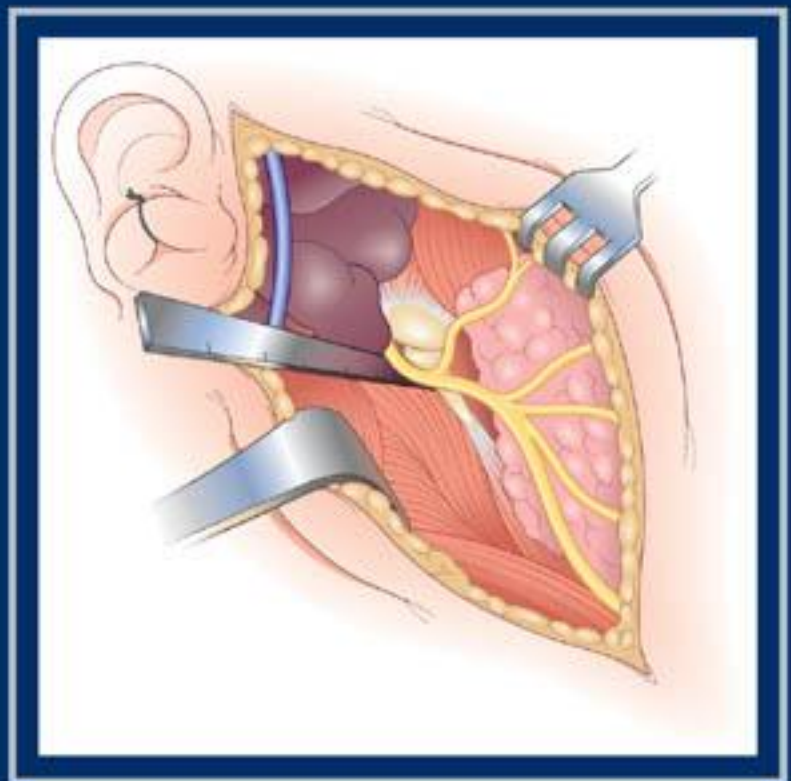


Operative Oral and Maxillofacial Surgery

SECOND EDITION



Edited by

John Langdon, Mohan Patel, Robert Ord
and Peter Brennan

Operative Oral and Maxillofacial Surgery

This page intentionally left blank

Operative Oral and Maxillofacial Surgery

SECOND EDITION

John D. Langdon Emeritus Professor of Oral and Maxillofacial Surgery,
King's College London, UK

Mohan F. Patel Consultant Surgeon, Department of Oral and Maxillofacial
Surgery, Royal Berkshire Hospital, Reading, UK

Robert A. Ord Professor, Department of Oral and Maxillofacial Surgery,
Baltimore College of Dental Surgery, Baltimore, Maryland, USA

Peter A. Brennan Consultant Oral and Maxillofacial Surgeon, Honorary
Professor of Surgery, Department of Oral and Maxillofacial Surgery, Queen
Alexandra Hospital, Portsmouth, UK

First published in Great Britain in 1998 by Chapman and Hall.
This second edition published in 2009 by
Hodder Arnold, an imprint of Hodder Education, an Hachette UK Company,
338 Euston Road, London NW1 3BH

<http://www.hodderarnold.com>

© 2011 Hodder & Stoughton Limited

All rights reserved. Apart from any use permitted under UK copyright law, this publication may only be reproduced, stored or transmitted, in any form, or by any means with prior permission in writing of the publishers or in the case of reprographic production in accordance with the terms of licences issued by the Copyright Licensing Agency. In the United Kingdom such licences are issued by the Copyright Licensing Agency: 90 Tottenham Court Road, London W1T 4LP

Hachette UK's policy is to use papers that are natural, renewable and recyclable products and made from wood grown in sustainable forests. The logging and manufacturing processes are expected to conform to the environmental regulations of the country of origin.

Whilst the advice and information in this book are believed to be true and accurate at the date of going to press, neither the author[s] nor the publisher can accept any legal responsibility or liability for any errors or omissions that may be made. In particular (but without limiting the generality of the preceding disclaimer) every effort has been made to check drug dosages; however it is still possible that errors have been missed. Furthermore, dosage schedules are constantly being revised and new side-effects recognized. For these reasons the reader is strongly urged to consult the drug companies' printed instructions before administering any of the drugs recommended in this book.

British Library Cataloguing in Publication Data

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

Library of Congress Cataloging-in-Publication Data

A catalog record for this book is available from the Library of Congress

ISBN-13 978 0 340 945 896

1 2 3 4 5 6 7 8 9 10

Commissioning Editor: Gavin Jamieson
Project Editor: Francesca Naish
Production Controller: Joanna Walker
Cover Designer: Helen Townson
Index compiled by: Indexing Specialists (UK) Ltd.

Typeset in 10 on 12 pt Minion by Phoenix Photosetting, Chatham, Kent
Printed and bound in Italy by Printer Trento

What do you think about this book? Or any other Hodder Arnold title?
Please visit our website: www.hodderarnold.com

Dedication

To Paul, Jane, Sue and Rachel, and to colleagues and trainees: past, present and future.

This page intentionally left blank

Contents

Contributors	xi
Foreword	xv
Preface	xvii
List of abbreviations used	xix

PART ONE: DIAGNOSTIC INVESTIGATIONS

1.1	Imaging techniques, including computed tomography-guided biopsy and FDG-PET <i>Stephen Connor</i>	3
1.2	Ultrasound imaging, including ultrasound-guided biopsy <i>Rachel Oeppen and Rhodri Evans</i>	17
1.3	Surgical and other investigations <i>Julia Woolgar</i>	25
1.4	Fine needle aspiration biopsy <i>Matthias AW Merckx</i>	33
1.5	Three-dimensional imaging <i>Ashraf F Ayoub</i>	37

PART TWO: ORAL SURGERY

2.1	Tooth extraction <i>Cathy Bryant</i>	47
2.2	Removal of unerupted teeth <i>James Swift</i>	59
2.3	Nerve injuries and repair <i>John Zuniga and Andrew Tay</i>	63
2.4	Surgical endodontics <i>Helen Spencer</i>	71
2.5	Benign cysts of the face and jaws <i>Joseph Helman</i>	75
2.6	Basic implantology: An American perspective <i>Jaime Brahim</i>	79
2.7	Adjunctive office-based techniques for bone augmentation in oral implantology: An American perspective <i>Gary Warburton</i>	85
2.8	Basic and advanced implantology: A European perspective <i>John Cawood</i>	95
2.9	Major preprosthetic surgery, incorporating implants <i>Eugene Keller</i>	107
2.10	Craniofacial implantology <i>Greg Boyes-Varley and Dale Howes</i>	119
2.11	Tissue engineering <i>Miller H Smith, Kenji Izumi and Stephen E Feinberg</i>	137

PART THREE: SURGICAL TECHNIQUES

3.1	Emergency procedures <i>David Macpherson and Clive Pratt</i>	149
3.2	Intraoral flaps and skin grafting <i>John Carter</i>	159
3.3	Pectoralis major <i>Andrew Lyons</i>	169
3.4	Reconstructive surgery – harvesting, skin mucosa and cartilage <i>Peter Ward Booth</i>	173
3.5	Microvascular surgery – principles <i>Cyrus Kerawala</i>	187
3.6	Radial forearm flap <i>Andrew E Brown and Christopher M Avery</i>	195
3.7	Scapular and parascapular flap (with or without bone) <i>Xin Peng, Chi Mao and Guang-yan Yu</i>	201
3.8	Rectus abdominis <i>Xin Peng, Chi Mao and Guang-yan Yu</i>	205
3.9	Latissimus dorsi <i>Andrew Baker</i>	209
3.10	Anterolateral thigh flap <i>Andrew Lyons</i>	215
3.11	Gracilis flap <i>Henning Schliephake</i>	223
3.12	Fibular flap <i>Peter Brennan and André Eckardt</i>	229
3.13	Vascularized iliac crest grafts <i>Andrew Lyons</i>	235
3.14	Facial Reanimation <i>Henning Schliephake</i>	243
3.15	The use of lasers – general principles <i>Madanagopalan Ethunandan</i>	249
3.16	The use of lasers – photodynamic therapy <i>Colin Hopper</i>	253

PART FOUR: MALIGNANT DISEASE OF THE MOUTH AND JAW

4.1	Assessment and principles of management <i>Peter A Brennan</i>	259
4.2	Percutaneous endoscopic gastrostomy <i>Susannah Green and Pradeep Bhandari</i>	267
4.3	Oral and oropharyngeal squamous cell carcinoma: Pathological assessment of resection specimens and neck dissections <i>Julia Woolgar</i>	273
4.4	Access surgery <i>Barrie Evans and Dorothy Lang</i>	279
4.5	Excision of skin lesions and orbital and nasal reconstruction <i>Bruce B Horswell</i>	291
4.6	Local resection and reconstruction of oral carcinomas and lip cancer <i>Robert A Ord</i>	307
4.7	Jaw resection <i>James S Brown</i>	317
4.8	Orbital resection and reconstruction <i>Alexander D Rapidis</i>	327
4.9	Neck dissection <i>Peter A Brennan</i>	341
4.10	Sentinel node biopsy <i>Moni Abraham Kuriakose and Nirav Pravin Trivedi</i>	349

4.11	Tumours of the skull base <i>Dorothy A Lang and Barrie T Evans</i>	355
------	---	-----

PART FIVE: SALIVARY AND THYROID SURGERY

5.1	Submandibular, sublingual and minor salivary gland surgery <i>John D Langdon</i>	365
5.2	Management of stones and strictures and interventional sialography <i>Michael P Escudier and Jacqui E Brown</i>	379
5.3	Parotid surgery <i>John D Langdon</i>	389
5.4	Extracapsular dissection <i>Mark McGurk and Luke Cascarini</i>	401
5.5	Thyroidectomy, cysts of the thyroglossal duct tract and ectopic thyroid <i>Eric J Dierks</i>	405

PART SIX: VASCULAR LESIONS

6.1	Treatment techniques, surgery and sclerosants <i>Maria E Papadaki and Leonard B Kaban</i>	417
6.2	Interventional radiology of the head and neck <i>John S Millar</i>	433

PART SEVEN: TRAUMA

7.1	Assessment and initial management <i>Mohan F Patel</i>	445
7.2	Contemporary maxillofacial fixation techniques <i>Domenick P Coletti</i>	453
7.3	Soft tissue injuries <i>Suhail K Mithani and Eduardo D Rodriguez</i>	463
7.4	Dentoalveolar trauma <i>Bernard J Costello and Brian Martin</i>	475
7.5	Mandibular fractures <i>Michael Perry</i>	479
7.6	Management of condylar fractures, including endoscopic reduction <i>Roger Currie</i>	487
7.7	Middle third fractures <i>Joe McManners, Jeremy McMahon and Ian Holland</i>	493
7.8	Orbital trauma <i>Michael Williams</i>	503
7.9	Craniofacial trauma, including management of frontal sinus and nasoethmoidal injuries <i>Robert P Bentley</i>	513
7.10	Zygomatic fractures <i>Michael Perry</i>	531

PART EIGHT: TEMPOROMANDIBULAR JOINT

8.1	Temporomandibular joint arthroscopy <i>Joseph McCain and King Kim</i>	543
8.2	Surgery to the temporomandibular joint <i>George Dimitroulis</i>	553
8.3	Treatment of temporomandibular joint ankylosis <i>Andrew J Sidebottom and Robert Hensher</i>	567
8.4	Total prosthetic replacement of the temporomandibular joint <i>Andrew J Sidebottom and Robert Hensher</i>	573

PART NINE: CLEFT LIP AND PALATE

9.1	Primary closure of unilateral cleft lip <i>Chris Penfold</i>	581
9.2	Primary closure of bilateral clefts <i>Krishna Shama Rao</i>	589
9.3	Primary closure of cleft palate <i>Christoph Huppa</i>	599
9.4	Secondary cleft procedures <i>John Caccamese</i>	609
9.5	Alveolar bone grafting <i>Tim Flood</i>	619
9.6	Cleft rhinoplasty <i>Ilanko Ilankovan</i>	625

PART TEN: CRANIOFACIAL SURGERY

10.1	Segmental surgery of the jaws <i>Paul JW Stoeltinga</i>	635
10.2	Orthognathic surgery of the mandible <i>Paul A Johnson</i>	643
10.3	Orthognathic surgery – maxilla (Le Fort I, II and III) <i>George Obeid</i>	649
10.4a	Mandibular distraction osteogenesis by intraoral and extraoral techniques <i>David A Walker</i>	659
10.4b	Maxillary distraction osteogenesis by intraoral and extraoral techniques <i>David A Walker</i>	667
10.5	Surgical management of craniosynostosis <i>GE Ghali and David M Montes</i>	675
10.6	Hemifacial microsomia <i>Janice Lee</i>	685
10.7	Sleep apnoea and snoring, including non-surgical techniques <i>Joe Deatherage and Peter Waite</i>	691

PART ELEVEN: FACIAL AESTHETIC SURGERY

11.1	Nonsurgical techniques: botox, fillers <i>N Ravindranathan</i>	703
11.2	Hair transplantation <i>N Ravindranathan and E Antonio Mangubat</i>	717
11.3	Brow lift and face lift including endoscopic surgery <i>Tirbod Fattahi</i>	733
11.4	Blepharoplasty <i>Leo Stassen</i>	743
11.5	Otoplasty <i>Leo Stassen</i>	749
11.6	Rhinoplasty and septoplasty: Closed and open techniques and the Oriental nose <i>Luc Cesteleyn, N Ravindranathan and Corazon Collantes Jose</i>	757
11.7	Post-traumatic rhinoplasty <i>Luc Cesteleyn</i>	781
	Index	789

Contributors

Christopher M Avery

Maxillofacial Unit, Leicester Royal Infirmary, Leicester, UK

Ashraf F Ayoub

Professor and Honorary Consultant in Oral and Maxillofacial Surgery, Glasgow University Dental Hospital and School, Glasgow, UK

Andrew W Baker

John Radcliffe Hospital, Oxford, UK

Robert P Bentley

King's College Hospital, London, UK

Pradeep Bhandari

Department of Gastroenterology, Queen Alexandra Hospital, Portsmouth, UK

Greg Boyes-Varley

Morningside Medi-Clinic, Johannesburg, South Africa

Jaime Brahim

University of Maryland Dental School, Oral and Maxillofacial Surgery Department, Baltimore, Maryland, USA

Peter A Brennan

Department of Oral and Maxillofacial Surgery, Queen Alexandra Hospital, Portsmouth, UK

Andrew E Brown

Honorary Consultant, Queen Victoria Hospital, East Grinstead, UK

James S Brown

Regional Maxillofacial Unit, University Hospital Aintree, Liverpool, UK

Jacqui E Brown

KCL Dental Institute of Guy's, King's College and St Thomas' Hospitals, London, UK

Catherine Bryant

Department of Oral Surgery, King's College Hospital NHS Foundation Trust, London, UK

John F Caccamese Jr

Department of Oral and Maxillofacial Surgery, University of Maryland Medical Center and Kernan Hospital and Greater Baltimore Medical Center Cleft Teams, Baltimore, MD, USA

Luke Cascarini

North West Hospitals, London, UK

John Cawood

Spire Murrayfield Hospital, Wirral, UK

Luc Cesteleyn

Department of Maxillofacial Surgery, AZ St Lucas Gent, Belgium and University of Michigan, Ann Arbor, MI, USA

Domenick P Coletti

University of Maryland Dental School, Oral-Maxillofacial Surgery, Baltimore, MD, USA

Stephen EJ Connor

Neuroradiology Department, Kings College Hospital, London, UK

Bernard J Costello

Pediatric Oral and Maxillofacial Surgery, Children's Hospital of Pittsburgh, and Department of Oral and Maxillofacial Surgery, University of Pittsburgh, Pittsburgh, PA, USA

Roger Currie

Crosshouse Hospital, Kilmarnock, UK

Eric J Dierks

Oregon Health and Science University, Legacy Emanuel Hospital, Portland, OR, USA

George Dimitroulis

Department of Surgery, St Vincent's Hospital, University of Melbourne, Australia

André Eckardt

Department of Oral and Maxillofacial Surgery, Hanover Medical University, Hannover, Germany

Michael P Escudier

King's College London Dental Institute, London, UK

Madanagopalan Ethunandan

Maxillofacial Unit, St Richard's Hospital, Chichester, UK

Barrie Evans

Southampton University Hospitals NHS Trust, Southampton, UK

Rhodri Evans

Consultant Radiologist, Radiology Department Morrision Hospital, Swansea, UK

Tirbod Fattahi

University of Florida – Jacksonville, Department of Surgery, Jacksonville, FL, USA

Stephen E Feinberg

Oral and Maxillofacial Surgery, University of Michigan, Ann Arbor, MI, USA

Tim Flood

Salisbury District Foundation Trust, Salisbury, UK

GE Ghali

Department of Oral and Maxillofacial Surgery, LSU Health Science Center, Shreveport, LA, USA

Susannah Green

Department of Gastroenterology, Queen Alexandra Hospital, Portsmouth, UK

Joseph Helman

University of Michigan Hospital, Ann Arbor, MI, USA

Robert Hensher

Kind Edward VII's Hospital, London, UK

Ian Holland

Southern General, Glasgow, UK

Colin Hopper

Consultant Oral and Maxillofacial Surgeon, University College London Hospitals, London, UK

Bruce B Horswell

Charleston Area Medical Center, Charleston, WV, USA

Dale Howes

Morningside Medi-Clinic, Johannesburg, South Africa

Christoph Huppa

South Thames Cleft Service, Guy's Hospital, London, UK

Ilanko Ilankovan

Poole General Hospital, Poole, UK

Kenji Izumi

Oral Anatomy, Niigata University, Niigata, Japan

Paul A Johnson

Royal Surrey County Hospital, Surrey, UK

Corazon Collantes Jose

Asian Hospital, Manila, Philippines

Leonard B Kaban

Harvard School of Dental Medicine, Massachusetts General Hospital, Boston, MA, USA

Eugene Keller

Mayo Clinic, Department of General Surgery, Rochester, MN, USA

Cyrus J Kerawala

Royal Marsden Hospital, London, UK

King Kim

Oral and Maxillofacial Surgery Program, Nova Southeastern University/Broward General Medical Center, Fort Lauderdale, FL, USA

Moni Kuriakose

Chief of Department of Surgical Oncology, Head of Department of Head Neck Surgery, Mazumdar Shaw Center Et NH, Bangalore, India

Janice Lee

Oral and Maxillofacial Surgery, Department of Oral and Maxillofacial Surgery, UCSF, San Francisco, CA, USA

Dorothy Lang

Wessex Neurological Centre, Southampton University Hospitals NHS Trust, Southampton, UK

John D Langdon

King's College London, UK

Andrew Lyons

Guy's Hospital, London, UK

David W Macpherson

Maxillofacial Unit, St Richard's Hospital, Chichester, UK

E Antonio Mangubat

Southcentre Cosmetic Surgery, Seattle, Washington DC, USA

Chi Mao

Peking University School of Stomatology, Beijing, China

Brian Martin

Pediatric Dentistry, Children's Hospital of Pittsburgh, University of Pittsburgh, Pittsburgh, PA, USA

Joseph McCain

Nova Southeastern University/Broward General Medical Center, Fort Lauderdale, FL, USA

Mark McGurk

Dental Institute at Guy's, King's College and St Thomas' Hospitals, London, UK

Jeremy McMahon

Southern General, Glasgow, UK

Joe McManners

Forth Valley Royal Hospital, Larbert, UK

Matthias AW Merckx

Department of Oral and Maxillofacial Surgery, Radboud University, Nijmegen Medical Center, Nijmegen, The Netherlands

John S Millar

Wessex Neurological Centre, Southampton, UK

Suhail K Mithani

Plastic and Reconstructive Surgery, Johns Hopkins University School of Medicine, Baltimore, MD, USA

David M Montes

Department of Oral and Maxillofacial Surgery, LSU Health Science Center, Shreveport, LA, USA

George Obeid

Washington Hospital Center, Department of Oral-Maxillofacial Surgery, Washington, DC, USA

Rachel S Oeppen

Department of Radiology, Southampton University Hospitals NHS Trust, Southampton, UK

Robert A Ord

University of Maryland/Greenebaum Cancer Center, Baltimore, MD, USA

Maria E Papadaki

Harvard School of Dental Medicine, Massachusetts General Hospital, Boston, MA, USA

Mohan F Patel

Royal Berkshire Hospital Foundation Trust, Reading, UK

Chris Penfold

Glan Clwyd Hospital, Rhyl, UK

Xin Peng

Peking University School of Stomatology, Beijing, China

Michael Perry

School of Dentistry, Royal Group of Hospitals, Belfast, UK

CA Pratt

Maxillofacial Unit, St Richards Hospital, Chichester, UK

Krishna Shama Rao

Professor, President of Maaya Foundation and Clinical Director, Centre for Craniofacial Anomalies, University of Karnataka, India

Alexander D Rapidis

Eastman Dental Institute, University College London, University of London, UK and Department of Head and Neck Surgery, Greek Anticancer Institute, Saint Savvas Hospital, Athens, Greece

N Ravindranathan

Department of Maxillo Facial/Facial Plastic Surgery, RIPAS Hospital, Brunei, Darussalam

Eduardo D Rodriguez

Plastic and Reconstructive Surgery, University of Maryland School of Medicine, Baltimore, MD, USA

Henning Schliephake

Department of Oral Maxillofacial Surgery, University Medicine Göttingen, George Augusta University, Göttingen, Germany

Andrew J Sidebottom

Queens Medical Centre, Nottingham, UK

Miller H Smith

Oral and Maxillofacial Surgery, University of Michigan, Ann Arbor, MI, USA

Helen Spencer

Queen Alexandra Hospital, Portsmouth, UK

Leo Stassen

Maxillofacial Unit, St James' Hospital, Dublin, Eire

Paul JW Stoelinga

Former Head of Department of Oral and Maxillofacial Surgery, Radboud University, Medical Center, Nijmegen, The Netherlands

James Swift

University of Minnesota, Minneapolis, MN, USA

Andrew BG Tay

Department of Oral and Maxillofacial Surgery, National Dental Centre, Singapore

Nirav Pravin Trivedi

Consultant, Department of Head Neck Surgery, Mazumdar Shaw Cancer Center & NH, Bangalore, India

David A Walker

Hospital for Sick Children, Faculty of Dentistry, University of Toronto, Toronto, Canada

Gary Warburton

University of Maryland Medical Center, Baltimore, MD, USA

Peter Ward Booth

Honorary Consultant, Queen Victoria Hospital, East Grinstead, UK

Michael Williams

Eastbourne District General Hospital, Eastbourne, UK

Julia A Woolgar

University of Liverpool, Liverpool and Royal Liverpool and Broadgreen University Hospitals NHS Trust, Liverpool, UK

Guang-yan Yu

Peking University School of Stomatology, Beijing, China

John Zuniga

University of Texas Southwestern Medical Centre, Division of Oral and Maxillofacial Surgery, Department of Surgery, Dallas, TX, USA

This page intentionally left blank