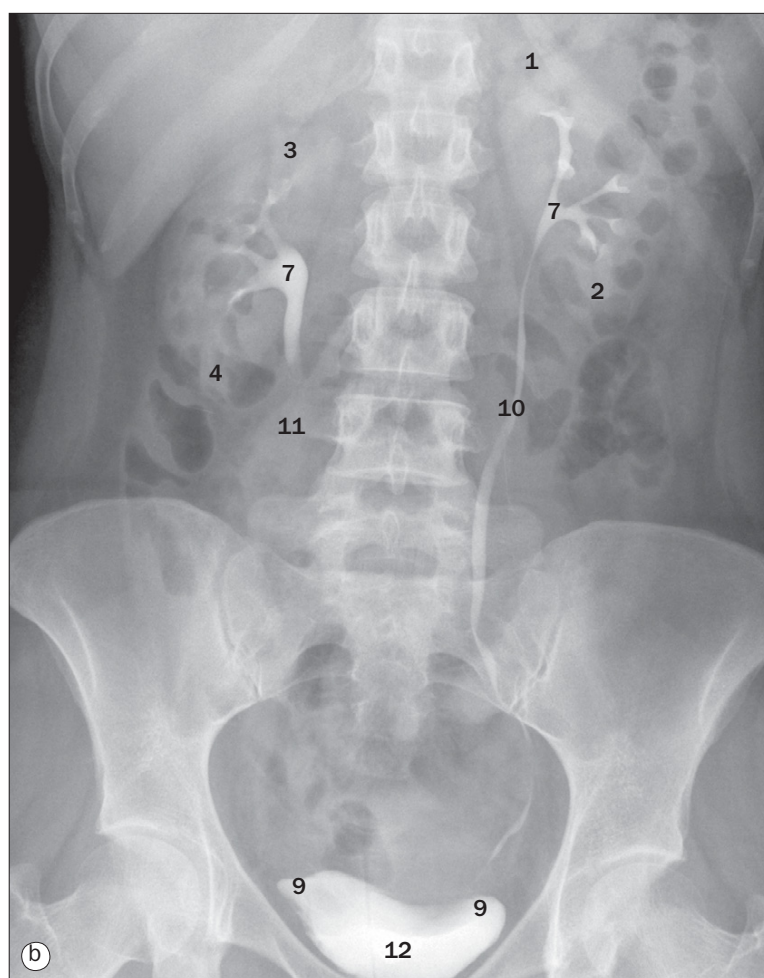
(b) Late phase with peritoneal spill.

- 1 Ampulla of uterine tube
- 2 Body of uterus
- 3 Cervix of uterus
- 4 Contrast spillage into peritoneal cavity
- 5 Cornu of uterus
- 6 Foley balloon catheter in uterus
- 7 Fundus of uterus
- 8 Isthmus of uterine tube
- 9 Uterine tube (fallopian tube)



(a)

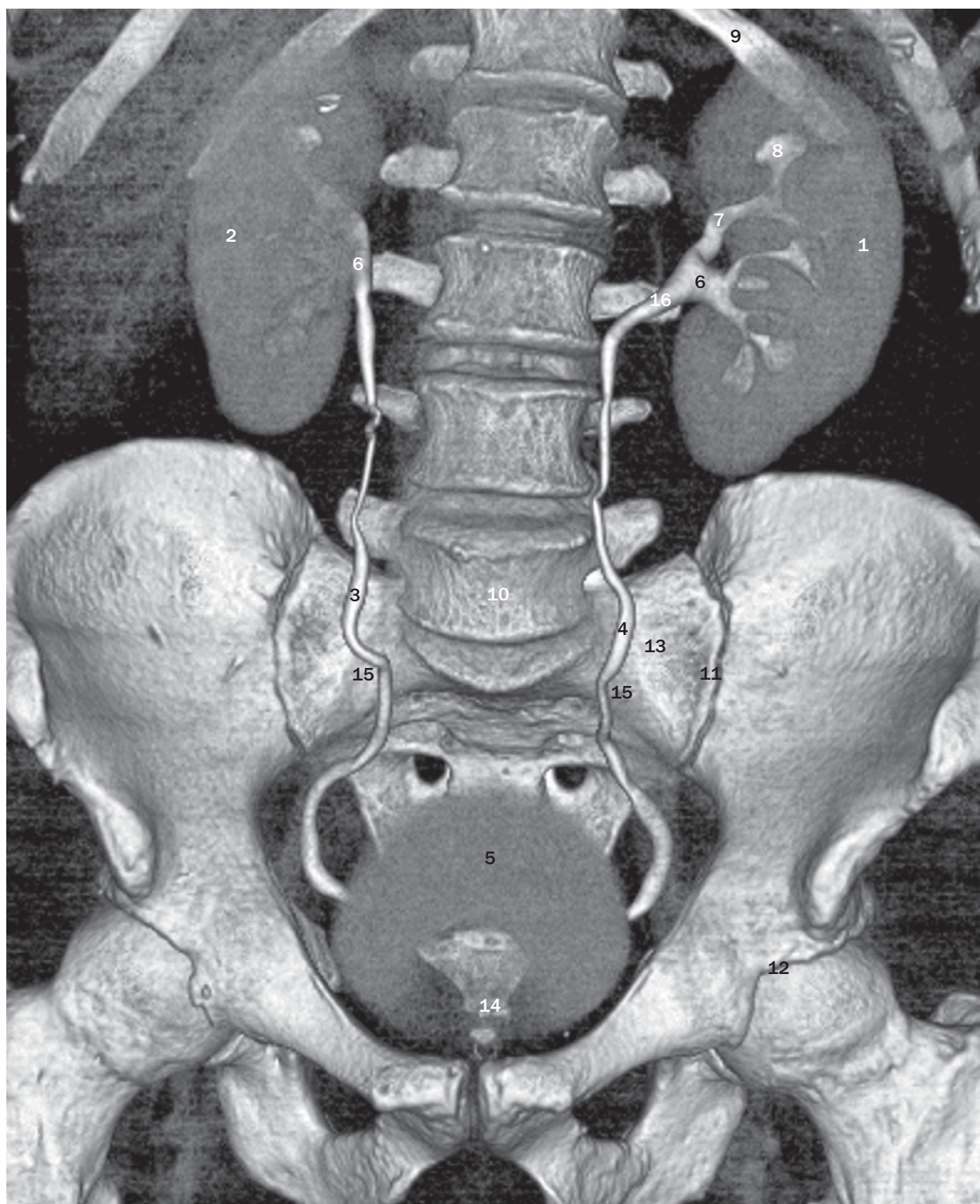
(a) 10 minutes IVU (intravenous urogram) with abdominal compression.



(b)

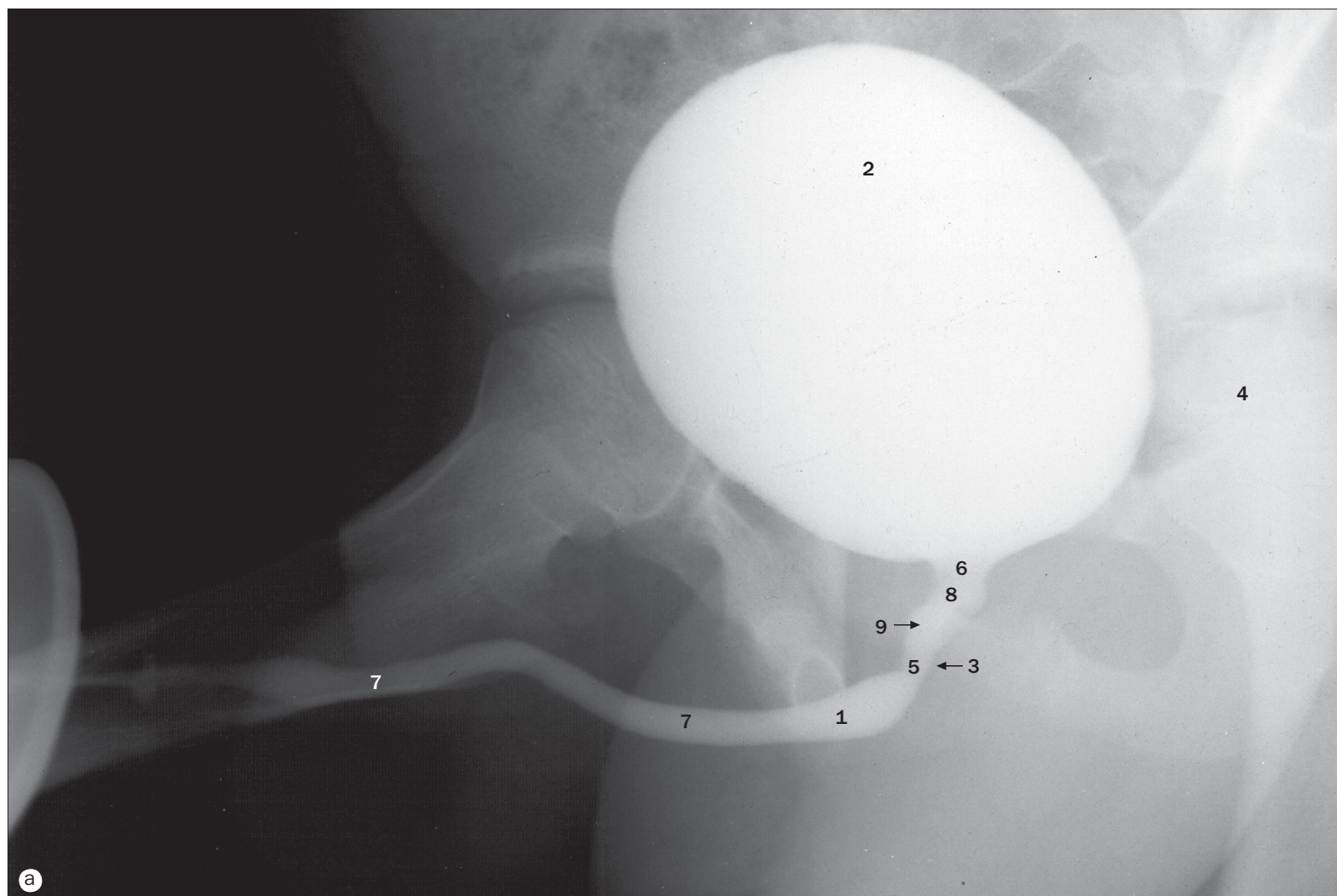
(b) Full length 15 minutes IVU after release of compression.

- 1 Upper pole of left kidney
- 2 Lower pole of left kidney
- 3 Upper pole of right kidney
- 4 Lower pole of right kidney
- 5 Minor calyx
- 6 Major calyx
- 7 Renal pelvis
- 8 Pelvi-ureteric junction
- 9 Vesico-ureteric junction
- 10 Left ureter
- 11 Right ureter
- 12 Urinary bladder
- 13 Renal papilla



3D CT urogram at 10 minutes post intravenous injection.

- | | |
|-------------------|--|
| 1 Left kidney | 9 Twelfth rib |
| 2 Right kidney | 10 Body of L5 vertebra |
| 3 Right ureter | 11 Sacro-iliac joint |
| 4 Left ureter | 12 Hip joint |
| 5 Urinary bladder | 13 Sacral alum |
| 6 Renal pelvis | 14 Coccyx |
| 7 Major calyx | 15 Point of ureteric crossover of common iliac vessels |
| 8 Minor calyx | 16 Pelvi-ureteric junction (PUJ) |

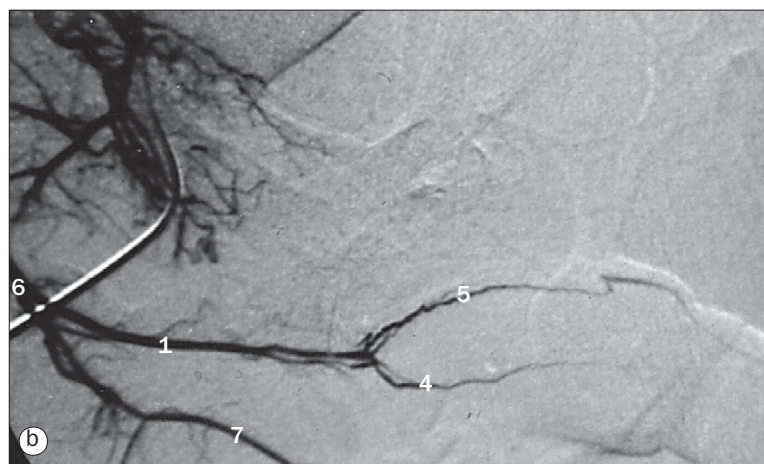


(a) Male urethrogram, oblique image.

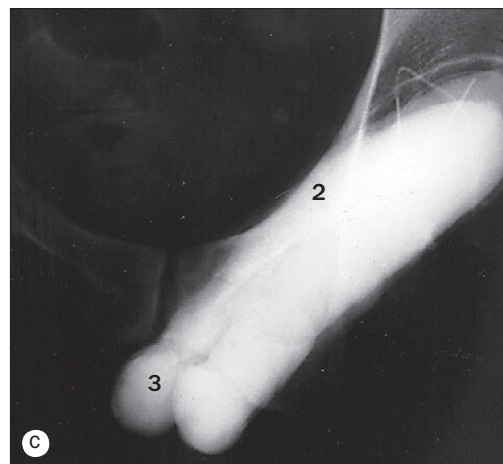
(b) Penile arteriogram.

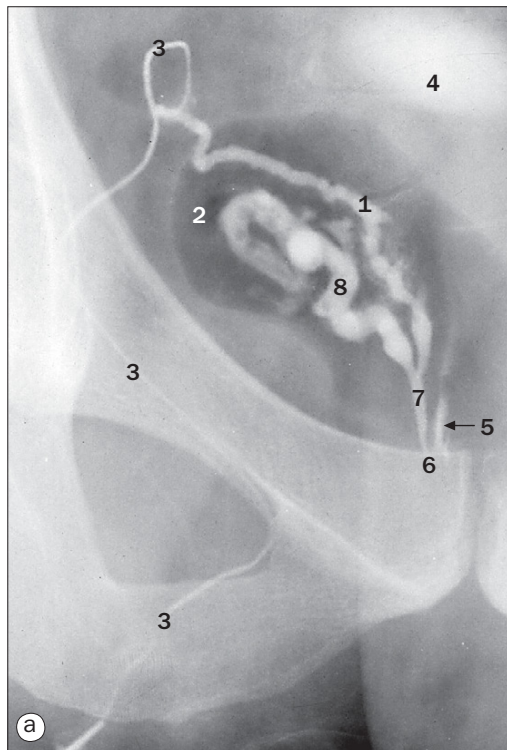
(c) Cavernosogram.

- | | |
|---|-------------------------------------|
| 1 Bulbous urethra | 6 Neck of urinary bladder |
| 2 Contrast in urinary bladder | 7 Penile urethra |
| 3 External sphincter (sphincter urethrae) | 8 Prostatic urethra |
| 4 Head of femur | 9 Seminal colliculus (verumontanum) |
| 5 Membranous urethra | |



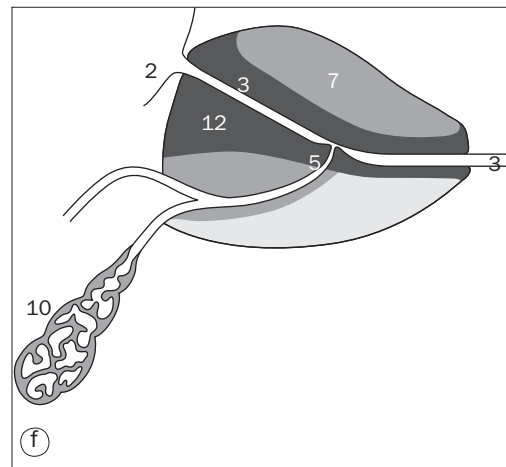
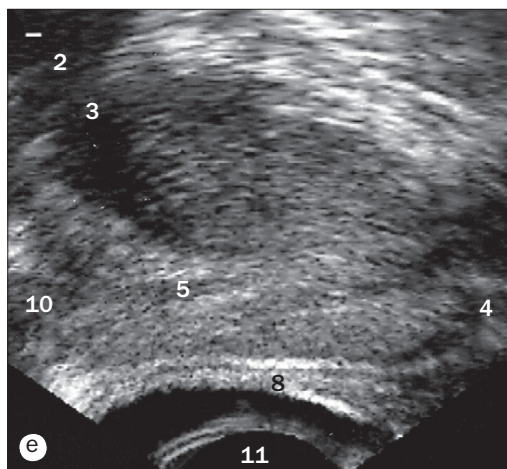
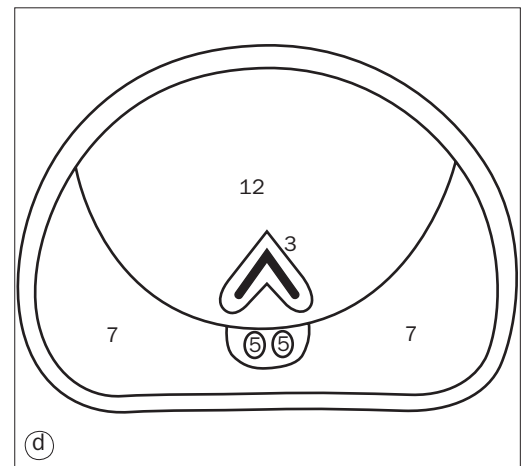
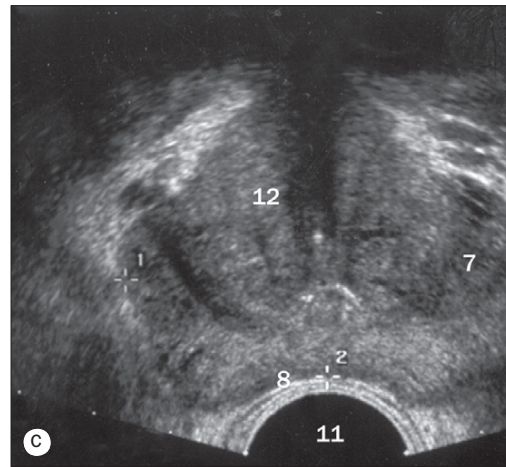
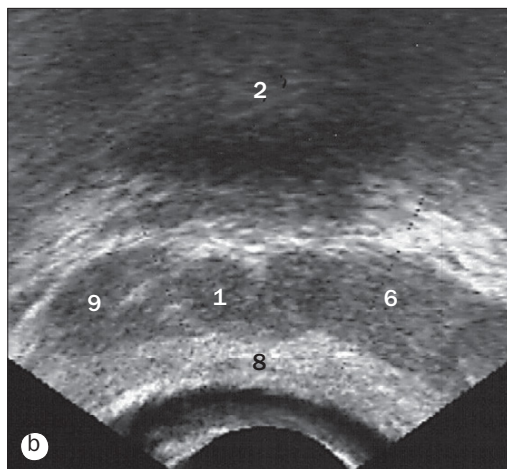
- | | |
|-----------------------------|------------------------------|
| 1 Artery of the penis | 5 Dorsal artery of the penis |
| 2 Corpus cavernosum | 6 Internal pudendal artery |
| 3 Crus of corpus cavernosum | 7 Perineal artery |
| 4 Deep artery of the penis | |





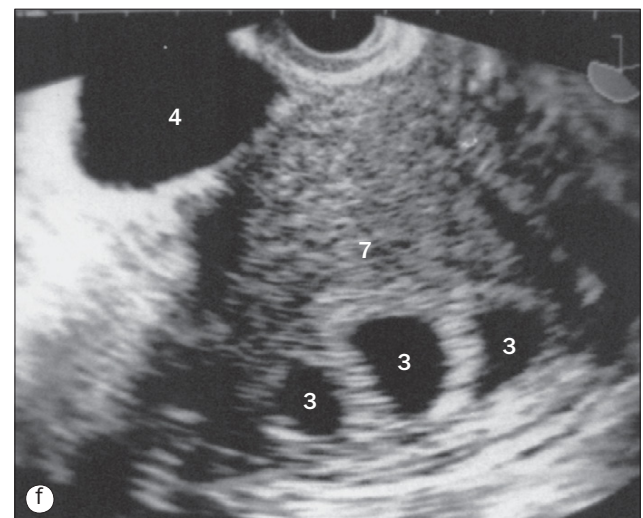
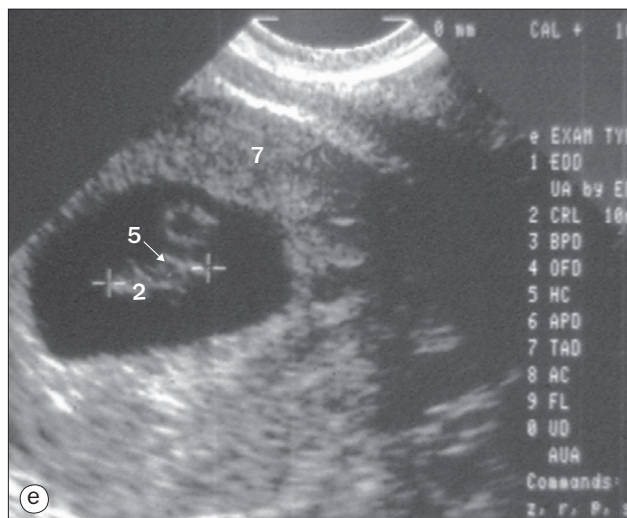
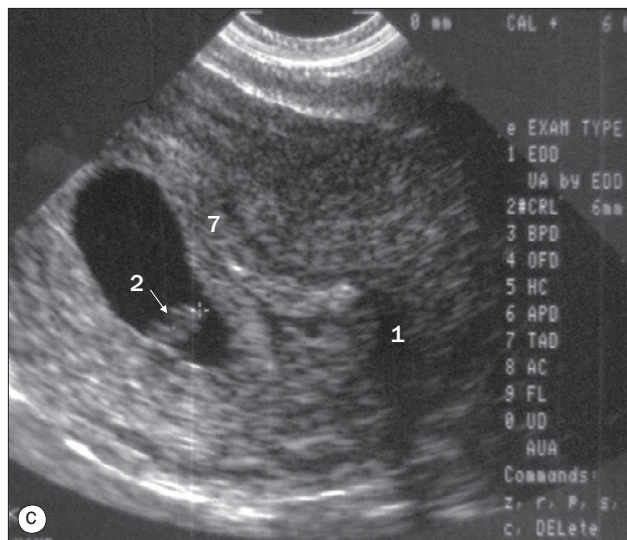
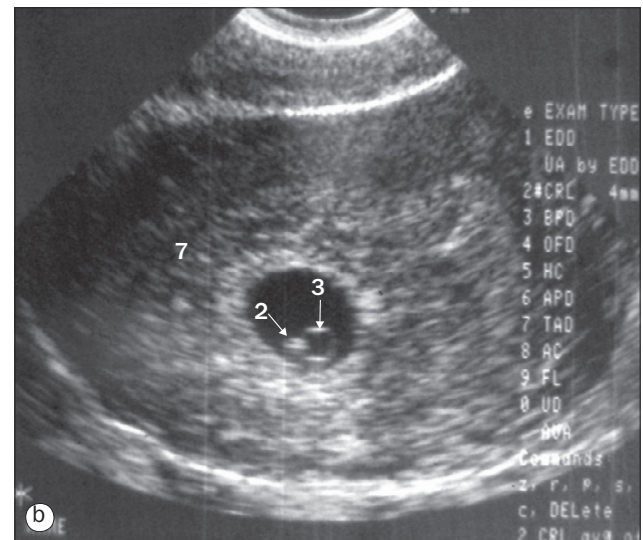
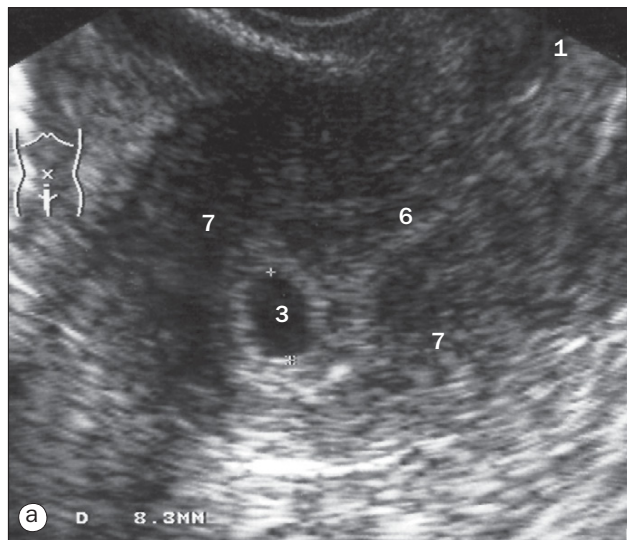
(a) Seminal vesiculogram.

- 1 Ampulla of ductus deferens
- 2 Colonic gas
- 3 Ductus deferens (vas deferens)
- 4 Full urinary bladder
- 5 Left ejaculatory duct
- 6 Position of seminal colliculus (verumontanum)
- 7 Right ejaculatory duct
- 8 Seminal vesicle



- 1 Ampulla of ductus deferens
- 2 Bladder
- 3 Course of urethra
- 4 Distal urethra
- 5 Ejaculatory duct
- 6 Left seminal vesicle
- 7 Peripheral zone of prostate
- 8 Rectal wall
- 9 Right seminal vesicle
- 10 Seminal vesicle
- 11 Transducer
- 12 Transitional zone of prostate

Rectal ultrasound of the prostate, (b) axial scan through bladder base, (c) axial scan through mid prostate, (d) line drawing of axial scan prostate, (e) sagittal midline scan, (f) line drawing of midline sagittal scan.



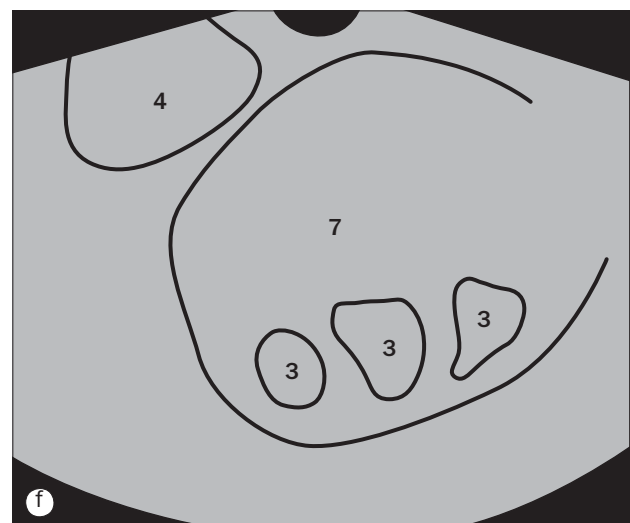
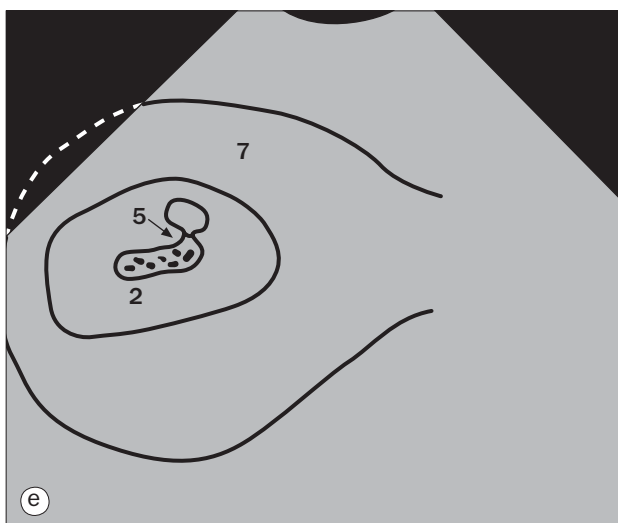
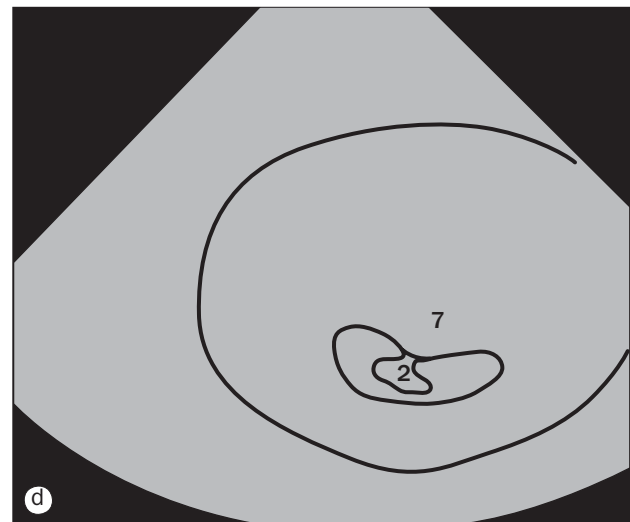
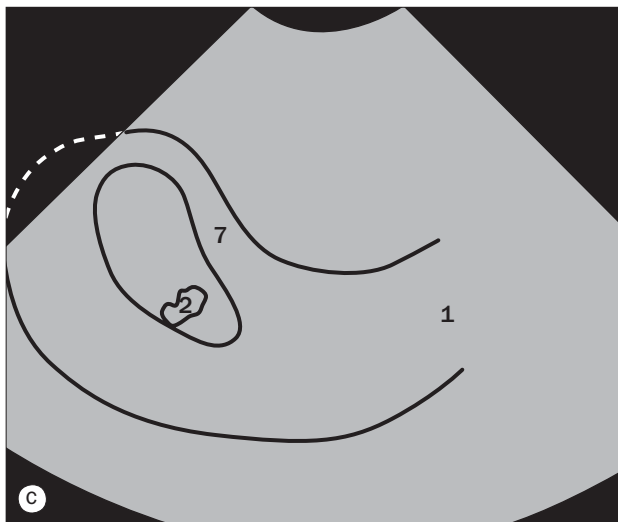
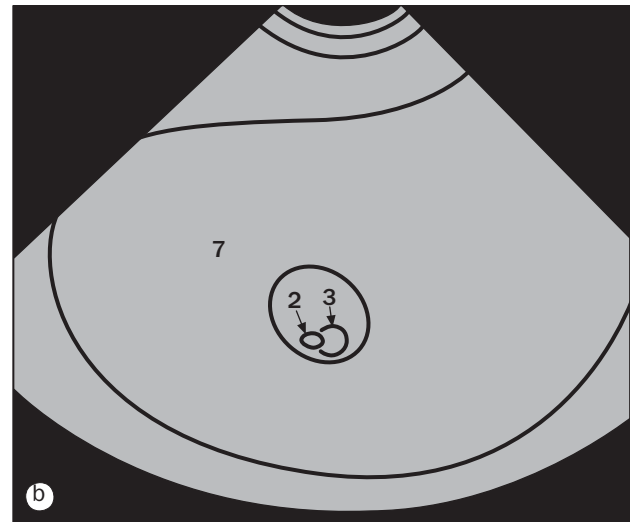
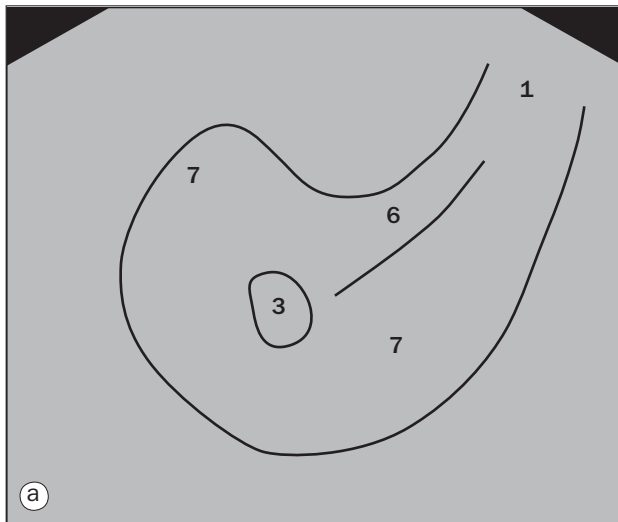
(a) Gestational sac of 8 mm = 5 weeks + 3 days gestational age, (b) CRL (crown rump length) = 4 mm = 6 weeks gestational age, (c) CRL = 6 mm = 6 weeks + 3 days gestational age, (d) CRL = 8 mm = 6 weeks + 5 days gestational age, (e) CRL = 10 mm = 7 weeks + 2 days gestational age, (f) triplets – three separate gestational sacs.

1 Cervix
2 Fetus

3 Gestation sac
4 Maternal bladder

5 Position of fetal heart
6 Uterine cavity

7 Uterus



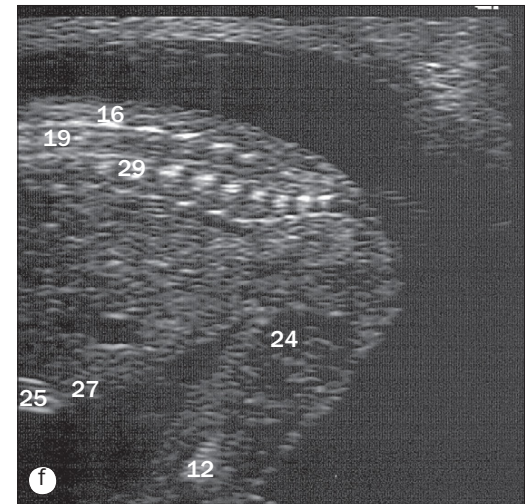
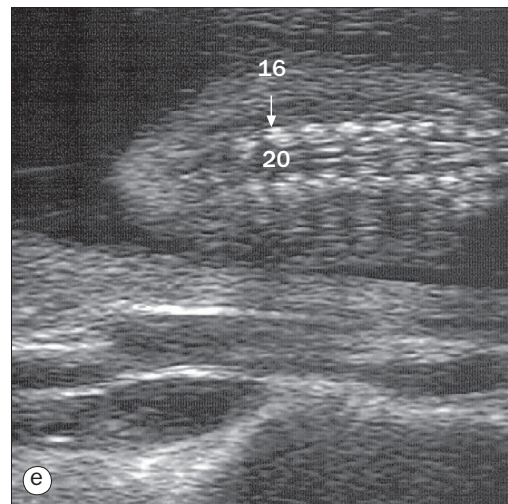
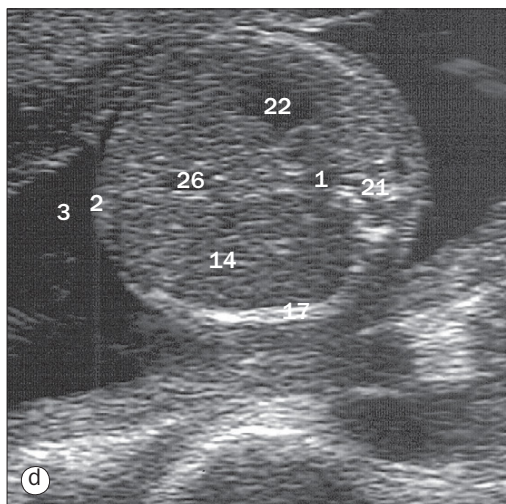
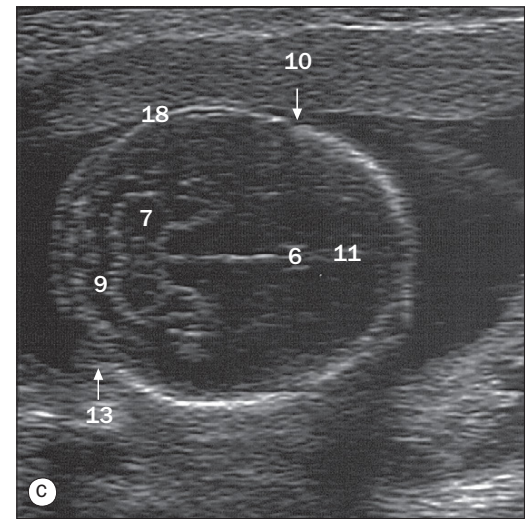
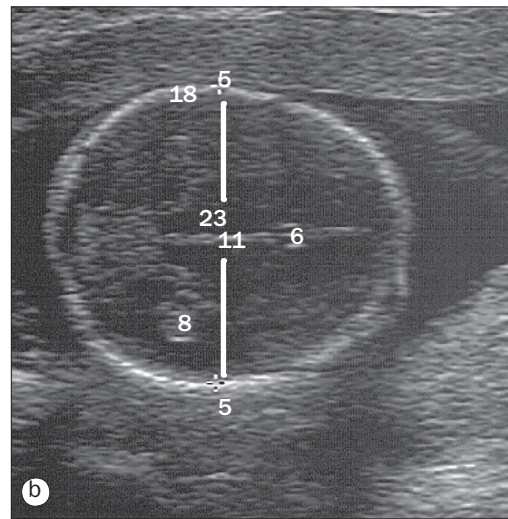
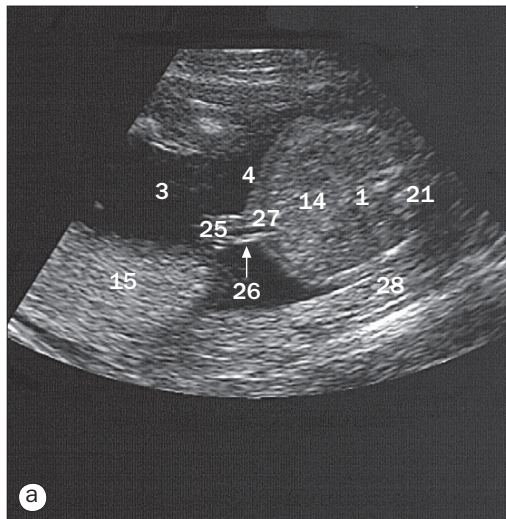
(a)–(f) Line diagrams of ultrasound images opposite.

1 Cervix
2 Fetus

3 Gestation sac
4 Maternal bladder

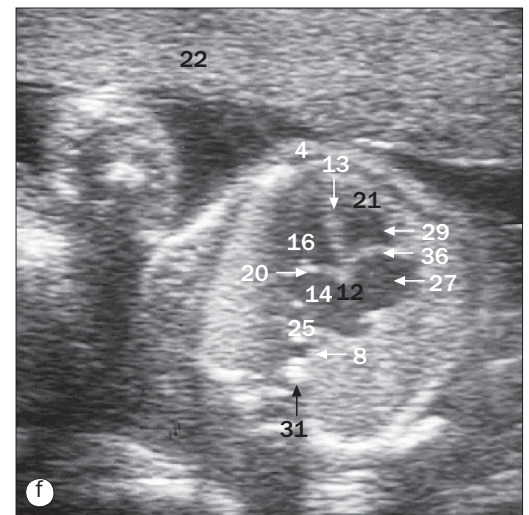
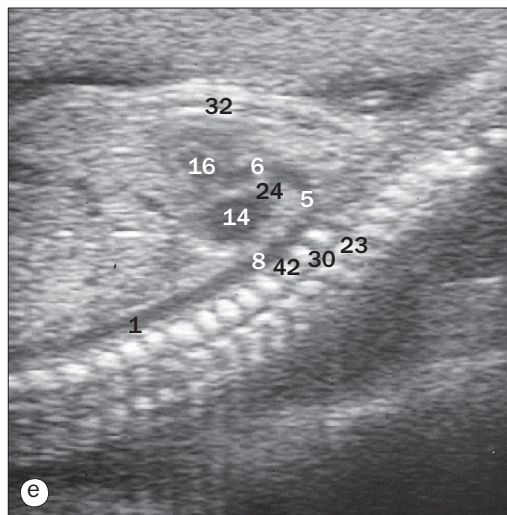
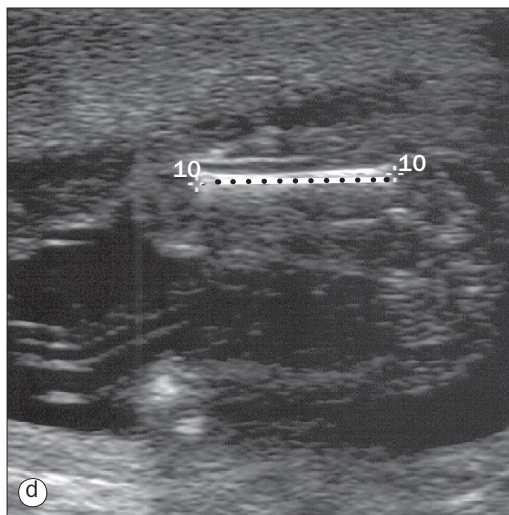
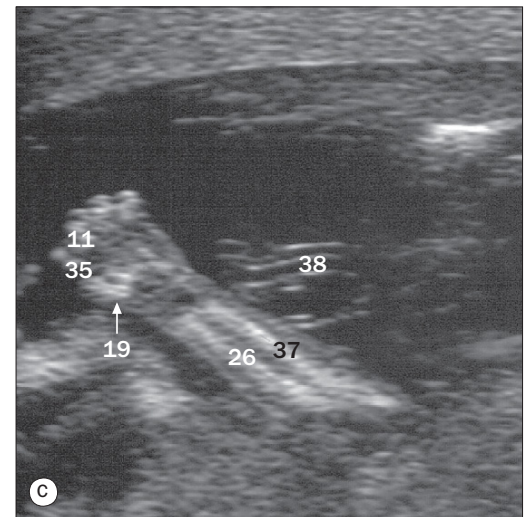
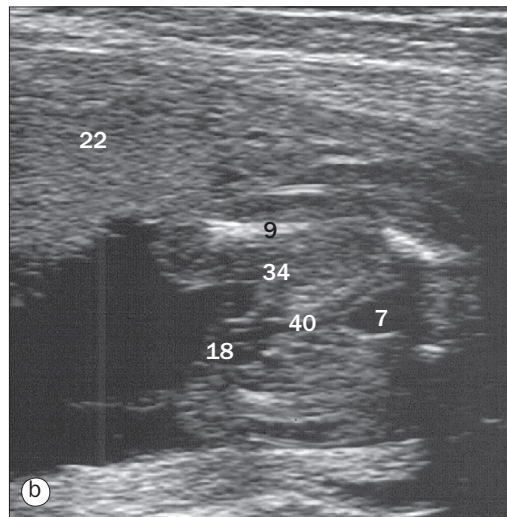
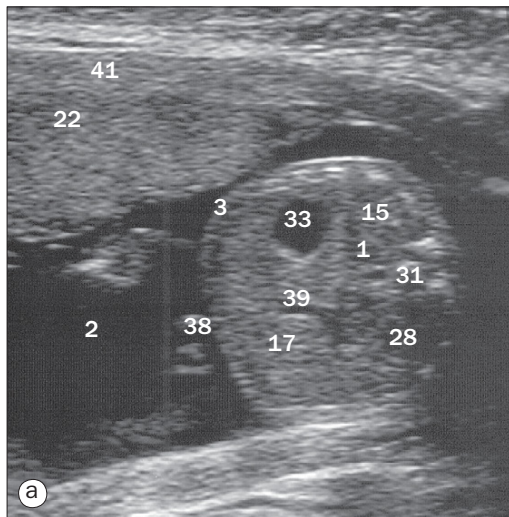
5 Position of fetal heart
6 Uterine cavity

7 Uterus



Fetal ultrasound, second trimester, (a) cord insertion, (b) and (c) skull, (d) abdomen, (e) and (f) spine.

- | | |
|---|------------------------------------|
| 1 Abdominal aorta | 15 Placenta |
| 2 Abdominal circumference measurement | 16 Posterior elements of vertebrae |
| 3 Amniotic fluid | 17 Ribs |
| 4 Anterior abdominal wall | 18 Skull |
| 5 Biparietal diameter measurement | 19 Spinal canal |
| 6 Cavum septum pellucidum | 20 Spinal cord |
| 7 Cerebellum | 21 Spine |
| 8 Choroid plexus | 22 Stomach |
| 9 Cisterna magna (cerebellomedullary cistern) | 23 Thalamus |
| 10 Coronal suture | 24 Thigh |
| 11 Falx cerebri | 25 Umbilical cord |
| 12 Femur | 26 Umbilical vein |
| 13 Lambdoid suture | 27 Umbilicus |
| 14 Liver | 28 Uterine wall |
| | 29 Vertebral body |



Fetal ultrasound, second trimester,
(a) abdomen, (b) pelvis, (c) forearm,
(d) femur, (e) heart and aorta,
(f) four chamber view of the heart.

- | | |
|---|------------------------------------|
| 1 Abdominal aorta | 22 Placenta |
| 2 Amniotic fluid | 23 Posterior elements of vertebrae |
| 3 Anterior abdominal wall | 24 Pulmonary artery |
| 4 Anterior chest wall | 25 Pulmonary vein |
| 5 Aortic arch | 26 Radius |
| 6 Ascending aorta | 27 Right atrium |
| 7 Bladder | 28 Right kidney |
| 8 Descending aorta | 29 Right ventricle |
| 9 Femur | 30 Spinal canal |
| 10 Femur for femoral length measurement | 31 Spine |
| 11 Finger | 32 Sternum |
| 12 Interatrial septum | 33 Stomach |
| 13 Interventricular septum | 34 Thigh |
| 14 Left atrium | 35 Thumb |
| 15 Left kidney | 36 Tricuspid valve |
| 16 Left ventricle | 37 Ulna |
| 17 Liver | 38 Umbilical cord |
| 18 Male external genitalia | 39 Umbilical vein |
| 19 Metacarpal shaft | 40 Urethra |
| 20 Mitral valve | 41 Uterine wall |
| 21 Moderator band | 42 Vertebral body |



(a) Early filling phase, pelvis.

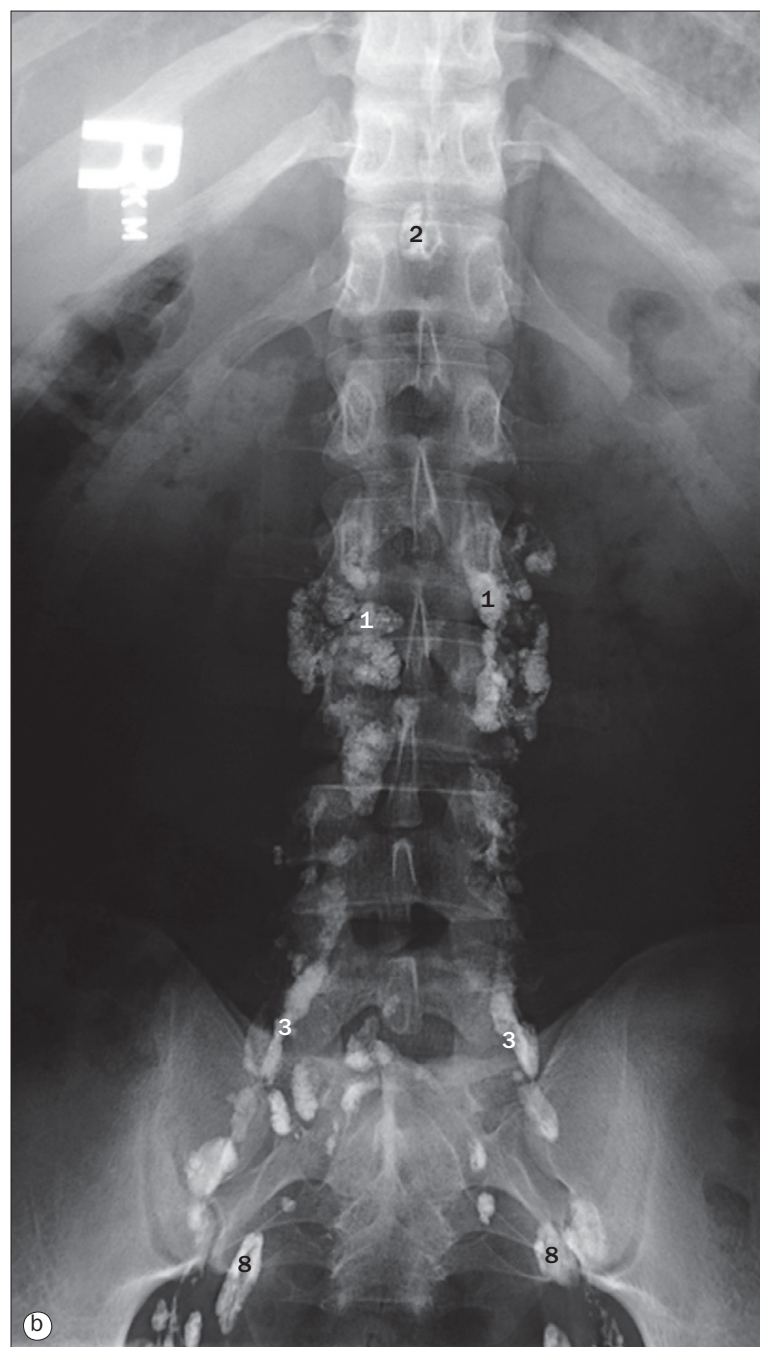
(b) Late filling phase, pelvis.

- 1 Ascending lumbar chains
- 2 Afferent inguinal lymphatics
- 3 Common iliac nodes
- 4 Efferent inguinal lymphatics
- 5 External iliac nodes
- 6 Superficial inguinal nodes
- 7 Lumbar crossover
- 8 Deep inguinal nodes



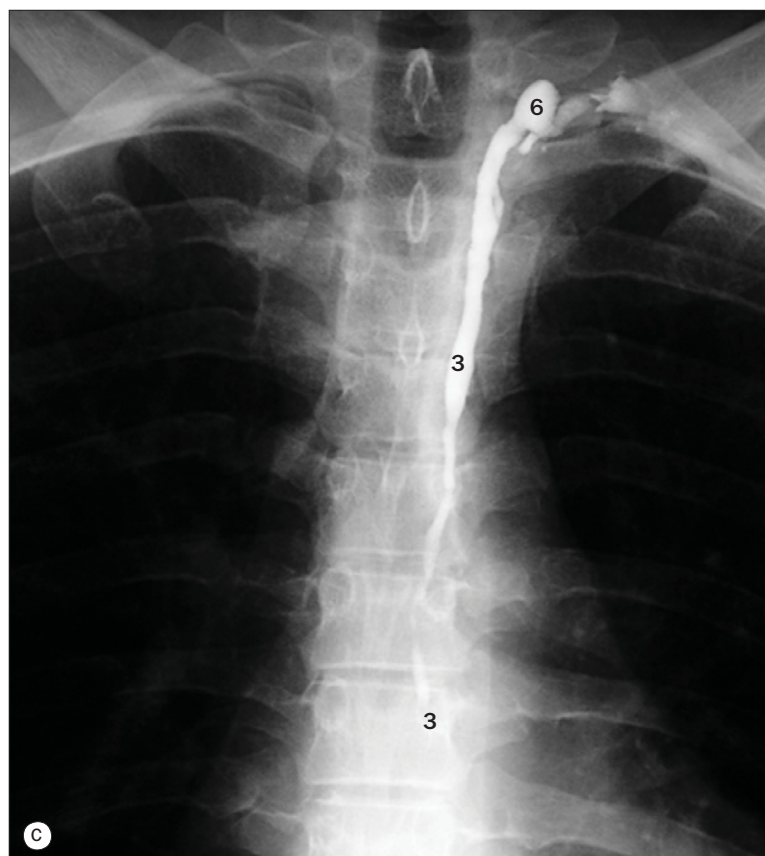


(a) Early filling phase, abdomen.



(b) Late filling phase, abdomen.

- | | |
|--|----------------------------------|
| 1 Ascending lumbar chains | 6 Inguinal nodes (early filling) |
| 2 Cisterna chyli | 7 Lumbar crossover |
| 3 Common iliac nodes | 8 Deep inguinal nodes |
| 4 Efferent inguinal lymphatics | 9 Thoracic duct |
| 5 External iliac nodes (early filling) | |



(a) Calf lymphatics following cannulation of lymphatic vessels in the feet.

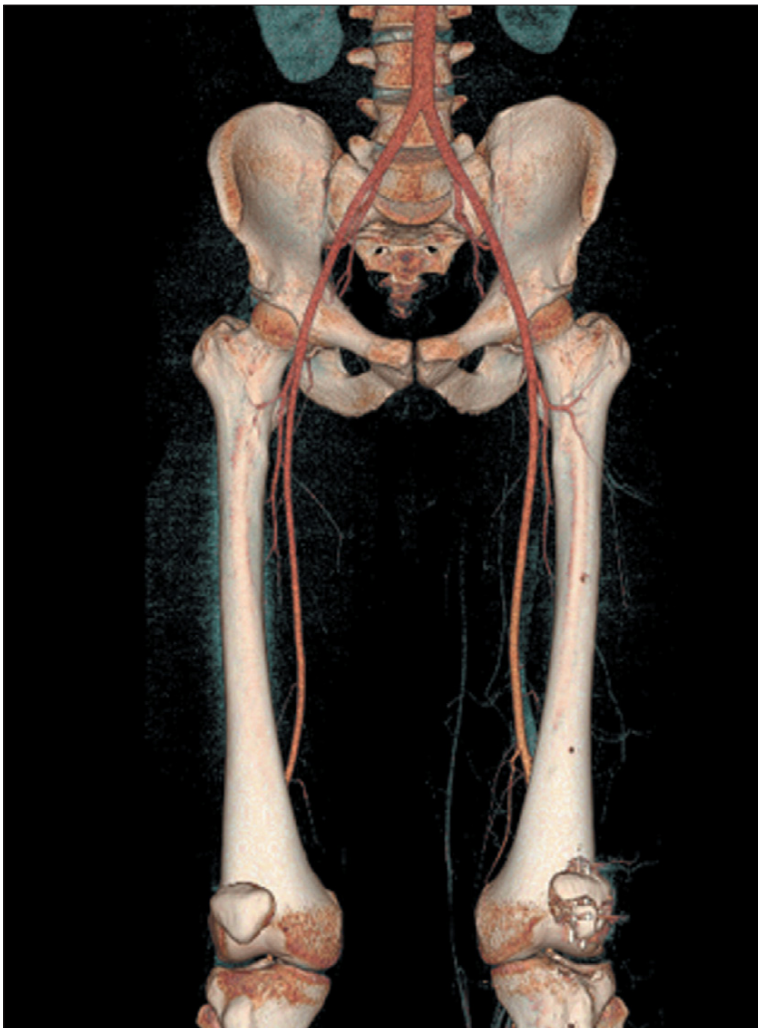
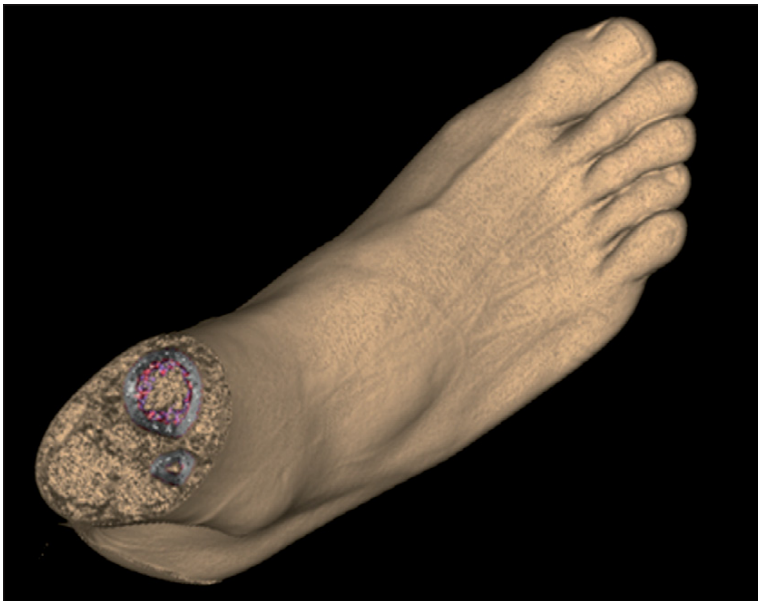
(b) Lateral early phase filling in abdomen.

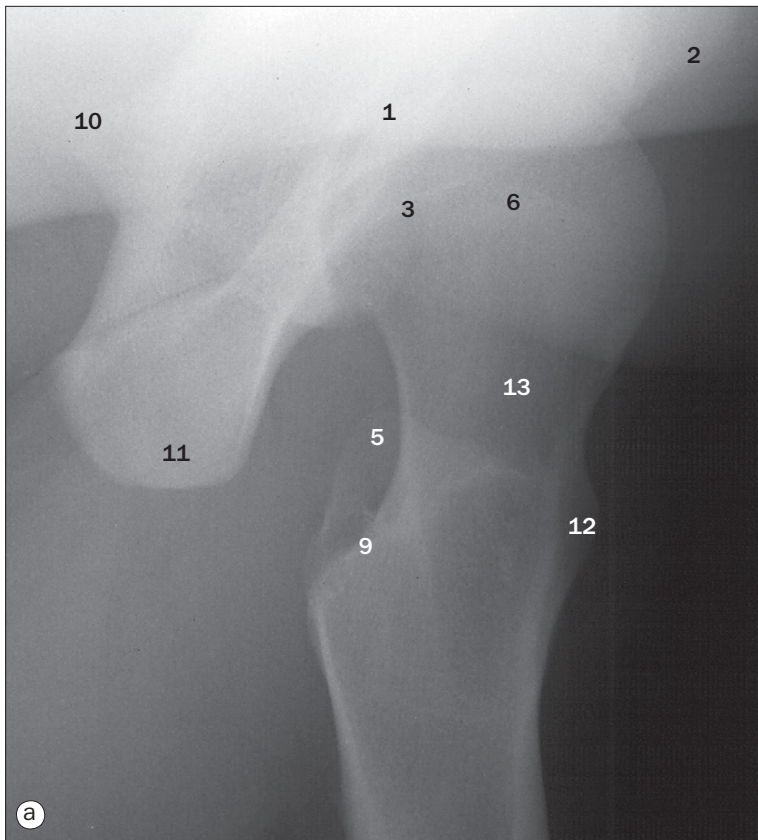
(c) Thoracic duct.

- 1 Ascending lumbar chains of lymph nodes
- 2 Cisterna chyli
- 3 Thoracic duct
- 4 Peripheral foot lymphatic channels
- 5 Peripheral lower leg lymphatic channels
- 6 Terminal ampulla

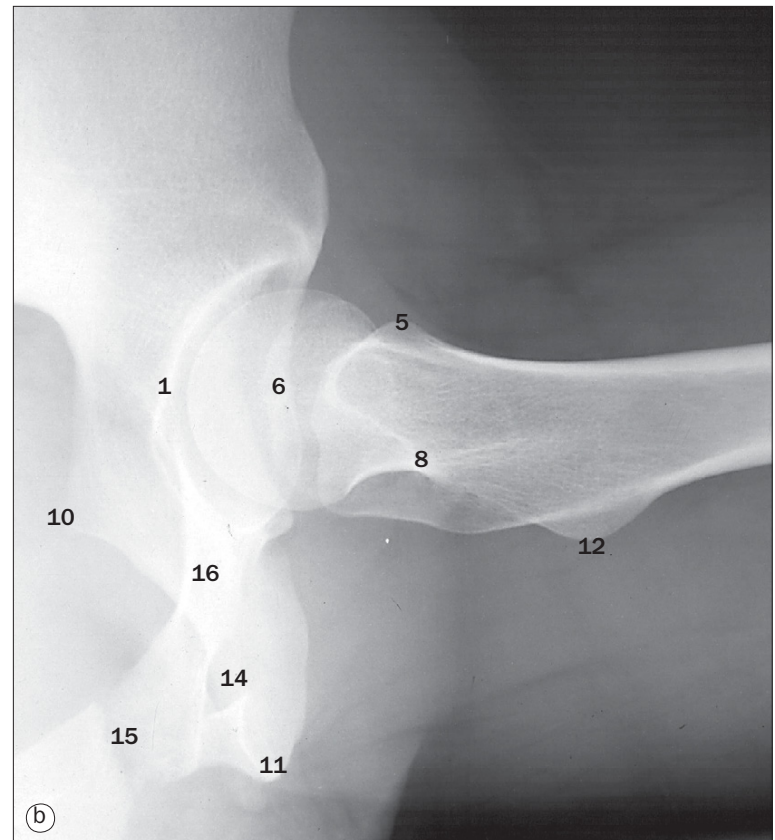
7

Lower limb

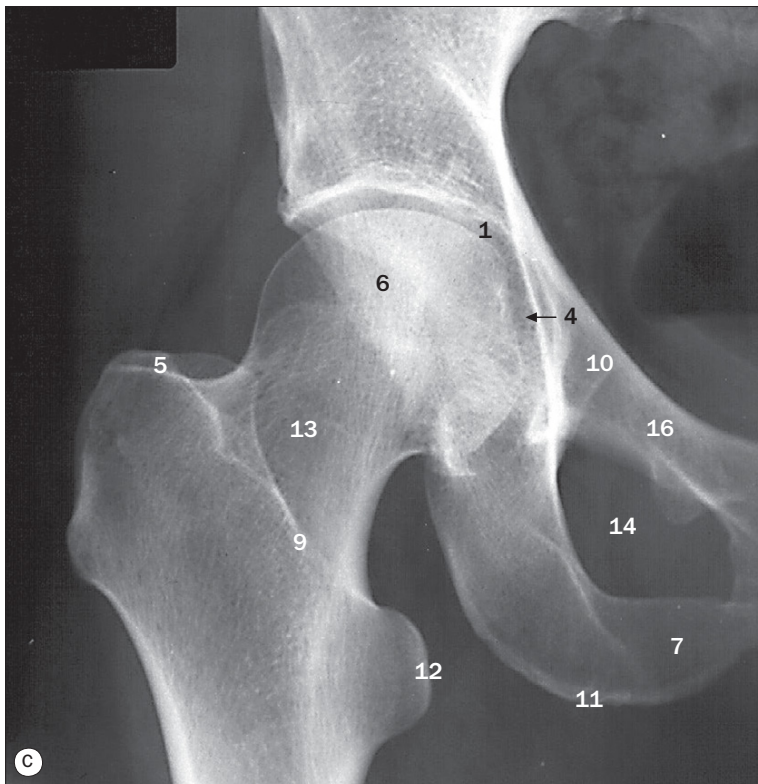




(a) Hip (for neck of femur), lateral projection.

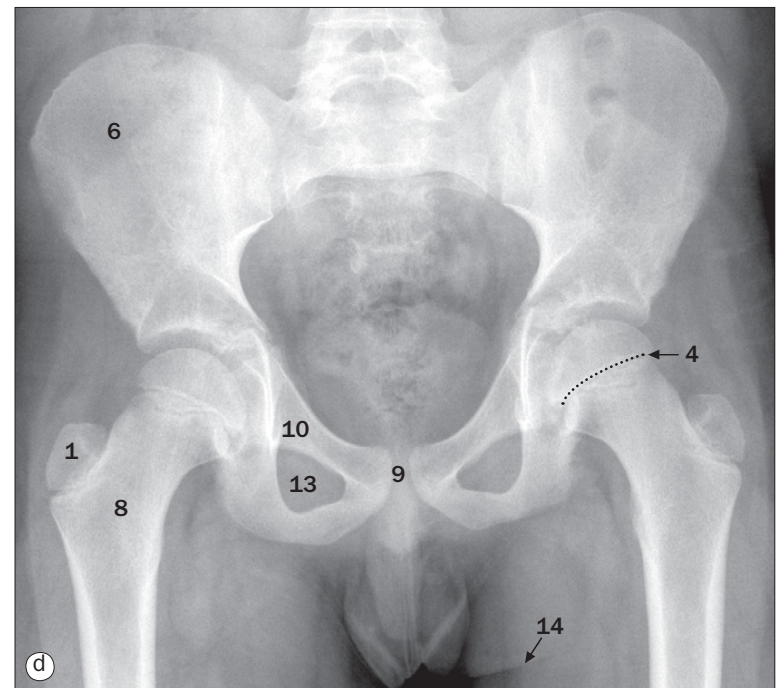
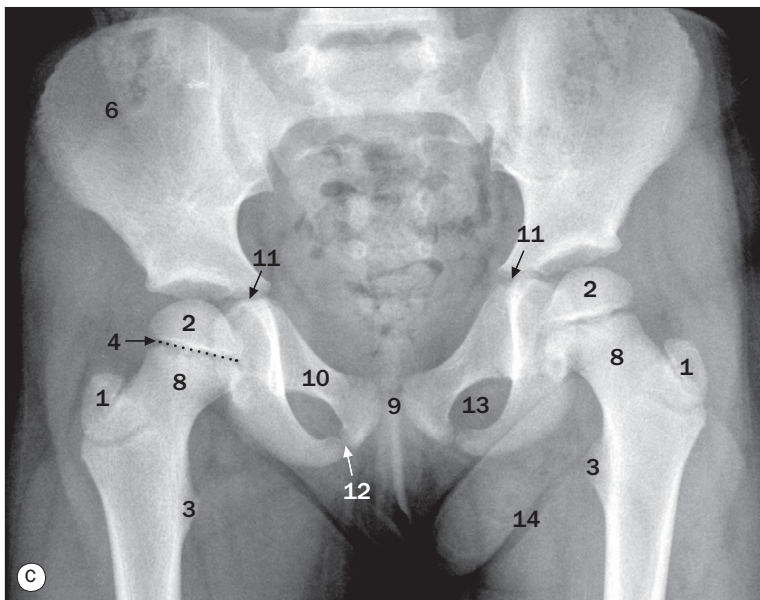
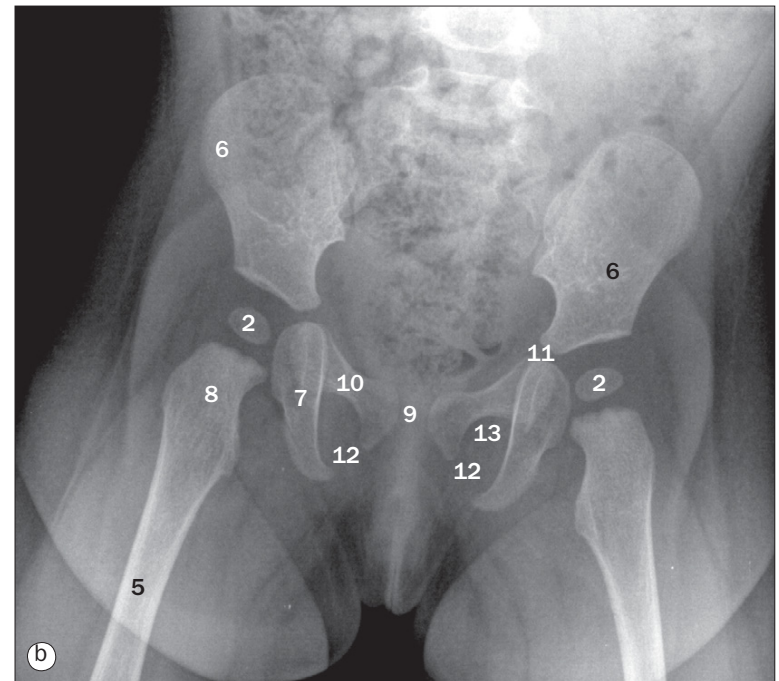
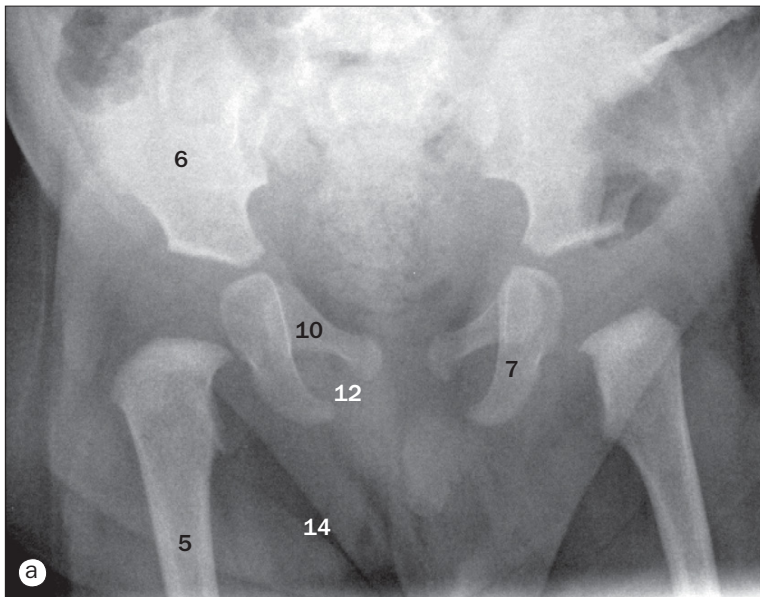


(b) Hip, lateral projection.



(c) Hip, anteroposterior projection.

- 1 Acetabulum
- 2 Anterior inferior iliac spine
- 3 Epiphysial line
- 4 Fovea
- 5 Greater trochanter of femur
- 6 Head of femur
- 7 Inferior ramus of pubis
- 8 Intertrochanteric crest of femur
- 9 Intertrochanteric line
- 10 Ischial spine
- 11 Ischial tuberosity
- 12 Lesser trochanter of femur
- 13 Neck of femur
- 14 Obturator foramen
- 15 Pubic symphysis
- 16 Superior ramus of pubis

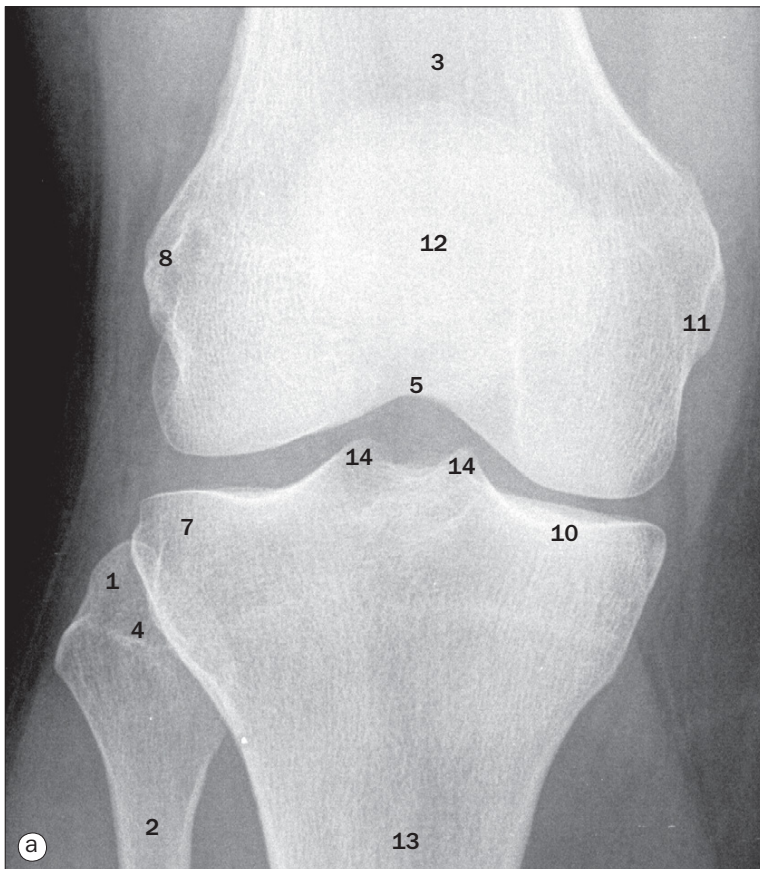


Pelvis, (a) of a 4-month-old girl, (b) of a 9-month-old girl, (c) of a 6-year-old girl, (d) of an 11-year-old girl.

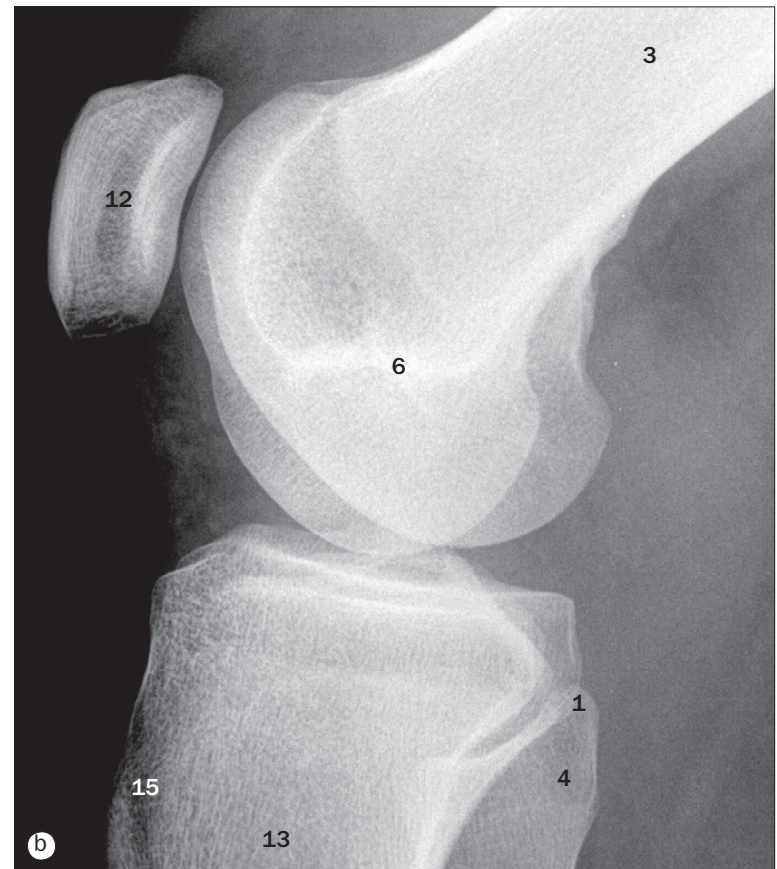
- | | |
|--|--|
| 1 Centre for greater trochanter | 8 Neck of femur |
| 2 Centre for head of femur (femoral capital epiphysis) | 9 Pubic symphysis |
| 3 Centre for lesser trochanter | 10 Pubis |
| 4 Epiphysial line | 11 Triradiate cartilage |
| 5 Femur | 12 Unossified junction between ischium and pubis |
| 6 Ilium | 13 Obturator foramen |
| 7 Ischium | 14 Fat creases |

INNOMINATE (HIP)	Appears	Fused
Ilium	2–3 miu	7–9 yrs
Ischium	4 miu	7–9 yrs
Pubis	4 miu	7–9 yrs
Acetabulum	11–14 yrs	15–25 yrs
Ant. sup. iliac spine	Puberty	15–25 yrs
Iliac crest/sup. spines	Puberty	15–25 yrs
Ischial tuberosity	Puberty +	15–25 yrs

FEMUR (c)	Appears	Fused
Shaft	7 wiu	
Head	4–6 mths	14–18 yrs
Greater trochanter	2–4 yrs	14–18 yrs
Lesser trochanter	10–12 yrs	14–18 yrs
Distal end	9 miu	17–19 yrs

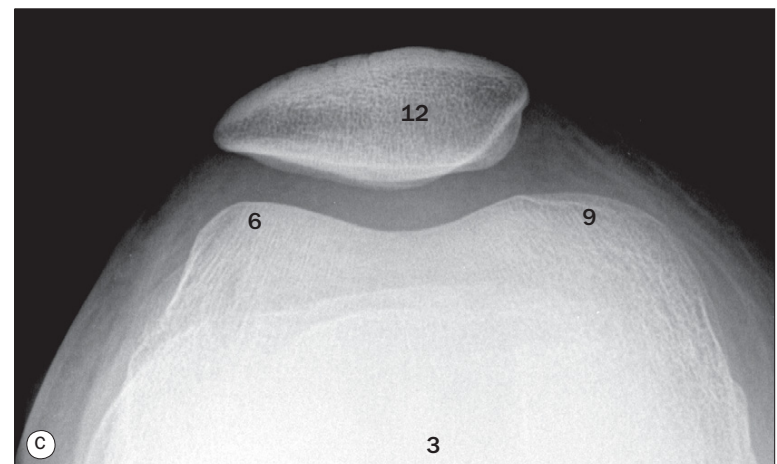


(a) Anteroposterior projection.

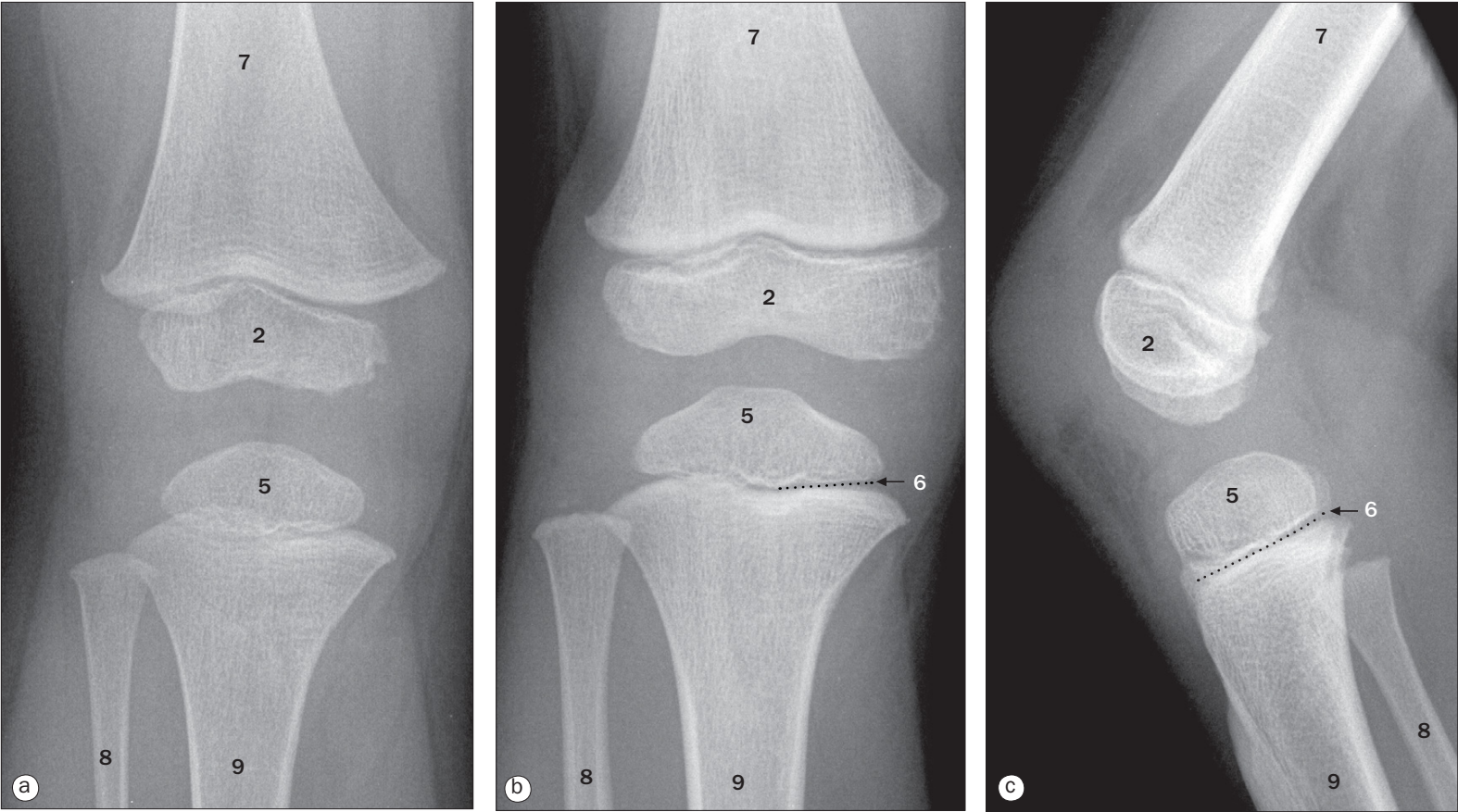


(b) Lateral projection.

- 1 Apex (styloid process) of fibula
- 2 Fibula neck
- 3 Femur
- 4 Head of fibula
- 5 Intercondylar fossa
- 6 Lateral condyle of femur
- 7 Lateral condyle of tibia
- 8 Lateral epicondyle of femur
- 9 Medial condyle of femur
- 10 Medial condyle of tibia
- 11 Medial epicondyle of femur
- 12 Patella
- 13 Tibia
- 14 Tubercles of intercondylar eminence
- 15 Tuberosity of tibia



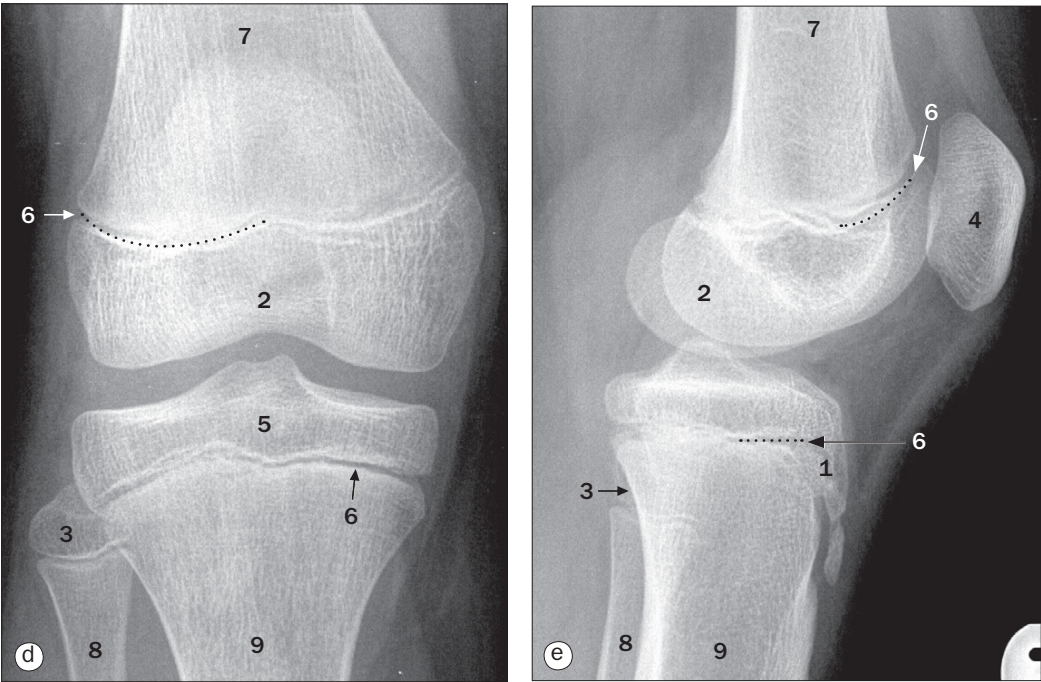
(c) Inferosuperior (skyline) projection.



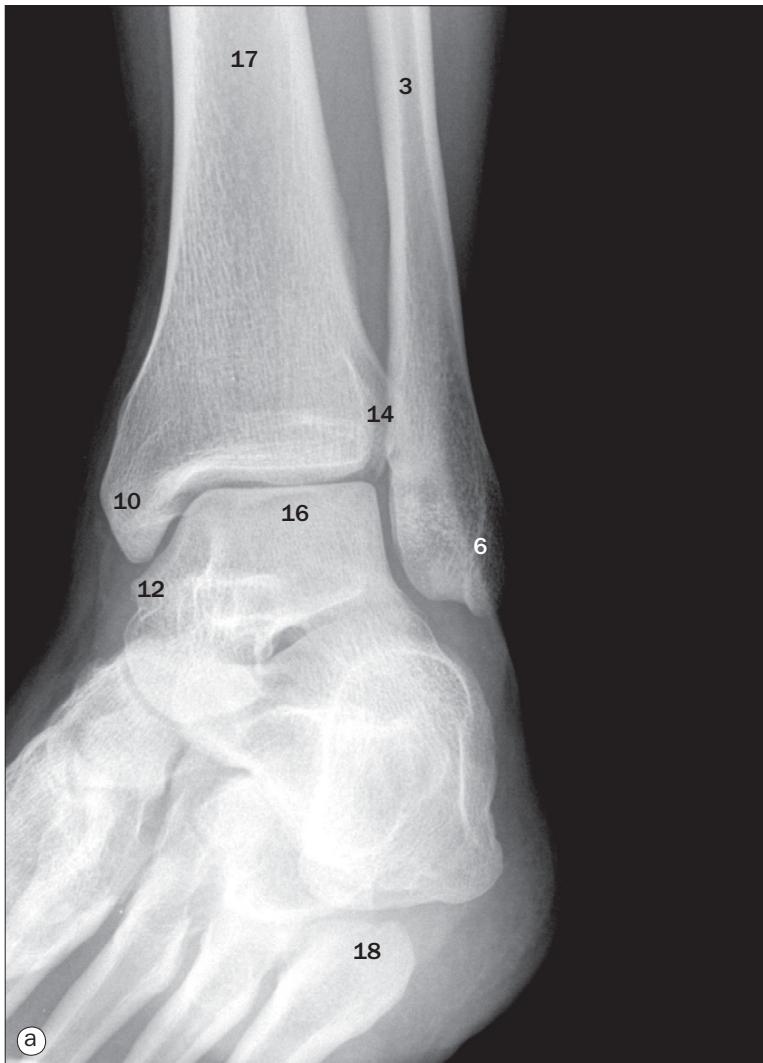
(a) 2-year-old girl. (b) and (c) 5-year-old girl.

- 1 Antero-inferior extension of proximal tibial centre for tuberosity of tibia
2 Centre for distal femur
3 Centre for head of fibula
4 Patella
5 Centre for proximal tibia
6 Epiphysal line
7 Femur
8 Fibula
9 Tibia

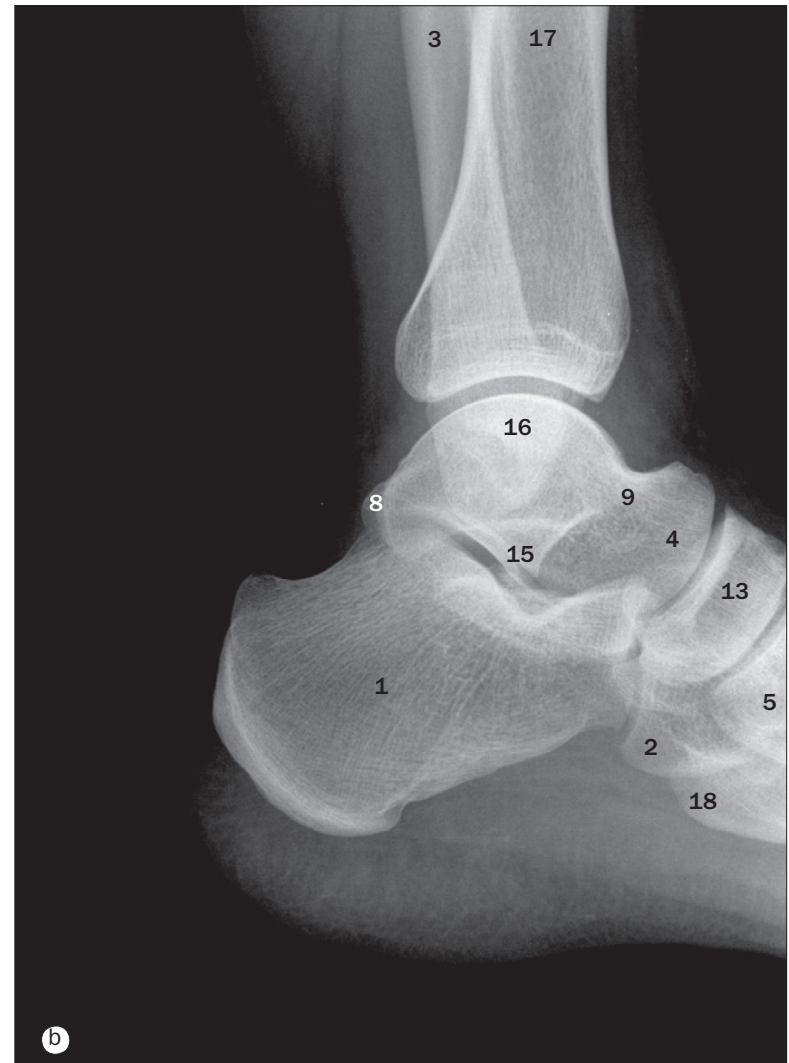
PATELLA (c)	Appears	Fused
1–3 centres	3–5 yrs	Puberty
TIBIA (c)		
Shaft	7 wiu	
Proximal/plateau	9 miu	16–18 yrs
Tuberosity	10–12 yrs	12–14 yrs
Distal end	4 mths–1 yr	15–17 yrs
FIBULA (c)		
Shaft	8 wiu	
Proximal end/head	2–4 yrs	17–19 yrs
Distal end	6 mths–1 yr	15–17 yrs



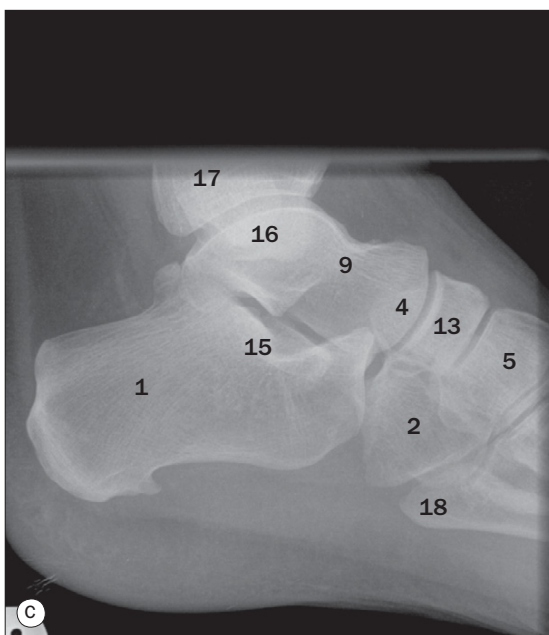
(d) and (e) 12-year-old girl.



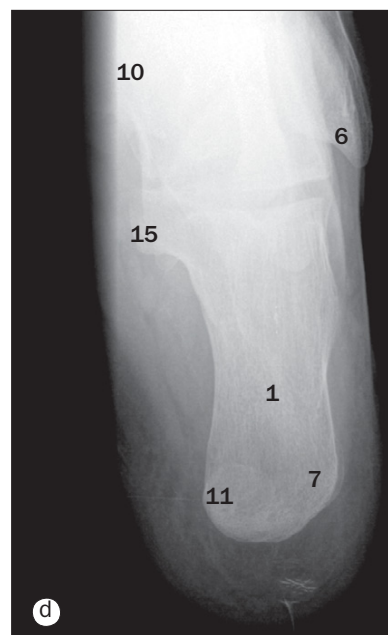
(a) Ankle joint, anteroposterior projection.



(b) Ankle joint, lateral projection.

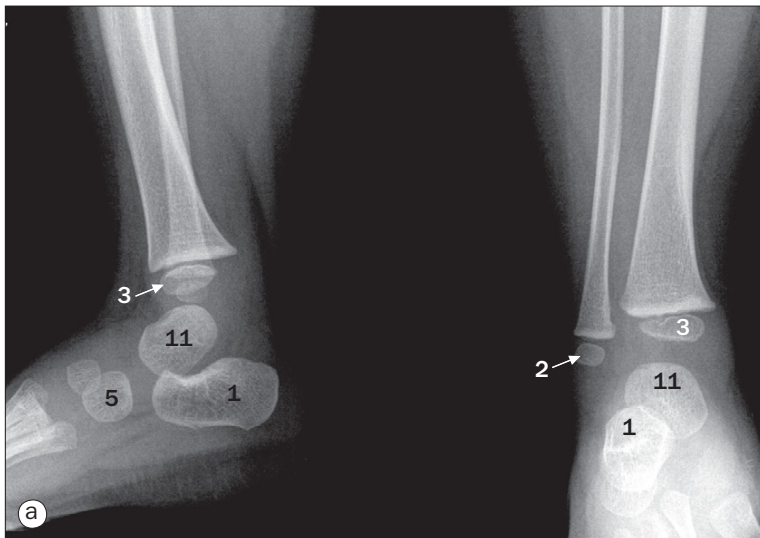


(c) Calcaneus, lateral projection.

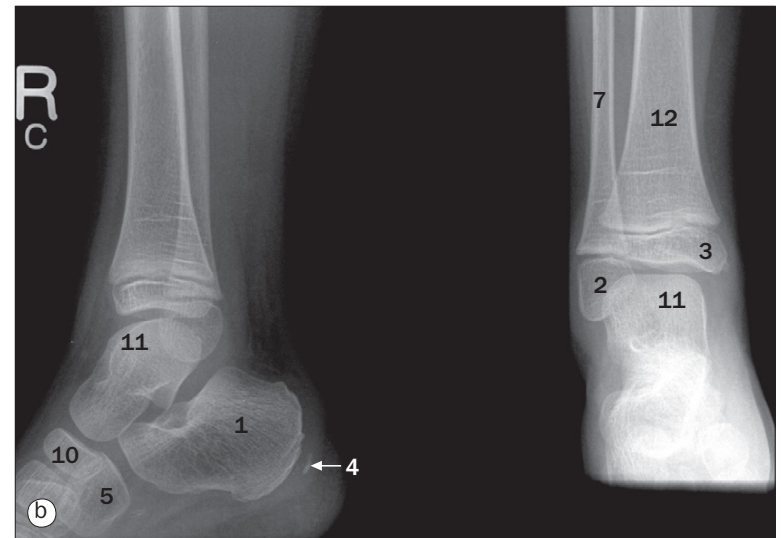


(d) Calcaneus, axial (caudo cranial) projection.

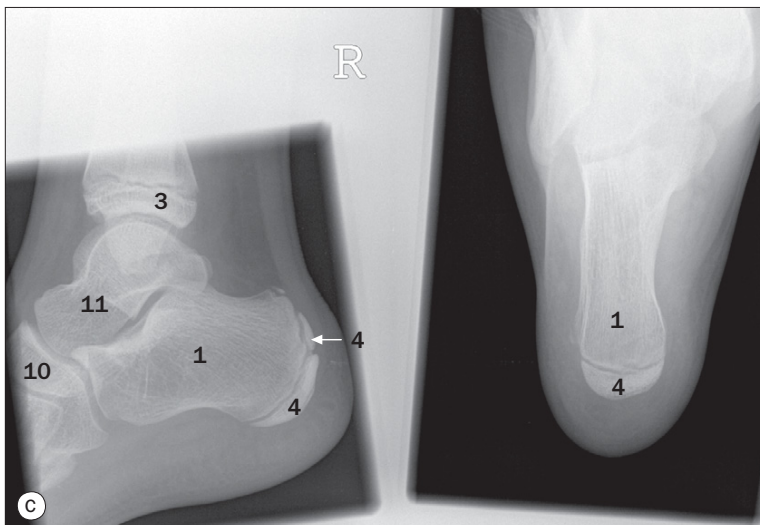
- 1 Calcaneus
- 2 Cuboid
- 3 Fibula
- 4 Head of talus
- 5 Lateral cuneiform
- 6 Lateral malleolus of fibula
- 7 Lateral process of calcaneus
- 8 Lateral tubercle of talus
- 9 Neck of talus
- 10 Medial malleolus of tibia
- 11 Medial process of calcaneus
- 12 Medial tubercle of talus
- 13 Navicular
- 14 Region of inferior tibiofibular joint
- 15 Sustentaculum tali of calcaneus
- 16 Talus
- 17 Tibia
- 18 Tuberosity of base of fifth metatarsal



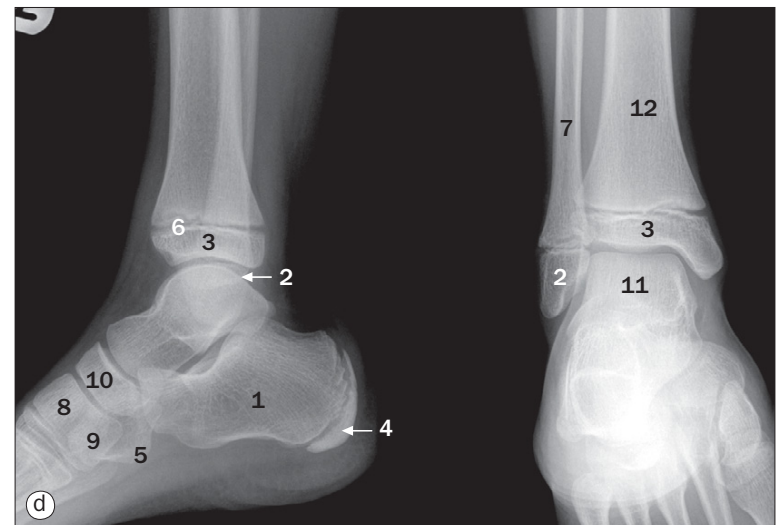
(a) Ankle of a 3-year-old girl.



(b) Ankle of a 5-year-old girl.



(c) Ankle of a 13-year-old girl.



(d) Calcaneus of a 10-year-old girl.

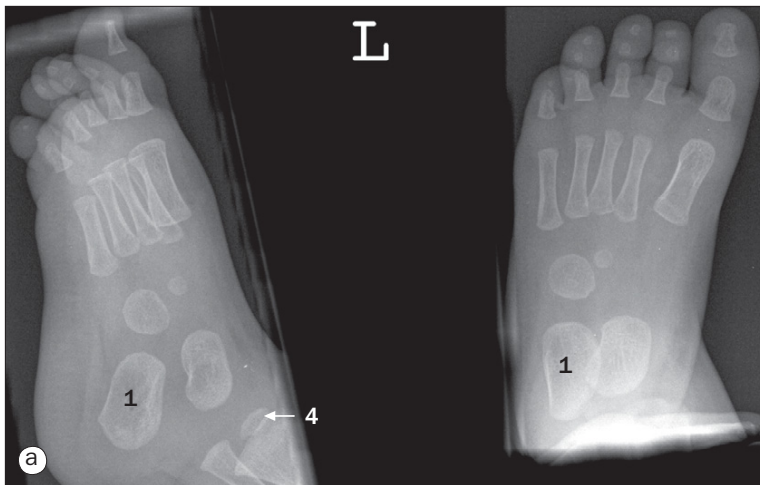
- 1 Calcaneus
- 2 Centre for distal fibula
- 3 Centre for distal tibia
- 4 Centre for posterior aspect of calcaneus
- 5 Cuboid
- 6 Epiphyseal line
- 7 Fibula
- 8 Intermediate cuneiform
- 9 Lateral cuneiform
- 10 Navicular
- 11 Talus
- 12 Tibia

TARSAL BONES (c)	Appears	Fused
Calcaneus	3 miu	14–16 yrs
Talus	6 miu	
Navicular	3 yrs	
Cuneiform lateral	6 mths–1 yr	
Cuneiform intermediate	2–3 yrs	
Cuneiform medial	1–2 yrs	
Cuboid	9 miu	

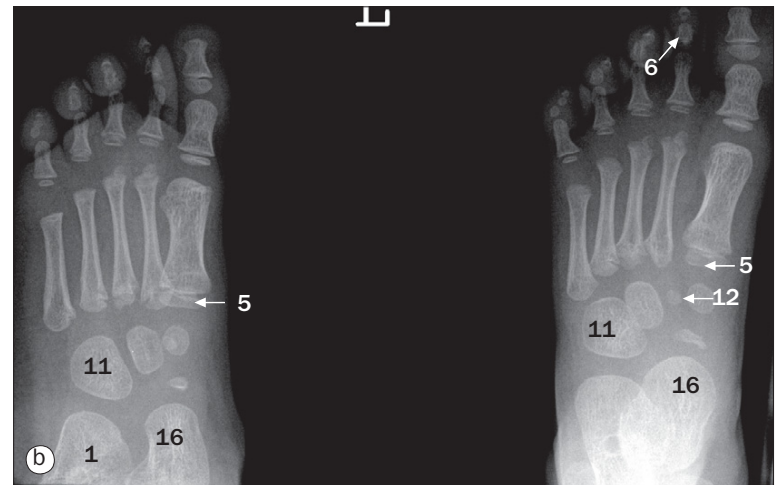


Foot, (a) dorsoplantar projection, (b) dorsoplantar oblique projection, (c) and (d) os naviculare.

- 1 Calcaneus
- 2 Cuboid
- 3 Distal phalanx of second toe
- 4 First metatarsal
- 5 Intermediate cuneiform
- 6 Lateral cuneiform
- 7 Medial cuneiform
- 8 Middle phalanx of second toe
- 9 Navicular
- 10 Proximal phalanx of second toe
- 11 Sesamoid bones in flexor hallucis brevis muscle
- 12 Talus
- 13 Tuberosity of base of fifth metatarsal
- 14 Os naviculare



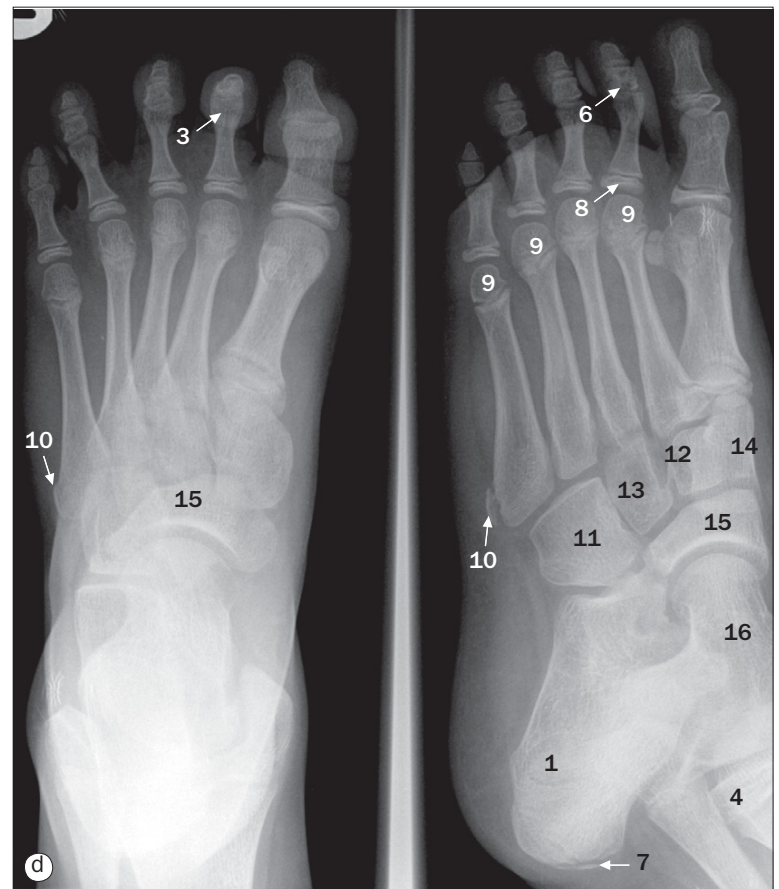
(a) Foot of an 11-month-old girl.



(b) Foot of a 3-year-old girl.



(c) Foot of a 6-year-old girl.

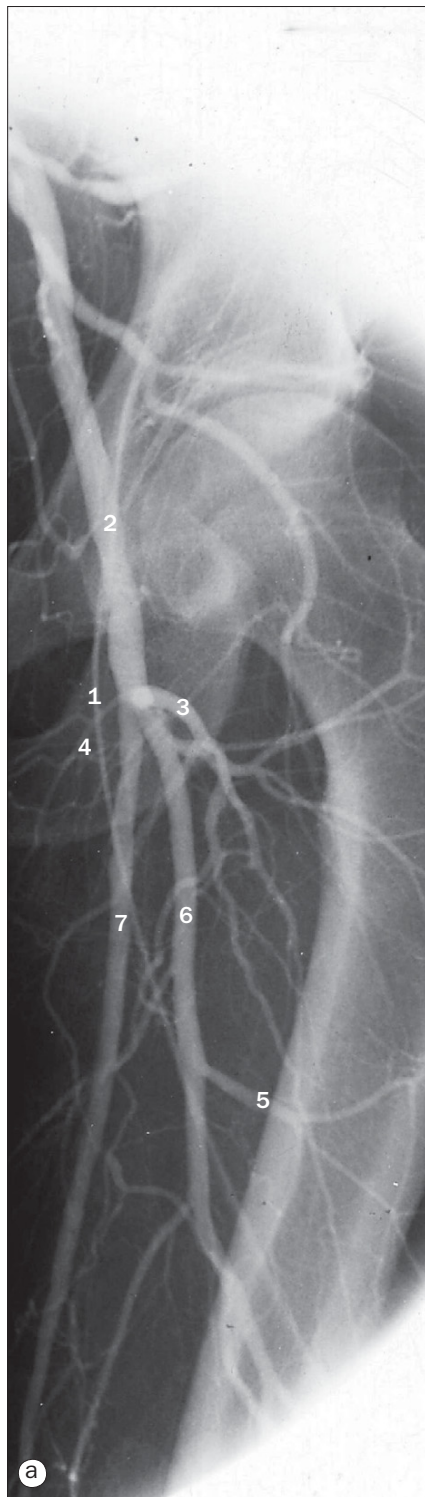


(d) Foot of a 12-year-old girl.

- 1 Calcaneus
- 2 Centre for distal fibula
- 3 Centre for distal phalanx of second toe
- 4 Centre for distal tibia
- 5 Centre for first metatarsal
- 6 Centre for middle phalanx of second toe
- 7 Centre for posterior aspect of calcaneus
- 8 Centre for proximal phalanx of second toe
- 9 Centre for second metatarsal (applies to second to fifth metatarsal)
- 10 Centre for tuberosity of base of fifth metatarsal
- 11 Cuboid
- 12 Intermediate cuneiform
- 13 Lateral cuneiform
- 14 Medial cuneiform
- 15 Navicular
- 16 Talus

METATARSALS (c)	Appears	Fused
Shafts	9 wiu	
Heads (2–5) or base (1)	3–4 yrs	17–20 yrs
Tuberosity of 5	10–12 yrs	13–15 yrs
PHALANGES (c)		
Shaft	9–12 wiu	
Bases (variable)	1–6 yrs	14–18 yrs

TARSAL BONES (c)	Appears	Fused
Calcaneus	3 miu	14–16 yrs
Talus	6 miu	
Navicular	3 yrs	
Cuneiform lateral	6 mths–1 yr	
Cuneiform intermediate	2–3 yrs	
Cuneiform medial	1–2 yrs	
Cuboid	9 miu	



(a) Femoral arteriogram.

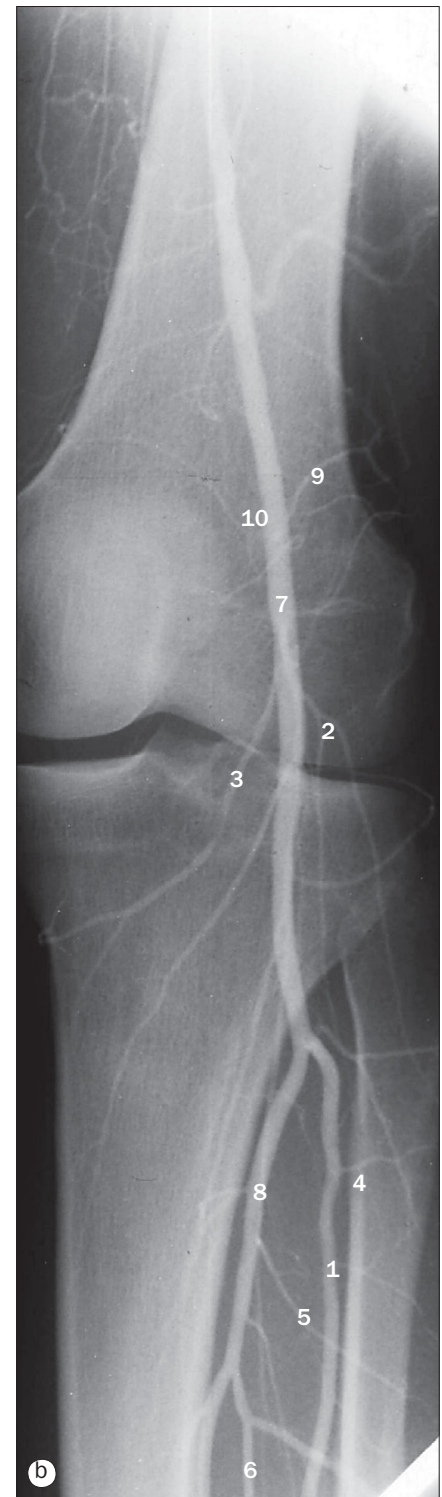
The femoropopliteal and tibial arteries are imaged by catheterising the distal abdominal aorta and injecting contrast medium. The column of contrast is then followed as it passes down the legs. If only one leg is to be imaged, an injection into the ipsilateral femoral artery suffices. The external iliac artery continues as the common femoral artery, which originates deep to the inguinal ligament, dividing into the superficial and deep (profunda) femoral arteries. An oblique view is often useful to image the femoral bifurcation and to identify atheroma at the origins of these vessels.

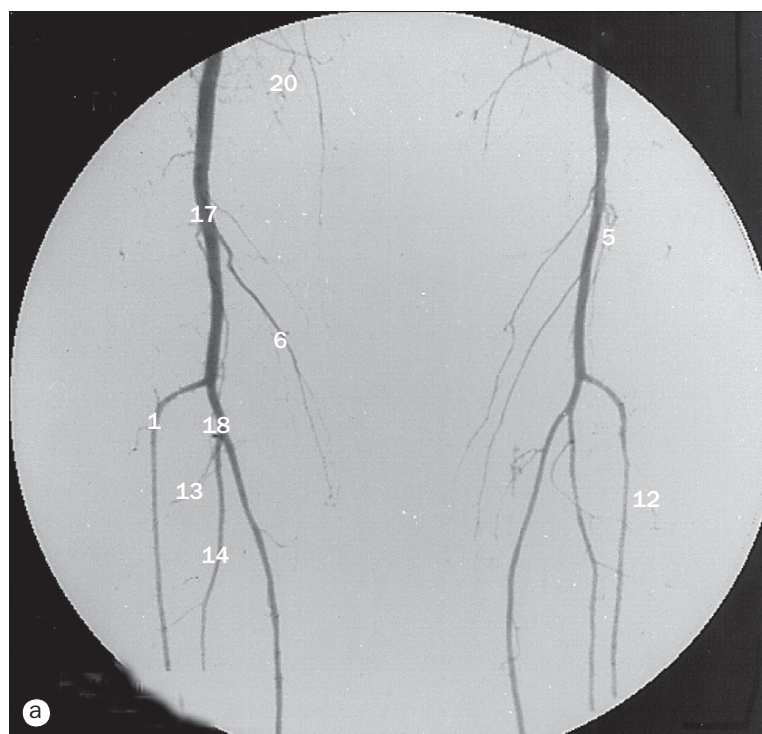
- 1 Catheter introduced into distal abdominal aorta via left femoral artery
- 2 Common femoral artery
- 3 Lateral circumflex femoral artery
- 4 Medial circumflex femoral artery
- 5 Perforating artery
- 6 Profunda femoris artery
- 7 Superficial femoral artery

(b) Popliteal arteriogram.

The superficial femoral artery becomes the popliteal artery as it passes through the hiatus in the adductor magnus muscle. The popliteal artery terminates at the lower border of the popliteus muscle, dividing into the anterior and posterior tibial arteries.

- 1 Anterior tibial artery
- 2 Inferior lateral genicular artery
- 3 Inferior medial genicular artery
- 4 Muscular branches of anterior tibial artery
- 5 Muscular branches of posterior tibial artery
- 6 Peroneal artery
- 7 Popliteal artery
- 8 Posterior tibial artery
- 9 Superior lateral genicular artery
- 10 Superior medial genicular artery



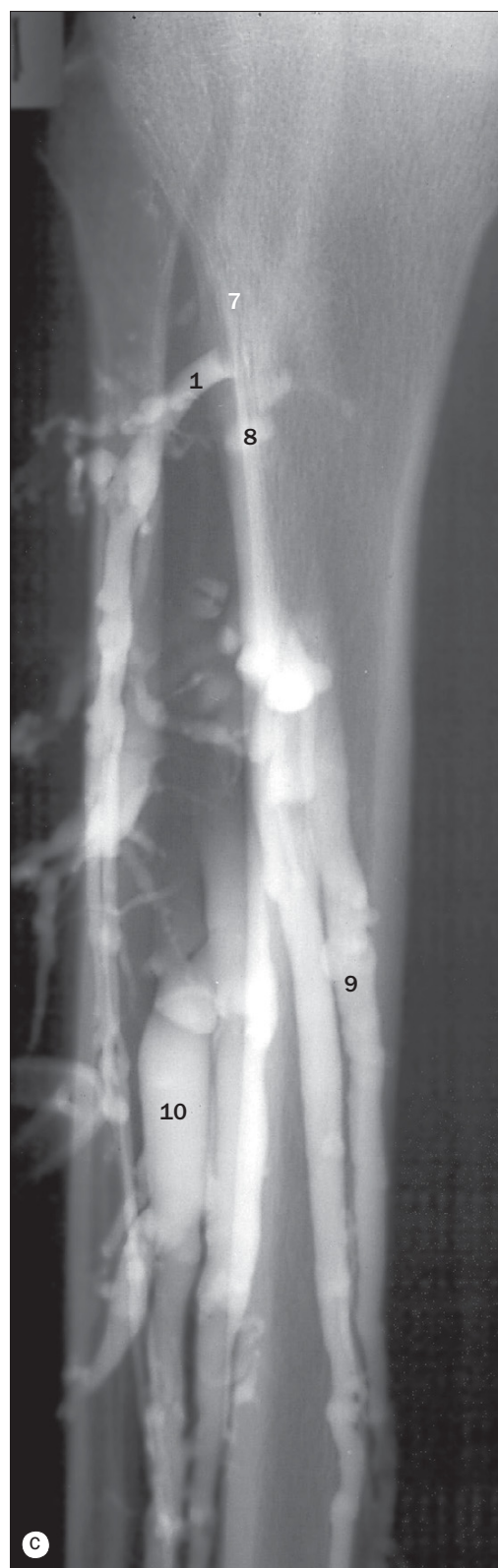
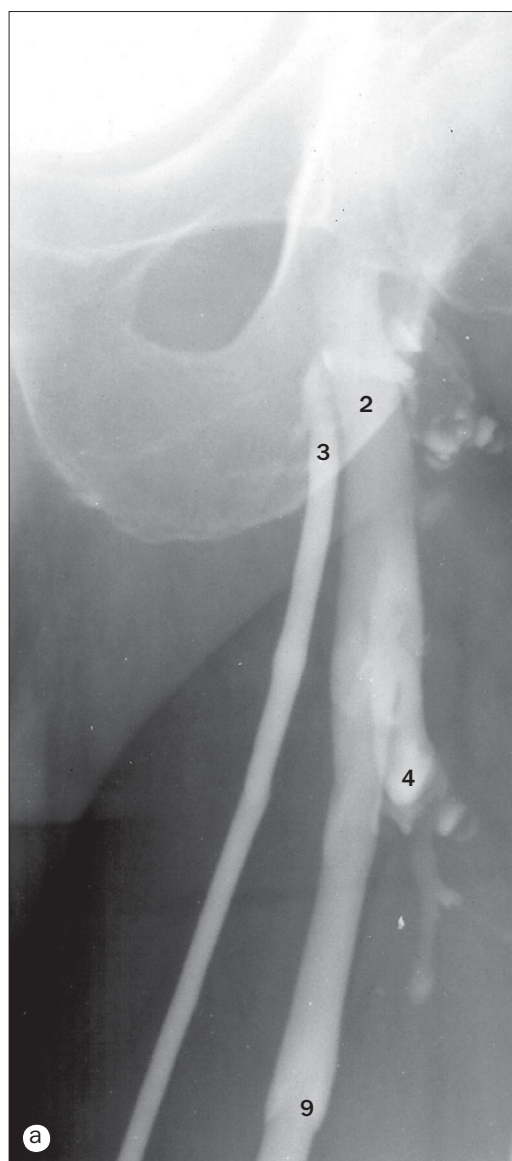


(a) Popliteal arteriogram, (b) foot arteriogram, lateral image, (c) foot venogram, (d) MR angiogram of calf arteries.

- 1 Anterior tibial artery
- 2 Dorsal venous arch
- 3 Dorsalis pedis artery
- 4 Great saphenous vein
- 5 Inferior lateral genicular artery
- 6 Inferior medial genicular artery
- 7 Lateral marginal vein

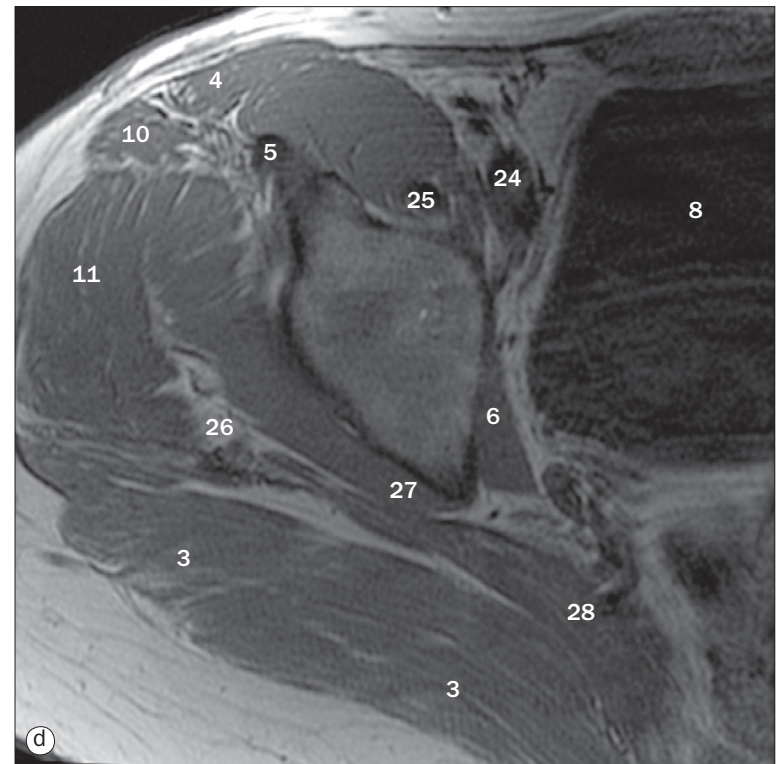
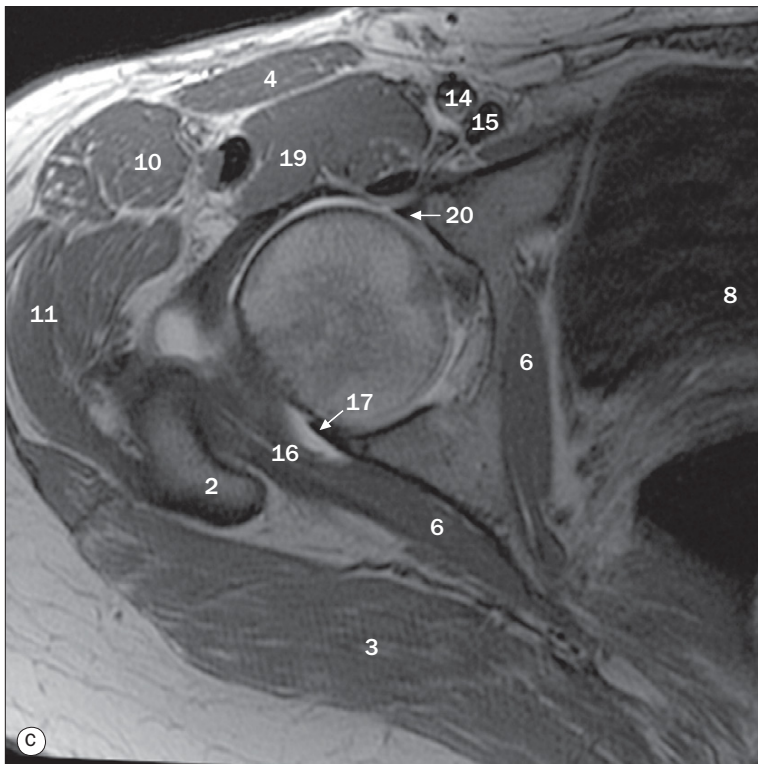
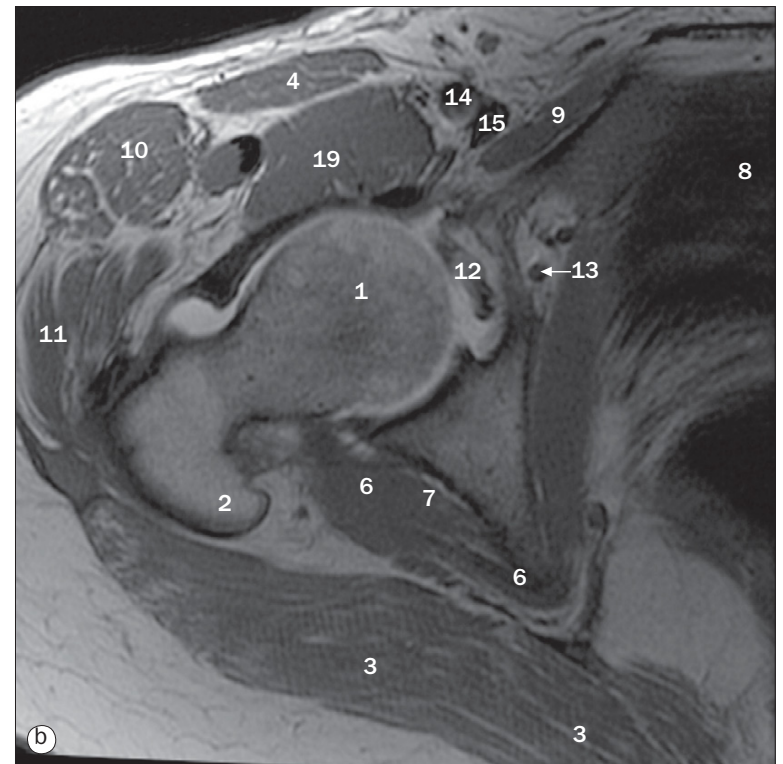
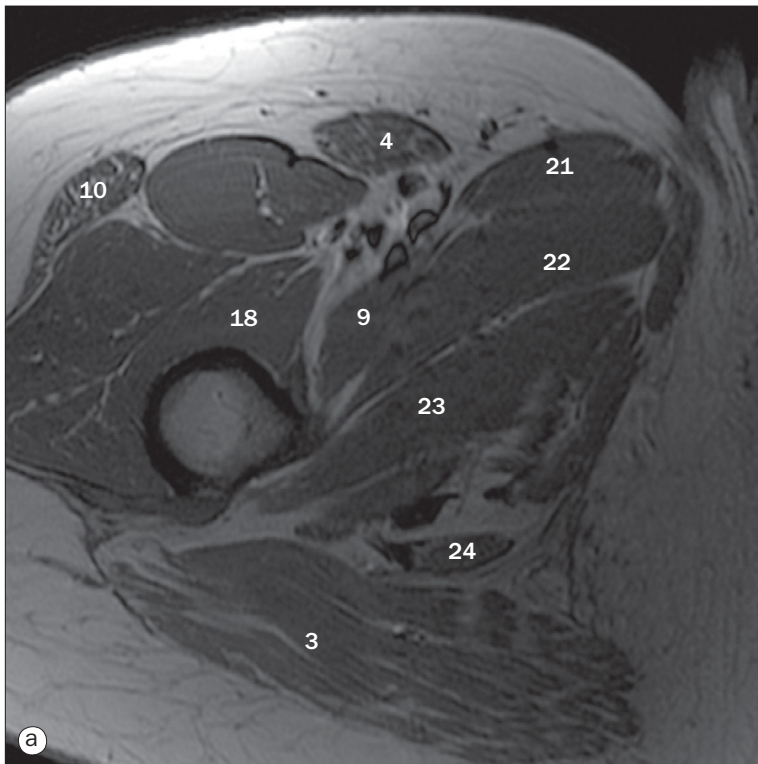
- 8 Lateral plantar artery
- 9 Medial calcaneal artery
- 10 Medial marginal vein
- 11 Medial plantar artery
- 12 Muscular branches of anterior tibial artery
- 13 Muscular branches of posterior tibial artery

- 14 Peroneal artery
- 15 Plantar arch
- 16 Plantar cutaneous venous plexus
- 17 Popliteal artery
- 18 Posterior tibial artery
- 19 Small saphenous vein
- 20 Superior medial genicular artery



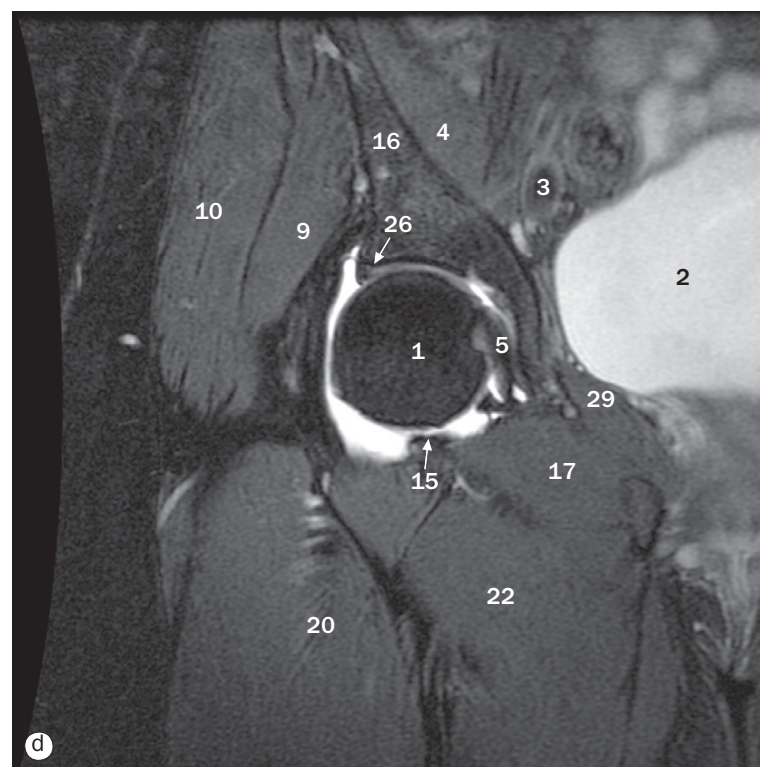
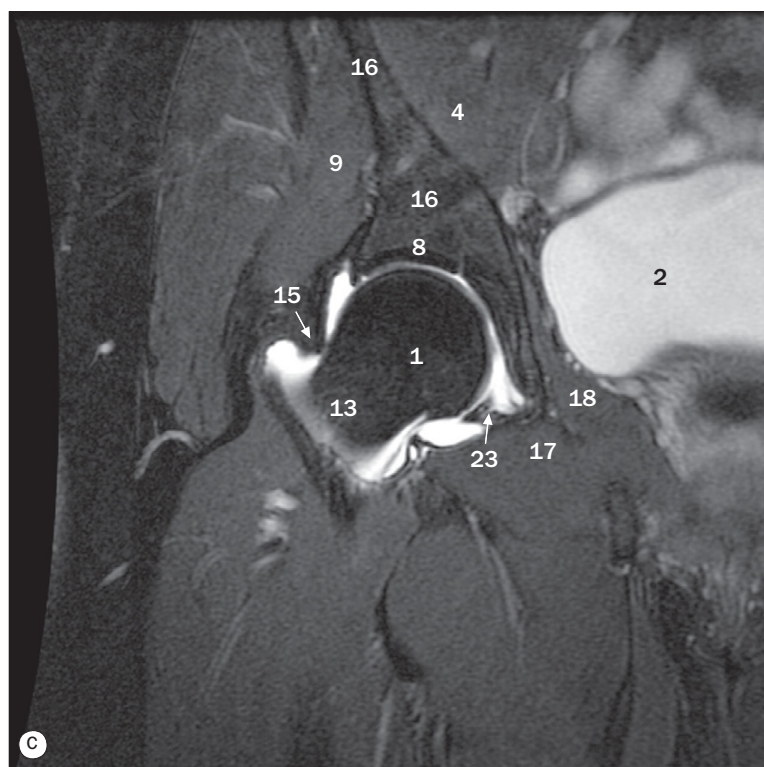
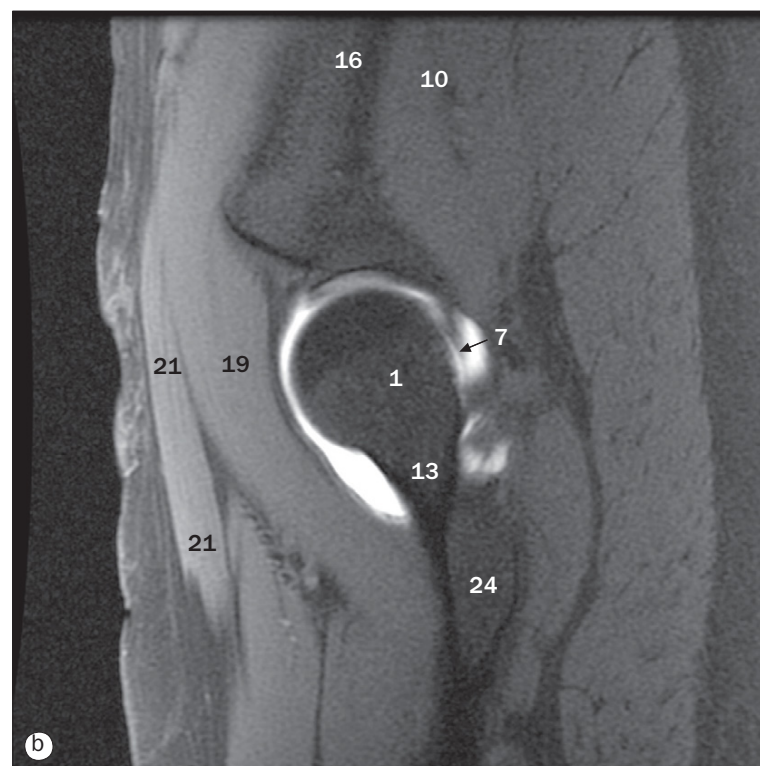
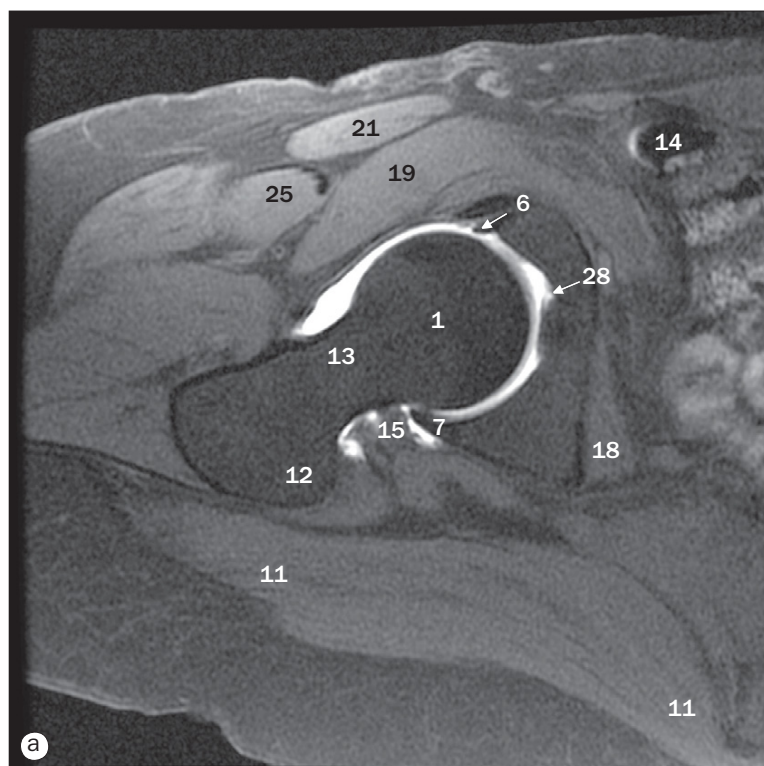
(a)–(c) Lower limb venograms.

- 1 Anterior tibial vein
- 2 Femoral vein
- 3 Great (long) saphenous vein
- 4 Lateral circumflex vein
- 5 Muscular tributary of femoral vein
- 6 Perforating vein
- 7 Popliteal vein
- 8 Posterior tibial veins
- 9 Venous valves
- 10 Venous calf plexus



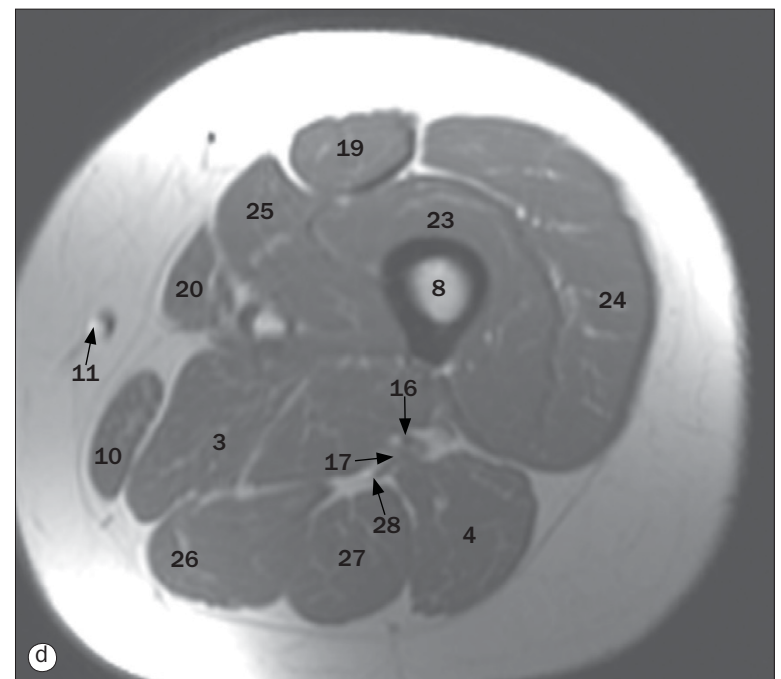
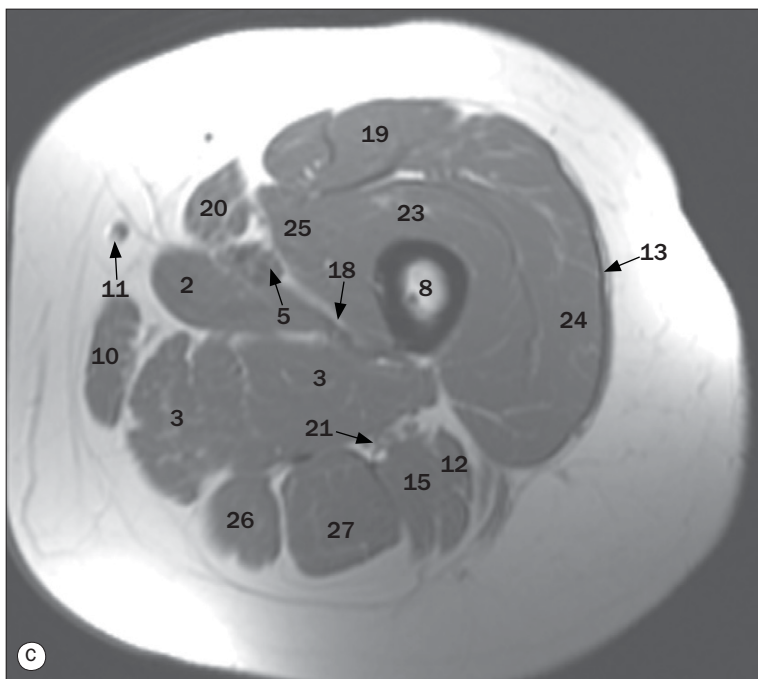
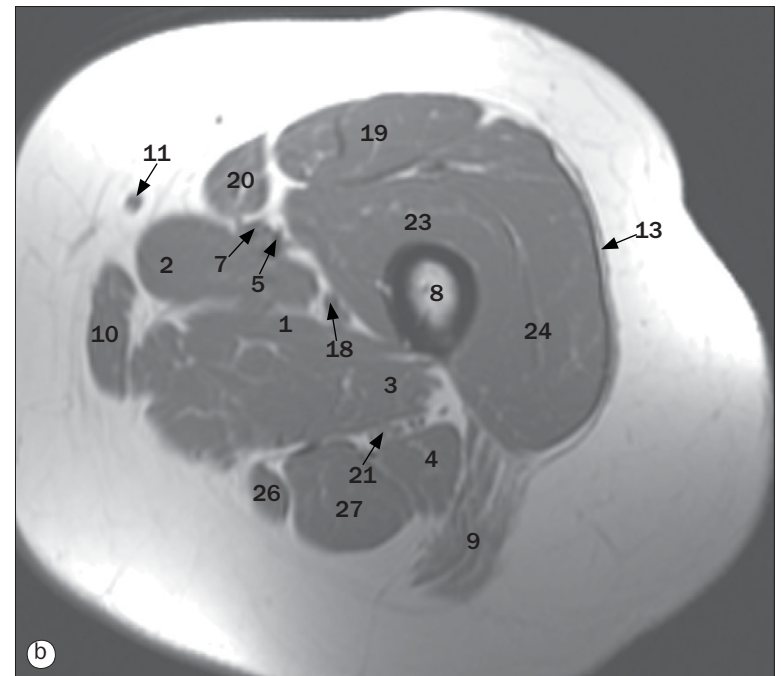
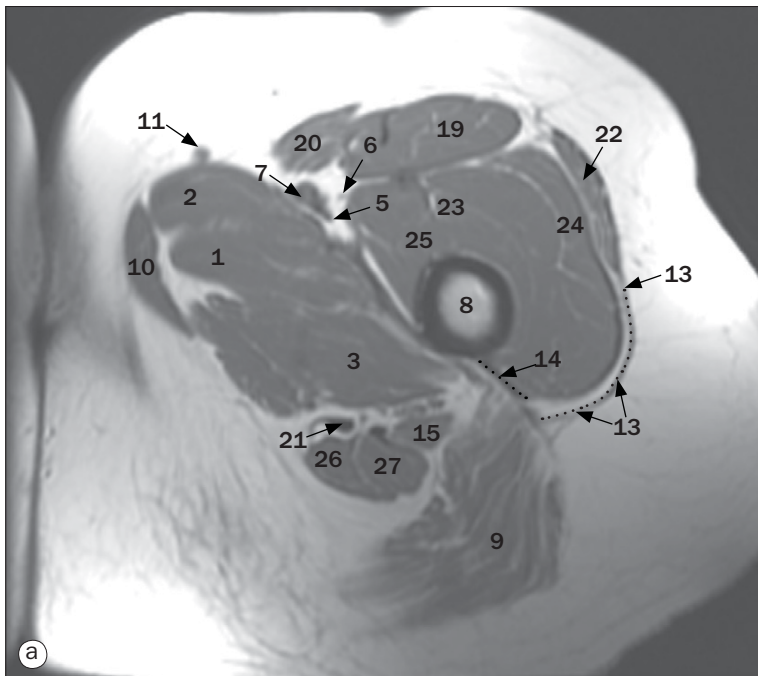
(a)–(d) Hip, axial MR images, from superior to inferior.

- | | | | |
|-----------------------------------|------------------------------|--|----------------------------|
| 1 Femoral head | 8 Bladder | 16 Tendon of obturator internus muscle | 22 Adductor brevis muscle |
| 2 Greater trochanter | 9 Pectineus muscle | 17 Posterior acetabular labrum | 23 Adductor magnus muscle |
| 3 Gluteus maximus muscle | 10 Tensor fascia lata muscle | 18 Vastus intermedius muscle | 24 Semitendinosus muscle |
| 4 Sartorius muscle | 11 Vastus lateralis muscle | 19 Iliopsoas muscle | 25 Profunda femoris artery |
| 5 Tendon of rectus femoris muscle | 12 Ligamentum teres | 20 Anterior acetabular labrum | 26 External iliac artery |
| 6 Obturator internus muscle | 13 Obturator nerve | 21 Adductor longus muscle | 27 Gluteus minimus muscle |
| 7 Superior gemellus muscle | 14 Femoral artery | | 28 Gluteus medius muscle |
| | 15 Femoral vein | | |



Hip, MR arthrogram images, (a) axial, (b) sagittal, (c) and (d) coronal.

- | | | |
|-------------------------------|--|-----------------------------------|
| 1 Femoral head | 11 Gluteus maximus muscle | 21 Sartorius muscle |
| 2 Bladder | 12 Greater trochanter | 22 Adductor longus muscle |
| 3 External iliac artery | 13 Femoral neck | 23 Transverse acetabular ligament |
| 4 Iliacus muscle | 14 Femoral artery | 24 Quadratus femoris muscle |
| 5 Ligamentum teres | 15 Zona orbicularis (circular fibrous capsule) | 25 Rectus femoris muscle |
| 6 Anterior acetabular labrum | 16 Iliac bone | 26 Superior acetabular labrum |
| 7 Posterior acetabular labrum | 17 Obturator externus muscle | 27 Gemellus muscle |
| 8 Acetabular roof | 18 Obturator internus muscle | 28 Acetabular notch (pulvinar) |
| 9 Gluteus minimus muscle | 19 Iliopsoas muscle | 29 Pectineus muscle |
| 10 Gluteus medius muscle | 20 Vastus intermedius | |

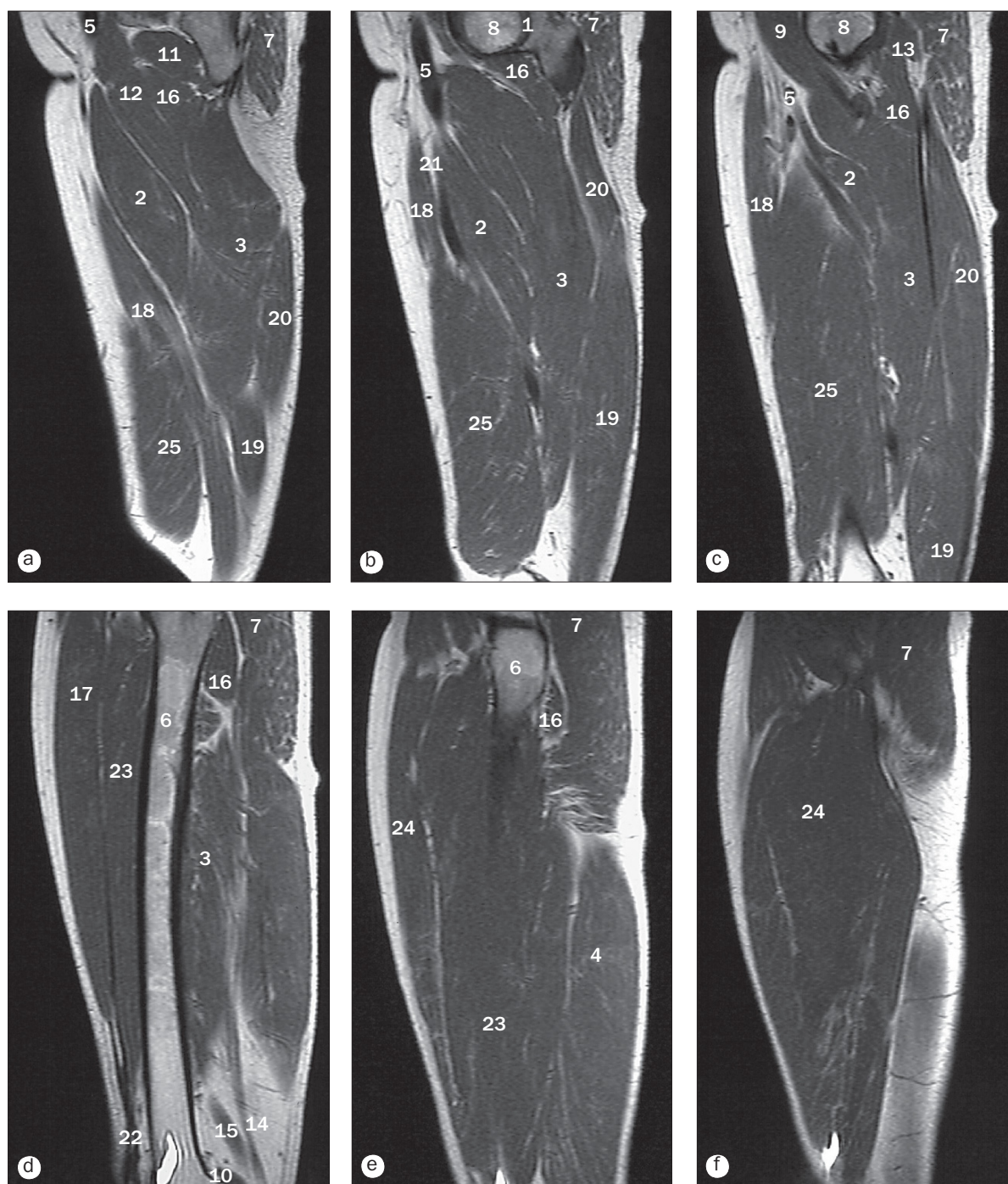


(a)–(d) Axial MR images of the thigh.

1 Adductor brevis muscle
2 Adductor longus muscle
3 Adductor magnus muscle
4 Biceps femoris muscle
5 Femoral artery
6 Femoral nerve
7 Femoral vein
8 Femur
9 Gluteus maximus muscle
10 Gracilis muscle

11 Great (long) saphenous vein
12 Short head of biceps femoris muscle
13 Iliotibial tract
14 Lateral intermuscular septum
15 Long head of biceps femoris muscle
16 Popliteal artery
17 Popliteal vein
18 Profunda femoris artery
19 Rectus femoris muscle
20 Sartorius muscle

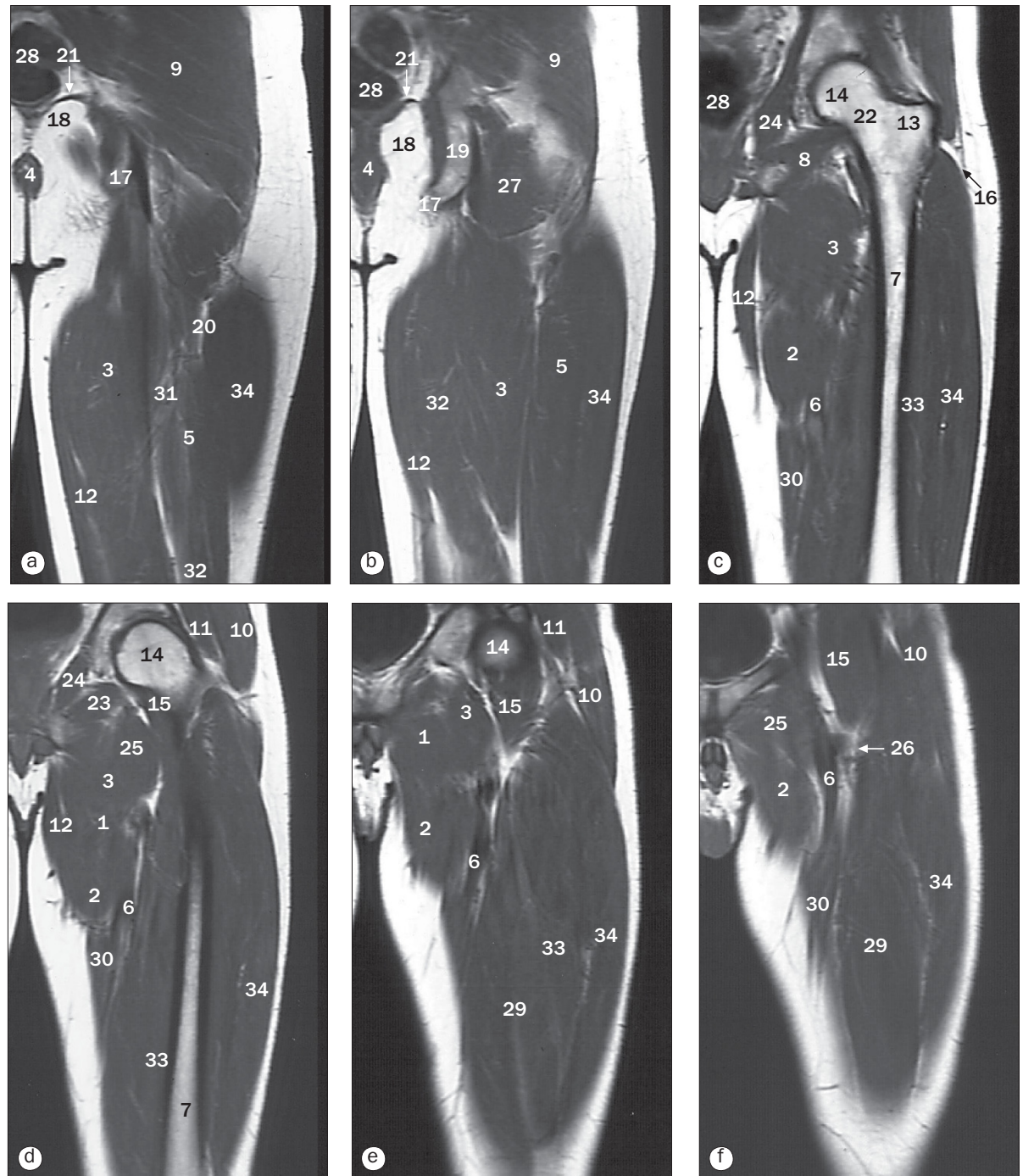
21 Sciatic nerve
22 Tensor fasciae latae muscle
23 Vastus intermedius muscle
24 Vastus lateralis muscle
25 Vastus medialis muscle
26 Semimembranosus muscle
27 Semitendinosus muscle
28 Tibial nerve



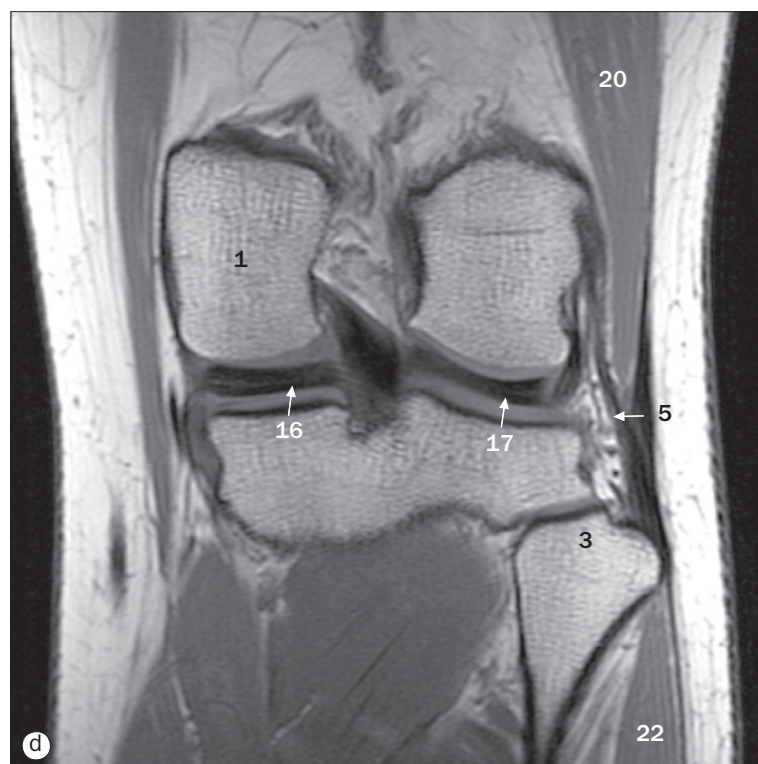
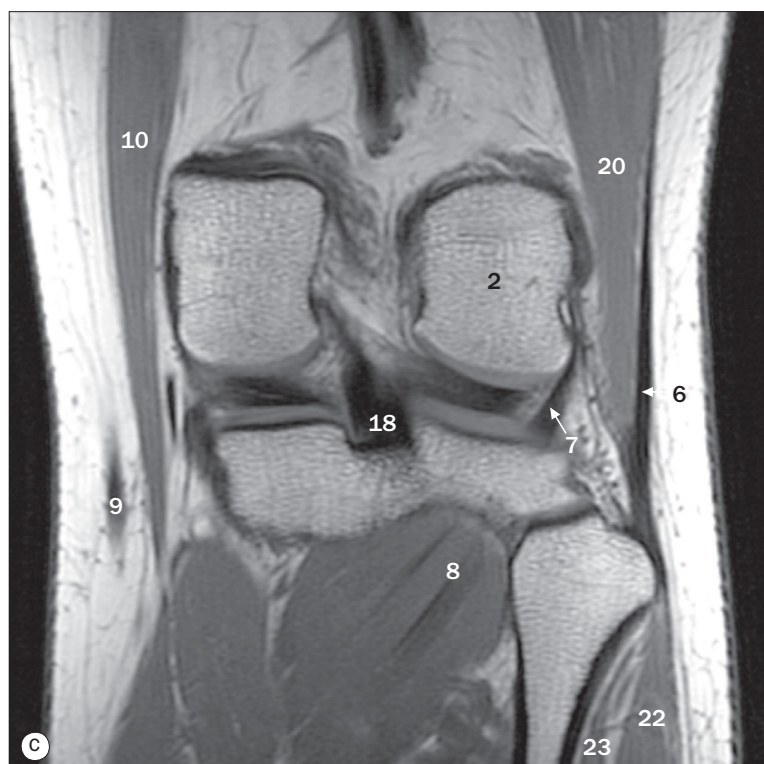
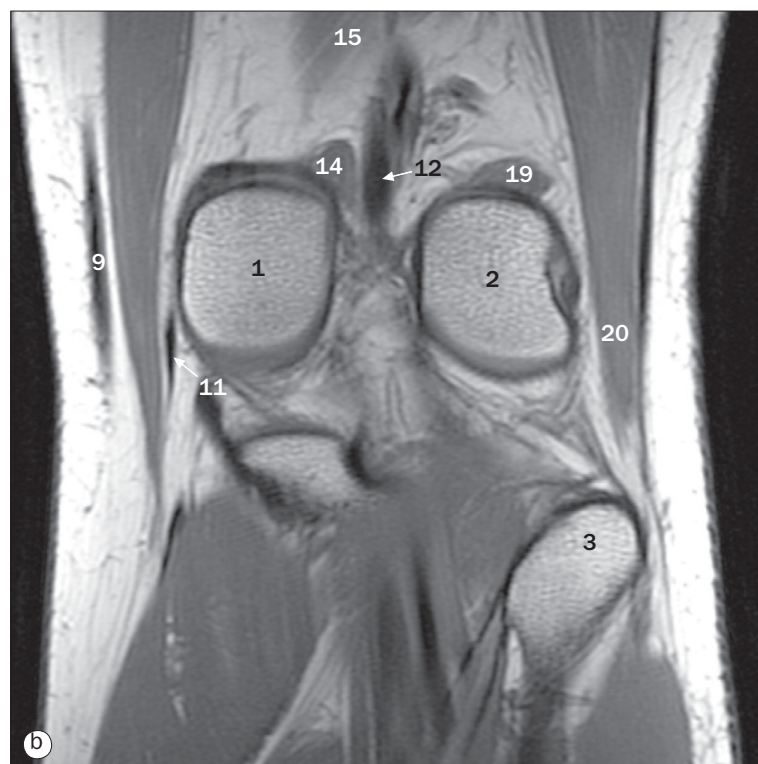
(a)–(f) Thigh, sagittal MR images.

- | | | |
|--------------------------|---|--|
| 1 Acetabulum | 10 Lateral head of gastrocnemius muscle | 18 Sartorius muscle |
| 2 Adductor longus muscle | 11 Obturator externus muscle | 19 Semimembranosus muscle |
| 3 Adductor magnus muscle | 12 Pectineus muscle | 20 Semitendinosus muscle |
| 4 Biceps femoris muscle | 13 Piriformis muscle | 21 Subsartorial canal (Hunter's canal) |
| 5 Femoral artery | 14 Popliteal artery | 22 Tendon of quadriceps muscle |
| 6 Femur | 15 Popliteal vein | 23 Vastus intermedius muscle |
| 7 Gluteus maximus muscle | 16 Quadratus femoris muscle | 24 Vastus lateralis muscle |
| 8 Head of femur | 17 Rectus femoris muscle | 25 Vastus medialis muscle |
| 9 Iliopsoas muscle | | |

(a)–(f) Thigh, coronal MR images.

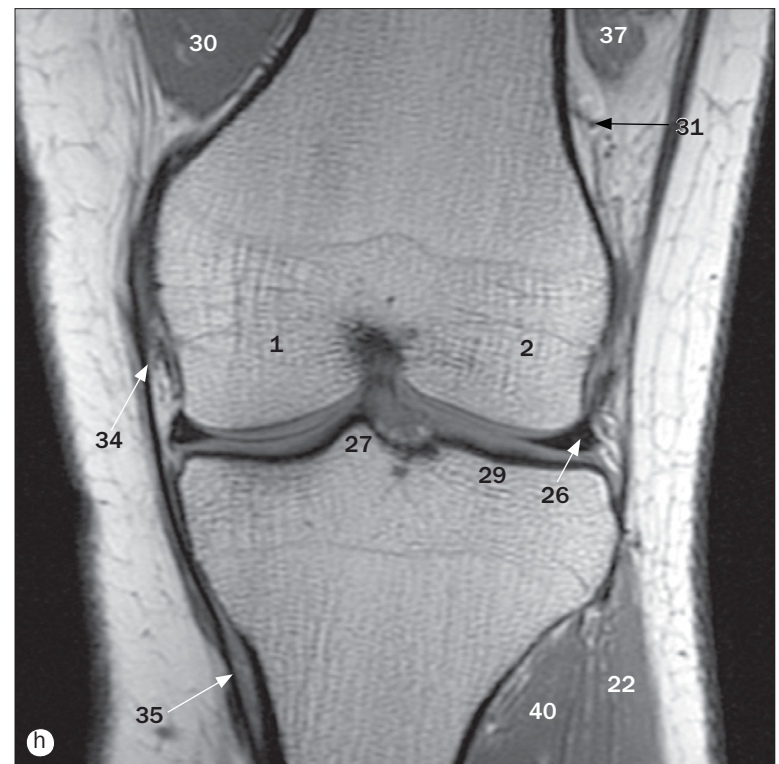
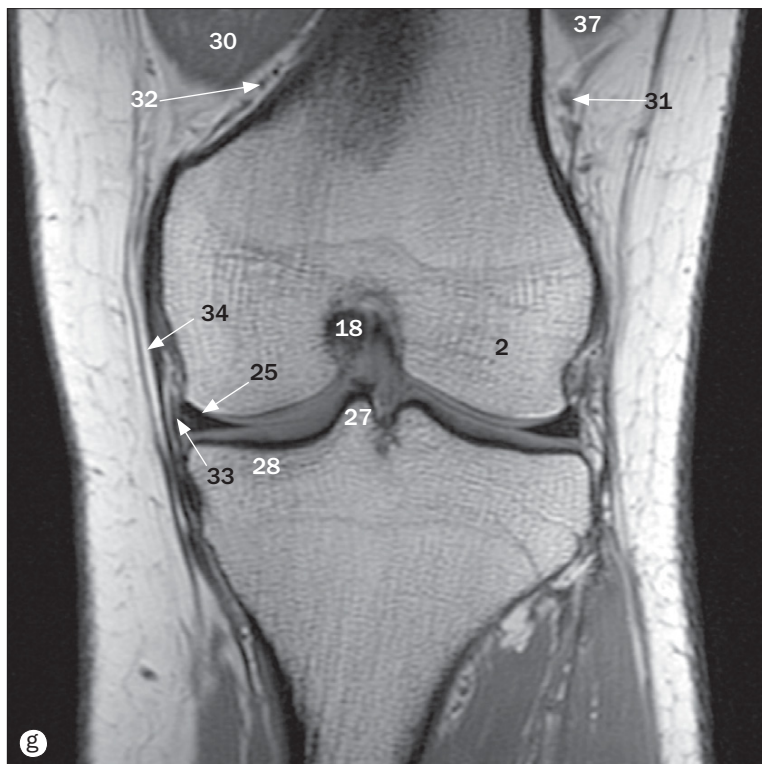
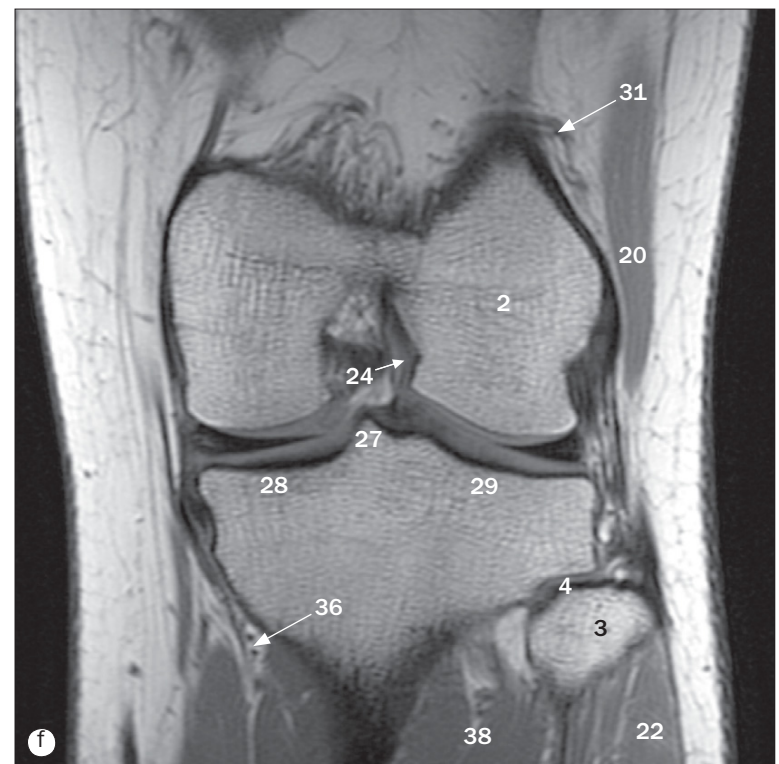
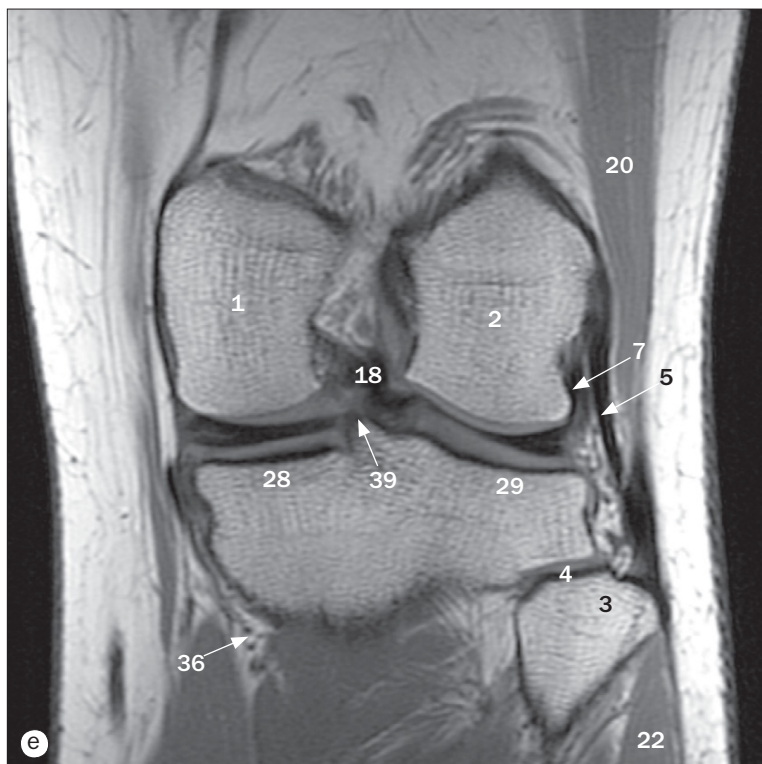


- | | | |
|---------------------------|---------------------------------|------------------------------|
| 1 Adductor brevis muscle | 13 Greater trochanter of femur | 25 Pectineus muscle |
| 2 Adductor longus muscle | 14 Head of femur | 26 Profunda femoris artery |
| 3 Adductor magnus muscle | 15 Iliopsoas muscle | 27 Quadratus femoris muscle |
| 4 Anal canal | 16 Iliotibial tract | 28 Rectum |
| 5 Biceps femoris muscle | 17 Ischial tuberosity | 29 Rectus femoris muscle |
| 6 Femoral artery | 18 Ischio-anal fossa | 30 Sartorius muscle |
| 7 Femur | 19 Ischium | 31 Semimembranosus muscle |
| 8 Gemellus muscle | 20 Lateral intermuscular septum | 32 Semitendinosus muscle |
| 9 Gluteus maximus muscle | 21 Levator ani muscle | 33 Vastus intermedius muscle |
| 10 Gluteus medius muscle | 22 Neck of femur | 34 Vastus lateralis muscle |
| 11 Gluteus minimus muscle | 23 Obturator externus muscle | |
| 12 Gracilis muscle | 24 Obturator internus muscle | |



(a)–(h) Knee, coronal MR images, from posterior to anterior.

- | | | |
|-------------------------------|--|---------------------------------------|
| 1 Medial femoral condyle | 9 Great (long) saphenous vein | 17 Posterior horn lateral meniscus |
| 2 Lateral femoral condyle | 10 Sartorius muscle | 18 Posterior cruciate ligament |
| 3 Head of fibula | 11 Tendon of gracilis muscle | 19 Lateral head of gastrocnemius |
| 4 Proximal tibiofibular joint | 12 Popliteal artery | 20 Biceps femoris muscle |
| 5 Lateral collateral ligament | 13 Common peroneal (fibular) nerve | 21 Soleus muscle |
| 6 Iliotibial tract | 14 Medial head of gastrocnemius muscle | 22 Peroneus (fibularis) longus muscle |
| 7 Tendon of popliteus muscle | 15 Semimembranosus muscle | 23 Extensor digitorum longus muscle |
| 8 Popliteus muscle | 16 Posterior horn medial meniscus | 24 Anterior cruciate ligament |

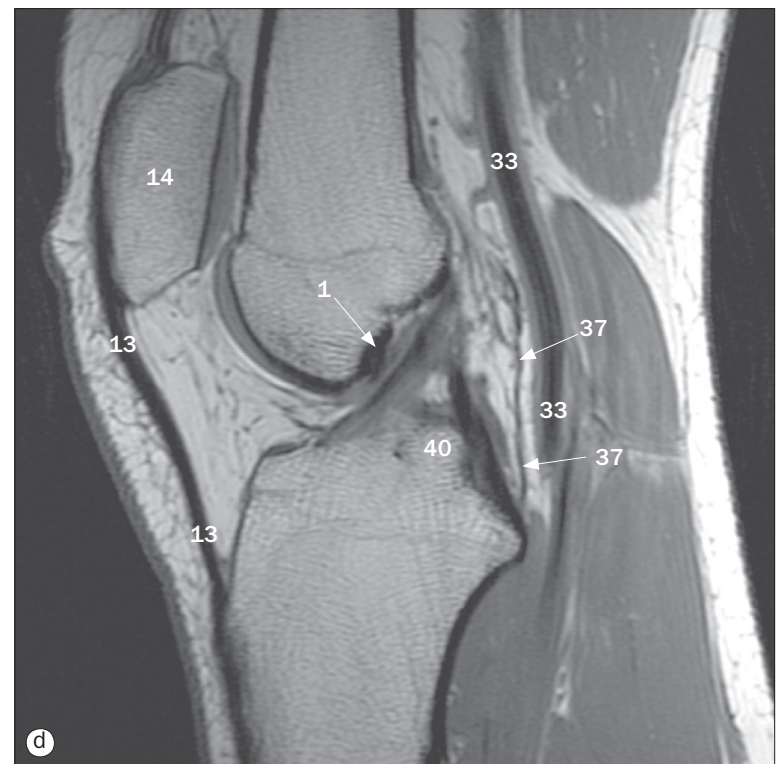
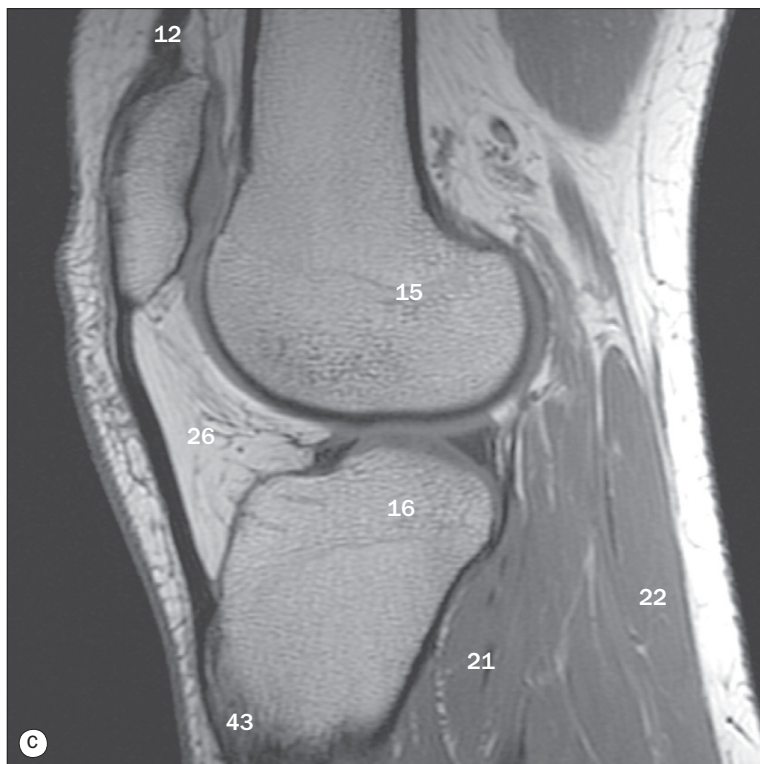
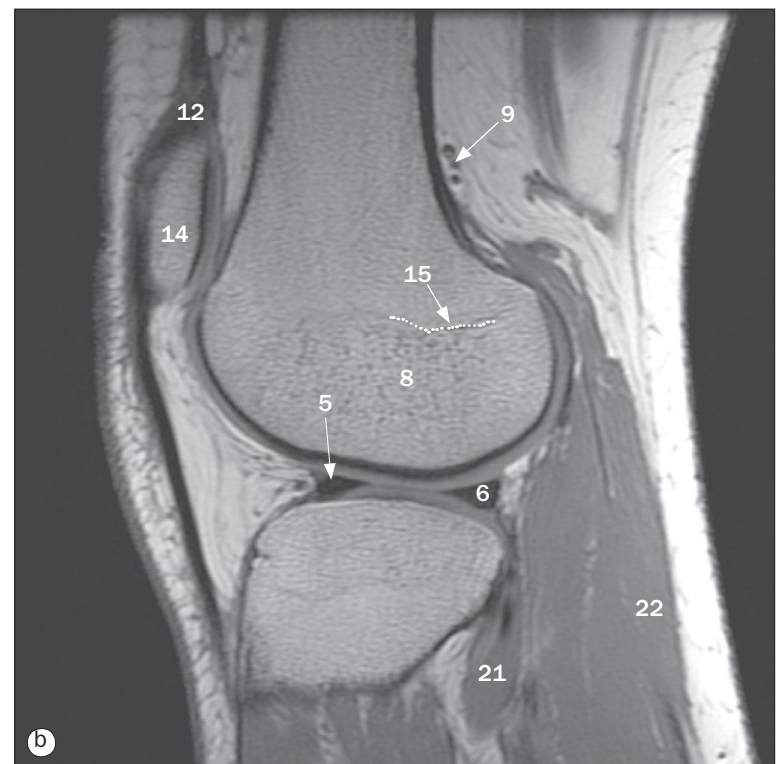
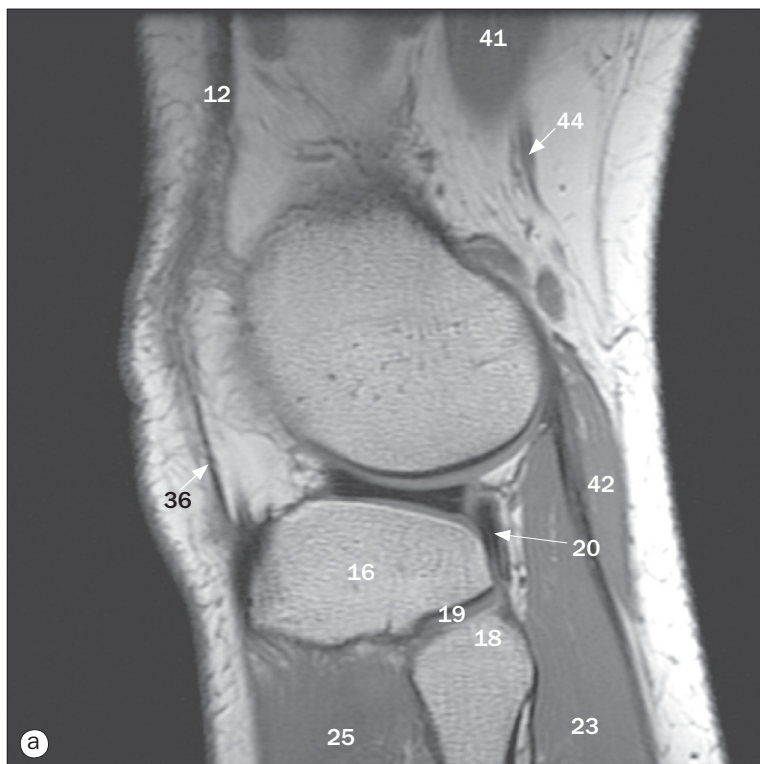


(a)–(h) Knee, coronal MR images, from posterior to anterior.

25 Body of medial meniscus
26 Body of lateral meniscus
27 Tibial spine
28 Medial tibial condyle
29 Lateral tibial condyle
30 Vastus medialis muscle

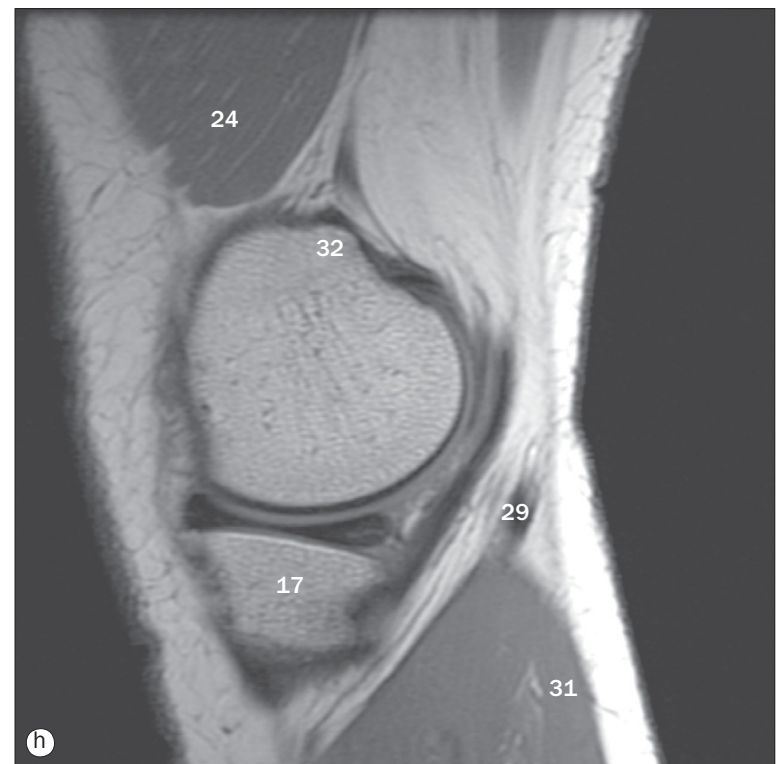
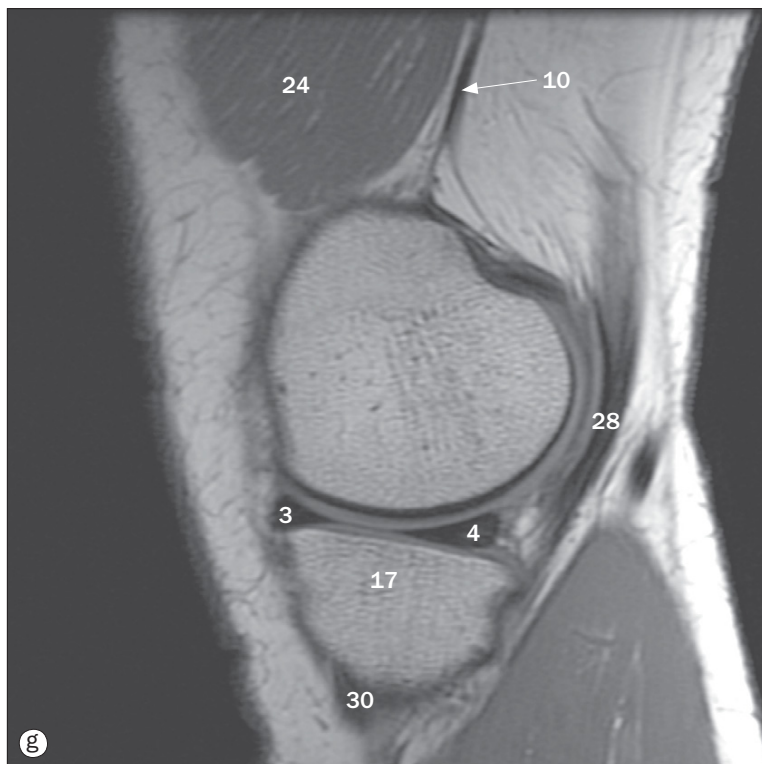
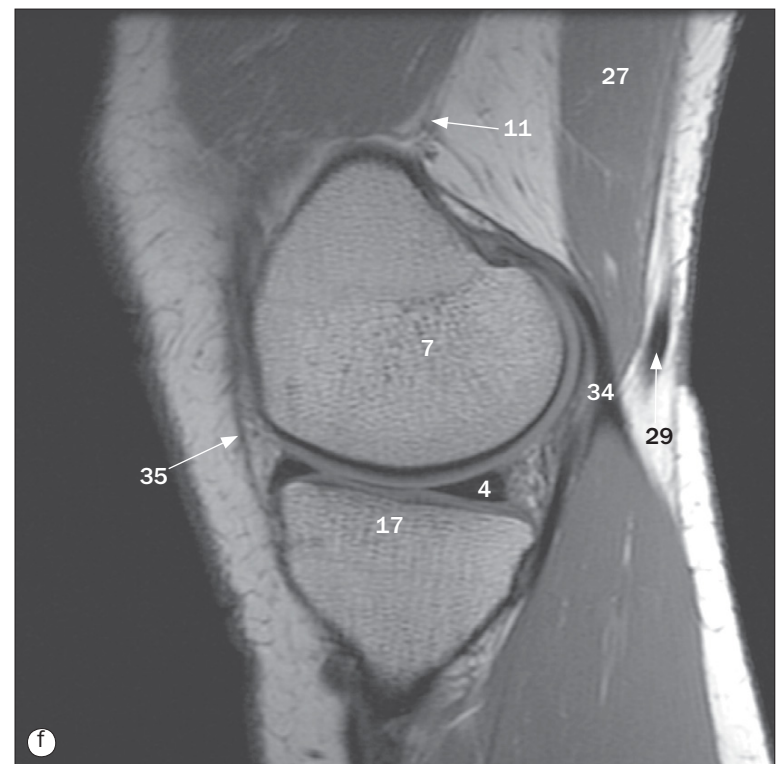
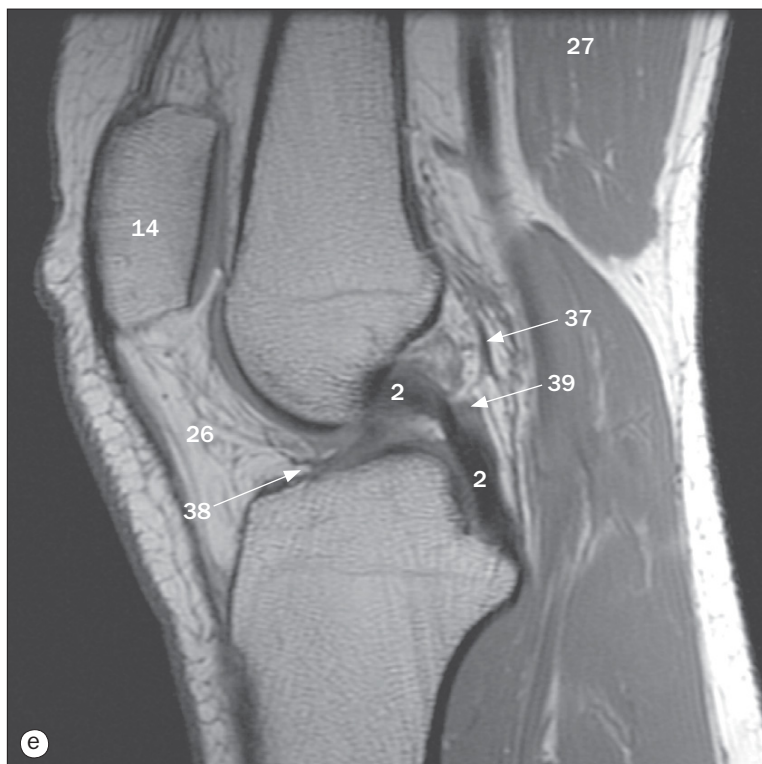
31 Lateral superior genicular artery
32 Medial superior genicular artery
33 Medial collateral ligament deep portion
34 Medial collateral ligament superficial portion
35 Pes anserinus (muscle attachments)

36 Medial inferior genicular artery
37 Vastus lateralis muscle
38 Tibialis posterior muscle
39 Root of posterior horn, medial meniscus
40 Tibialis anterior muscle
41 Tibial nerve



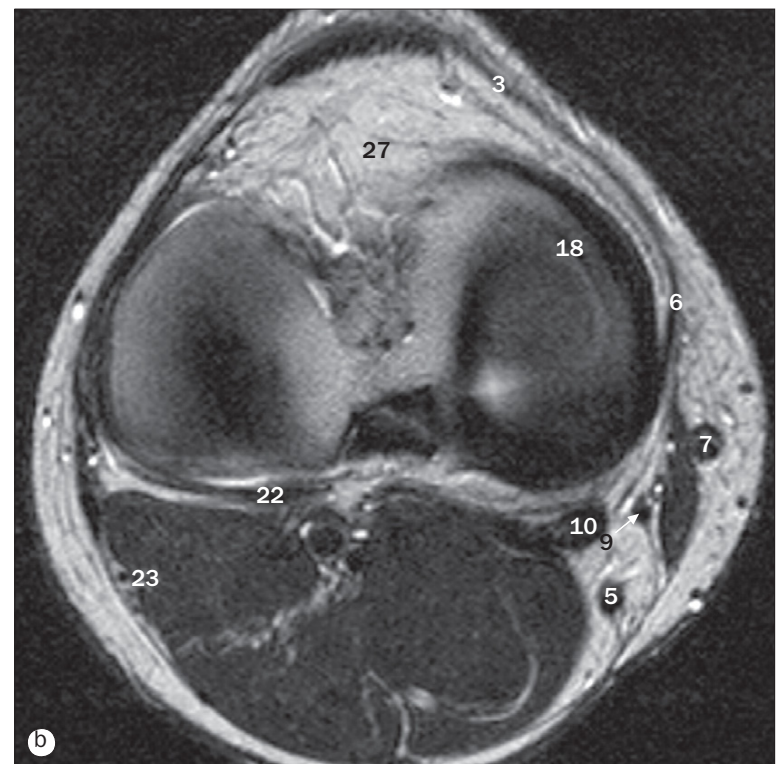
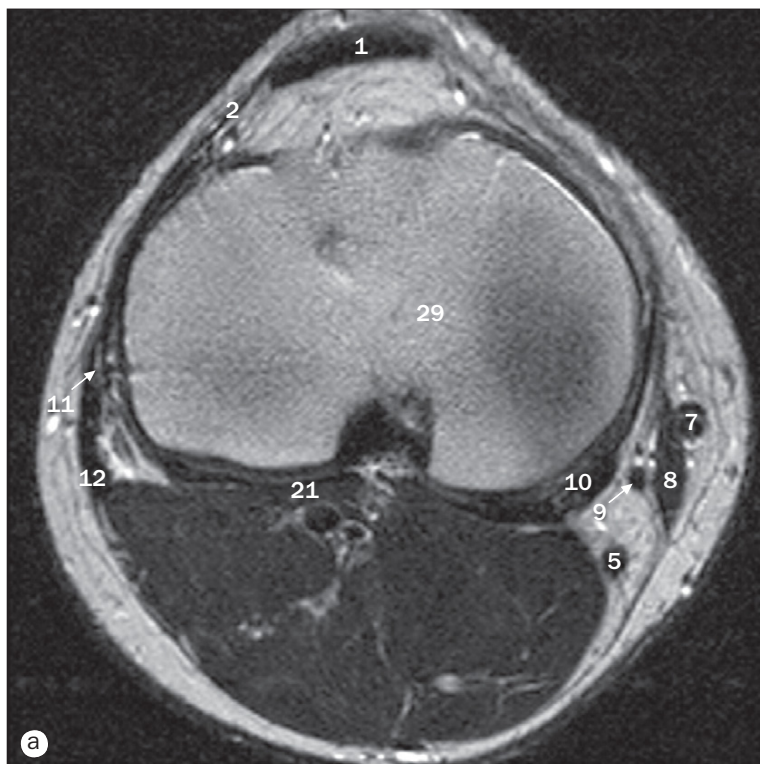
(a)–(h) Knee, sagittal MR images, from lateral to medial.

- | | | |
|-----------------------------------|---|---|
| 1 Anterior cruciate ligament | 9 Lateral superior genicular artery and veins | 17 Medial tibial plateau |
| 2 Posterior cruciate ligament | 10 Median intermuscular septum | 18 Fibular head |
| 3 Anterior horn medial meniscus | 11 Medial superior genicular artery | 19 Proximal tibiofibular joint |
| 4 Posterior horn medial meniscus | 12 Quadriceps tendon | 20 Popliteus tendon |
| 5 Anterior horn lateral meniscus | 13 Patellar tendon | 21 Popliteus muscle belly |
| 6 Posterior horn lateral meniscus | 14 Patella | 22 Lateral head of gastrocnemius muscle |
| 7 Medial condyle of femur | 15 Epiphyseal line/scar | 23 Soleus muscle |
| 8 Lateral condyle of femur | 16 Lateral tibial plateau | 24 Vastus medialis muscle |



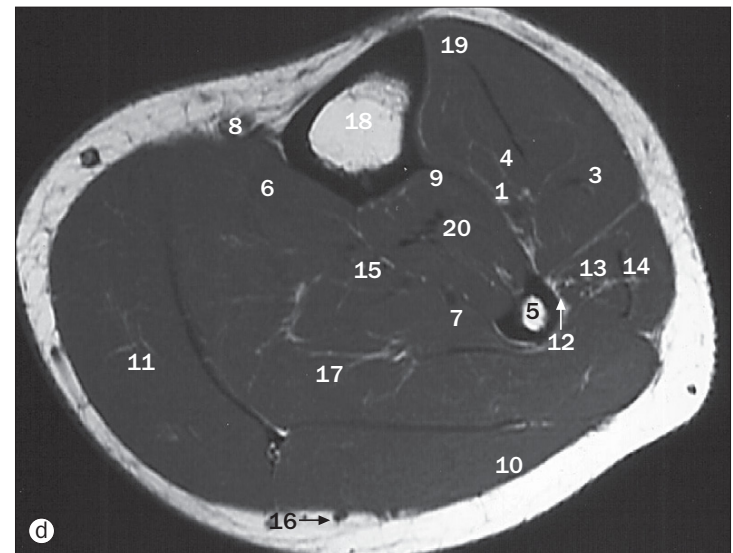
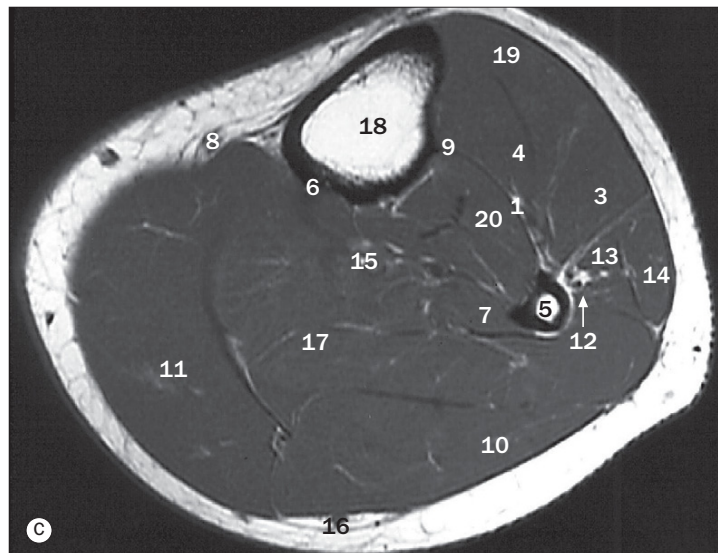
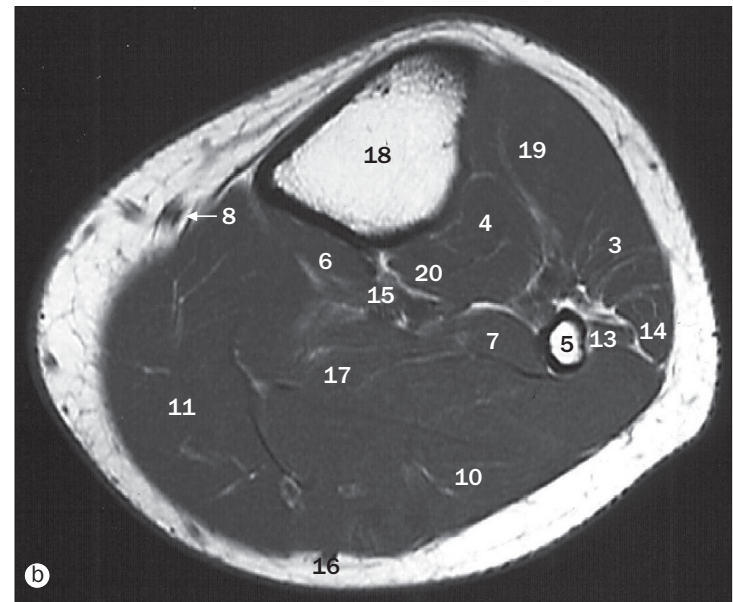
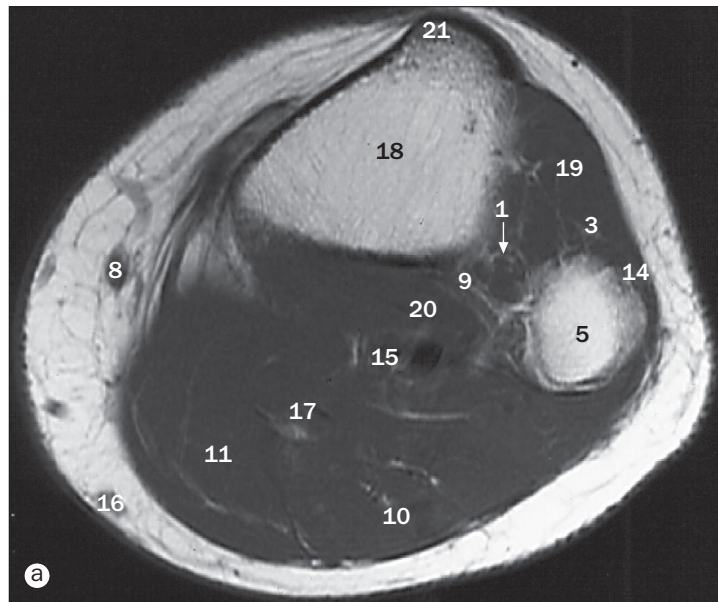
(a)–(h) Knee, sagittal MR images, from lateral to medial.

- | | | |
|--|--|--|
| 25 Tibialis anterior muscle | 32 Adductor tubercle | 39 Meniscomfemoral ligament (Wrisberg) |
| 26 Infrapatellar fat pad | 33 Popliteal artery | 40 Tibial spine |
| 27 Semimembranosus muscle | 34 Medial head of gastrocnemius tendon | 41 Biceps femoris muscle |
| 28 Semimembranosus tendon | 35 Medial patellar retinaculum | 42 Plantaris muscle |
| 29 Semitendinosus tendon | 36 Lateral patellar retinaculum | 43 Tibial tuberosity |
| 30 Sartorius tendon | 37 Posterior joint capsule | 44 Common peroneal (fibular) nerve |
| 31 Medial head of gastrocnemius muscle | 38 Transverse ligament | |



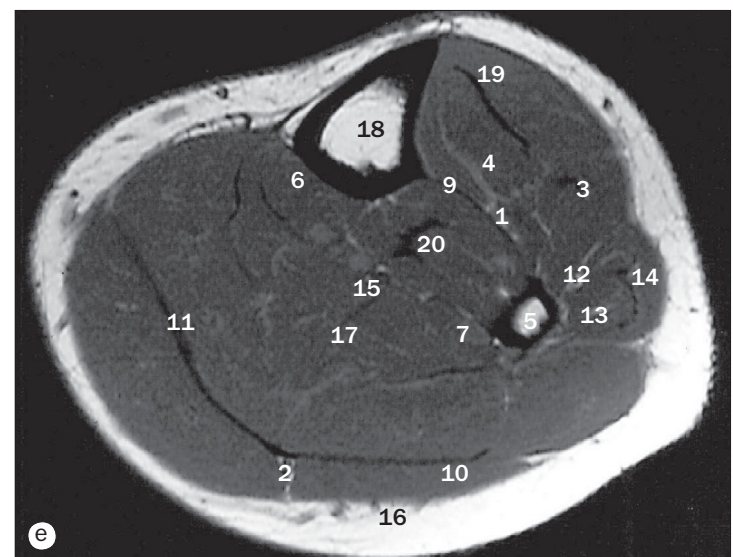
(a)–(d) Knee, axial MR images, from inferior to superior.

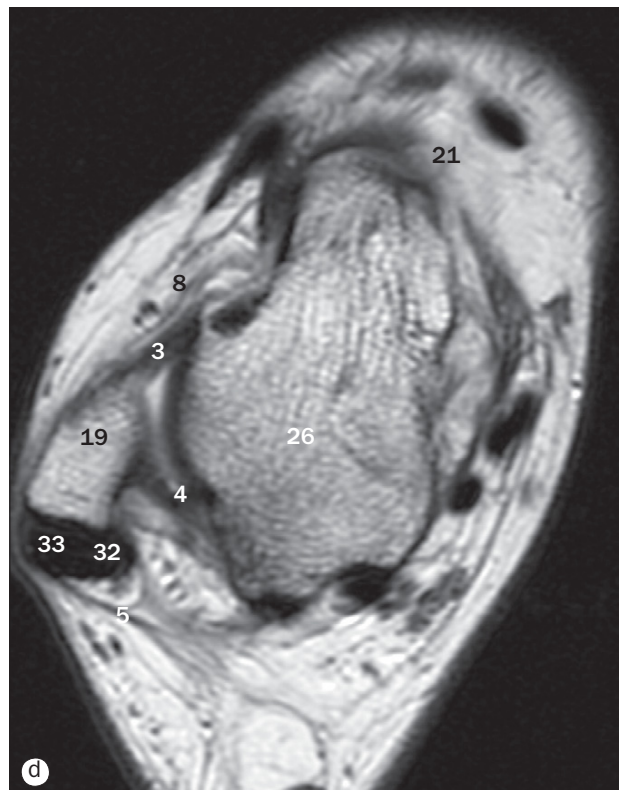
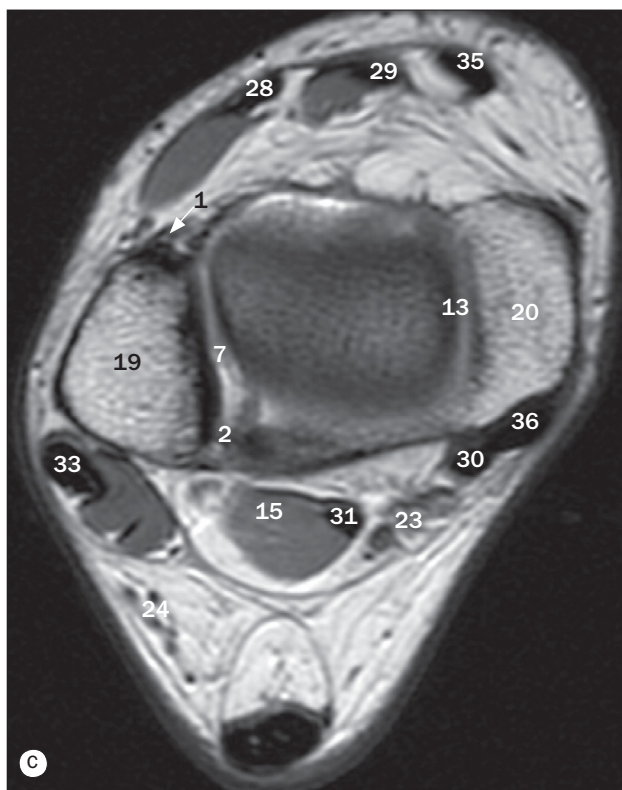
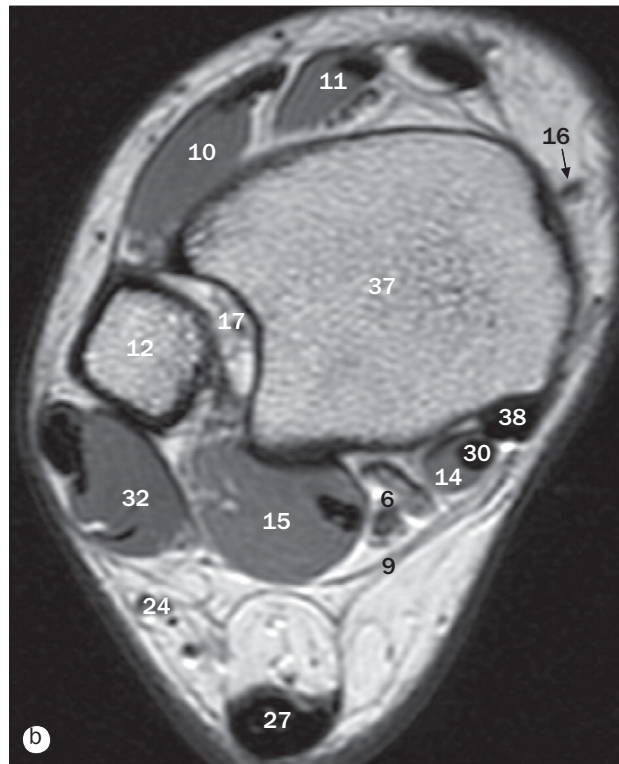
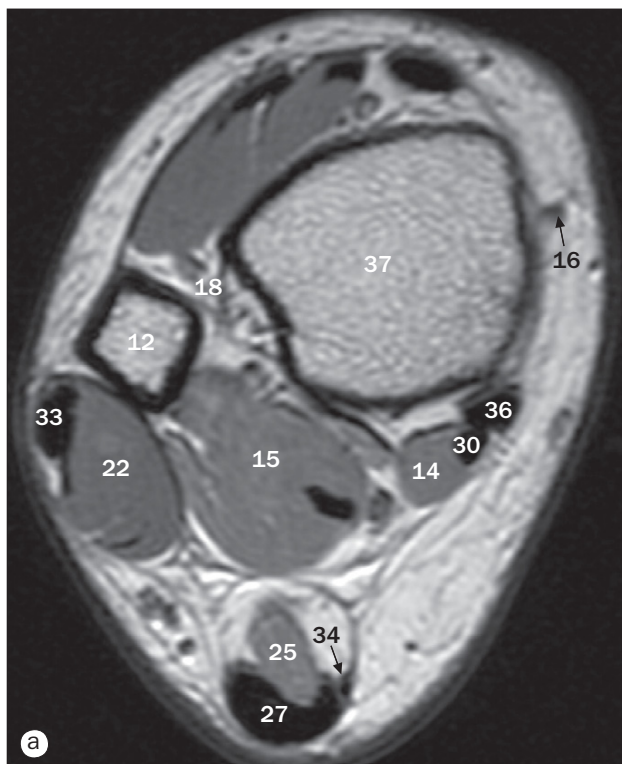
- | | | |
|--------------------------------|--------------------------------------|------------------------------------|
| 1 Patellar tendon | 12 Biceps femoris tendon | 21 Popliteus muscle |
| 2 Lateral patellar retinaculum | 13 Posterior cruciate ligament | 22 Popliteus tendon |
| 3 Medial patellar retinaculum | 14 Anterior cruciate ligament | 23 Common peroneal (fibular) nerve |
| 4 Iliotibial tract | 15 Medial head gastrocnemius muscle | 24 Patella |
| 5 Semitendinosus tendon | 16 Biceps femoris muscle | 25 Lateral condylar eminence |
| 6 Medial collateral ligament | 17 Lateral head gastrocnemius muscle | 26 Short (lesser) saphenous vein |
| 7 Long (great) saphenous vein | 18 Medial meniscus | 27 Infrapatellar fat pad |
| 8 Sartorius muscle | 19 Popliteal artery | 28 Deep fascia (fascia lata) |
| 9 Gracilis tendon | 20 Popliteal vein | 29 Tibial plateau |
| 10 Semimembranosus tendon | | 30 Medial condyle of femur |
| 11 Lateral collateral ligament | | 31 Lateral condyle of femur |



(a)–(e) Calf, axial MR images.

- | | |
|---------------------------------------|---|
| 1 Anterior tibial artery | 10 Lateral head of gastrocnemius muscle |
| 2 Aponeurosis of gastrocnemius muscle | 11 Medial head of gastrocnemius muscle |
| 3 Extensor digitorum longus muscle | 12 Peroneal artery |
| 4 Extensor hallucis longus muscle | 13 Peroneus brevis muscle |
| 5 Fibula | 14 Peroneus longus muscle |
| 6 Flexor digitorum longus muscle | 15 Posterior tibial artery |
| 7 Flexor hallucis longus muscle | 16 Small saphenous vein |
| 8 Great (long) saphenous vein | 17 Soleus muscle |
| 9 Interosseous membrane | 18 Tibia |
| | 19 Tibialis anterior muscle |
| | 20 Tibialis posterior muscle |
| | 21 Tuberosity of tibia |





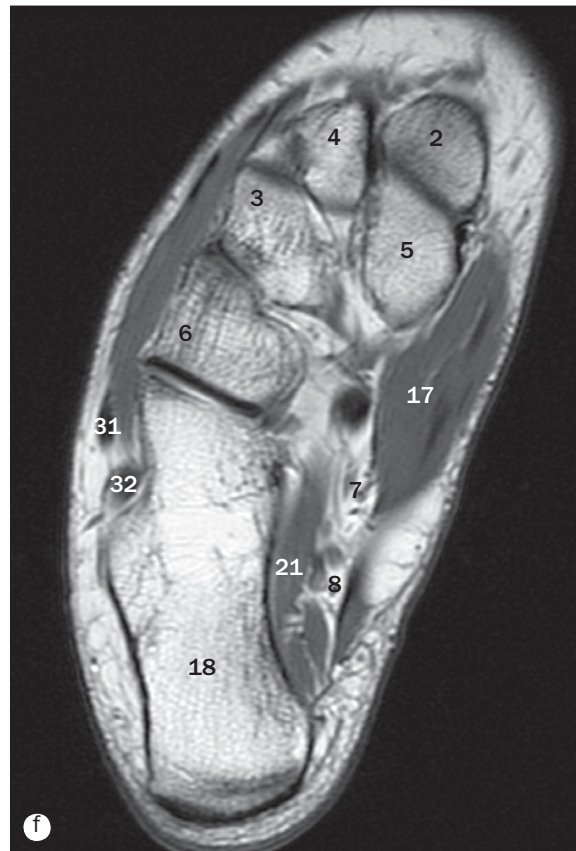
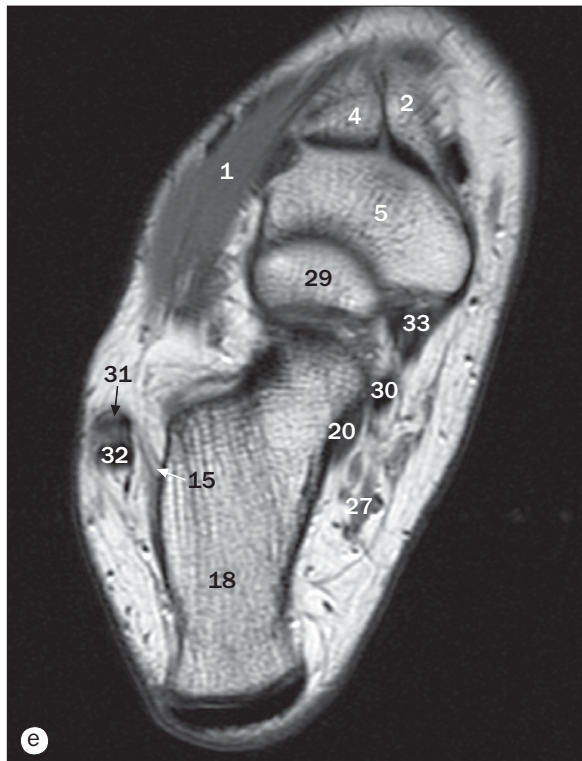
- 1 Anterior inferior tibiofibular ligament
- 2 Posterior inferior tibiofibular ligament
- 3 Anterior talofibular ligament
- 4 Posterior talofibular ligament
- 5 Peroneal (fibular) retinaculum
- 6 Neurovascular bundle
- 7 Talofibular joint
- 8 Extensor retinaculum
- 9 Flexor retinaculum
- 10 Extensor digitorum muscle
- 11 Extensor hallucis longus muscle
- 12 Fibula
- 13 Talotibial joint
- 14 Flexor digitorum longus muscle
- 15 Flexor hallucis longus muscle
- 16 Great (long) saphenous vein
- 17 Inferior tibiofibular joint
- 18 Interosseous membrane
- 19 Lateral malleolus
- 20 Medial malleolus
- 21 Navicular
- 22 Peroneus (fibularis) brevis muscle
- 23 Posterior tibial artery and vein
- 24 Small saphenous vein
- 25 Soleus muscle
- 26 Talus
- 27 Tendo calcaneus (Achilles' tendon)

(a)–(h) Axial MR images of the ankle, from superior to inferior.

- 28 Tendon of extensor digitorum muscle
- 29 Tendon of extensor hallucis longus muscle
- 30 Tendon of flexor digitorum longus muscle
- 31 Tendon of flexor hallucis longus muscle

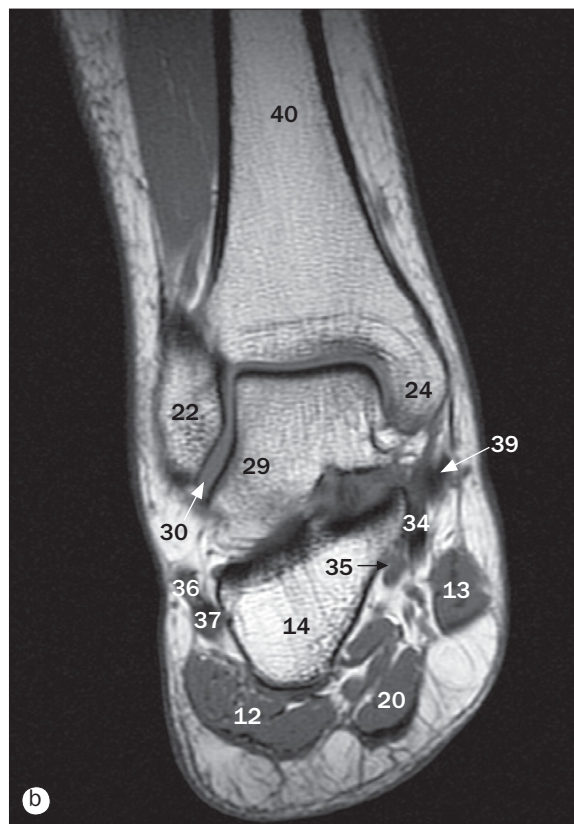
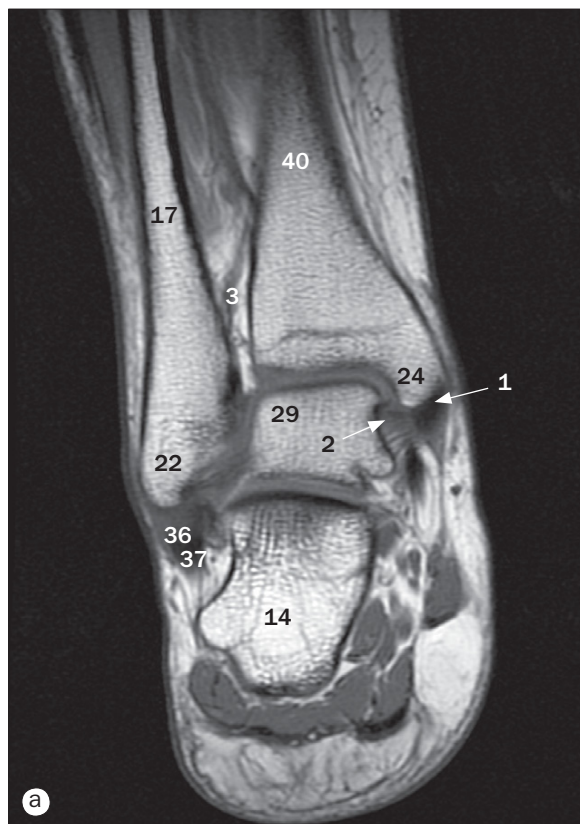
- 32 Tendon of peroneus (fibularis) brevis muscle
- 33 Tendon of peroneus (fibularis) longus muscle
- 34 Tendon of plantaris muscle

- 35 Tendon of tibialis anterior muscle
- 36 Tendon of tibialis posterior muscle
- 37 Tibia
- 38 Tibialis posterior muscle

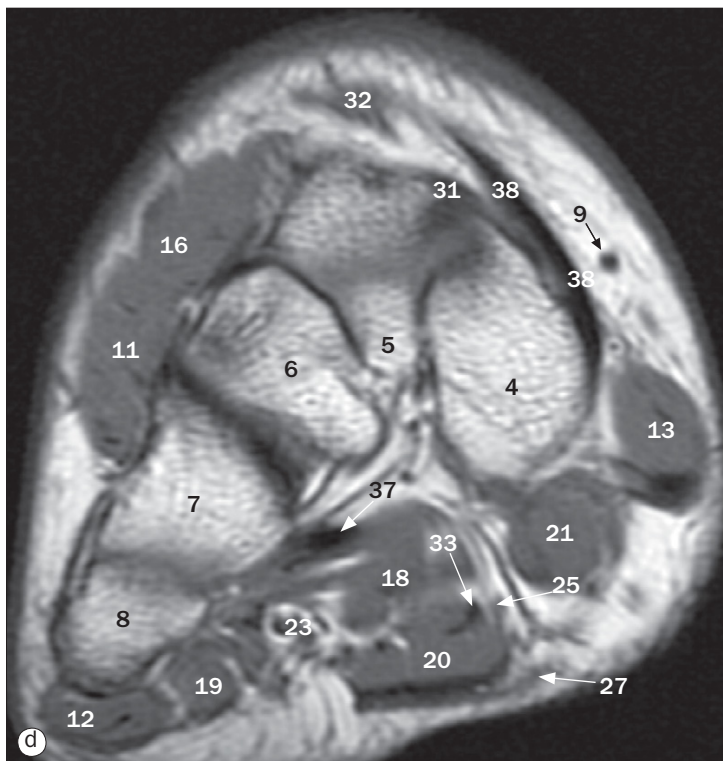
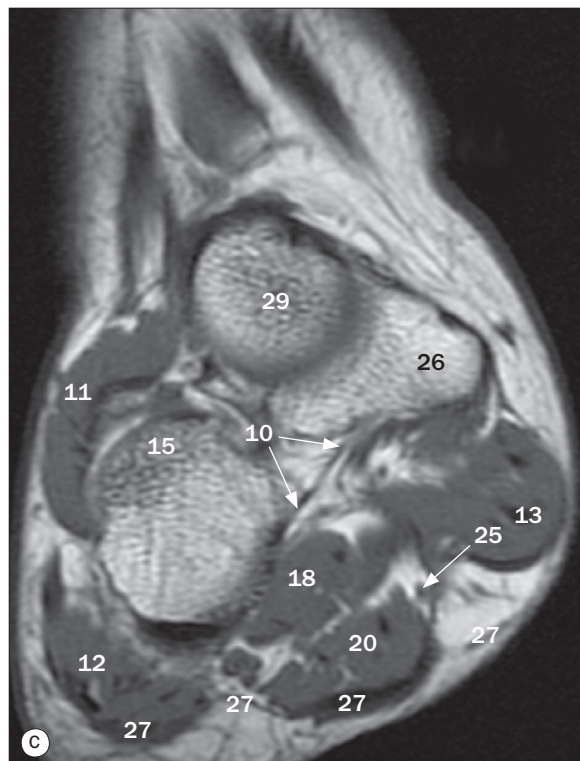


- 1 Extensor digitorum brevis
- 2 Medial cuneiform
- 3 Lateral cuneiform
- 4 Intermediate cuneiform
- 5 Navicular
- 6 Cuboid
- 7 Medial plantar nerve and vessels
- 8 Lateral plantar nerve and vessels
- 9 First metatarsal head
- 10 Heel fat pad
- 11 Fifth metatarsal base (tuberosity)
- 12 Second metatarsal
- 13 Third metatarsal
- 14 Fourth metatarsal
- 15 Calcaneofibular ligament
- 16 Abductor digiti minimi muscle
- 17 Abductor hallucis muscle
- 18 Calcaneus
- 19 Deltoid ligament
- 20 Tendon of flexor hallucis longus
- 21 Flexor accessorius muscle (quadratus plantae)
- 22 Flexor digitorum brevis muscle
- 23 Inferior tibiofibular joint
- 24 Lateral malleolus
- 25 Medial malleolus
- 26 Plantar aponeurosis
- 27 Posterior tibial artery
- 28 Sustentaculum tali
- 29 Talus head
- 30 Tendon of flexor digitorum longus muscle
- 31 Tendon of peroneus (fibularis) brevis muscle
- 32 Tendon of peroneus (fibularis) longus muscle
- 33 Tendon of tibialis posterior muscle

(a)–(h) Axial MR images of the ankle, from superior to inferior.



- 1 Deltoid ligament, superficial portion
- 2 Deltoid ligament, deep portion
- 3 Tibiofibular ligament
- 4 First metatarsal
- 5 Second metatarsal
- 6 Third metatarsal
- 7 Fourth metatarsal
- 8 Fifth metatarsal
- 9 Great (long) saphenous vein
- 10 Plantar calcaneonavicular 'spring' ligament
- 11 Extensor digitorum brevis
- 12 Abductor digiti minimi muscle
- 13 Adductor hallucis muscle
- 14 Calcaneus
- 15 Cuboid
- 16 Extensor digitorum brevis muscle
- 17 Fibula

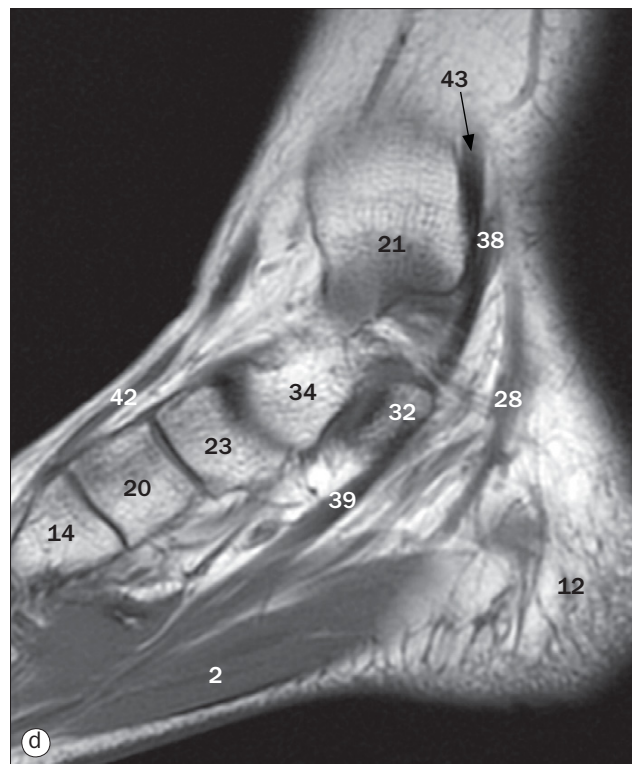
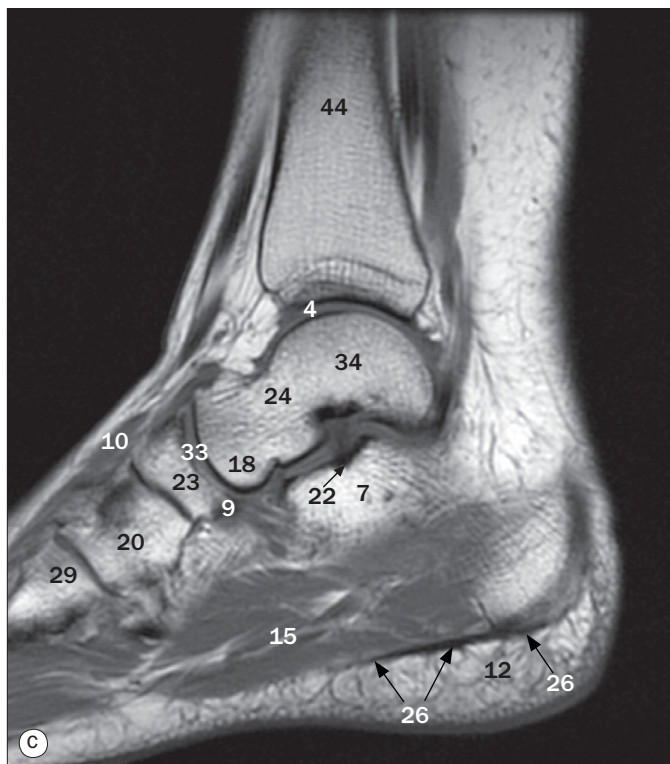
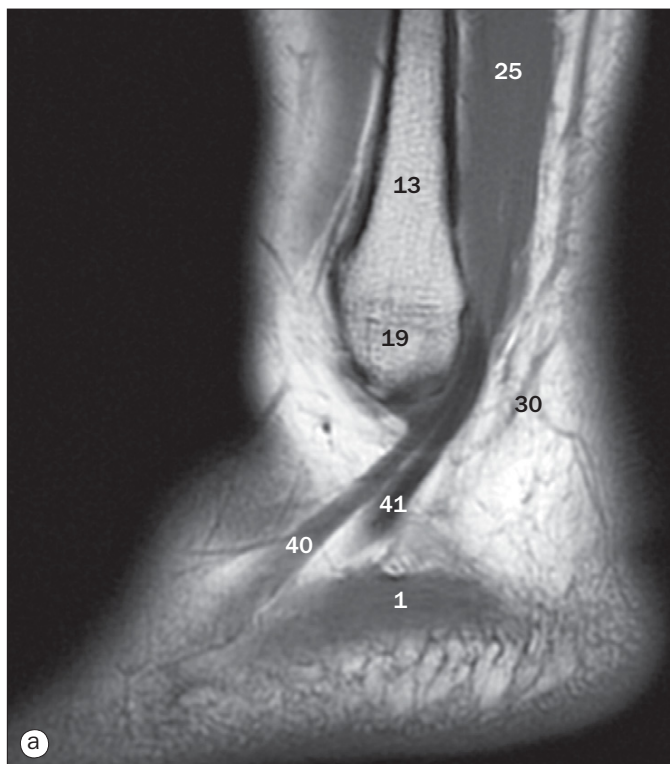


(a)–(d) Ankle and foot, coronal MR images.

- 18 Flexor accessorius muscle
- 19 Flexor digiti minimi muscle
- 20 Flexor digitorum brevis muscle
- 21 Flexor hallucis brevis muscle
- 22 Lateral malleolus
- 23 Lateral plantar nerve and vessels
- 24 Medial malleolus
- 25 Medial plantar nerve and artery
- 26 Navicular

- 27 Plantar aponeurosis
- 28 Sustentaculum tali
- 29 Talus
- 30 Talofibular joint
- 31 Tendon of extensor digitorum longus muscle
- 32 Tendon of extensor hallucis longus muscle
- 33 Tendon of flexor digitorum brevis muscle
- 34 Tendon of flexor digitorum longus muscle

- 35 Tendon of flexor hallucis longus muscle
- 36 Tendon of peroneus (fibularis) brevis muscle
- 37 Tendon of peroneus (fibularis) longus tendon and muscle
- 38 Tendon of tibialis anterior muscle
- 39 Tendon of tibialis posterior muscle
- 40 Tibia



- 1 Abductor digiti minimi muscle
- 2 Abductor hallucis muscle
- 3 Anterior tubercle of calcaneus
- 4 Articular cartilage
- 5 Insertion of Achilles tendon
- 6 Calcaneocuboid joint
- 7 Calcaneus
- 8 Cuboid
- 9 Cuneonavicular joint
- 10 Extensor digitorum brevis muscle
- 11 Lateral process calcaneus
- 12 Fat pad
- 13 Fibula
- 14 First metatarsal
- 15 Flexor digitorum brevis muscle
- 16 Flexor digitorum longus muscle
- 17 Flexor hallucis longus muscle
- 18 Head of talus
- 19 Lateral malleolus
- 20 Medial cuneiform
- 21 Medial malleolus
- 22 Middle facet, subtalar joint
- 23 Navicular
- 24 Neck of talus
- 25 Peroneus brevis muscle
- 26 Plantar aponeurosis
- 27 Posterior subtalar joint
- 28 Posterior tibial artery and vein
- 29 Metatarsal base
- 30 Small (short) saphenous vein
- 31 Soleus muscle
- 32 Sustentaculum tali

(a)–(d) Ankle, sagittal MR images, from lateral to medial.

33 Talonavicular joint

34 Talus

35 Tarsal sinus

36 Tendocalcaneus (Achilles' tendon)

37 Tendon of extensor digitorum muscle

38 Tendon of flexor digitorum longus muscle

39 Tendon of flexor hallucis longus muscle

40 Tendon of peroneus brevis muscle

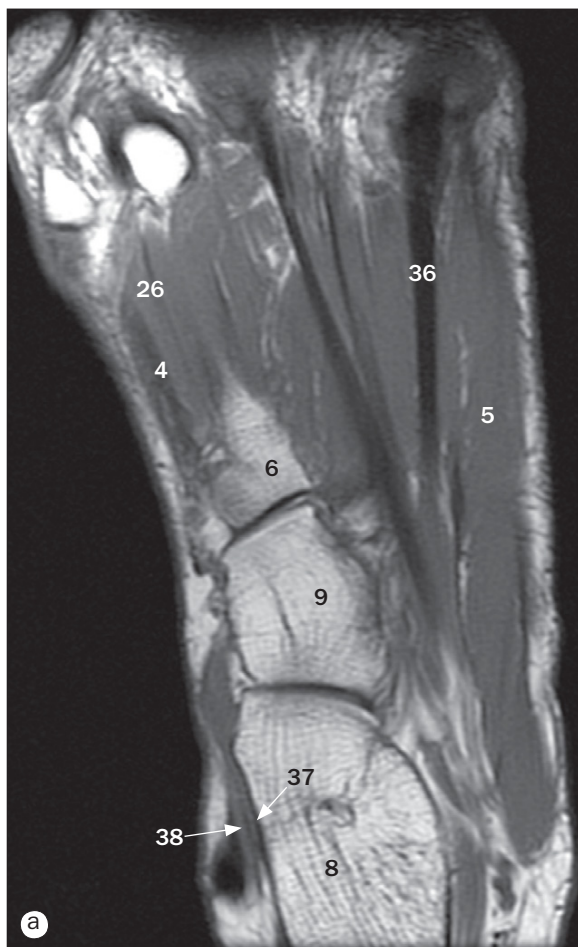
41 Tendon of peroneus longus muscle

42 Tendon of tibialis anterior muscle

43 Tendon of tibialis posterior muscle

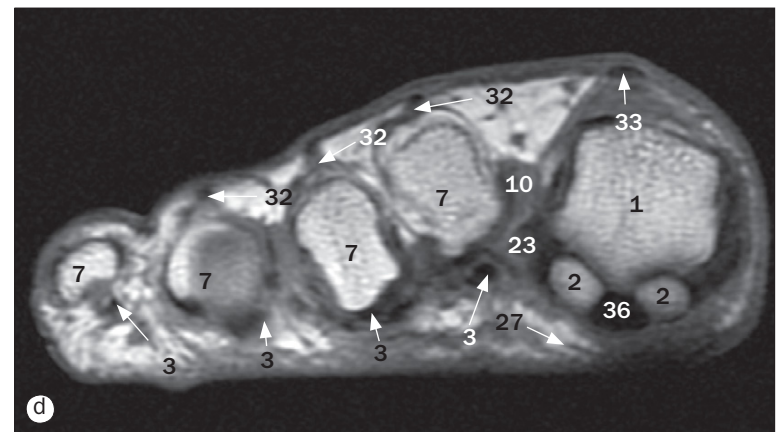
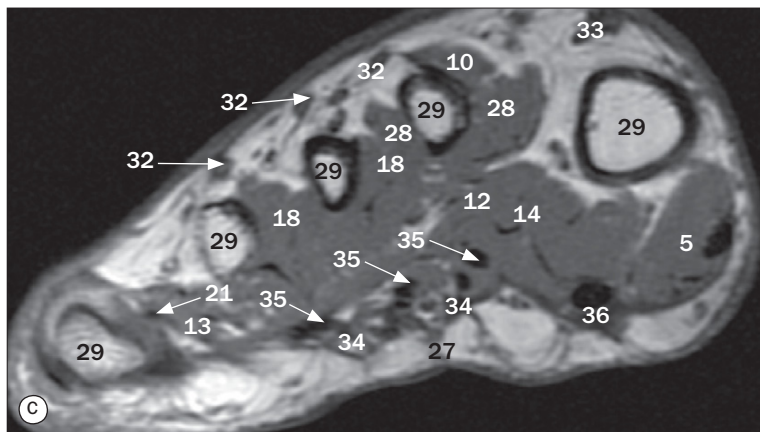
44 Tibia

45 Tibiotalar part of ankle joint



- 1 Head of first metatarsal
- 2 Sesamoid bones in flexor hallucis brevis
- 3 Flexor digitorum longus
- 4 Abductor digiti minimi muscle
- 5 Adductor hallucis muscle and tendon
- 6 Base of metatarsal
- 7 Base of proximal phalanx
- 8 Calcaneus
- 9 Cuboid
- 10 Dorsal interossei muscle
- 11 Extensor digitorum brevis muscle
- 12 Flexor accessorius muscle (quadratus plantae)
- 13 Flexor digiti minimi muscle
- 14 Flexor digitorum brevis muscle
- 15 Flexor hallucis brevis muscle
- 16 Head of talus
- 17 Intermediate cuneiform
- 18 Interossei muscles
- 19 Lateral cuneiform
- 20 Lateral malleolus

(a)–(b) Foot, coronal MR images.



(c)–(d) Foot, axial MR images.

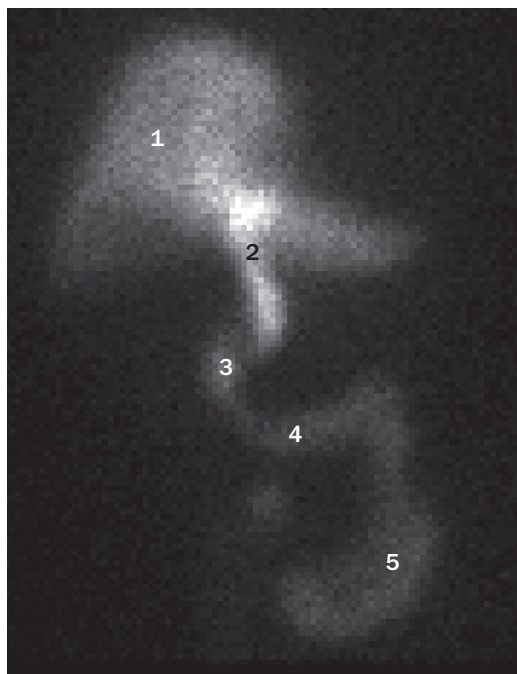
- 21 Lateral plantar nerve
- 22 Medial cuneiform
- 23 Medial plantar nerve and artery
- 24 Navicular
- 25 Neck of talus
- 26 Opponens digiti minimi muscle

- 27 Plantar aponeurosis
- 28 Plantar interossei muscle
- 29 Shafts of metatarsals 1,2,3,4,5
- 30 Talus
- 31 Tarsal sinus
- 32 Tendon of extensor digitorum longus muscle

- 33 Tendon of extensor hallucis longus muscle
- 34 Tendon of flexor digitorum brevis muscle
- 35 Tendon of flexor digitorum longus muscle
- 36 Tendon of flexor hallucis longus muscle
- 37 Tendon of peroneus brevis muscle
- 38 Tendon of peroneus longus muscle

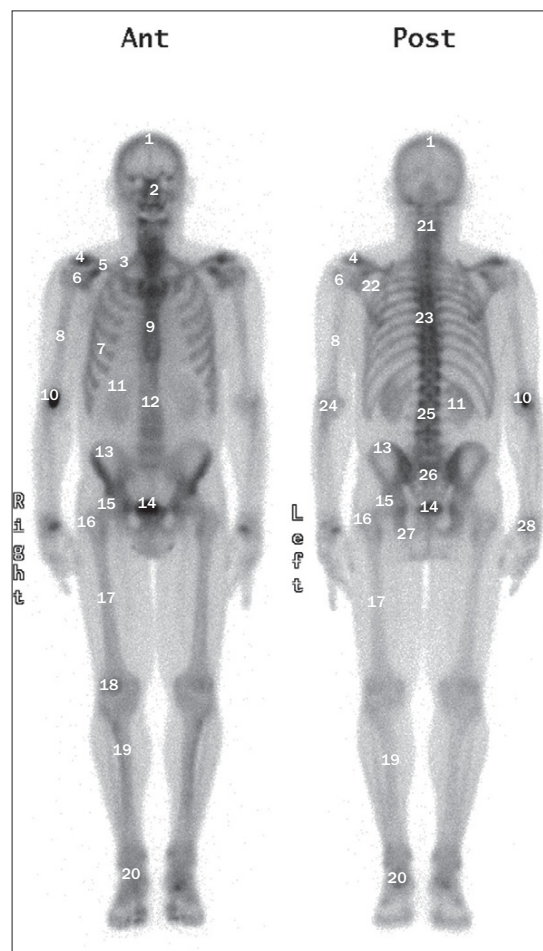
8

Nuclear medicine



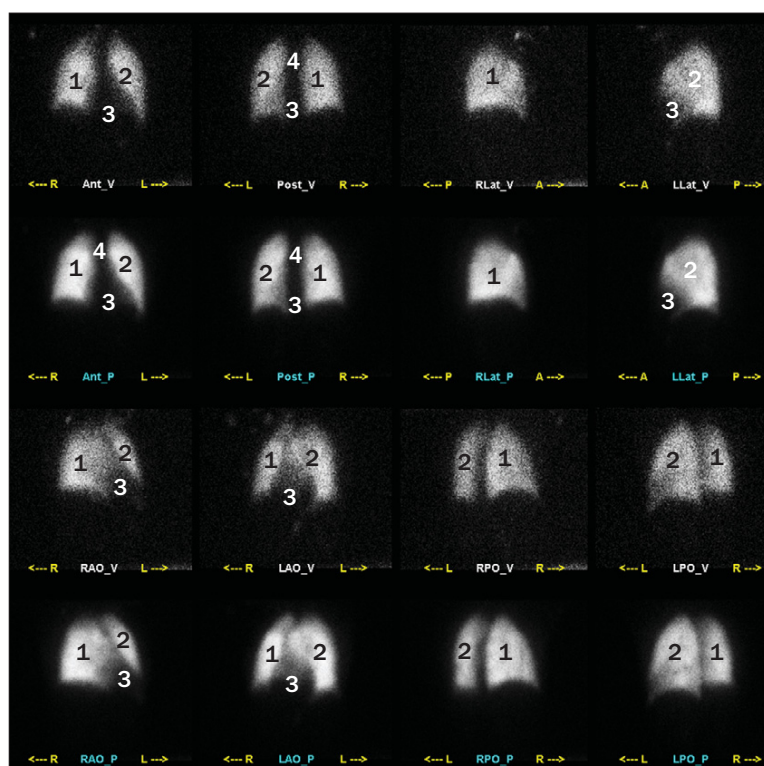
Hepatobiliary scan. The agents injected for this exam are rapidly cleared from the blood. The hepatocytes of the liver extract most of the injected dose and excrete it into the intrahepatic biliary tree. From there, the tracer flows into the hepatic and bile ducts. The agent will often passively fill the gall bladder (not seen in this example for various reasons, e.g. surgically absent, gall bladder is distended or has actively contracted during imaging or patient has had a prolonged fast prior to imaging). The agent then will enter into the duodenum through the ampulla of Vater, and eventually into the small bowel.

- 1 Liver
- 2 Bile duct
- 3 Descending (second) part of duodenum
- 4 Horizontal (third) part of duodenum
- 5 Jejunum



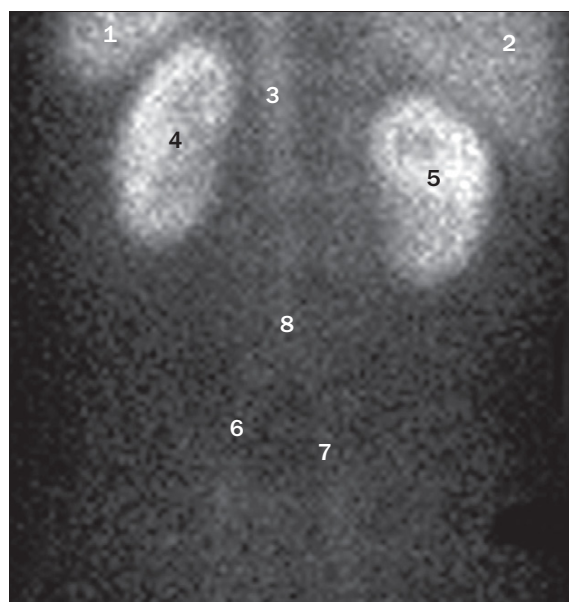
Whole body bone scan. Bone scans use physiologic agents to detect subtle abnormalities in bone metabolism. They are used to define skeletal abnormalities to include infectious, traumatic, congenital, metabolic and malignant conditions. Although the bone takes up the agent, some remains in the blood pool and is eventually excreted by the kidneys.

- | | |
|---|--------------------------------|
| 1 Cranium/skull | 14 Urinary bladder |
| 2 Nose and facial bones | 15 Femoral head |
| 3 First rib | 16 Greater trochanter of femur |
| 4 Acromioclavicular joint | 17 Femoral shaft |
| 5 Clavicle | 18 Patella |
| 6 Humeral head | 19 Tibia |
| 7 Fifth rib | 20 Ankle |
| 8 Humeral shaft | 21 Cervical spine |
| 9 Sternum | 22 Scapula |
| 10 Soft tissue extravasation at injection site in antecubital fossa | 23 Thoracic spine |
| 11 Right kidney | 24 Elbow |
| 12 Bodies of lumbar spine | 25 Third lumbar vertebral body |
| 13 Iliac | 26 Sacrum |
| | 27 Ischial tuberosity |
| | 28 Wrist |



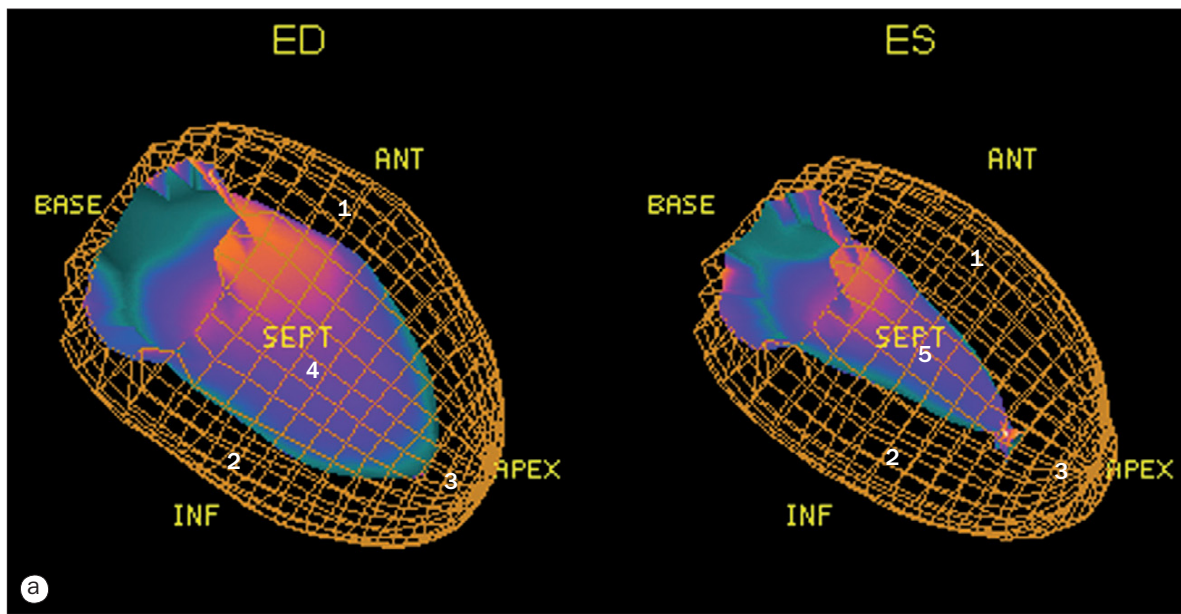
Lung scan. Imaging of the lungs involves both ventilation and perfusion. These two distributions match in the normal state. The order of imaging the ventilation and perfusion depends on the agents being used. Both ventilation and perfusion imaging evaluate the lungs in eight projections (anterior, posterior, right lateral, left lateral, right anterior oblique (RAO), left anterior oblique (LAO), right posterior oblique (RPO) and left posterior oblique (LPO)). The first and third rows are ventilation and the second and fourth rows are the matching perfusion.

- | | |
|--------------|----------------------|
| 1 Right lung | 3 Cardiac silhouette |
| 2 Left lung | 4 Mediastinum |

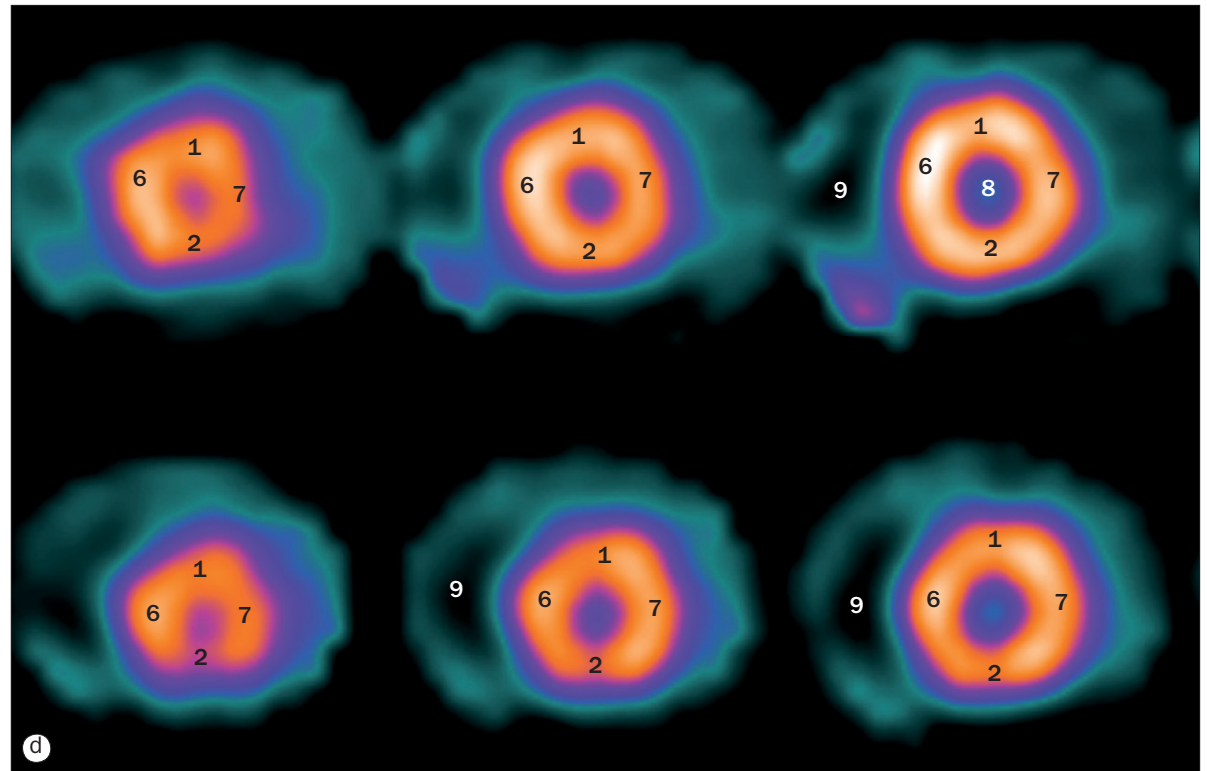
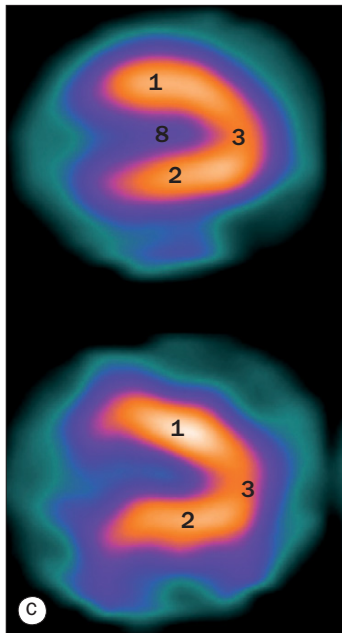
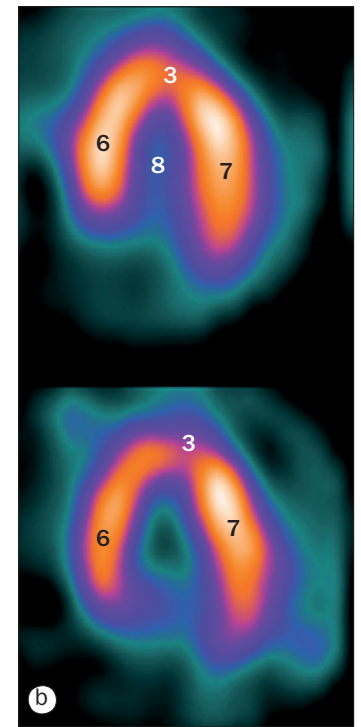


Renal scan. Renal imaging is performed with the camera placed on the patient's back because the kidneys are closer to the skin surface thus optimising the activity from the kidneys. Depending on the radiopharmaceutical used, relative structure and/or function of the kidneys can be obtained. In general, perfusion and excretion of the agent can be assessed in renal imaging. In the early staging of imaging some of the agent remains in the blood pool allowing visualisation of the surrounding structures.

- | | |
|-------------------|--------------------------------|
| 1 Spleen | 5 Right kidney |
| 2 Liver | 6 Left common iliac artery |
| 3 Abdominal aorta | 7 Right common iliac artery |
| 4 Left kidney | 8 Abdominal aortic bifurcation |

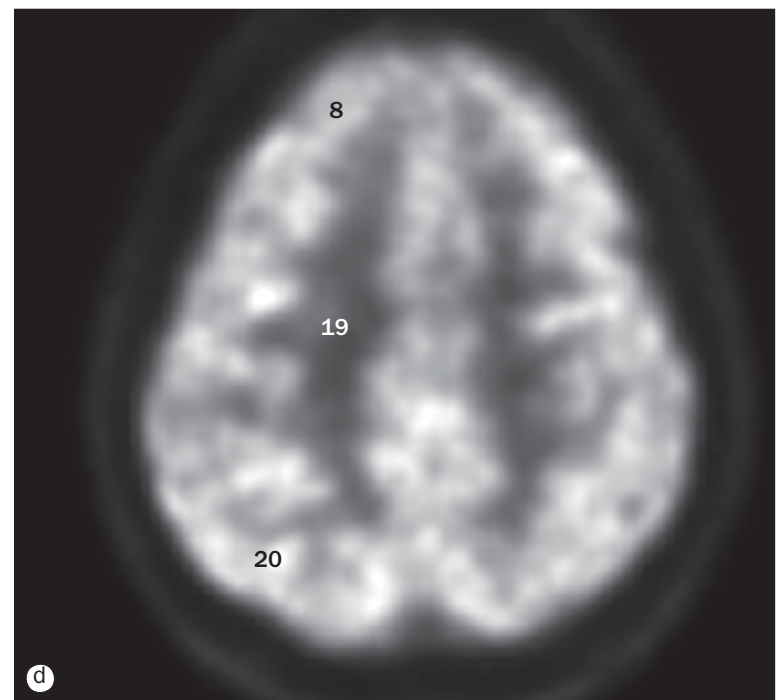
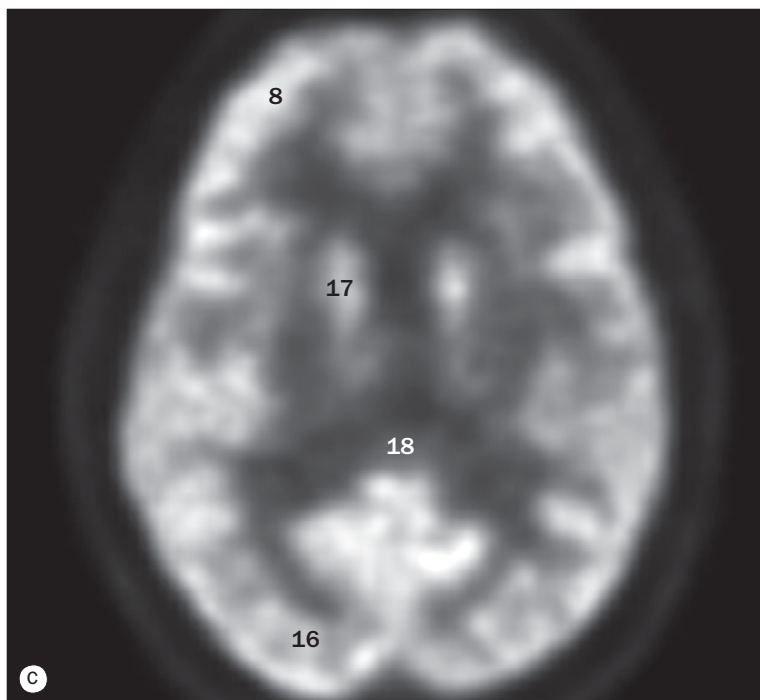
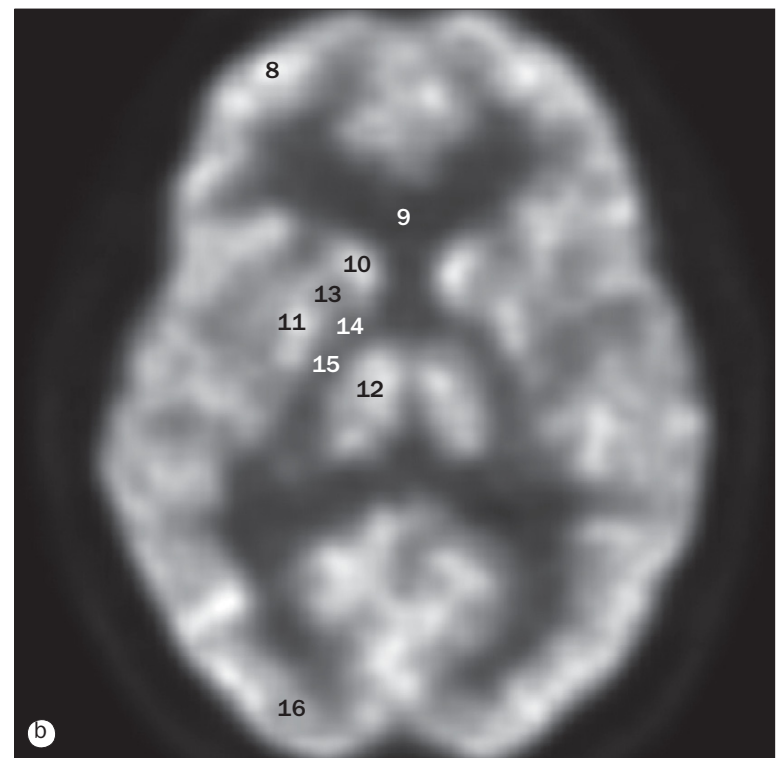
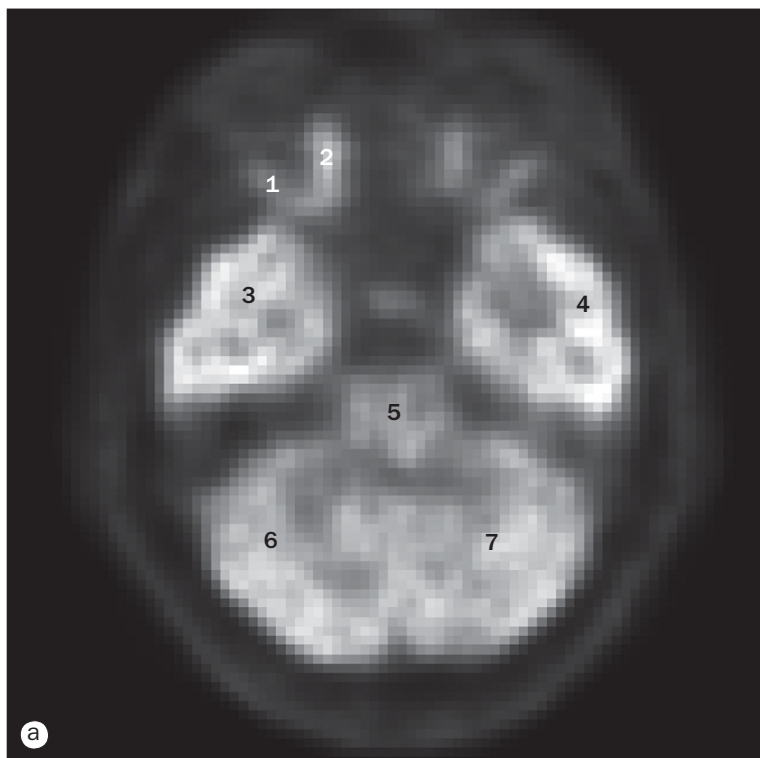


Cardiac scans, (a) 3D reconstructions of the left ventricle at end diastole (ED) and end systole (ES). Subtracting the ventricular volume at end systole from end diastole represents the ejection volume during systole.



Cardiac scans, (b)–(d), images are obtained during stress (exercise or pharmaceutical) represented by the top row of images and during rest represented by the bottom row of images. Comparison of these can determine alterations in cardiac circulation, from acute ischaemia to an old infarction. After imaging, the heart is sliced in different planes to evaluate the specific walls and the circulation that supplies them. The left ventricle appears as a 'horseshoe' shape on the vertical long axis (b) and horizontal long axis (c), and as a 'donut' on the short axis (d) views. The anterior wall, apex and portion of the septum are supplied by the left anterior descending artery (LAD). The right coronary artery (RCA) supplies the inferior wall and part of the septum, and the circumflex artery supplies the lateral wall.

- | | |
|---|--|
| 1 Anterior wall of left ventricle | 5 Blood pool volume within the left ventricle at end systole |
| 2 Inferior wall of left ventricle | 6 Interventricular septum |
| 3 Apical portion of left ventricle | 7 Lateral wall of left ventricle |
| 4 Blood pool volume within the left ventricle at end diastole | 8 Left ventricle cavity |
| | 9 Right ventricle cavity |

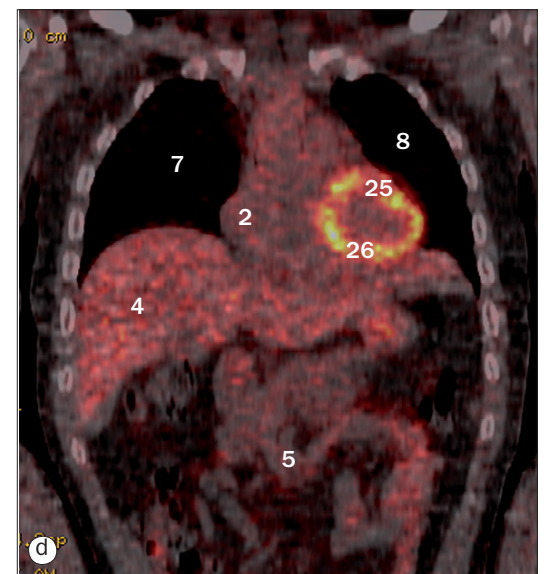
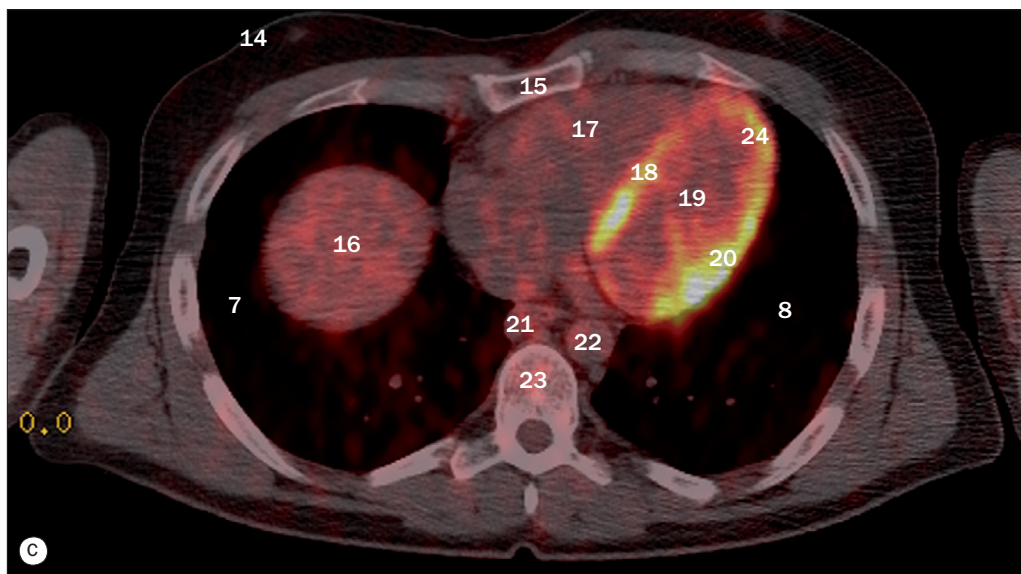
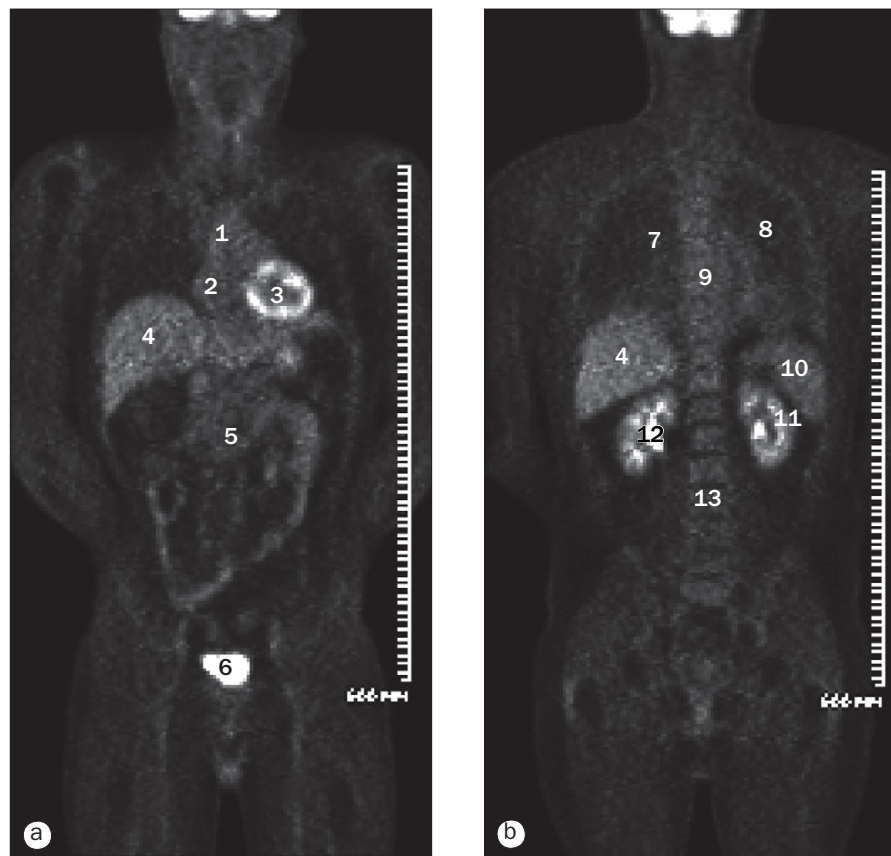


(a)–(d) PET metabolic brain scans. Fluorodeoxyglucose (FDG) is a derivative of glucose. Cells cannot differentiate between glucose and FDG. A major difference is that, once inside the cell, FDG is not metabolised and is trapped. This allows for easy imaging of structures in the body. The brain has high FDG uptake, with grey matter having a higher uptake compared with white matter. The basal ganglia usually have slightly higher uptake than the cortex. It is normal to have areas of increased uptake in the frontal eye fields, visual cortex and Wernicke's region.

- 1 Lateral rectus muscle
- 2 Medial rectus muscle
- 3 Right temporal lobe
- 4 Left temporal lobe
- 5 Brainstem
- 6 Right cerebellar hemisphere
- 7 Left cerebellar hemisphere

- 8 Frontal lobe
- 9 Corpus callosum, genu
- 10 Caudate nucleus, head
- 11 Putamen
- 12 Thalamus
- 13 Internal capsule, anterior limb
- 14 Internal capsule, genu

- 15 Internal capsule, posterior limb
- 16 Occipital lobe
- 17 Caudate nucleus, body
- 18 Corpus callosum, splenium
- 19 Corona radiata
- 20 Parietal lobe



(a)–(d) Whole body PET/CT scans. PET imaging offers physiological function of the tissue and CT offers anatomical information. By fusing these images, precise localisation of areas of interest is made. Figures (a) and (b) are coronal PET images of the body at different depths. Figures (c) and (d) are fused PET/CT images in the axial (c) and coronal (d) projections.

- | | | |
|------------------|----------------------------|------------------------------------|
| 1 Mediastinum | 10 Spleen | 19 Left ventricle, cavity |
| 2 Right atrium | 11 Cortex of kidney | 20 Lateral wall of left ventricle |
| 3 Left ventricle | 12 Kidney, renal pelvis | 21 Oesophagus |
| 4 Liver | 13 Lumbar spine | 22 Descending thoracic aorta |
| 5 Small bowel | 14 Right breast tissue | 23 Thoracic vertebral body |
| 6 Bladder | 15 Sternum | 24 Apex of left ventricle |
| 7 Right lung | 16 Liver, dome | 25 Anterior wall of left ventricle |
| 8 Left lung | 17 Right ventricle | 26 Inferior wall of left ventricle |
| 9 Thoracic spine | 18 Interventricular septum | |

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Note: References are to text mentions (mainly in the legends and boxes) rather than the numbers encoding structures in the figures. The most common imaging modalities (radiographs and conventional CT and MRI) have not been indexed.

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