

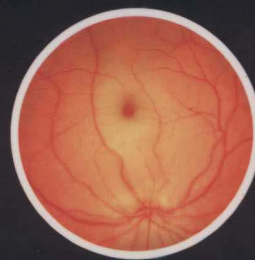
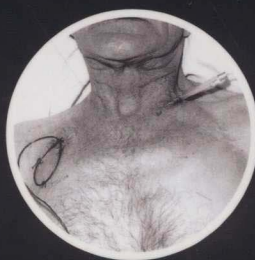
Study smart with

Student Consult

McMINN & ABRAHAMs'

CLINICAL ATLAS OF HUMAN ANATOMY

SEVENTH EDITION



MOSBY
ELSEVIER

PETER H. ABRAHAMs
JONATHAN D. SPRATT
MARIOS LOUKAS
ALBERT N. VAN SCHOOR

Dedication and Preface

McMINN & ABRAHAMs'

CLINICAL ATLAS OF HUMAN ANATOMY

SEVENTH EDITION

Peter H. Abrahams, MB BS, FRCS (Ed), FRCR, DO (Hon) FHEA

Professor of Clinical Anatomy, Warwick Medical School, UK

Professor of Clinical Anatomy, St. George's University, Grenada, W.I.

National Teaching Fellow 2011, UK

Life Fellow, Girton College, Cambridge, UK

Examiner, MRCS, Royal Colleges of Surgeons (UK)

Family Practitioner, Brent, London, UK

Jonathan D. Spratt, MA (Cantab), FRCS (Eng), FRCS (Glasg), FRCR

Consultant Clinical Radiologist, University Hospital of North Durham, UK

Examiner in Anatomy, Royal College of Radiologists, UK

Visiting Fellow in Radiological Anatomy, University of Northumbria, UK

Visiting Professor of Anatomy, St. George's Medical School, Grenada, W.I.

Marios Loukas, MD, PhD

Professor and Chair, Department of Anatomical Sciences

Dean of Research, School of Medicine

St. George's University, Grenada, W.I.

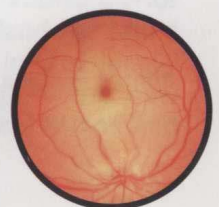
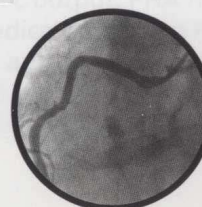
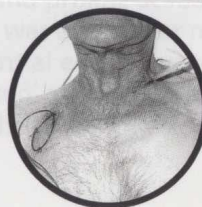
Albert-Neels van Schoor, BSc MedSci, BSc (Hons), MSc, PhD

Senior Lecturer, Department of Anatomy, School of Medicine, Faculty of Health Sciences

University of Pretoria, Pretoria, Gauteng, South Africa

For additional online content visit studentconsult.com

ELSEVIER
MOSBY



First edition 1977 by Wolfe Publishing
Second edition 1988 by Wolfe Publishing
Third edition 1993 by Mosby-Wolfe, an imprint of Times Mirror International Publishers Ltd
Fourth edition 1998 by Mosby, an imprint of Mosby International Ltd
Fifth edition 2003 by Elsevier Science Ltd
Sixth edition 2008 by Elsevier Ltd

The right of Peter H. Abrahams, Jonathan D. Spratt, Marios Loukas and Albert N. Van Schoor to be identified as author of this work has been asserted by him in accordance with the Copyright, Designs and Patents Act 1988.

All photographs taken by Ralph Hutchings, photographer for Imagingbody.com, remain in his sole copyright.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions. This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods, professional practices, or medical treatment may become necessary.

Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information, methods, compounds, or experiments described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

With respect to any drug or pharmaceutical products identified, readers are advised to check the most current information provided (i) on procedures featured or (ii) by the manufacturer of each product to be administered, to verify the recommended dose or formula, the method and duration of administration, and contraindications. It is the responsibility of practitioners, relying on their own experience and knowledge of their patients, to make diagnoses, to determine dosages and the best treatment for each individual patient, and to take all appropriate safety precautions.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN: 978-0723-43697-3

Reprinted 2014

International edition: 978-0723-43698-0

Reprinted 2013, 2014

Printed in China

Working together to grow
libraries in developing countries

www.elsevier.com | www.bookaid.org | www.sabre.org

ELSEVIER

BOOK AID
International

Sabre Foundation

Study smart with

Student Consult

Searchable full text online

**Register and activate this title today
at studentconsult.com**

Activation Code

**Scratch off Below
Abrahams**

- Access the full text online
- Download images
- Add your own notes and bookmarks
- Search across all the **Student Consult** resources you own online in one place

ALREADY REGISTERED?

1. Go to studentconsult.com; Sign in
2. Click the "Activate Another Book" button
3. Gently scratch off the surface of the sticker with the edge of a coin to reveal your Pin code
4. Enter it into the "Pin code" box; select the title you've activated from the drop-down menu
5. Click the "Activate Book" button

FIRST-TIME USER?

1. **REGISTER**
 - Go to studentconsult.com; click "Register Now"
 - Fill in your user information and click "Activate your account"
2. **ACTIVATE YOUR BOOK**
 - Click the "Activate Another Book" button
 - Gently scratch off the surface of the sticker with the edge of a coin to reveal your Pin code
 - Enter it into the "Pin code" box; select the title you've activated from the drop-down menu
 - Click the "Activate Book" button

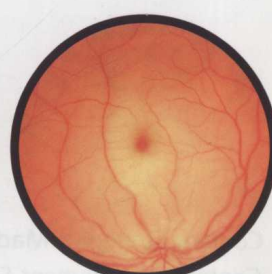
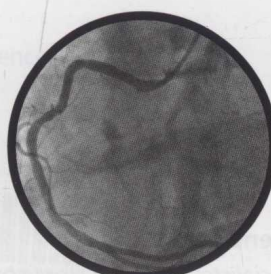
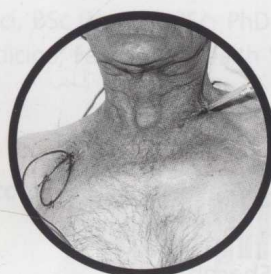
Access to, and online use of, content through the Student Consult website is for individual use only; library and institutional access and use are strictly prohibited. For information on products and services available for institutional access, please contact our Account Support Center at (+1) 877-857-1047. Important note: Purchase of this product includes access to the online version of this edition for use exclusively by the individual purchaser from the launch of the site. This license and access to the online version operates strictly on the basis of a single user per PIN number. The sharing of passwords is strictly prohibited, and any attempt to do so will invalidate the password. Access may not be shared, resold, or otherwise circulated, and will terminate 12 months after publication of the next edition of this product. Full details and terms of use are available upon registration, and access will be subject to your acceptance of these terms of use.

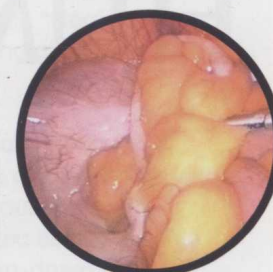
For technical assistance: email online.help@elsevier.com
call 800-401-9962 (inside the US) / call +1-314-995-3200 (outside the US)

MCMINN & ABRAHAMS'

CLINICAL ATLAS OF HUMAN ANATOMY

SEVENTH EDITION





Content Strategist: Madelene Hyde

Content Development Specialists: Rachael Harrison, Sharon Nash

Publishing Services Manager: Patricia Tannian

Senior Project Manager: Sarah Wunderly

Design: Russell Purdy

Illustration Manager: Jennifer Rose

Illustrator: Oxford Designers & Illustrators

Dedication and Preface

"To all our long-suffering spouses and children who rarely see us enough and to our international students who see us too much!"

As with most academic literature, there is a large element of truth to the often misquoted "If I have seen further it is by standing on ye shoulders of Giants" as written by Sir Isaac Newton to Robert Hooke in 1676. In our case it is not only the giants of our own discipline of anatomy and especially its clinical branch; this atlas has also benefited from a real contribution from our students, colleagues, teachers and mentors.

This new seventh edition of McMinn and Abrahams' *Clinical Atlas of Human Anatomy* is the culmination of 40 years' work by a huge team. The first three editions of this seminal colour atlas were authored by Professor Bob McMinn, Ralph Hutchings and Bari Logan, and the last four editions have been the results of a combined academic endeavour of the now departed "giants" Professors John Pegington (University College London), Sandy Marks (University of Massachusetts, USA) and Hanno Boon (Pretoria, South Africa) working with myself (PHA). For previous dedications see the sixth edition dedication online (www.studentconsult.com).

In the autumn of 2012 we heard the sad news of Bob McMinn's passing at the age of 88. Following in his father's footsteps Bob, graduated from Glasgow University in medicine in 1947. His main academic career was in London, first as Professor at Kings College, London and then as the William Collins Professor at the Royal College of Surgeons of England. Along the way Bob not only gained an MD but a PhD as well in the field of wound healing and tissue repair. However, it is for this revolutionary *McMinn's Colour Atlas of Human Anatomy*, first produced in 1977, that Bob's name is known worldwide. Not only will this seventh edition bring sales to over 2 million in some 30 languages, including Latin, Korean, Chinese, Japanese and most European languages, but this book is also very popular with the art world – something of which he was most proud.

As a founding member of the British Association of Clinical Anatomists and past secretary of the Anatomical Society of Great Britain, Bob was one of my mentors (PHA) and a truly kind, warm-hearted and generous gentleman, whose invitation to work with him on the third edition in 1989 changed my own academic direction and pointed me to the "light" of clinical anatomy. I shall always remember the BACA/AACA



Cambridge meeting in 2000 when Bob, the true Scot, arrived for his presentation as only a Scot can!

This new edition is authored by PHA and Jonathan Spratt, a Director of Radiology at Durham who worked on the sixth edition, and to replace the lost multi-talented giants of clinical anatomy we have transfused some new young anatomical blood.

First we have Professor Marios Loukas MD, PhD, Chair of Department of Anatomical Sciences and Dean of Research, at St. George's University, Grenada, West Indies, who for the last decade has made anatomical waves with his amazing energy and prolific academic output. PHA has known Marios since he was a first-year medical student in Poland and noted his potential even 15 years ago. He is now an internationally recognised and published author and brings to this new edition his wide European education in Greece, Poland and

Germany, as well as his postgraduate experience in Harvard and the Caribbean.

To add to this truly global academic input we also welcome Dr. Albert Van Schoor, anatomist from Pretoria and Honorary Secretary of the Anatomical Society of Southern Africa (ASSA), who is truly following in the footsteps of his own mentor, Professor Hanno Boon. Albert's passion for both teaching and clinically applied research – his PhD was on clinical anatomy of practical procedures in children – was instilled in him by Professor Boon. His African experience and connections with physicians have brought us illustrations from the developing world that often are unavailable in Western culture. Gross pathologies seen in the tropics are vividly illustrated on our web pages.

We, all the authors both old and new, have essentially followed the pattern of Bob McMinn's original work to produce an atlas of the human body aimed at health professionals but have moved the emphasis to correlating the "real" human body dissections directly with clinical practice such as radiology, endoscopy or clinical problems, both in the atlas itself and especially in the clinical vignettes on the website. To this end we have included and done the following:

- Added 100+ new dissections including lymphatics
- Added 100+ radiological images (MR and CT) correlated with dissections
- Added 300+ radiological images for the clinical vignettes on the web
- Increased the clinical anatomy case vignettes to nearly 500 – all now on the web with full download ability as jpeg files onto any student's notes.
- Increased the images on the web to 2000+ which include clinical cases operative images, radiological techniques, endoscopy, etc.

- Added a new video section of 200+ 3D rotations and video loops (mainly 64-slice CT scan reconstructions and angiography) to help students appreciate the anatomical three-dimensional relationships (thanks especially to Dr. Richard Wellings, University Hospitals Coventry and Warwickshire, for most of this collection).

We hope that teachers, especially those in less developed parts of the world, will now be stimulated to give presentations with the latest technology to help their students learn anatomy in all its 3D glory. These video loops are marked by the video icon shown in the key below on the relevant page in the atlas and are all to be found in the 3D files on the web filed under anatomical structures (e.g., arteries, veins, brain, thorax). We hope this latest technology will excite all students in their study of the human body.

For additional electronic content look out for the below icons:



Go online to view 200+ 3D rotations and video loops



Go online to view 2000+ clinical cases

PHA
JS
ML
AVS

Acknowledgements

Dissections

Heartfelt thanks to all our **donors and their families** for their ultimate donation for the benefit of mankind and future generations of medical knowledge. This supreme gift to mankind educates and enriches the human experience for generations to come, for today's medical students are tomorrow's clinicians and professors.

The production of this atlas and accompanying web site has been a huge team effort over 5 years and has involved prosectors and professors, teachers and students from four continents but especially from England, South Africa, the United States and the West Indies. We, the four authors, would like to thank all those who worked with us to deliver this new exciting clinical atlas and accompanying web site.

Prosection preparation

Daniële Cavanagh, Franci Dorfling, Heinrich Hesse, Professor Greg Lebona, Lané Prigge, Soné du Plessis, all from the University of Limpopo, Medunsa Campus, South Africa

Nkhensani Mogale, University of Johannesburg, South Africa

Rene Human-Baron, Elsabè Smit, University of Pretoria, South Africa

Theofanis Kollias, Elizabeth Hogan, Mohammed Irfan Ali and faculty Drs. Kathleen Bubba, Deon Forester, and Eward Marshall, Department of Anatomical Sciences, St. George's University School of Medicine, Grenada, West Indies.

Many of the new dissections were carried out at the second Hanno Boon Masterclass in Grenada in July of 2011. Those contributing their skills and in honouring the international memory of Professor Hanno Boon (R.I.P.) were Vicky Cottrell, Paul Danse, Maira du Plessis, Alison Tucker, Richard Tunstall, George Salter, Shane Tubbs and the following Warwick University Medical students in the UK—Ross Bannon, Matthew Boissaud-Cooke, Michael Brown, Edward Dawton, Sarah Diaper, Zara Eagle, Elizabeth Jane Harris, Morag Harris, Daniel Lin, Riwa Meshaka, Rob Neave, Charlotte Oakley, Chris Parry, Alison Rangedara, Farah Sadrudin, Jon Senior, Catherine Tart, Adam Walsh, Melanie Whitehead, John Williams, Katie Wooding, Dr. James Chambers.



The second Hanno Boon memorial dissection masterclass participants, Grenada, 2011.

Photographic, technical and research

Laura Jane van Schoor (Laura Jane Photography, South Africa) and Joanna Loukas (Department of Anatomical Sciences, St. George's University) for their photographic skills.

Marius Loots, Gert Lewis, and Samuel Ngobeni (Department of Anatomy, University of Pretoria, South Africa) for technical assistance.

Carlson Dominique, Rodon Marast, Christopher Belgrave, Ryan Jacobs, Nadica Thomas-Dominique, Jacqueline Hope, Salisha Thomas and Yvonne James of the Department of Anatomical Sciences at St. Georges University, for their technical and lab assistance.

The following research fellows of the Department of Anatomical Sciences at St. Georges University for their contribution—Drs. Asma Mian, Irfan Chaudhry, Philip Veith, Amit Sharma, Edward Sorenson, Matthew Prekupec and Christa Blaak.

All the mistakes, though hopefully very few, are ours but the following individuals have kept the errors to a minimum with

their proof reading skills and expert knowledge: Eng-Tat Ang, PT, PhD; James Chambers, MBChB, BSc(Hons); Sundeep Singh Deol MSc, PhD, MD; Petrut Gogalniceanu, BSc, Med, MRCS; Ruth Joplin, PhD; David A. Magezi MA(Cantab), BM BCh (Oxon), PhD (Notts); David Metcalfe, BSc(Hons), LLB(Hons), MRCS; Barry S Mitchell, BSc, PhD, MSc, FSB, FHEA; Tom Paterson BSc(Hons)Anatomy, MBChB Glasgow; Jamie Roebuck BSc, MBChB, FHEA; R. Subbu, MBChB, MRCS, BSci(HONS); Kapil Sugand, BSc, MBBS; Richard Tunstall, BMedSci, PhD, PGCLTHE, FHEA; Tom Turmezei, MA, MPhil, BMBCh, FRCR; Anne Waddingham, BSc, LCGI.

Clinical, operative, endoscopic, ultrasound, other imaging modalities and videos cases (see also the sixth edition clinical cases acknowledgements on the web page).

Drs. Elias Abdulah MD, Chrystal Antoine MD, Nicole Avril MD, Prof. Danny Burns MD, PhD, Melissa Brandford MD, Katusha Cornwall MD, Adegberno Fakoya MD, Nicole George MD, Prof. Robbie Hage MD, PhD, DLO, MBA, ENT Surgeon, Kennard Philip MD, and Kazzara Raeburn MD, Department of Anatomical Sciences, St. George's University, Grenada, West Indies; Prof. Kitt Shaffer MD, PhD, Department of Radiology, Boston University, Boston Massachusetts, United States; Dr. Robert Ward MD, Department of Radiology, Tufts University, Boston, Massachusetts, United States; Dr. MA Strydom, Steve Biko Academic Hospital, Pretoria, South Africa; Drs. MJ Heystek, M Maharaj, E Poulet, and E Raju,

Department of Family Medicine, Tshwane District Hospital, University of Pretoria, South Africa; Dr. PS Levay and Prof. D van Zyl, Department of Internal Medicine, Kalafong Hospital, University of Pretoria, South Africa; Dr. AK Mynhardt, University of Pretoria, South Africa; Dr. MY Gamielien, Oral & Dental Hospital, University of Pretoria, South Africa; Members of the Department of Plastic and Reconstructive Surgery, University of Limpopo (Medunsa campus), South Africa; Dr. Richard Wellings, Consultant Radiologist and Hon Associate Professor, UHCW Trust and Warwick Medical School, United Kingdom; Ms. Kavita Singh and Mr. Janos Balega, Consultant Gynaecological Oncologists, Sandwell and West Birmingham Hospitals Trust, Pan-Birmingham Gynaecology Cancer Centre Birmingham, United Kingdom; Dr. Adam Iqbal, UHCW Trust and Warwick Medical School; Mr. Michael Brown and Mr. Mark Mobley, Warwick Medical School, University of Warwick, Coventry, United Kingdom; Ms. Nadia Boujo and Mr. Alfred Boujo, London; Dr. Vibart Yaw, Consultant Oral and Maxillofacial Surgeon, General Hospital, St. George's, Grenada, West Indies; Dr. Ankur Gulati, Cardiology Specialist Registrar, The London Chest Hospital, UK

User Guide

This book is arranged in the general order 'head to toe'. The Head and Neck section (including the brain) is followed by the Vertebral column and spinal cord, then Upper limb, Thorax, Abdomen and pelvis, Lower limb and finally Lymphatics. In each section, skeletal elements are shown first followed by dissections, with surface views included for orientation. All structures are labelled by numbers, and these are identified in lists beside each image. An arrowhead at the end of a leader indicates that the structure labelled is just out of view beyond the tip of the arrow. Text has been limited to that needed to understand how the preparation was made, and is not intended to be comprehensive.

Orientation



- 1 Anterior nasal spine
- 2 Body of mandible
- 3 Frontal bone
- 4 Frontal notch
- 5 Frontal process of maxilla
- 6 Glabella
- 7 Greater wing of sphenoid bone
- 8 Infra-orbital foramen
- 9 Infra-orbital margin
- 10 Inferior nasal process
- 11 Inferior orbital fissure
- 12 Lacrimal bone
- 13 Lesser wing of sphenoid bone
- 14 Maxilla
- 15 Mental foramen
- 16 Mental protuberance
- 17 Middle nasal concha
- 18 Nasal bone
- 19 Nasal septum
- 20 Orbit
- 21 Orbit of mandible
- 22 Superior orbital fissure
- 23 Supra-orbital foramen
- 24 Supra-orbital margin
- 25 Zygomatic bone

The term skull includes the mandible and cranium, although the skull includes the mandible.

The cranium is the part of the skull that contains the brain and is the upper part of the cranium that contains the brain.

The front part of the skull forms the facial skeleton.

The supra-orbital, infra-orbital and mental foramina (24, 11 and 15) are in approximately the same vertical plane.

Details of individual skull bones are given on pages 16-27, of the bones of the orbit and nose on page 12, and of the teeth on pages 12-13.

Contents

Systemic review



Skeleton
Muscles
Arteries
Veins
Nerves
Dermatomes
Cross-sections of the human body

Head, neck and brain



Skull	1
Skull bones	18
Neck	28
Root of the neck	36
Face	38
Temporal and infratemporal fossae	40
Infratemporal fossa	42
Deep infratemporal fossa	44
Pharynx	45
Larynx	48
Cranial cavity	51
Eye	54
Nose	58
Nose and tongue	59
Ear	60
Brain	62
Cranial nerves	73
Clinical thumbnails	80

Vertebral column and spinal cord



Vertebral column overview	83
Back and shoulder	84
Vertebrae	85
Sacrum	89
Sacrum and coccyx	90
Bony pelvis	92
Vertebral ossification	93
Vertebral column and spinal cord	94
Surface anatomy of the back	100
Muscles of the back	101
Sub-occipital triangle	104
Vertebral radiographs	106
Clinical thumbnails	108

Upper limb



Upper limb overview	109
Upper limb bones	110
Shoulder	126
Axilla	138
Arm	143
Elbow	145
Forearm	148
Hand	154
Wrist and hand radiographs	169
Clinical thumbnails	170

Thorax



Thorax overview	173
Thoracic bones	174

Thoracic wall surface markings and breast	178
Breast	179
Thoracic wall and surface markings	180
Thoracic wall	181
Thoracic viscera	184
Heart	185
Mediastinum	192
Mediastinal imaging	196
Lungs	197
Superior mediastinum	205
Superior mediastinum and thoracic inlet	206
Superior thoracic aperture (thoracic inlet)	208
Posterior mediastinum	209
Intercostal nerves and thoracic joints	211
Aorta and associated vessels	212
Diaphragm	213
Oesophageal imaging	214
Clinical thumbnails	215

Abdomen and pelvis

5

Abdomen overview	217
Anterior abdominal wall	218
Male pelvis	225
Inguinal region	226
Upper abdomen	227
Intestinal imaging	240
Liver	244
Gall bladder imaging	247
Spleen	249
Spleen and intestines	250
Intestines	251
Small intestine	252
Kidneys and suprarenal glands	253
Kidneys and kidney imaging	259
Diaphragm and posterior abdominal wall	260
Posterior abdominal and pelvic walls	261
Pelvic walls	263
Male inguinal region, external genitalia	265
Male pelvis	266
Pelvic vessels and nerves	269
Pelvic ligaments	271
Female pelvis	272

Female perineum	276
Male perineum	278
Clinical thumbnails	280

Lower Limb

6

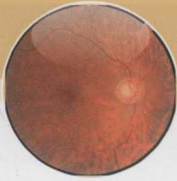
Lower limb overview	285
Lower limb bones	286
Foot bones	310
Foot and ankle bones	312
Ankle bones	313
Development of lower limb bones	314
Gluteal region	316
Thigh	318
Front of thigh	320
Hip joint	324
Knee	328
Knee radiographs	336
Leg	337
Ankle and foot	344
Foot	350
Ankle and foot imaging	354
Clinical thumbnails	355

Lymphatics

7

Lymphatic system	359
Lymphangiography	359
Thymus	360
Chest	360
Palatine tonsils	360
Neck	361
Thoracic duct	362
Right axilla	363
Cisterna chyli and thoracic duct	365
Female pelvis	366
Gross lymphadenopathy of the pelvis	367
Thigh and superficial inguinal lymph nodes	368
Clinical thumbnails	369
Index	371

Head, neck and brain



1

Skull from the front



- 1 Anterior nasal spine
- 2 Body of mandible
- 3 Frontal bone
- 4 Frontal notch
- 5 Frontal process of maxilla
- 6 Glabella
- 7 Greater wing of sphenoid bone
- 8 Infra-orbital foramen
- 9 Infra-orbital margin
- 10 Inferior nasal concha
- 11 Inferior orbital fissure
- 12 Lacrimal bone
- 13 Lesser wing of sphenoid bone
- 14 Maxilla
- 15 Mental foramen
- 16 Mental protuberance
- 17 Middle nasal concha
- 18 Nasal bone
- 19 Nasal septum
- 20 Nasion
- 21 Orbit (orbital cavity)
- 22 Ramus of mandible
- 23 Superior orbital fissure
- 24 Supra-orbital foramen
- 25 Supra-orbital margin
- 26 Zygomatic bone



The term 'skull' includes the mandible, and 'cranium' refers to the skull without the mandible.

The calvarium is the vault of the skull (cranial vault or skull-cap) and is the upper part of the cranium that encloses the brain.

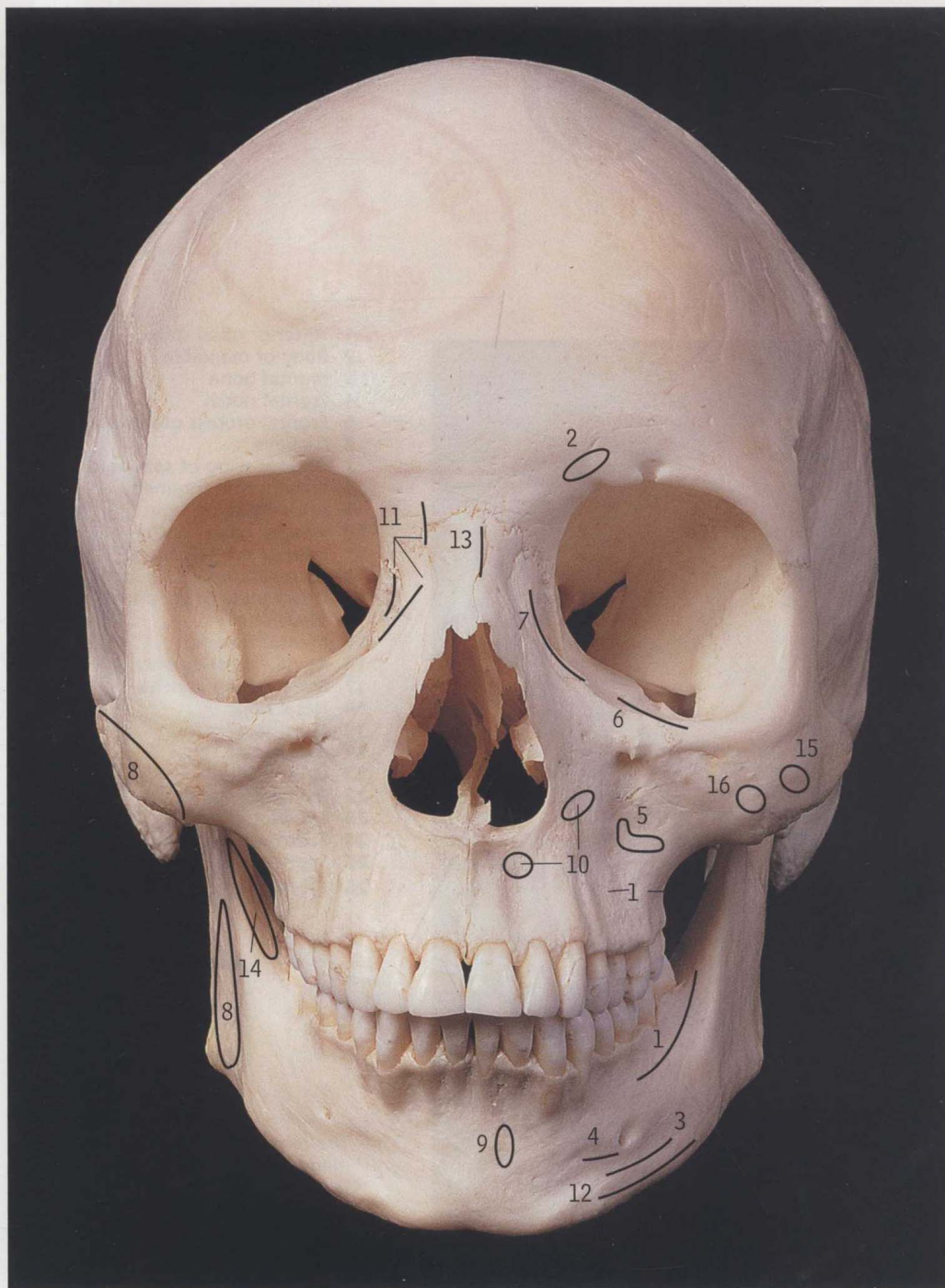
The front part of the skull forms the facial skeleton.

The supra-orbital, infra-orbital and mental foramina (24, 8 and 15) lie in approximately the same vertical plane.

Details of individual skull bones are given on pages 18–27, of the bones of the orbit and nose on page 12, and of the teeth on pages 13–19.

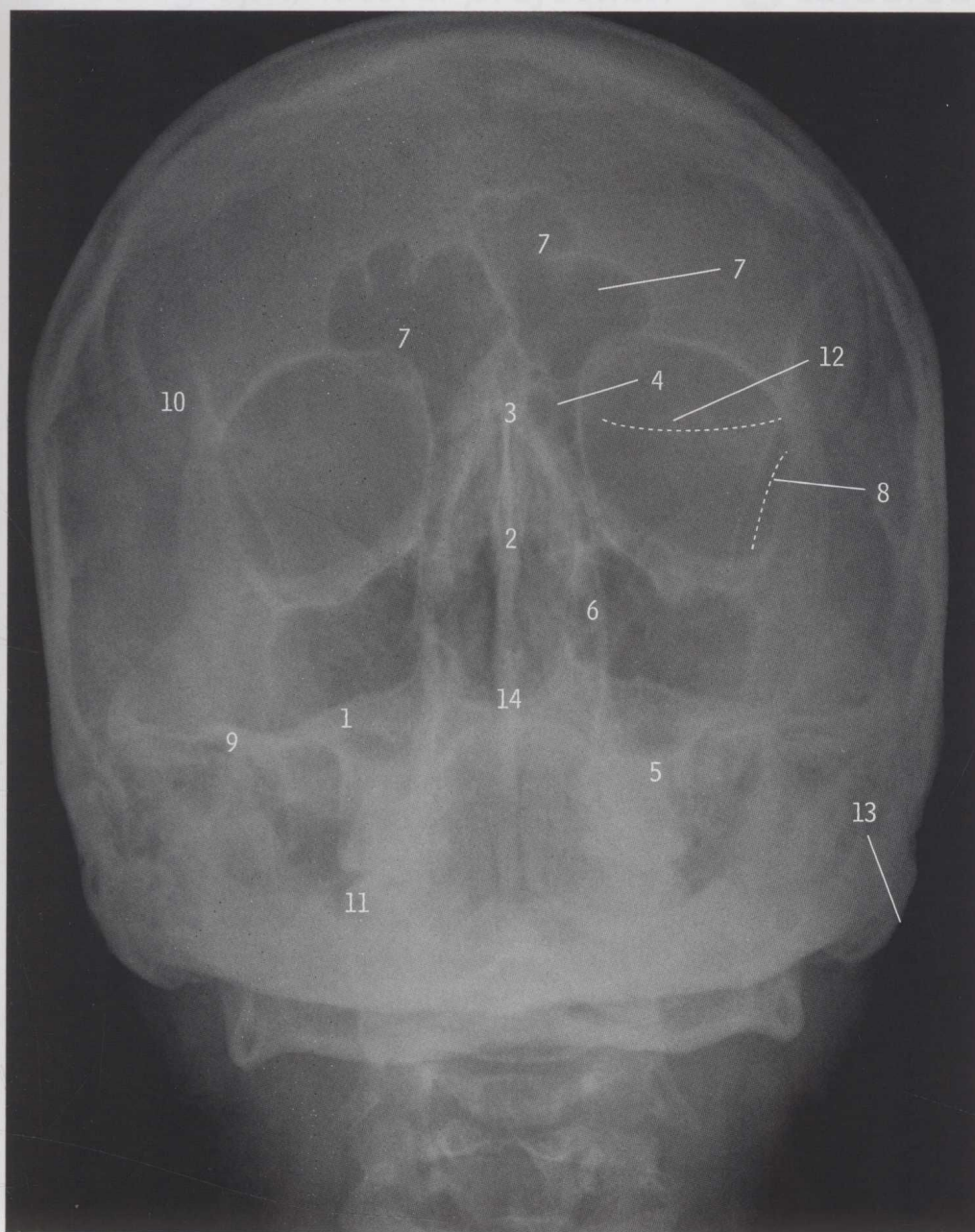


Skull muscle attachments, from the front



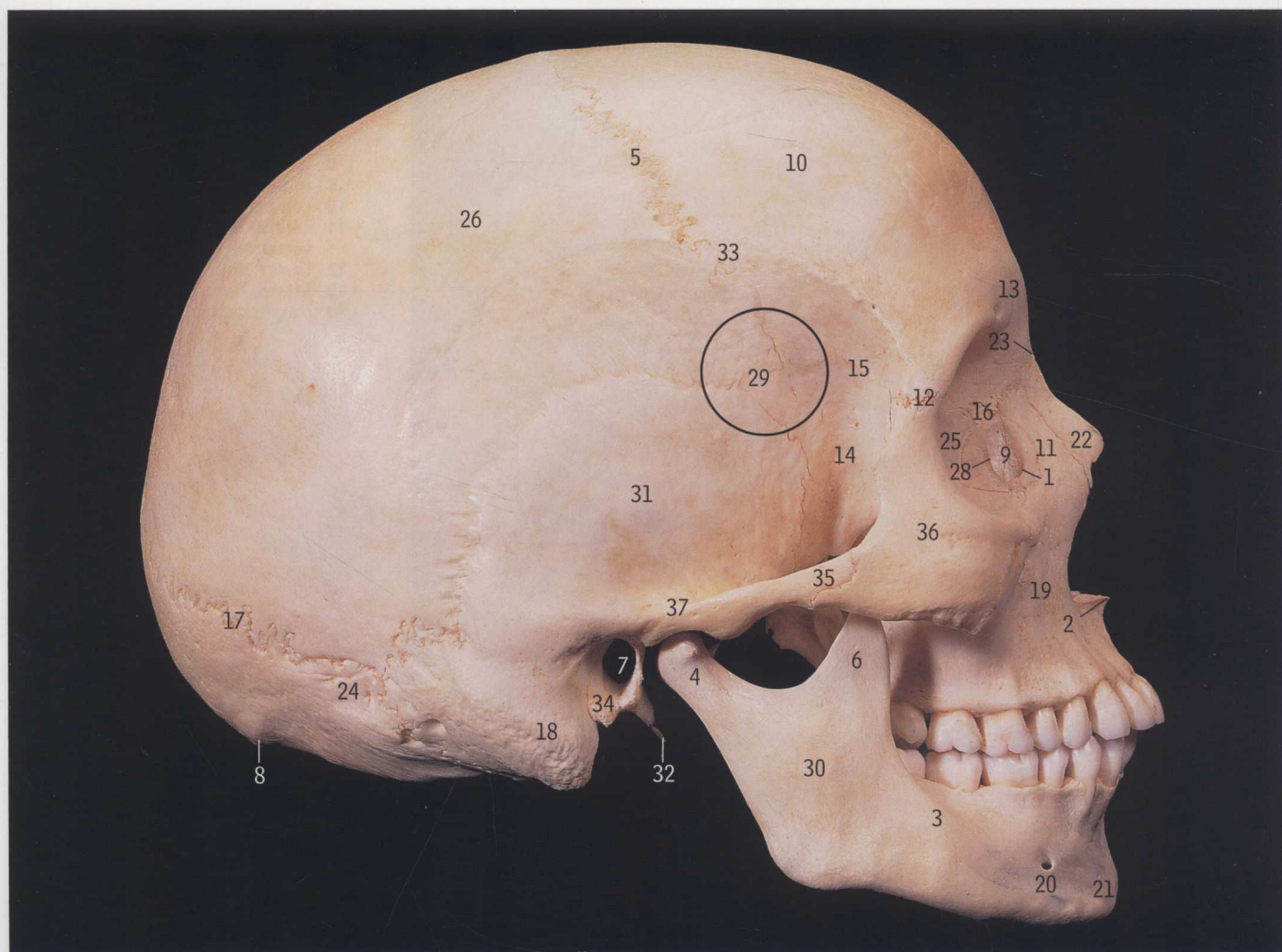
- 1 Buccinator
- 2 Corrugator supercilii
- 3 Depressor anguli oris
- 4 Depressor labii inferioris
- 5 Levator anguli oris
- 6 Levator labii superioris
- 7 Levator labii superioris alaeque nasi
- 8 Masseter
- 9 Mentalis
- 10 Nasalis
- 11 Orbicularis oculi
- 12 Platysma
- 13 Procerus
- 14 Temporalis
- 15 Zygomaticus major
- 16 Zygomaticus minor

Skull radiograph, occipitofrontal 15° projection



- 1 Basi-occiput
- 2 Body of sphenoid
- 3 Crista galli
- 4 Ethmoidal air cells
- 5 Floor of maxillary sinus (antrum)
- 6 Foramen rotundum
- 7 Frontal sinus
- 8 Greater wing of sphenoid
- 9 Internal acoustic meatus
- 10 Lambdoid suture
- 11 Lateral mass of atlas (first cervical vertebra)
- 12 Lesser wing of sphenoid
- 13 Mastoid process
- 14 Nasal septum

Skull from the right



- | | | | |
|---|-------------------------------------|---|---------------------------------------|
| 1 Anterior lacrimal crest | 10 Frontal bone | 20 Mental foramen | 30 Ramus of mandible |
| 2 Anterior nasal spine | 11 Frontal process of maxilla | 21 Mental protuberance | 31 Squamous part of temporal bone |
| 3 Body of mandible | 12 Frontozygomatic suture | 22 Nasal bone | 32 Styloid process of temporal bone |
| 4 Condylar process of the mandible | 13 Glabella | 23 Nasion | 33 Superior temporal line |
| 5 Coronal suture | 14 Greater wing of sphenoid bone | 24 Occipital bone | 34 Tympanic part of temporal bone |
| 6 Coronoid process of mandible | 15 Inferior temporal line | 25 Orbital plate of ethmoid bone | 35 Zygomatic arch |
| 7 External acoustic meatus of temporal bone | 16 Lacrimal bone | 26 Parietal bone | 36 Zygomatic bone |
| 8 External occipital protuberance (inion) | 17 Lambdoid suture | 27 Pituitary fossa (sella turcica) (see Figure A on page 5) | 37 Zygomatic process of temporal bone |
| 9 Fossa for lacrimal sac | 18 Mastoid process of temporal bone | 28 Posterior lacrimal crest | |
| | 19 Maxilla | 29 Pterion (encircled) | |

Pterion (29) is not a single point but an area where the frontal (10), parietal (26), squamous part of the temporal (31) and greater wing of the sphenoid bone (14) adjoin one another.

It is an important landmark for the anterior branch of the middle meningeal artery, which underlies this area on the inside of the skull (page 17).



Extradural haemorrhage, see pages 80–82.

此为试读, 需要完整PDF请访问: www.ertongbook.com