Copyrighted Material

Fourth Edition

Volume Five

Peter C. Neligan

Plastic Surgery

Breast

Volume Editor

Maurice Y. Nahabedian

ELSEVIER

Copyrighted Material

Fourth Edition

Plastic Surgery

Breast

Volume Five

Content Strategist: Belinda Kuhn

Content Development Specialists: Louise Cook, Sam Crowe, Alexandra Mortimer

e-products, Content Development Specialist: Kim Benson **Project Managers:** Anne Collett, Andrew Riley, Julie Taylor

Designer: Miles Hitchen

Illustration Managers: Karen Giacomucci, Amy Faith Heyden

Marketing Manager: Melissa Fogarty

 $\textbf{Video Liaison:} \ Will \ Schmitt$



Breast

Volume Five

Volume Editor

Maurice Y. Nahabedian

MD. FACS

Professor and Chief

Section of Plastic Surgery

MedStar Washington Hospital Center

Washington DC, USA;

Vice Chairman

Department of Plastic Surgery

MedStar Georgetown University Hospital

Washington DC, USA

Editor-in-Chief

Peter C. Neligan

MB, FRCS(I), FRCSC, FACS

Professor of Surgery

Department of Surgery, Division of Plastic Surgery

University of Washington

Seattle, WA, USA

Multimedia Editor

Daniel Z. Liu

MD

Plastic and Reconstructive Surgeon Cancer Treatment Centers of America at Midwestern Regional Medical Center Zion, IL, USA

For additional online figures, videos and video lectures visit Expertconsult.com

ELSEVIER

© 2018, Elsevier Inc. All rights reserved.

First edition 1990 Second edition 2006 Third edition 2013 Fourth edition 2018

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).

Venkat V. Ramakrishnan and Nakul G. Patel retain copyright to their photographs and videos.

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.

Volume 5 ISBN: 978-0-323-35709-8 Volume 5 Ebook ISBN: 978-0-323-35710-4 6 volume set ISBN: 978-0-323-35630-5



your source for books, journals and multimedia in the health sciences

www.elsevierhealth.com



publisher's policy is to use paper manufactured from sustainable forests

Video Contents



Volume One:

Chapter 15: Skin graft

15.1: Harvesting a split-thickness skin graft Dennis P. Orgill

Chapter 34: Robotics in plastic surgery

34.1: Robotic microsurgery

34.2: Robotic rectus abdominis muscle flap harvest

34.3: Trans-oral robotic surgery

34.4: Robotic latissimus dorsi muscle harvest

34.5: Robotic lymphovenous bypass

Jesse C. Selber

Volume Two:

Chapter 6.2: Facelift: Principles of and surgical approaches to facelift

6.2.1: Parotid masseteric fascia

6.2.2: Anterior incision

6.2.3: Posterior incision

6.2.4: Facelift skin flap

6.2.5: Facial fat injection

Richard J. Warren

6.2.6: Anthropometry, cephalometry, and orthognathic surgery Jonathon S. Jacobs, Jordan M. S. Jacobs, and Daniel I. Taub

Chapter 6.3: Facelift: Platysma-SMAS plication

6.3.1: Platysma-SMAS plication

Dai M. Davies and Miles G. Berry

Chapter 6.4: Facelift: Facial rejuvenation with loop sutures – the MACS lift and its derivatives

6.4.1: Loop sutures MACS facelift

Patrick L. Tonnard

From Aston SJ, Steinbrech DS, Walden JL, eds. Aesthetic Plastic Surgery, Saunders Elsevier; 2009; with permission from Elsevier

Chapter 6.7: Facelift: SMAS with skin attached – the "high SMAS" technique

6.7.1: The high SMAS technique with septal reset

Fritz E. Barton Jr.

© Fritz E. Barton Jr.

Chapter 6.8: Facelift: Subperiosteal midface lift

6.8.1: Subperiosteal midface lift: Endoscopic temporo-midface Oscar M. Ramirez

Chapter 9: Blepharoplasty

9.1: Periorbital rejuvenation

Julius Few Jr. and Marco Ellis © Julius Few Jr.

Chapter 11: Asian facial cosmetic surgery

1.1: Medial epicanthoplasty

11.2: Eyelidplasty: Non-incisional method

11.3: Rhinoplasty

11.4: Subclinical ptosis correction (total)

11.5: Secondary rhinoplasty: Septal extension graft and costal

cartilage strut fixed with K-wire

Kyung S. Koh, Jong Woo Choi, and Clyde H. Ishii

Chapter 12: Neck rejuvenation

12.1: Anterior lipectomy

James E. Zins, Colin M. Morrison, and C. J. Langevin

Chapter 13: Structural fat grafting

13.1: Structural fat grafting of the face

Sydney R. Coleman and Alesia P. Saboeiro

Chapter 14: Skeletal augmentation

14.1: Chin implant

Michael J. Yarumchuk

© Mesa J, Havlik R, Mackay D, Buchman S, Losee J, eds. Atlas of Operative Craniofacial Surgery, CRC Press, 2019.

14.2: Mandibular angle implant

14.3: Midface skeletal augmentation and rejuvenation

Michael J. Yarumchuk

© Michael J. Yaremchuk

Chapter 16: Open technique rhinoplasty

16.1: Open technique rhinoplasty

Allen L. Van Beek

Chapter 20: Otoplasty and ear reduction

20.1: Setback otoplasty

Leila Kasrai

Chapter 23: Abdominoplasty procedures

23.1: Abdominoplasty

Dirk F. Richter and Alexander Stoff

Chapter 24: Lipoabdominoplasty

24.1: Lipoabdominoplasty (including secondary lipo)

Osvaldo Saldanha, Sérgio Fernando Dantas de Azevedo, Osvaldo Ribeiro Saldanha Filho, Cristianna Bonnetto Saldanha, and Luis Humberto Uribe Morelli

Chapter 26.2: Buttock augmentation: Buttock augmentation with implants

26.2.1: Buttock augmentation

Terrence W. Bruner, Jose Abel De la Peña Salcedo, Constantino G. Mendieta, and Thomas L. Roberts III

Chapter 27: Upper limb contouring

27.1: Brachioplasty

27.2: Upper limb contouring

Joseph F. Capella, Matthew J. Trovato, and Scott Woehrle

Chapter 28: Post-bariatric reconstruction

28.1: Post-bariatric reconstruction – bodylift procedure *J. Peter Rubin and Jonathan W. Toy* © *J. Peter Rubin*

Volume Three:

Chapter 6: Aesthetic nasal reconstruction

6.1: The three-stage folded forehead flap for cover and lining6.2: First-stage transfer and intermediate operationFrederick J. Menick

Chapter 7: Auricular construction

7.1: Total auricular construction *Akira Yamada*

Chapter 8: Acquired cranial and facial bone deformities

8.1: Removal of venous malformation enveloping intraconal optic nerve

Renee M. Burke, Robert J. Morin, and S. Anthony Wolfe

Chapter 13: Facial paralysis

13.1: Facial paralysis Eyal Gur

13.2: Facial paralysis

13.3: Cross facial nerve graft

13.4: Gracilis harvest

Peter C. Neligan

Chapter 14: Pharyngeal and esophageal reconstruction

14.1: Reconstruction of pharyngoesophageal defects with the anterolateral thigh flap *Peirong Yu*

Chapter 15: Tumors of the facial skeleton: Fibrous dysplasia

15.1: Surgical approaches to the facial skeleton Yu-Ray Chen, You-Wei Cheong, and Alberto Córdova-Aguilar

Chapter 17: Local flaps for facial coverage

17.1: Facial artery perforator flap
17.2: Local flaps for facial coverage

Peter C. Neligan

Chapter 21.2: Rotation advancement cheiloplasty

21.2.1: Repair of unilateral cleft lip

Philip Kuo-Ting Chen, M. Samuel Noordhoff, Frank Chun-Shin, Chang, and Fuan Chiang Chan

21.2.2: Unilateral cleft lip repair – anatomic subunit approximation technique David M. Fisher

Chapter 24: Alveolar clefts

24.1: Unilateral cleft alveolar bone graft

24.2: Mobilized premaxilla after vomer osteotomy prior to setback and splint application

Richard A. Hopper and Gerhard S. Mundinger

Chapter 26: Velopharyngeal dysfunction

26.1: Velopharyngeal incompetence - 1

26.2: Velopharyngeal incompetence – 2

26.3: Velopharyngeal incompetence – 3

Richard E. Kirschner and Adriane L. Baylis

Chapter 27: Secondary deformities of the cleft lip, nose, and palate

27.1: Abbé flap

27.2: Alveolar bone grafting

27.3: Complete takedown

27.4: Definitive rhinoplasty

Evan M. Feldman, John C. Koshy, Larry H. Hollier Jr., and Samuel Stal

27.5: Thick lip and buccal sulcus deformities

Evan M. Feldman and John C. Koshy

Chapter 36: Pierre Robin Sequence

36.1: Mandibular distraction *Arun K. Gosain and Chad A. Pumell*

Chapter 39: Vascular anomalies

39.1: Lip hemangioma *Arin K. Greene*

Chapter 43: Reconstruction of urogenital defects: Congenital

43.1: First-stage hypospadias repair with free inner preputial graft

43.2: Second-stage hypospadias repair with tunica vaginalis flap

Mohan S. Gundeti and Michael C. Large

Volume Four:

Chapter 2: Management of lower extremity trauma

2.1: Anterolateral thigh flap harvest Michel Saint-Cyr

Chapter 3: Lymphatic reconstruction of the extremities

3.1: End-to-side lymphovenous bypass technique

© Cheng M-H, Chang D, Patel K. Principles and Practice of Lymphedema Surgery, Elsevier; 2015.

3.2: Recipient site preparation for vascularized lymph node transfer – axilla

© Cheng M-H, Chang D, Patel K. Principles and Practice of Lymphedema Surgery, Elsevier; 2015.

3.3: Indocyanine green lymphography *David W. Chang*

3.4: Charles procedure

Peter C. Neligan

Chapter 6: Diagnosis and treatment of painful neuroma and nerve compression in the lower extremity

6.1: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity 1

6.2: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity 2

6.3: Diagnosis and treatment of painful neuroma and of nerve compression in the lower extremity 3

A. Lee Dellon

Chapter 7: Skeletal reconstruction

7.1: Medial femoral condyle/medial geniculate artery osteocutaneous free flap dissection for scaphoid nonunion Stephen J. Kovach III and L. Scott Levin

Chapter 10: Reconstruction of the chest

10.1: Sternal rigid fixation

David H. Song and Michelle C. Roughton

Chapter 12: Abdominal wall reconstruction

12.1: Component separation innovation *Peter C. Neligan*

Chapter 13: Reconstruction of male genital defects

13.1: Complete and partial penile reconstruction Stan Monstrey, Peter Ceulemans, Nathalie Roche, Philippe Houtmeyers, Nicolas Lumen, and Piet Hoebeke

Volume Five:

Chapter 6: Mastopexy options and techniques

6.1: Circumareolar mastopexy Kenneth C. Shestak

Chapter 7: One- and two-stage considerations for augmentation mastopexy

7.1: Preoperative markings for a single-stage augmentation mastopexy

W. Grant Stevens

Chapter 10: Reduction mammaplasty with short scar techniques

10.1: SPAIR technique Dennis C. Hammond

Chapter 11: Gynecomastia surgery

11.1: Ultrasound-assisted liposuctionCharles M. Malata

Chapter 15: One- and two-stage prosthetic reconstruction in nipple-sparing mastectomy

15.1: Pectoralis muscle elevation

15.2: Acellular dermal matrix

15.3: Sizer

Amy S. Colwell

Chapter 16: Skin-sparing mastectomy: Planned two-stage and direct-to-implant breast reconstruction

16.1: Mastectomy and expander insertion: First stage **16.2:** Mastectomy and expander insertion: Second stage Maurizio B. Nava, Giuseppe Catanuto, Angela Pennati, Valentina Visintini Cividin, and Andrea Spano

Chapter 19: Latissimus dorsi flap breast reconstruction

19.1: Latissimus dorsi flap technique $Scott L. Spear^{\dagger}$

19.2: Markings

19.3: Intraoperative skin paddles

19.4: Tendon division

19.5: Transposition and skin paddles

19.6: Inset and better skin paddle explanation

Neil A. Fine and Michael S. Gart

Chapter 20.2: The deep inferior epigastric artery perforator (DIEAP) flap

20.2.1: The Deep Inferior Epigastric Artery Perforator (DIEAP) flap breast reconstruction

Phillip N. Blondeel and Robert J. Allen, Sr.

Chapter 21.2: Gluteal free flaps for breast reconstruction

21.2.1: Superior Gluteal Artery Perforator (SGAP) flap 21.2.2: Inferior Gluteal Artery Perforator (IGAP) flap Peter C. Neligan

Chapter 21.3: Medial thigh flaps for breast reconstruction

21.3.1: Transverse Upper Gracilis (TUG) flap 1 Peter C. Neligan

21.3.2: Transverse Upper Gracilis (TUG) flap 2 Venkat V. Ramakrishnan

Chapter 23.2: Partial breast reconstruction using reduction and mastopexy techniques

23.2.1: Partial breast reconstruction using reduction mammoplasty

Maurice Y. Nahabedian

23.2.2: Partial breast reconstruction with a latissimus dorsi flap Neil A. Fine

23.2.3: Partial breast reconstruction with a pedicle TRAM *Maurice Y. Nahabedian*

Volume Six:

Chapter 1: Anatomy and biomechanics of the hand

1.1: The extensor tendon compartments

1.2: The contribution of the interosseous and lumbrical muscles to the lateral bands

1.3: Extrinsic flexors and surrounding vasculonervous elements, from superficial to deep

1.4: The lumbrical plus deformity

1.5: The sensory and motor branches of the median nerve in the hand

James Chang, Vincent R. Hentz, Robert A. Chase, and Anais Legrand

Chapter 2: Examination of the upper extremity

2.1: Flexor profundus test in a normal long finger

2.2: Flexor sublimis test in a normal long finger

2.3: Extensor pollicis longus test in a normal person

2.4: Test for the Extensor Digitorum Communis (EDC) muscle in a normal hand

2.5: Test for assessing thenar muscle function

2.6: The "cross fingers" sign

2.7: Static Two-Point Discrimination Test (s-2PD Test)

2.8: Moving 2PD Test (m-2PD Test) performed on the radial or ulnar aspect of the finger

2.9: Semmes–Weinstein monofilament test: The patient should sense the pressure produced by bending the filament

2.10: Allen's test in a normal person

2.11: Digital Allen's test

2.12: Scaphoid shift test

2.13: Dynamic tenodesis effect in a normal hand

2.14: The milking test of the fingers and thumb in a normal

2.15: Eichhoff test

2.16: Adson test

2.17: Roos test

Rvosuke Kakinoki

Chapter 3: Diagnostic imaging of the hand and wrist

3.1: Scaphoid lunate dislocation

Alphonsus K. Chong and David M. K. Tan

3.2: Right wrist positive midcarpal catch up clunk Alphonsus K. Chong

Chapter 4: Anesthesia for upper extremity surgery

4.1: Supraclavicular block

Subhro K. Sen

Chapter 5: Principles of internal fixation as applied to the hand and wrist

5.1: Dynamic compression plating and lag screw technique Christopher Cox

5.2: Headless compression screw

5.3: Locking vs. non-locking plates

Jeffrey Yao and Jason R. Kang

Chapter 7: Hand fractures and joint injuries

7.1: Bennett reduction

7.2: Hemi-Hamate arthroplasty

Warren C. Hammert

Chapter 9: Flexor tendon injury and reconstruction

9.1: Zone II flexor tendon repair

9.2: Incision and feed tendon forward

9.3: Distal tendon exposure

9.4: Six-strand M-tang repair

9.5: Extension-flexion test - wide awake

Jin Bo Tang

Chapter 10: Extensor tendon injuries

10.1: Sagittal band reconstruction

10.2: Setting the tension in extensor indicis transfer

Chapter 11: Replantation and revascularization

11.1: Hand replantation

James Chang

Chapter 12: Reconstructive surgery of the mutilated hand

12.1: Debridement technique

James Chang

Chapter 13: Thumb reconstruction: Nonmicrosurgical techniques

13.1: Osteoplastic thumb reconstruction

13.2: First Dorsal Metacarpal Artery (FDMA) flap

Jeffrey B. Friedrich

Chapter 14: Thumb reconstruction: Microsurgical techniques

14.1: Trimmed great toe

14.2: Second toe for index finger

14.3: Combined second and third toe for metacarpal hand Nidal F. Al Deek

Chapter 19: Rheumatologic conditions of the hand and wrist

19.1: Extensor tendon rupture and end-side tendon transfer *James Chang*

19.2: Silicone metacarpophalangeal arthroplasty Kevin C. Chung and Evan Kowalski

Chapter 20: Osteoarthritis in the hand and wrist

20.1: Ligament reconstruction tendon interposition arthroplasty of the thumb carpometacarpal joint

James W. Fletcher

Chapter 21: The stiff hand and the spastic hand

21.1: Flexor pronator slide

David T. Netscher

Chapter 22: Ischemia of the hand

22.1: Radial artery sympathectomy

Hee Chang Ahn and Neil F. Jones

22.2: Interposition arterial graft and sympathectomy Hee Chang Ahn

Chapter 24: Nerve entrapment syndromes

24.1: The manual muscle testing algorithm

24.2: Scratch collapse test - carpal tunnel

Elisabet Hagert

24.3: Injection technique for carpal tunnel surgery

24.4: Wide awake carpal tunnel surgery

Donald Lalonde

24.5: Clinical exam and surgical technique – lacertus syndrome

Elisabet Hagert

24.6: Injection technique for cubital tunnel surgery

24.7: Wide awake cubital tunnel surgery

Donald Lalonde

24.8: Clinical exam and surgical technique – radial tunnel syndrome

24.9: Clinical exam and surgical technique – lateral intermuscular syndrome

24.10: Clinical exam and surgical technique – axillary nerve entrapment

Elisabet Hagert

24.11: Carpal tunnel and cubital tunnel releases in the same patient in one procedure with field sterility: Part 1 – local anesthetic injection for carpal tunnel

24.12: Carpal tunnel and cubital tunnel releases in the same patient in one procedure with field sterility: Part 2 – local anesthetic injection for cubital tunnel

Donald Lalonde and Michael Bezuhly

Chapter 25: Congenital hand I: Embryology, classification, and principles

25.1: Pediatric trigger thumb release

James Chang

Chapter 27: Congenital hand III: Thumb hypoplasia

27.1: Thumb hypoplasia

Joseph Upton III and Amir Taghinia

Chapter 30: Growth considerations in pediatric upper extremity trauma and reconstruction

30.1: Epiphyseal transplant harvesting technique *Marco Innocenti and Carla Baldrighi*

Chapter 31: Vascular anomalies of the upper extremity

31.1: Excision of venous malformationJoseph Upton III and Amir Taghinia

Chapter 32: Peripheral nerve injuries of the upper extremity

32.1: Suture repair of the cut digital nerve

32.2: Suture repair of the median nerve

Simon Famebo and Johan Thorfinn

Chapter 35: Free-functioning muscle transfer in the upper extremity

35.1: Gracilis functional muscle harvest Gregory H. Borschel

Chapter 36: Brachial plexus injuries: Adult and pediatric

36.1: Pediatric: shoulder correct and biceps-to-triceps transfer with preserving intact brachialis

36.2: Adult: results of one-stage surgery for C5 rupture, C6-T1 root avulsion 10 years after

36.3: Nerve transfer results 1

36.4: Nerve transfer results 2

36.5: Nerve transfer results 3

36.6: Nerve transfer results 4

36.7: Nerve transfer results 5

David Chwei-Chin Chuana

Chapter 37: Restoration of upper extremity function in tetraplegia

37.1: The single-stage grip and release procedure

37.2: Postoperative results after single-stage grip release procedure in OCu3–5 patients

Carina Reinholdt and Catherine Curtin

Chapter 38: Upper extremity vascularized composite allotransplantation

38.1: Upper extremity composite tissue allotransplantation *W. P. Andrew Lee and Vijay S. Gorantla*

Chapter 39: Hand therapy

39.1: Goniometric measurement

39.2: Threshold testing

Christine B. Novak and Rebecca L. Neiduski



Lecture Video Contents

Volume One:

Chapter 1: Plastic surgery and innovation in medicine

Plastic surgery and innovation in medicine

Peter C. Neligan

Chapter 7: Digital imaging in plastic surgery

Digital imaging in plastic surgery

Daniel Z. Liu

Chapter 15: Skin graft

Skin graft

Peter C. Neligan

Chapter 19: Repair and grafting of peripheral nerve

Nerve injury and repair

Kirsty Usher Boyd, Andrew Yee, and Susan E. Mackinnon

Chapter 20: Reconstructive fat grafting

Reconstructive fat grafting

J. Peter Rubin

Chapter 21: Vascular territories

Vascular territories

Steven F. Morris

Chapter 22: Flap classification and applications

Flap classification and applications

Joon Pio Hong

Chapter 23: Flap pathophysiology and pharmacology

Flap pathophysiology and pharmacology

Cho Y. Pang and Peter C. Neligan

Chapter 24: Principles and techniques of microvascular surgery

Principles and techniques of microvascular surgery

Fu-Chan Wei, Nidal F. Al Deek, and Sherilyn Keng Lin Tay

Chapter 25: Principles and applications of tissue expansion

Principles and applications of tissue expansion

Ivo Alexander Pestana, Louis C. Argenta, and Malcolm W. Marks

Chapter 26: Principles of radiation

Therapeutic radiation: principles, effects, and complications

Gabrielle M. Kane

Chapter 28: Benign and malignant nonmelanocytic tumors of the skin and soft tissue

Benign and malignant nonmelanocytic tumors of the skin and soft tissue

Rei Ogawa

Chapter 31: Facial prosthetics in plastic surgery

Facial prosthetics in plastic surgery

Gordon H. Wilkes

Volume Two:

Chapter 4: Skincare and nonsurgical skin rejuvenation

Skincare and nonsurgical skin rejuvenation

Leslie Baumann and Edmund Weisberg

Chapter 5.2: Injectables and resurfacing techniques: Soft-tissue fillers

Soft-tissue fillers

Trevor M. Born, Lisa E. Airan, and Daniel Suissa

Chapter 5.3: Injectables and resurfacing techniques: Botulinum toxin (BoNT-A)

Botulinum toxin

Michael A. C. Kane

Chapter 5.4: Injectables and resurfacing techniques: Laser resurfacing

Laser resurfacing

Steven R. Cohen, Ahmad N. Saad, Tracy Leong, and E. Victor Ross

Chapter 5.5: Injectables and resurfacing techniques: Chemical peels

Chemical peels

Suzan Obagi

Chapter 6.1: Facelift: Facial anatomy and aging

Anatomy of the aging face

Brvan Mendelson and Chin-Ho Wong

Chapter 6.2: Facelift: Principles of and surgical approaches to facelift

Principles of and surgical approaches to facelift

Richard J. Warren

Chapter 6.3: Facelift: Platysma-SMAS plication

Platysma-SMAS plication

Miles G. Berry

Chapter 6.4: Facelift: Facial rejuvenation with loop sutures – the MACS lift and its derivatives

Facial rejuvenation with loop sutures – the MACS lift and its derivatives

Mark Laurence Jewell

Chapter 6.5: Facelift: Lateral SMASectomy facelift

Lateral SMASectomy facelift

Daniel C. Baker and Steven M. Levine

Chapter 6.6: Facelift: The extended SMAS technique in facial rejuvenation

The extended SMAS technique in facelift

James M. Stuzin

Chapter 6.7: Facelift: SMAS with skin attached – the "high SMAS" technique

SMAS with skin attached - the high SMAS technique

Fritz E. Barton Jr.

Chapter 6.8: Facelift: Subperiosteal midface lift

Subperiosteal midface lift

Alan Yan and Michael J. Yaremchuk

Chapter 6.9: Facelift: Male facelift

Male facelift

Timothy J. Marten and Dino Elyassnia

Chapter 6.10: Facelift: Secondary deformities and the secondary facelift

Secondary deformities and the secondary facelift

Timothy J. Marten and Dino Elyassnia

Chapter 7: Forehead rejuvenation

Forehead rejuvenation

Richard J. Warren

Chapter 8: Endoscopic brow lifting

Endoscopic brow lift

Renato Saltz and Alyssa Lolofie

Chapter 9: Blepharoplasty

Blepharoplasty

Julius Few Jr. and Marco Ellis

Chapter 11: Asian facial cosmetic surgery

Asian facial cosmetic surgery

Clyde H. Ishii

Chapter 12: Neck rejuvenation

Neck rejuvenation

James E. Zins, Joshua T. Waltzman, and Rafael A. Couto

Chapter 13: Structural fat grafting

Structural fat grafting

Sydney R. Coleman and Alesia P. Saboeiro

Chapter 15: Nasal analysis and anatomy

Nasal analysis and anatomy

Rod J. Rohrich

Chapter 19: Secondary rhinoplasty

Secondary rhinoplasty

Ronald P. Gruber, Simeon H. Wall Jr., David L. Kaufman, and David M. Kahn

Chapter 21: Hair restoration

Hair restoration

Jack Fisher

Chapter 22.1: Liposuction: A comprehensive review of techniques and safety

Liposuction

Phillip J. Stephan, Phillip Dauwe, and Jeffrey Kenkel

Chapter 22.2: Correction of liposuction deformities with the SAFE liposuction technique

SAFE liposuction technique

Simeon H. Wall Jr. and Paul N. Afrooz

Chapter 23: Abdominoplasty procedures

Abdominoplasty

Dirk F. Richter and Nina Schwaiger

Chapter 25.2: Circumferential approaches to truncal contouring: Belt lipectomy

Belt lipectomy

Al S. Aly, Khalid Al-Zahrani, and Albert Cram

Chapter 25.3: Circumferential approaches to truncal contouring: The lower lipo-bodylift

Circumferential lower bodylift

Dirk F. Richter and Nina Schwaiger

Chapter 25.4: Circumferential approaches to truncal contouring: Autologous buttocks augmentation with purse string gluteoplasty

Purse string gluteoplasty

Joseph P. Hunstad and Nicholas A. Flugstad

Chapter 25.5: Circumferential approaches to truncal contouring: Lower bodylift with autologous gluteal flaps for augmentation and preservation of gluteal contour

Lower bodylift with gluteal flaps

Robert F. Centeno and Jazmina M. Gonzalez

Chapter 26.3: Buttock augmentation: Buttock shaping with fat grafting and liposuction

Buttock shaping with fat grafting and liposuction

Constantino G. Mendieta, Thomas L. Roberts III, and Terrence W. Bruner

Chapter 27: Upper limb contouring

Upper limb contouring

Joseph F. Capella, Matthew J. Trovato, and Scott Woehrle

Chapter 30: Aesthetic genital surgery

Aesthetic genital surgery

Gary J. Alter

Volume Three:

Chapter 10.3: Midface reconstruction: The M. D. Anderson approach

Midfacial reconstruction: The M. D. Anderson approach

Matthew M. Hanasono and Roman Skoracki

Chapter 12: Lip reconstruction

Lip reconstruction

Peter C. Neligan and Lawrence J. Gottlieb

Chapter 14: Pharyngeal and esophageal reconstruction

Pharyngoesophageal reconstruction

Peirona Yu

Chapter 15: Tumors of the facial skeleton: Fibrous dysplasia

Fibrous dysplasia

Alberto Córdova-Aguilar and Yu-Ray Chen

Chapter 17: Local flaps for facial coverage

Local flaps for facial coverage

David W. Mathes

Chapter 19: Facial transplant

Facial transplant

Michael Sosin and Eduardo D. Rodriguez

Chapter 32: Nonsyndromic craniosynostosis

Nonsyndromic craniosynostosis

Patrick A. Gerety, Jesse A. Taylor, and Scott P. Bartlett

Chapter 36: Pierre Robin Sequence

Pierre Robin sequence

Chad A. Purnell and Arun K. Gosain

Chapter 39: Vascular anomalies

Vascular anomalies

Arin K. Greene and John B. Mulliken

Volume Four:

Chapter 2: Management of lower extremity trauma

Management of lower extremity trauma

Yoo Joon Sur, Shannon M. Colohan, and Michel Saint-Cyr

Chapter 15: Surgery for gender identity disorder

Surgery for gender identity disorder

Loren S. Schechter

Chapter 16: Pressure sores

Pressure sores

Robert Kwon, Juan L. Rendon, and Jeffrey E. Janis

Chapter 17: Perineal reconstruction

Perineal reconstruction

Hakim K. Said and Otway Louie

Volume Five:

Chapter 5: Breast augmentation with autologous fat grafting

Breast augmentation with autologous fat grafting

E. Delay

Chapter 6: Mastopexy options and techniques

Mastopexy

Robert Cohen

Chapter 9: Reduction mammaplasty with inverted-T techniques

Reduction mammaplasty with inverted-T techniques

Maurice Y. Nahabedian

Chapter 15: One- and two-stage prosthetic reconstruction in nipple-sparing mastectomy

Prosthetic reconstruction in nipple-sparing mastectomy

Amv S. Colwell

Chapter 20.1: Abdominally based free flaps: Introduction

Abdominally-based autologous breast reconstruction

Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.2: The deep inferior epigastric artery perforator (DIEAP) flap

Abdominally-based autologous breast reconstruction

Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.3: The superficial inferior epigastric artery (SIEA) flap

Abdominally-based autologous breast reconstruction

Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 20.4: The free TRAM flap

Abdominally-based autologous breast reconstruction

Maurice Y. Nahabedian, Phillip N. Blondeel, and David H. Song

Chapter 25: Radiation therapy considerations in the setting of breast reconstruction

Radiation therapy in breast reconstruction

Steven Kronowitz

Volume Six:

Chapter 7: Hand fractures and joint injuries

Hand fractures and joint injuries

Joseph S. Khouri and Warren C. Hammert

Chapter 13: Thumb reconstruction: Non-microsurgical techniques

Thumb reconstruction

Nicholas B. Vedder and Jeffrey B. Friedrich

Chapter 21: The stiff hand and the spastic hand

The stiff hand

David T. Netscher, Kenneth W. Donohue, and Dang T. Pham

Chapter 24: Nerve entrapment syndromes

Tips and pearls on common nerve compressions

Elisabet Hagert and Donald Lalonde

Chapter 30: Growth considerations in pediatric upper extremity trauma and reconstruction

Growth considerations in pediatric upper extremity trauma and reconstruction

Marco Innocenti and Carla Baldrighi

Chapter 33: Nerve transfers

Nerve injury and repair

Kirsty Usher Boyd, Andrew Yee, and Susan E. Mackinnon

Chapter 37: Restoration of upper extremity function in tetraplegia

Restoration of upper extremity function in tetraplegia

Carina Reinholdt and Catherine Curtin



Preface to the Fourth Edition

When I wrote the preface to the 3rd edition of this book, I remarked how honored and unexpectedly surprised I was to be the Editor of this great series. This time 'round, I'm equally grateful to carry this series forward. When Elsevier called me and suggested it was time to prepare the 4th edition, my initial reaction was that this was way too soon. What could possibly have changed in Plastic Surgery since the 3rd edition was launched in 2012? As it transpires, there have been many developments and I hope we have captured them in this edition.

We have an extraordinary specialty. A recent article by Chadra, Agarwal and Agarwal entitled "Redefining Plastic Surgery" appeared in *Plastic and Reconstructive Surgery—Global Open*. In it they gave the following definition: "Plastic surgery is a specialized branch of surgery, which deals with deformities, defects and abnormalities of the organs of perception, organs of action and the organs guarding the external passages, besides innovation, implantation, replantation and transplantation of tissues, and aims at restoring and improving their form, function and the esthetic appearances." This is an all-encompassing but very apt definition and captures the enormous scope of the specialty.¹

In the 3rd edition, I introduced volume editors for each of the areas of the specialty because the truth is that one person can no longer be an expert in all areas of this diverse specialty, and I'm certainly not. I think this worked well because the volume editors not only had the expertise to present their area of subspecialty in the best light, but they were tuned in to what was new and who was doing it. We have continued this model in this new edition. Four of the seven volume editors from the previous edition have again helped to bring the latest and the best to this edition: Drs Gurtner, Song, Rodriguez, Losee, and Chang have revised and updated their respective volumes with some chapters remaining, some extensively revised, some added, and some deleted. Dr. Peter Rubin has replaced Dr. Rick Warren to compile the Aesthetic volume (Vol. 2). Dr. Warren did a wonderful job in corralling this somewhat disparate, yet vitally important, part of our specialty into the Aesthetic volume in the 3rd edition but felt that the task of doing it again, though a labor of love, was more than he wanted to take on. Similarly, Dr. Jim Grotting who did a masterful job in the last edition on the Breast volume, decided that doing a major revision should be undertaken by someone with a fresh perspective and Dr. Maurice Nahabedian stepped into that breach. I hope you will like the changes you see in both of these volumes.

Dr. Allen Van Beek was the video editor for the last edition and he compiled an impressive array of movies to complement the text. This time around, we wanted to go a step further and though we've considerably expanded the list of videos accompanying the text (there are over 170), we also added the idea of lectures accompanying selected chapters. What we've done here is to take selected key chapters and include the images from that chapter, photos and artwork, and create a narrated presentation that is available online; there are annotations in the text to alert the reader that this is available. Dr. Daniel Liu, who has taken over from Dr. Van Beek as multimedia editor (rather than video editor) has done an amazing job in making all of this happen. There are over 70 presentations of various key chapters online, making it as easy as possible for you, the reader, to get as much knowledge as you can, in the easiest way possible from this edition. Many of these presentations have been done by the authors of the chapters; the rest have been compiled by Dr. Liu and myself from the content of the individual chapters. I hope you find them useful.

The reader may wonder how this all works. To plan this edition, the Elsevier team, headed by Belinda Kuhn, and I, convened a face-to-face meeting in San Francisco. The volume editors, as well as the London based editorial team, were present. We went through the 3rd edition, volume by volume, chapter by chapter, over an entire weekend. We decided what needed to stay, what needed to be added, what needed to be revised, and what needed to be changed. We also decided who should write the various chapters, keeping many existing authors, replacing others, and adding some new ones; we did this so as to really reflect the changes occurring within the specialty. We also decided on practical changes that needed to be made. As an example, you will notice that we have omitted the complete index for the 6 Volume set from Volumes 2-6 and highlighted only the table of contents for that particular volume. The complete index is of course available in Volume 1 and fully searchable online. This allowed us to save several hundred pages per volume, reducing production costs and diverting those dollars to the production of the enhanced online content.

In my travels around the world since the 3rd edition was published, I've been struck by what an impact this publication has had on the specialty and, more particularly, on training. Everywhere I go, I'm told how the text is an important part of didactic teaching and a font of knowledge. It is gratifying to see that the 3rd edition has been translated into Portuguese, Spanish, and Chinese. This is enormously encouraging. I hope this 4th edition continues to contribute to the specialty, remains a resource for practicing surgeons, and continues to prepare our trainees for their future careers in Plastic Surgery.

Peter C. Neligan Seattle, WA September, 2017

List of Editors





Editor-in-Chief
Peter C. Neligan, MB, FRCS(I), FRCSC, FACS
Professor of Surgery
Department of Surgery, Division of Plastic Surgery
University of Washington
Seattle, WA, USA



Volume 4: Lower Extremity, Trunk, and Burns David H. Song, MD, MBA, FACS
Regional Chief, MedStar Health
Plastic and Reconstructive Surgery
Professor and Chairman
Department of Plastic Surgery
Georgetown University School of Medicine
Washington, DC, USA



Volume 1: Principles Geoffrey C. Gurtner, MD, FACS Johnson and Johnson Distinguished Professor of Surgery and Vice Chairman, Department of Surgery (Plastic Surgery) Stanford University Stanford, CA, USA



Volume 5: Breast Maurice Y. Nahabedian, MD, FACS Professor and Chief Section of Plastic Surgery MedStar Washington Hospital Center Washington, DC, USA; Vice Chairman Department of Plastic Surgery MedStar Georgetown University Hospital Washington, DC, USA



Volume 2: Aesthetic
J. Peter Rubin, MD, FACS
UPMC Professor of Plastic Surgery
Chair, Department of Plastic Surgery
Professor of Bioengineering
University of Pittsburgh
Pittsburgh, PA, USA



Volume 6: Hand and Upper Extremity
James Chang, MD
Johnson & Johnson Distinguished
Professor and Chief
Division of Plastic and Reconstructive Surgery
Stanford University Medical Center
Stanford, CA, USA



Volume 3: Craniofacial, Head and Neck Surgery Eduardo D. Rodriguez, MD, DDS

Helen L. Kimmel Professor of Reconstructive
Plastic Surgery
Chair, Hansjörg Wyss Department of Plastic
Surgery
NYU School of Medicine
NYU Langone Medical Center
New York, NY, USA



Multimedia editor
Daniel Z. Liu, MD
Plastic and Reconstructive Surgeon
Cancer Treatment Centers of America at Midwestern Regional Medical Center
Zion, IL, USA



Volume 3: Pediatric Plastic Surgery
Joseph E. Losee, MD
Ross H. Musgrave Professor of Pediatric Plastic
Surgery
Department of Plastic Surgery
University of Pittsburgh Medical Center;
Chief Division of Pediatric Plastic Surgery
Children's Hospital of Pittsburgh
Pittsburgh, PA, USA



List of Contributors

The editors would like to acknowledge and offer grateful thanks for the input of all previous editions' contributors, without whom this new edition would not have been possible.

VOLUME ONE

Hatem Abou-Sayed, MD, MBA

Vice President Physician Engagement Interpreta, Inc. San Diego, CA, USA

Paul N. Afrooz, MD

Resident

Plastic and Reconstructive Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Claudia R. Albornoz, MD, MSc

Research Fellow Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Nidal F. Al Deek, MD

Doctor of Plastic and Reconstructive Surgery Chang Gung Memorial Hospital Taipei, Taiwan

Amy K. Alderman, MD, MPH

Private Practice Atlanta, GA, USA

Louis C. Argenta, MD

Professor of Plastic and Reconstructive Surgery Department of Plastic Surgery Wake Forest Medical Center Winston Salem, NC, USA

Stephan Ariyan, MD, MBA

Emeritus Frank F. Kanthak Professor of Surgery, Plastic Surgery, Surgical Oncology, Otolaryngology Yale University School of Medicine; Associate Chief Department of Surgery; Founding Director, Melanoma Program Smilow Cancer Hospital, Yale Cancer Center

Tomer Avraham, MD

New Haven, CT, USA

Attending Plastic Surgeon Mount Sinai Health System Tufts University School of Medicine New York, NY, USA

Aaron Berger, MD, PhD

Clinical Assistant Professor Division of Plastic Surgery Florida International University School of Medicine Miami, FL, USA

Kirsty Usher Boyd, MD, FRCSC

Assistant Professor Surgery (Plastics) Division of Plastic and Reconstructive Surgery University of Ottawa Ottawa, Ontario, Canada

Charles E. Butler, MD, FACS

Professor and Chairman Department of Plastic Surgery Charles B. Barker Endowed Chair in Surgery The University of Texas MD Anderson Cancer Center Houston, TX, USA

Peter E. M. Butler, MD, FRCSI, FRCS, FRCS(Plast)

Professor Plastic and Reconstructive Surgery University College and Royal Free London London, UK

Yilin Cao, MD, PhD

Professor Shanghai Ninth People's Hospital Shanghai Jiao Tong University School of Medicine Shanghai, China

Franklyn P. Cladis, MD, FAAP

Associate Professor of Anesthesiology Department of Anesthesiology The Children's Hospital of Pittsburgh of UPMC Pittsburgh, PA, USA

Mark B. Constantian, MD

Private Practice Surgery (Plastic Surgery) St. Joseph Hospital Nashua, NH, USA

Daniel A. Cuzzone, MD

Plastic Surgery Fellow Hanjörg Wyss Department of Plastic Surgery New York University Medical Center New York, NY, USA

Gurleen Dhami, MD

Chief Resident Department of Radiation Oncology University of Washington Seattle, WA, USA

Gayle Gordillo, MD

Associate Professor Plastic Surgery The Ohio State University Columbus, OH, USA

Geoffrey C. Gurtner, MD, FACS

Johnson and Johnson Distinguished Professor of Surgery and Vice Chairman, Department of Surgery (Plastic Surgery) Stanford University Stanford, CA, USA

Phillip C. Haeck, MD

Surgeon Plastic Surgery The Polyclinic Seattle, WA, USA

The late Bruce Halperin[†], MD

Formerly Adjunct Associate Professor of Anesthesia Department of Anesthesia Stanford University Stanford, CA, USA

Daniel E. Heath

Lecturer School of Chemical and Biomedical Engineering University of Melbourne Parkville, Victoria, Australia

Joon Pio Hong, MD, PhD, MMM

Professor Plastic Surgery Asan Medical Center, University of Ulsan Seoul, South Korea

Michael S. Hu, MD, MPH, MS

Postdoctoral Fellow Division of Plastic Surgery Department of Surgery Stanford University School of Medicine Stanford, CA, USA

C. Scott Hultman, MD, MBA

Professor and Chief Division of Plastic and Reconstructive Surgery University of North Carolina Chapel Hill, NC, USA

Amir E. Ibrahim

Division of Plastic Surgery
Department of Surgery
American University of Beirut Medical Center
Beirut, Lebanon

Leila Jazayeri, MD

Microsurgery Fellow Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Brian Jeffers

Student Bioengineering University of California Berkeley Berkeley, CA USA

Lynn Jeffers, MD, FACS

Private Practice Oxnard, CA, USA

Mohammed M. Al Kahtani, MD, FRCSC

Clinical Fellow Division of Plastic Surgery Department of Surgery University of Alberta Edmonton, Alberta, Canada

Gabrielle M. Kane, MB, BCh, EdD, FRCPC

Associate Professor Radiation Oncology University of Washington Seattle, WA, USA

Raghu P. Kataru, PhD

Senior Research Scientist Memorial Sloan-Kettering Cancer Center New York, NY, USA

Carolyn L. Kerrigan, MD, MSc, MHCDS

Professor of Surgery Surgery Dartmouth-Hitchcock Medical Center Lebanon, NH, USA

Timothy W. King, MD, PhD, FAAP, FACS

Associate Professor with Tenure Departments of Surgery and Biomedical Engineering;

Director of Research, Division of Plastic Surgery University of Alabama at Birmingham (UAB) Craniofacial and Pediatric Plastic Surgery Children's of Alabama – Plastic Surgery; Chief, Plastic Surgery Section Birmingham VA Hospital Birmingham, AL, USA

Brian M. Kinney, MD, FACS, MSME

Clinical Assistant Professor of Plastic Surgery University of Southern California School of Medicine Los Angeles, CA, USA

W. P. Andrew Lee, MD

The Milton T. Edgerton MD, Professor and Chairman

Department of Plastic and Reconstructive Surgery

Johns Hopkins University School of Medicine Baltimore, MD, USA

Sherilyn Keng Lin Tay, MBChB, MSc, FRCS(Plast)

Consultant Plastic Surgeon Canniesburn Plastic Surgery Unit Glasgow Royal Infirmary Glasgow, UK

Daniel Z. Liu. MD

Plastic and Reconstructive Surgeon Cancer Treatment Centers of America at Midwestern Regional Medical Center Zion, IL, USA

Wei Liu, MD, PhD

Professor

Plastic and Reconstructive Surgery Shanghai Ninth People's Hospital Shanghai Jiao Tong University School of Medicine Shanghai, China

Michael T. Longaker, MD, MBA, FACS

Deane P. and Louise Mitchell Professor and Vice Chair

Department of Surgery Stanford University Stanford, CA, USA

H. Peter Lorenz, MD

Service Chief and Professor, Plastic Surgery Lucile Packard Children's Hospital Stanford University School of Medicine Stanford, CA, USA

Susan E. Mackinnon, MD

Sydney M. Shoenberg Jr. and Robert H. Shoenberg Professor
Department of Surgery, Division of Plastic and Reconstructive Surgery
Washington University School of Medicine
St. Louis, MO, USA

Malcolm W. Marks, MD

Professor and Chairman Department of Plastic Surgery Wake Forest University School of Medicine Winston-Salem, NC, USA

Diego Marre, MD

Fellow
O'Brien Institute
Department of Plastic and Reconstructive
Surgery
St. Vincent's Hospital
Melbourne, Australia

David W. Mathes, MD

Professor and Chief of the Division of Plastic and Reconstructive Surgery University of Colorado Aurora, CO, USA

Evan Matros MD, MMSc

Plastic Surgeon Memorial Sloan-Kettering Cancer Center New York, NY, USA

Isabella C. Mazzola, MD

Attending Plastic Surgeon Klinik für Plastische und Ästhetische Chirurgie Klinikum Landkreis Erding Erding, Germany

Riccardo F. Mazzola, MD

Plastic Surgeon Department of Specialistic Surgical Sciences Fondazione Ospedale Maggiore Policlinico, Ca' Granda IRCCS Milano, Italy

Lindsay D. McHutchion, MS, BSc

Anaplastologist Institute for Reconstructive Sciences in Medicine Edmonton, Alberta, Canada

Babak J. Mehrara. MD. FACS

Associate Member, Associate Professor of Surgery (Plastic) Memorial Sloan Kettering Cancer Center Weil Cornell University Medical Center New York, NY USA

Steven F. Morris, MD, MSc, FRCSC

Professor of Surgery Department of Surgery Dalhousie University Halifax, Nova Scotia, Canada

Professorial Fellow

Wayne A. Morrison, MBBS, MD, FRACS

O'Brien Institute
Department of Surgery, University of Melbourne
Department of Plastic and Reconstructive
Surgery, St. Vincent's Hospital
Melbourne, Australia

Peter C. Neligan, MB, FRCS(I), FRCSC, FACS

Professor of Surgery Department of Surgery, Division of Plastic Surgery University of Washington Seattle, WA, USA

Andrea J. O'Connor, BE(Hons), PhD

Associate Professor Department of Chemical and Biomolecular Engineering University of Melbourne Parkville, Victoria, Australia

Rei Ogawa, MD, PhD, FACS

Professor and Chief Department of Plastic Reconstructive and Aesthetic Surgery Nippon Medical School Tokyo, Japan

Dennis P. Orgill, MD, PhD

Professor of Surgery
Harvard Medical School
Medical Director, Wound Care Center;
Vice Chairman for Quality Improvement
Department of Surgery
Brigham and Women's Hospital
Boston, MA, USA

Cho Y. Pang. PhD

Senior Scientist
Research Institute
The Hospital for Sick Children;
Professor
Departments of Surgery/Physiology
University of Toronto
Toronto, Ontario, Canada

Ivo Alexander Pestana, MD, FACS

Associate Professor Plastic and Reconstructive Surgery Wake Forest University Winston Salem, NC, USA

Giorgio Pietramaggior, MD, PhD

Swiss Nerve Institute Clinique de La Source Lausanne, Switzerland

Andrea L. Pusic, MD, MHS, FACS

Associate Professor Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Russell R. Reid, MD, PhD

Associate Professor Surgery/Section of Plastic and Reconstructive Surgery University of Chicago Medicine Chicago, IL, USA

Neal R. Reisman, MD, JD

Chief Plastic Surgery Baylor St. Luke's Medical Center Houston, TX, USA

Joseph M. Rosen, MD

Professor of Surgery Plastic Surgery Dartmouth-Hitchcock Medical Center Lebanon, NH, USA

Sashwati Roy, MS, PhD

Associate Professor Surgery, Center for Regenerative Medicine and Cell based Therapies The Ohio State University Columbus, OH, USA

J. Peter Rubin, MD, FACS

UPMC Professor of Plastic Surgery Chair, Department of Plastic Surgery Professor of Bioengineering University of Pittsburgh Pittsburgh, PA, USA

Karim A. Sarhane, MD

Department of Surgery University of Toledo Medical Center Toledo, OH, USA

David B. Sarwer, PhD

Associate Professor of Psychology Departments of Psychiatry and Surgery University of Pennsylvania School of Medicine Philadelphia, PA, USA

Saia S. Scherer-Pietramaggiori, MD

Plastic and Reconstructive Surgeon Plastic Surgery University Hospital Lausanne Lausanne, Vaud, Switzerland

Iris A. Seitz, MD, PhD

Director of Research and International Collaboration University Plastic Surgery Rosalind Franklin University; Clinical Instructor of Surgery Chicago Medical School Chicago, IL, USA

Jesse C. Selber, MD, MPH, FACS

Associate Professor, Director of Clinical Research Department of Plastic Surgery MD Anderson Cancer Center Houston, TX, USA

Chandan K. Sen, PhD

Professor and Director Center for Regenerative Medicine and Cell-Based Therapies The Ohio State University Wexner Medical Center Columbus, OH, USA

Wesley N. Sivak, MD, PhD

Resident in Plastic Surgery Department of Plastic Surgery University of Pittsburgh Pittsburgh, PA, USA

M. Lucy Sudekum

Research Assistant Thayer School of Engineering at Dartmouth College Hanover, NH, USA

G. Ian Taylor, AO, MBBS, MD, MD(Hon Bordeaux), FRACS, FRCS(Eng), FRCS(Hon Edinburgh), FRCSI(Hon), FRSC(Hon Canada), FACS(Hon)

Professor
Department of Plastic Surgery
Royal Melbourne Hospital;
Professor
Department of Anatomy
University of Melbourne
Melbourne, Victoria, Australia

Chad M. Teven, MD

Resident Section of Plastic and Reconstructive Surgery University of Chicago Chicago, IL, USA

Ruth Tevlin, MB BAO BCh, MRCSI, MD

Resident in Surgery
Department of Plastic and Reconstructive
Surgery
Stanford University School of Medicine
Stanford, CA, USA

E. Dale Collins Vidal, MD, MS

Chief Section of Plastic Surgery Dartmouth–Hitchcock Medical Center Lebanon, NH, USA

Derrick C. Wan, MD

Associate Professor
Division of Plastic Surgery
Department of Surgery
Director of Maxillofacial Surgery
Lucile Packard Children's Hospital
Stanford University School of Medicine
Stanford, CA, USA

Renata V. Weber, MD

Assistant Professor Surgery (Plastics)
Division of Plastic and Reconstructive Surgery
Albert Einstein College of Medicine
Bronx, NY, USA

Fu-Chan Wei, MD

Professor Department of Plastic Surgery Chang Gung Memorial Hospital Taoyuan, Taiwan

Gordon H. Wilkes, BScMed, MD

Clinical Professor of Surgery
Department of Surgery University of Alberta
Institute for Reconstructive Sciences in Medicine
Misericordia Hospital
Edmonton, Alberta, Canada

Johan F. Wolfaardt, BDS, MDent(Prosthodontics), PhD

Professor
Division of Otolaryngology – Head and Neck
Surgery
Department of Surgery
Faculty of Medicine and Dentistry:

Director of Clinics and International Relations Institute for Reconstructive Sciences in Medicine University of Alberta Covenant Health Group

Alberta, Canada

Kiryu K. Yap, MBBS, BMedSc

Junior Surgical Trainee & PhD Candidate O'Brien Institute Department of Surgery, University of Melbourne Department of Plastic and Reconstructive Surgery, St. Vincent's Hospital Melbourne, Australia

Andrew Yee

Research Assistant Division of Plastic and Reconstructive Surgery Washington University School of Medicine St. Louis, MO, USA

Elizabeth R. Zielins, MD

Postdoctoral Research Fellow Surgery Stanford University School of Medicine Stanford, CA, USA

VOLUME TWO

Paul N. Afrooz, MD

Resident

Plastic and Reconstructive Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Jamil Ahmad, MD, FRCSC

Director of Research and Education The Plastic Surgery Clinic Mississauga; Assistant Professor Surgery University of Toronto Toronto, Ontario, Canada

Lisa E. Airan. MD

Aesthetic Dermatologist NYC
Private Practice;
Associate Clinical Professor Department of
Dermatology
Mount Sinai School of Medicine
New York, NY, USA

Gary J. Alter, MD

Assistant Clinical Professor Division of Plastic Surgery University of California Los Angeles, CA, USA

AI S. Aly, MD

Professor of Plastic Surgery Aesthetic and Plastic Surgery Institute University of California Irvine Orange, CA, USA

Khalid Al-Zahrani, MD, SSC-PLAST

Assistant Professor Consultant Plastic Surgeon King Khalid University Hospital King Saud University Riyadh, Saudi Arabia

Bryan Armijo, MD

Plastic Surgery Chief Resident Department of Plastic and Reconstructive Surgery Case Western Reserve/University Hospitals Cleveland, OH, USA

Daniel C. Baker, MD

Professor of Surgery Institute of Reconstructive Plastic Surgery New York University Medical Center Department of Plastic Surgery New York, NY, USA

Fritz E. Barton Jr., MD

Clinical Professor Department of Plastic Surgery UT Southwestern Medical Center Dallas, TX, USA

Leslie Baumann, MD

CEO

Baumann Cosmetic and Research Institute Miami, FL. USA

Miles G. Berry, MS, FRCS(Plast)

Consultant Plastic and Aesthetic Surgeon Institute of Cosmetic and Reconstructive Surgery London, UK

Trevor M. Born, MD

Division of Plastic Surgery
Lenox Hill/Manhattan Eye Ear and Throat
Hospital North Shore-LIJ Hospital
New York, NY, USA;
Clinical Lecturer
Division of Plastic Surgery
University of Toronto Western Division
Toronto, Ontario, Canada

Terrence W. Bruner, MD, MBA

Private Practice Greenville, SC, USA

Andrés F. Cánchica, MD

Chief Resident of Plastic Surgery Plastic Surgery Service Dr. Osvaldo Saldanha São Paulo, Brazil

Joseph F. Capella, MD

Medical Director

Chief Post-bariatric Body Contouring Division of Plastic Surgery Hackensack University Medical Center Hackensack, NJ, USA

Robert F. Centeno, MD, MBA

St. Croix Plastic Surgery and MediSpa; Chief Medical Quality Officer Governor Juan F. Luis Hospital and Medical Center Christiansted, Saint Croix, United States Virgin Islands

Ernest S. Chiu, MD, FACS

Associate Professor of Plastic Surgery Department of Plastic Surgery New York University New York, NY, USA

Jong Woo Choi, MD, PhD, MMM

Associate Professor Department of Plastic and Reconstructive Surgery Seoul Asan Medical Center Seoul, South Korea

Steven R. Cohen, MD

Senior Clinical Research Fellow, Clinical Professor Plastic Surgery University of California San Diego, CA; Director Craniofacial Surgery Rady Children's Hospital, Private Practice, FACES+ Plastic Surgery, Skin and Laser Center La Jolla, CA, USA

Sydney R. Coleman, MD

Assistant Clinical Professor Plastic Surgery New York University Medical Center New York; Assistant Clinical Professor Plastic Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Mark B. Constantian, MD

Private Practice
Surgery (Plastic Surgery)
St. Joseph Hospital
Nashua, NH, USA;
Adjunct Clinical Professor
Surgery (Plastic Surgery)
University of Wisconsin School of Medicine
Madison, WI, USA;
Visiting Professor
Plastic Surgery
University of Virginia Health System
Charlottesville, VA, USA

Rafael A. Couto, MD

Plastic Surgery Resident Department of Plastic Surgery Cleveland Clinic Cleveland, OH, USA

Albert Cram, MD

Professor Emeritus University of Iowa Iowa City Plastic Surgery Coralville, IO, USA

Phillip Dauwe, MD

Department of Plastic Surgery University of Texas Southwestern Medical School Dallas, TX, USA

Dai M. Davies, FRCS

Consultant and Institute Director Institute of Cosmetic and Reconstructive Surgery London, UK

Jose Abel De la Peña Salcedo, MD, FACS

Plastic Surgeon
Director
Instituto de Cirugia Plastica S.C.
Huixquilucan
Estado de Mexico, Mexico

Barry DiBernardo, MD, FACS

Clinical Associate Professor, Plastic Surgery Rutgers, New Jersey Medical School Director New Jersey Plastic Surgery Montclair, NJ, USA

Felmont F. Eaves III, MD, FACS

Professor of Surgery, Emory University Medical Director, Emory Aesthetic Center Medical Director, EAC Ambulatory Surgery Center Atlanta, GA, USA

Marco Ellis, MD

Director of Craniofacial Surgery Northwestern Specialists in Plastic Surgery; Adjunct Assistant Professor University of Illinois Chicago Medical Center Chicago, IL, USA

Dino Elyassnia, MD

Associate Plastic Surgeon Marten Clinic of Plastic Surgery San Francisco, CA, USA

Julius Few Jr., MD

Director

The Few Institute for Aesthetic Plastic Surgery; Clinical Professor Plastic Surgery University of Chicago Pritzker School of Medicine Chicago, IL, USA

Osvaldo Ribeiro Saldanha Filho, MD

Professor of Plastic Surgery Plastic Surgery Service Dr. Osvaldo Saldanha São Paulo, Brazil

Jack Fisher, MD

Associate Clinical Professor Plastic Surgery Vanderbilt University Nashville, TN, USA

Nicholas A. Flugstad, MD

Flugstad Plastic Surgery Bellevue, WA, USA

James D. Frame, MBBS, FRCS, FRCSEd, FRCS(Plast)

Professor of Aesthetic Plastic Surgery Anglia Ruskin University Chelmsford, UK

Jazmina M. Gonzalez, MD

Bitar Cosmetic Surgery Institute Fairfax, VA, USA

Richard J. Greco, MD

CEO

The Georgia Institute For Plastic Surgery Savannah, GA, USA

Ronald P. Gruber, MD

Adjunct Associate Clinical Professor Division of Plastic and Reconstructive Surgery Stanford University Stanford, CA Clinical Association Professor Division of Plastic and Reconstructive Surgery University of California San Francisco San Francisco, CA, USA

Bahman Guyuron, MD, FCVS

Editor in Chief, Aesthetic Plastic Surgery Journal Emeritus Professor of Plastic Surgery Case School of Medicine Cleveland, OH, USA

Joseph P. Hunstad, MD, FACS

Associate Consulting Professor Division of Plastic Surgery The University of North Carolina at Chapel Hill; Private Practice Huntersville/Charlotte, NC, USA

Clyde H. Ishii, MD, FACS

Assistant Clinical Professor of Surgery John A. Burns School of Medicine; Chief, Department of Plastic Surgery Shriners Hospital Honolulu Unit Honolulu, HI, USA

Nicole J. Jarrett, MD

Department of Plastic Surgery University of Pittsburgh Pittsburgh, PA, USA

Elizabeth B. Jelks, MD

Private Practice
Jelks Medical
New York, NY, USA

Glenn W. Jelks, MD

Associate Professor Department of Ophthalmology Department of Plastic Surgery New York University School of Medicine New York, NY, USA

Mark Laurence Jewell, MD

Assistant Clinical Professor Plastic Surgery Oregon Health Science University Portland, OR, USA

David M. Kahn, MD

Clinical Associate Professor of Plastic Surgery Department of Surgery Stanford University School of Medicine Stanford, CA, USA

Michael A. C. Kane, BS, MD

Attending Surgeon Plastic Surgery Manhattan Eye, Ear, and Throat Hospital New York, NY, USA

David L. Kaufman, MD, FACS

Private Practice Plastic Surgery Aesthetic Artistry Surgical and Medical Center Folsom, CA, USA

Jeffrey Kenkel, MD

Professor and Chairman Department of Plastic Surgery UT Southwestern Medical Center Dallas, TX, USA

Kyung S. Koh, MD, PhD

Professor of Plastic Surgery Asan Medical Center, University of Ulsan School of Medicine Seoul, South Korea

Tracy Leong, MD

Dermatology
Rady Children's Hospital - San Diego;
Sharp Memorial Hospital;
University California San Diego Medical Center
San Diego;
Private Practice, FACES+ Plastic Surgery, Skin
and Laser Center
La Jolla, CA, USA

Steven M. Levine, MD

Assistant Professor of Surgery (Plastic) Hofstra Medical School, Northwell Health, New York, NY, USA

Michelle B. Locke, MBChB, MD

Senior Lecturer in Surgery
Department of Surgery
University of Auckland Faculty of Medicine and
Health Sciences;
South Auckland Clinical Campus
Middlemore Hospital
Auckland, New Zealand

Alyssa Lolofie

University of Utah Salt Lake City, UT, USA

Timothy J. Marten, MD, FACS

Founder and Director Marten Clinic of Plastic Surgery San Francisco, CA, USA

Bryan Mendelson, FRCSE, FRACS, FACS

The Centre for Facial Plastic Surgery Toorak, Victoria, Australia

Constantino G. Mendieta, MD, FACS

Private Practice Miami, FL, USA

Drew B. Metcalfe, MD

Division of Plastic and Reconstructive Surgery Emory University Atlanta, GA, USA

Gabriele C. Miotto, MD

Emory School of Medicine Atlanta, GA, USA

Foad Nahai, MD

Professor of Surgery
Division of Plastic and Reconstructive Surgery
Department of Surgery
Emory University School of Medicine
Emory Aesthetic Center at Paces
Atlanta, Georgia, USA

Suzan Obagi, MD

Associate Professor of Dermatology Dermatology University of Pittsburgh; Associate Professor of Plastic Surgery Plastic Surgery University of Pittsburgh Pittsburgh, PA, USA

Sabina Aparecida Alvarez de Paiva, MD

Resident of Plastic Surgery Plastic Surgery Service Dr. Ewaldo Bolivar de Souza Pinto São Paulo, Brazil

Galen Perdikis, MD

Assistant Professor of Surgery Division of Plastic Surgery Emory University School of Medicine Atlanta, GA, USA

Jason Posner, MD, FACS

Private Practice Boca Raton, FL, USA

Dirk F. Richter, MD, PhD

Clinical Professor of Plastic Surgery University of Bonn Director and Chief Dreifaltigkeits-Hospital Wesseling, Germany

Thomas L. Roberts III. FACS

Plastic Surgery Center of the Carolinas Spartanburg, SC, USA

Jocelyn Celeste Ledezma Rodriguez, MD

Private Practice Guadalajara, Jalisco, Mexico

Rod J. Rohrich, MD

Clinical Professor and Founding Chair
Department of Plastic Surgery
Distinguished Teaching Professor
University of Texas Southwestern Medical Center
Founding Partner
Dallas Plastic Surgery Institute
Dallas. TX. USA

E. Victor Ross, MD

Director of Laser and Cosmetic Dermatology Scripps Clinic San Diego, CA, USA

J. Peter Rubin, MD, FACS

Chief

Plastic and Reconstructive Surgery University of Pittsburgh Medical Center; Associate Professor Department of Surgery University of Pittsburgh Pittsburgh, PA, USA

Ahmad N. Saad, MD

Private Practice FACES+ Plastic Surgery Skin and Laser Center La Jolla, CA, USA

Alesia P. Saboeiro, MD

Attending Physician Private Practice New York, NY, USA

Cristianna Bonnetto Saldanha, MD

Plastic Surgery Service Dr. Osvaldo Saldanha São Paulo, Brazil

Osvaldo Saldanha, MD, PhD

Director of Plastic Surgery Service Dr. Osvaldo Saldanha:

Professor of Plastic Surgery Department Universidade Metropolitana de Santos - UNIMES

São Paulo, Brazil

Plastic Surgery

Renato Saltz, MD, FACS

Saltz Plastic Surgery
President
International Society of Aesthetic Plastic Surgery
Adjunct Professor of Surgery

University of Utah
Past-President, American Society for Aesthetic

Salt Lake City and Park City, UT, USA

Paulo Rodamilans Sanjuan MD

Chief Resident of Plastic Surgery Plastic Surgery Service Dr. Ewaldo Boliar de Souza Pinto São Paulo, Brazil

Nina Schwaiger, MD

Senior Specialist in Plastic and Aesthetic Surgery Department of Plastic Surgery Dreifaltigkeits-Hospital Wesseling Wesseling, Germany

Douglas S. Steinbrech, MD, FACS

Gotham Plastic Surgery New York, NY, USA

Phillip J. Stephan, MD

Clinical Faculty
Plastic Surgery
UT Southwestern Medical School;
Plastic Surgeon
Texoma Plastic Surgery
Wichita Falls, TX, USA

David Gonzalez Sosa, MD

Plastic and Reconstructive Surgery Hospital Quirónsalud Torrevieja Alicante, Spain

James M. Stuzin, MD

Associate Professor of Surgery (Plastic) Voluntary University of Miami Leonard M. Miller School of Medicine Miami, FL, USA

Daniel Suissa, MD, MSc

Clinical Instructor Section of Plastic and Reconstructive Surgery Yale University New Haven, CT, USA

Charles H. Thorne, MD

Associate Professor of Plastic Surgery Department of Plastic Surgery NYU School of Medicine New York, NY, USA

Ali Totonchi, MD

Assistant Professor Plastic Surgery Case Western Reserve University; Medical Director Craniofacial Deformity Clinic Plastic Surgery MetroHealth Medical center Cleveland, OH, USA

Jonathan W. Toy, MD, FRCSC

Program Director, Plastic Surgery Residency Program Assistant Clinical Professor University of Alberta Edmonton, Alberta, Canada

Matthew J. Trovato, MD

Dallas Plastic Surgery Institute Dallas, TX, USA

Simeon H. Wall Jr., MD, FACS

Director

The Wall Center for Plastic Surgery; Assistant Clinical Professor Plastic Surgery LSU Health Sciences Center at Shreveport Shreveport, LA, USA

Joshua T. Waltzman, MD, MBA

Private Practice Waltzman Plastic and Reconstructive Surgery Long Beach, CA, USA

Richard J. Warren, MD, FRCSC

Clinical Professor Division of Plastic Surgery University of British Columbia Vancouver, British Columbia, Canada

Edmund Weisberg, MS, MBE

University of Pennsylvania Philadelphia, PA, USA

Scott Woehrle, MS BS

Physician Assistant Department of Plastic Surgery Jospeh Capella Plastic Surgery Ramsey, NJ, USA

Chin-Ho Wong, MBBS, MRCS, MMed(Surg), FAMS(Plast Surg)

W Aesthetic Plastic Surgery Mt Elizabeth Novena Specialist Center Singapore

Alan Yan, MD

Former Fellow Adult Reconstructive and Aesthetic Craniomaxillofacial Surgery Division of Plastic and Reconstructive Surgery Massachusetts General Hospital Boston, MA, USA

Michael J. Yaremchuk. MD

Chief of Craniofacial Surgery
Massachusetts General Hospital;
Clinical Professor of Surgery
Harvard Medical School;
Program Director
Harvard Plastic Surgery Residency Program
Boston, MA, USA

James E. Zins, MD

Chairman

Department of Plastic Surgery
Dermatology and Plastic Surgery Institute
Cleveland Clinic
Cleveland. OH. USA

VOLUME THREE

Neta Adler, MD

Senior Surgeon
Department of Plastic and Reconstructive
Surgery
Hadassah University Hospital
Jerusalem, Israel

Ahmed M. Afifi. MD

Assistant Professor of Plastic Surgery Department of Surgery University of Wisconsin Madison, WI, USA; Associate Professor Department of Plastic Surgery Cairo University Cairo, Egypt

Marta Alvarado, DDS, MS

Department of Orthodontics Facultad de Odontología Universidad de San Carlos de Guatemala Guatemala

Eric Arnaud, MD

Pediatric Neurosurgeon and Co-Director Unité de Chirurgie Craniofaciale Hôpital Necker Enfants Malades Paris, France

Stephen B. Baker, MD, DDS

Associate Professor and Program Director Co-Director Inova Hospital for Children Craniofacial Clinic Department of Plastic Surgery Georgetown University Hospital Georgetown, WA, USA

Scott P. Bartlett, MD

Professor of Surgery Surgery University of Pennsylvania; Chief Division of Plastic Surgery Surgery Children's Hospital of Philadelphia Philadelphia, PA, USA

Bruce S. Bauer. MD

Chief

Division of Plastic Surgery
NorthShore University HealthSystem
Highland Park;
Clinical Professor of Surgery
Department of Surgery
University of Chicago Pritzker School of
Medicine
Chicago, IL, USA

Adriane L. Baylis, PhD

Speech Scientist Section of Plastic and Reconstructive Surgery Nationwide Children's Hospital Columbus, OH, USA

Mike Bentz, MD, FAAP, FACS

Interim Chairman
Department of Surgery
University of Wisconsin;
Chairman Division of Plastic Surgery
Department of Surgery
University of Wisconsin
Madison, WI, USA

Craig Birgfeld, MD, FACS

Associate Professor, Pediatric Plastic and Craniofacial Surgery Seattle Children's Hospital Seattle, WA, USA

William R. Boysen, MD

Resident Physician, Urology University of Chicago Medicine Chicago, IL, USA

James P. Bradley, MD

Professor and Chief Section of Plastic and Reconstructive Surgery Temple University Philadelphia, PA, USA

Edward P. Buchanan, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Michael R. Bykowski, MD, MS

Plastic Surgery Resident Plastic Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Edward J. Caterson, MD, PhD

Director of Craniofacial Surgery Division of Plastic Surgery Brigham and Women's Hospital Boston, MA, USA

Rodney K. Chan, MD

Chief Plastic and Reconstructive Surgery Clinical Division and Burn Center United States Army Institute of Surgical Research Joint Base San Antonio, TX, USA

Edward I. Chang, MD

Assistant Professor
Department of Plastic Surgery
The University of Texas M. D. Anderson Cancer
Center
Houston, TX, USA

Constance M. Chen, MD, MPH

Director of Microsurgery
Plastic and Reconstructive Surgery
New York Eye and Ear Infirmary of Mt Sinai;
Clinical Assistant Professor
Plastic and Reconstructive Surgery
Weil Medical College of Cornell University;
Clinical Assistant Professor
Plastic and Reconstructive Surgery
Tulane University School of Medicine
New York, NY, USA

Yu-Ray Chen, MD

Professor of Surgery Plastic and Reconstructive Surgery Chang Gung Memorial Hospital Taoyuan City, Taiwan

Philip Kuo-Ting Chen, MD

Professor Craniofacial Center Chang Gung Memorial Hospital Taoyuan City, Taiwan

Ming-Huei Cheng, MD, MBA

Professor

Division of Reconstructive Microsurgery Department of Plastic and Reconstructive Surgery Chang Gung Memorial Hospital Taoyuan City, Taiwan

Gerson R. Chinchilla, DDS MS

Director

Department of Orthodontics Facultad de Odontología Universidad de San Carlos de Guatemala Guatemala

Peter G. Cordeiro, MD

Chief

Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center; Professor of Surgery Surgery Weil Medical College of Cornell University New York, NY, USA

Alberto Córdova-Aguilar, MD, MPH

Attending Plastic Surgeon
Surgery
Faculty of Medicine Ricardo Palma University
Lima, Peru

Edward H. Davidson, MA(Cantab), MBBS

Resident Plastic Surgeon Department of Plastic Surgery University of Pittsburgh Pittsburgh, PA, USA

Sara R. Dickie, MD

Clinician Educator

Surgery

University of Chicago Hospital Pritzker School of Medicine:

Attending Surgeon

Section of Plastic and Reconstructive Surgery NorthShore University HealthSystem

Northbrook, IL, USA

Risal S. Djohan, MD

Microsurgery Fellowship Program Director Plastic Surgery

Cleveland Clinic

Surgery ASC Quality Improvement Officer

Plastic Surgery

Cleveland Clinic

Cleveland, OH, USA

Amir H. Dorafshar, MBChB, FACS, FAAP

Associate Professor

Plastic and Reconstructive Surgery

Johns Hopkins Medical Institute;

Assistant Professor

Plastic Surgery

R Adams Cowley Shock Trauma Center

Baltimore, MD, USA

Jeffrey A. Fearon, MD

Director

The Craniofacial Center

Dallas, TX, USA

Alexander L. Figueroa, DMD

Craniofacial Orthodontist Rush Craniofacial Center Rush University Medical Center

Chicago, IL, USA

Alvaro A. Figueroa, DDS, MS

Co-Director

Rush Craniofacial Center Rush University Medical Center

Chicago, IL, USA

David M. Fisher, MB, BCh, FRCSC, FACS

Medical Director Cleft Lip and Palate Program Plastic Surgery

Hospital for Sick Children;

Associate Professor

Surgery

University of Toronto

Toronto, Ontario, Canada

Roberto L. Flores, MD

Associate Professor of Plastic Surgery Director of Cleft Lip and Palate Hansjörg Wyss Department of Plastic Surgery NYU Langone Medical Center New York, NY, USA

Andrew Foreman, B. Physio, BMBS(Hons), PhD, FRACS

Consultant Surgeon, Department of Otolaryngology - Head and Neck Surgery University of Adelaide, Royal Adelaide Hospital, Adelaide, SA, Australia

Patrick A. Gerety, MD

Assistant Professor of Surgery
Division of Plastic and Reconstructive Surgery
Indiana University and Riley Hospital for
Children

Philadelphia, PA, USA

Jesse A. Goldstein, MD

Chief Resident

Department of Plastic Surgery Georgetown University Hospital Washington, DC, USA

Arun K. Gosain, MD

Chief

Division of Plastic Surgery Ann and Robert H. Lurie Children's Hospital of Chicago

Chicago, IL, USA

Lawrence J. Gottlieb, MD

Professor of Surgery

Department of Surgery
Section of Plastic and Reconstructive Surgery

University of Chicago Chicago, IL, USA

Arin K. Greene, MD, MMSc

Department of Plastic and Oral Surgery Boston Children's Hospital; Associate Professor of Surgery Harvard Medical School Boston, MA, USA

Patrick J. Gullane, MD, FRCS

Wharton Chair in Head and Neck Surgery Professor of Surgery, Department of Otolaryngology - Head and Neck Surgery University of Toronto Toronto, Ontario, Canada

$\label{eq:mohan_substitution} \mbox{Mohan S. Gundeti, MB, MCh, FEBU, } \mbox{FRCS(Urol), FEAPU}$

Associate Professor of Urology in Surgery and Pediatrics, Director Pediatric Urology, Director Centre for Pediatric Robotics and Minimal Invasive Surgery

University of Chicago and Pritzker Medical School Comer Children's Hospital Chicago, IL, USA

Eyal Gur, MD

Professor of Surgery, Chief
Department of Plastic and Reconstructive
Surgery
The Tel Avis Sourceles Medical Center

The Tel Aviv Sourasky Medical Center Tel Aviv, Israel

Bahman Guyuron, MD, FCVS

Editor in Chief, Aesthetic Plastic Surgery Journal;

Emeritus Professor of Plastic Surgery Case School of Medicine Cleveland, OH, USA

Matthew M. Hanasono, MD

Associate Professor Department of Plastic Surgery The University of Texas MD Anderson Cancer Center

Toshinobu Harada, PhD

Houston, TX, USA

Professor in Engineering Department of Systems Engineering Faculty of Systems Engineering Wakayama University Wakayama, Japan

Jill A. Helms, DDS, PhD

Professor Surgery Stanford University Stanford, CA, USA

David L. Hirsch, MD, DDS

Director of Oral Oncology and Reconstruction Lenox Hill Hospital/Northwell Health New York, NY, USA

Jung-Ju Huang, MD

Associate Professor Division of Microsurgery Plastic and Reconstructive Surgery Chang Gung Memorial Hospital Taoyuan, Taiwan

William Y. Hoffman, MD

Professor and Chief
Division of Plastic and Reconstructive Surgery

San Francisco, CA, USA

Larry H. Hollier Jr., MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Richard A. Hopper, MD, MS

Chief

Division of Craniofacial Plastic Surgery Seattle Children's Hospital; Surgical Director Craniofacial Center Seattle Children's Hospital; Associate Professor Department of Surgery University of Washington Seattle, WA, USA

Gazi Hussain, MBBS, FRACS

Clinical Senior Lecturer Macquarie University Sydney, Australia

Oksana Jackson, MD

Assistant Professor Plastic Surgery Perelman School of Medicine at the University of Pennsylvania; Assistant Professor Plastic Surgery The Children's Hospital of Philadelphia Philadelphia, PA, USA

Svril James, MD

Clinic Marcel Sembat Boulogne-Billancourt Paris, France

Leila Jazayeri, MD

Microsurgery Fellow Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Sahil Kapur, MD

Assistant Professor
Department of Plastic Surgery
University of Texas - MD Anderson Cancer
Center
Houston, TX, USA

Henry K. Kawamoto Jr., MD, DDS

Clinical Professor Surgery Division of Plastic Surgery UCLA Los Angeles, CA, USA

David Y. Khechoyan, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Richard E. Kirschner, MD

Section Chief
Plastic and Reconstructive Surgery
Nationwide Children's Hospital;
Senior Vice Chair
Plastic Surgery
The Ohio State University Medical College
Columbus, OH, USA

John C. Koshy, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Michael C. Large, MD

Urologic Oncologist Urology of Indiana Greenwood, IN, USA

Edward I. Lee, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Jamie P. Levine, MD

Chief of Microsurgery Associate Professor Plastic Surgery NYU Langone Medical Center New York, NY, USA

Jingtao Li, DDS, PhD

Consultant Surgeon Oral and Maxillofacial Surgery West China Hospital of Stomatology Chengdu, Sichuan, People's Republic of China

Lawrence Lin, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Joseph E. Losee, MD

Ross H. Musgrave Professor of Pediatric Plastic Surgery Department of Plastic Surgery University of Pittsburgh Medical Center; Chief, Division of Pediatric Plastic Surgery Children's Hospital of Pittsburgh Pittsburgh, PA, USA

David W. Low, MD

Professor of Surgery
Division of Plastic Surgery
Perelman School of Medicine at the University
of Pennsylvania;
Clinical Associate
Department of Surgery
Children's Hospital of Philadelphia

Ralph T. Manktelow, MD, FRCSC

Professor of Surgery, The University of Toronto, Toronto, Ontario, Canada

Philadelphia, PA, USA

Paul N. Manson, MD

Distinguished Service Professor Plastic Surgery Johns Hopkins University Baltimore, MD, USA

David W. Mathes, MD

Professor and Chief of the Division of Plastic and Reconstructive Surgery Surgery Division of Plastic and Reconstructive Surgery University of Colorado Aurora, CO, USA

Frederick J. Menick, MD

Private Practitioner Tucson, AZ, USA

Fernando Molina, MD

Director Craniofacial Anomalies Foundation A.C. Mexico City; Professor of Plastic Reconstructive and Aesthetic Surgery Medical School Universidad La Salle Mexico City, Distrito Federal, Mexico

Laura A. Monson, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

Reid V. Mueller, MD

Associate Professor Plastic Surgery Oregon Health and Science University Portland, OR, USA

John B. Mulliken, MD

Professor Department of Plastic and Oral Surgery Boston Children's Hospital Harvard Medical School Boston, MA, USA

Gerhard S. Mundinger, MD

Assistant Professor Craniofacial, Plastic, and Reconstructive Surgery Louisiana State University Health Sciences Center Children's Hospital of New Orleans New Orleans, LA, USA

Blake D. Murphy, BSc, PhD, MD

Craniofacial Fellow Plastic Surgery Nicklaus Children's Hospital Miami, FL, USA

Peter C. Neligan, MB, FRCS(I), FRCSC, FACS

Professor of Surgery
Department of Surgery, Division of Plastic
Surgery
University of Washington
Seattle, WA, USA

M. Samuel Noordhoff, MD, FACS

Emeritus Professor in Surgery Chang Gung University Taoyuan City, Taiwan

Giovanna Paternoster, MD

Unité de chirurgie crânio-faciale du departement de neurochirurgie Hôpital Necker Enfants Malades Paris, France

Jason Pomerantz, MDAssistant Professor

Surgery
University of California San Francisco;
Surgical Director
Craniofacial Center
University of California San Francisco
San Francisco, CA, USA

Julian J. Pribaz, MD

Professor of Surgery University of South Florida, Morsani College of Medicine Tampa General Hospital Tampa, FL, USA

Chad A. Purnell, MD

Division of Plastic Surgery Lurie Children's Hospital of Northwestern Feinberg School of Medicine Chicago, IL, USA

Russell R. Reid, MD, PhD

New York, NY, USA

Associate Professor Surgery/Section of Plastic and Reconstructive Surgery University of Chicago Medicine Chicago, IL, USA

Eduardo D. Rodriguez, MD, DDS

Helen L. Kimmel Professor of Reconstructive Plastic Surgery Chair, Hansjörg Wyss Department of Plastic Surgery NYU School of Medicine NYU Langone Medical Center

Craig Rowin, MD

Craniofacial Fellow Plastic Surgery Nicklaus Children's Hospital Miami, FL, USA

Ruston J. Sanchez. MD

Plastic and Reconstructive Surgery Resident University of Wisconsin Madison, WI, USA

Lindsay A. Schuster, DMD, MS

Director Cleft-Craniofacial Orthodontics Pediatric Plastic Surgery Children's Hospital of Pittsburgh of UMPC; Clinical Assistant Professor of Plastic Surgery Department of Plastic Surgery University of Pittsburgh School of Medicine Pittsburgh, PA, USA

Jeremiah Un Chang See, MD

Plastic Surgeon Department of Plastic and Reconstructive Surgery Penang General Hospital Georgetown, Penang, Malaysia

Pradip R. Shetye, DDS, BDS, MDS

Assistant Professor (Orthodontics) Hansjörg Wyss Department of Plastic Surgery NYU Langone Medical Center New York, NY, USA

Roman Skoracki, MD

Plastic Surgery The Ohio State University Columbus, OH, USA

Mark B. Slidell, MD, MPH

Assistant Professor of Surgery Department of Surgery Section of Pediatric Surgery University of Chicago Medicine Biological Sciences Chicago, IL, USA

Washington, DC, USA

Michael Sosin, MD Research Fellow Department of Plastic Surgery Institute of Reconstructive Plastic Surgery NYU Langone Medical Center New York, NY, USA; Research Fellow Division of Plastic Reconstructive and Maxillofacial Surgery R Adams Cowley Shock Trauma Center University of Maryland Medical Center Baltimore, MD, USA; Resident Department of Surgery Medstar Georgetown University Hospital

Youssef Tahiri, MD, MSc, FRCSC, FAAP, **FACS**

Associate Professor Pediatric Plastic & Craniofacial Surgery Cedars Sinai Medical Center Los Angeles, CA, USA

Peter J. Taub. MD

Professor Surgery Pediatrics Dentistry and Medical Education Surgery Division of Plastic and Reconstructive Surgery Icahn School of Medicine at Mount Sinai New York, NY, USA

Jesse A. Taylor, MD

Mary Downs Endowed Chair of Pediatric Craniofacial Treatment and Research: Director, Penn Craniofacial Fellowship: Co-Director, CHOP Cleft Team Plastic, Reconstructive, and Craniofacial Surgery The University of Pennsylvania and Children's Hospital of Philadelphia Philadelphia, PA, USA

Kathryn S. Torok, MD

Assistant Professor Pediatric Rheumatology University of Pittsburgh Pittsburgh, PA, USA

Ali Totonchi, MD

Assistant Professor Plastic Surgery Case Western Reserve University; Medical Director Craniofacial Deformity Clinic Plastic Surgery MetroHealth Medical Center Cleveland, OH, USA

Kris Wilson, MD

Division of Plastic Surgery Baylor College of Medicine Houston, TX, USA

S. Anthony Wolfe, MD

Plastic Surgery Miami Children's Hospital Miami, FL, USA

Akira Yamada, MD, PhD

Professor of Plastic Surgery World Craniofacial Foundation Dallas, TX, USA; Clinical Assistant Professor Plastic Surgery Case Western Reserve University Cleveland, OH, USA

Peirong Yu, MD

Professor Plastic Surgery M. D. Anderson Cancer Center; Adjunct Professor Plastic Surgery Baylor College of Medicine Houston, TX, USA

Ronald M. Zuker, MD. FRCSC, FACS, FRCSEd(Hon)

Professor of Surgery Department of Surgery University of Toronto: Staff Plastic and Reconstructive Surgeon Department of Surgery SickKids Hospital Toronto, Ontario, Canada

VOLUME FOUR

Christopher E. Attinger, MD

Professor, Interim Chairman Department of Plastic Surgery Center for Wound Healing Medstar Georgetown University Hospital Washington, DC, USA

Lorenzo Borghese, MD

Plastic Surgeon Chief of International Missions Ospedale Pediatrico Bambino Gesù Rome. Italy

Charles E. Butler, MD, FACS

Professor and Chairman Department of Plastic Surgery Charles B. Barker Endowed Chair in Surgery The University of Texas M. D. Anderson Cancer Center Houston, TX, USA

David W. Chang, MD

Professor of Surgery University of Chicago Chicago, IL, USA

Karel Claes, MD

Department of Plastic and Reconstructive Suraerv Ghent University Hospital Ghent, Belgium

Mark W. Clemens II, MD, FACS

Associate Professor Plastic Surgery MD Anderson Cancer Center, Houston, TX, USA

Shannon M. Colohan, MD, MSc

Assistant Professor of Surgery University of Washington Seattle, WA, USA

Peter G. Cordeiro, MD

Chief Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Salvatore D'Arpa, MD, PhD

Department of Plastic and Reconstructive Surgery Ghent University Hospital Ghent, Belgium

Michael V. DeFazio, MD

Department Plastic Surgery MedStar Georgetown University Hospital Washington, DC, USA

A. Lee Dellon, MD, PhD

Professor of Plastic Surgery Professor of Neurosurgery Johns Hopkins University Baltimore, MD, USA

Sara R. Dickie, MD

Clinical Associate of Surgery University of Chicago Hospitals Pritzker School of Medicine Chicago, IL, USA

Ivica Ducic, MD, PhD

Clinical Professor of Surgery GWU Washington Nerve Institute McLean, VA, USA

Gregory A. Dumanian, MD

Stuteville Professor of Surgery Division of Plastic Surgery Northwestern Feinberg School of Medicine Chicago, IL, USA

John M. Felder III, MD

Fellow in Hand Surgery Plastic Surgery Washington University in Saint Louis St. Louis, MO, USA

Goetz A. Giessler, MD, PhD

Professor Director Plastic-Reconstructive, Aesthetic and Hand Surgery Gesundheit Nordhessen Kassel, Germany

Kevin D. Han, MD

Department of Plastic Surgery MedStar Georgetown University Hospital Washington, DC, USA

Piet Hoebeke

Department of Urology Ghent University Hospital Ghent, Belgium

Joon Pio Hong, MD, PhD, MMM

Professor of Plastic Surgery Asan Medical Center, University of Ulsan Seoul, South Korea

Michael A. Howard, MD

Clinical Assistant Professor of Surgery Plastic Surgery NorthShore University HealthSystem/University of Chicago Chicago, IL, USA

Jeffrey E. Janis, MD, FACS

Professor of Plastic Surgery, Neurosurgery, Neurology, and Surgery;

Executive Vice Chairman, Department of Plastic Surgery;

Chief of Plastic Surgery, University Hospitals Ohio State University Wexner Medical Center Columbus, OH, USA

Leila Jazayeri, MD

Microsurgery Fellow Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Grant M. Kleiber, MD

Assistant Professor of Surgery Division of Plastic and Reconstructive Surgery Washington University School of Medicine St. Louis, MO, USA

Stephen J. Kovach III, MD

Assistant Professor Division of Plastic Surgery University of Pennsylvania Philadelphia, PA, USA

Robert Kwon, MD

Southwest Hand and Microsurgery 3108 Midway Road, Suite 103 Plano, TX, USA

Raphael C. Lee, MS, MD, ScD, FACS, FAIMBE

Paul and Allene Russell Professor Plastic Surgery, Dermatology, Anatomy and Organismal Biology, Molecular Medicine University of Chicago Chicago, IL, USA

L. Scott Levin, MD, FACS

Chairman of Orthopedic Surgery Department of Orthopaedic Surgery University of Pennsylvania School of Medicine Philadelphia, PA, USA

Otway Louie, MD

Associate Professor Surgery University of Washington Medical Center Seattle, WA, USA

Nicolas Lumen, MD, PhD

Head of Clinic Urology Ghent University Hospital Ghent, Belgium

Alessandro Masellis, MD

Plastic Surgeon Euro-Mediterranean Council for Burns and Fire Disasters Palermo, Italy

Michele Masellis, MD

Former Chief of Department of Plastic and Reconstructive Surgery and Burn Therapy Department of Plastic and Reconstructive Surgery and Burn Therapy - ARNAS Ospedale Civico e Benfratelli Palermo, Italy

Stephen M. Milner, MB BS, BDS

Professor of Plastic Surgery Surgery Johns Hopkins School of Medicine Baltimore, MD, USA

Arash Momeni, MD

Fellow, Reconstructive Microsurgery Division of Plastic Surgery University of Pennsylvania Health System Philadelphia, PA, USA

Stan Monstrey, MD, PhD

Department of Plastic and Reconstructive Surgery Ghent University Hospital Ghent, Belgium

Venkateshwaran N, MBBS, MS, DNB, MCh, MRCS(Intercollegiate)

Consultant Plastic Surgeon Jupiter Hospital Thane, India

Rajiv P. Parikh, MD, MPHS

Resident Physician
Department of Surgery, Division of Plastic and
Reconstructive Surgery
Washington University School of Medicine
St. Louis, MO, USA

Mônica Sarto Piccolo, MD, MSc, PhD

Director Pronto Socorro para Queimaduras Goiânia, Goiás, Brazil

Nelson Sarto Piccolo, MD

Chief
Division of Plastic Surgery
Pronte Second para Quair

Pronto Socorro para Queimaduras Goiânia, Goiás, Brazil

Maria Thereza Sarto Piccolo, MD, PhD

Scientific Director Pronto Socorro para Queimaduras Goiânia, Goiás, Brazil

Vinita Puri, MS, MCh

Professor and Head
Department of Plastic, Reconstructive Surgery
and Burns
Seth G S Medical College and KEM Hospital
Mumbai, Maharashtra, India

Andrea L. Pusic, MD, MHS, FACS

Associate Professor Plastic and Reconstructive Surgery Memorial Sloan Kettering Cancer Center New York, NY, USA

Vinav Rawlani, MD

Division of Plastic Surgery Northwestern Feinberg School of Medicine Chicago, IL, USA

Juan L. Rendon, MD, PhD

Clinical Instructor Housestaff
Department of Plastic Surgery
The Ohio State University Wexner Medical
Center

Columbus, OH, USA

Michelle C. Roughton, MD

Assistant Professor

Division of Plastic and Reconstructive Surgery University of North Carolina at Chapel Hill Chapel Hill, NC, USA

Hakim K. Said, MD, FACS

Associate Professor Division of Plastic surgery University of Washington Seattle, WA, USA

Michel Saint-Cyr, MD, FRSC(C)

Professor Plastic Surgery Mayo Clinic Rochester, MN, USA

Michael Sauerbier, MD, PhD

Professor, Chair
Department for Plastic, Hand, and
Reconstructive Surgery
Academic Hospital Goethe University Frankfurt
am Main
Frankfurt am Main, Germany

Loren S. Schechter, MD

Associate Professor and Chief Division of Plastic Surgery Chicago Medical School Morton Grove, IL, USA

David H. Song, MD, MBA, FACS

Regional Chief, MedStar Health Plastic and Reconstructive Surgery Professor and Chairman Department of Plastic Surgery Georgetown University School of Medicine Washington, DC, USA

Yoo Joon Sur, MD, PhD

Associate Professor Department of Orthopedic Surgery The Catholic University of Korea, College of Medicine Seoul, Korea

Chad M. Teven, MD

Resident Section of Plastic and Reconstructive Surgery University of Chicago Chicago, IL, USA

VOLUME FIVE

Jamil Ahmad, MD, FRCSC

Director of Research and Education The Plastic Surgery Clinic Mississauga, Ontario, Canada; Assistant Professor of Surgery University of Toronto Toronto, Ontario, Canada

Robert J. Allen Sr., MD

Clinical Professor of Plastic Surgery Department of Plastic Surgery New York University Medical Center Charleston, NC, USA

Ryan E. Austin, MD, FRCSC

Plastic Surgeon The Plastic Surgery Clinic Mississauga, ON, Canada

Brett Beber, BA, MD, FRCSC

Plastic and Reconstructive Surgeon Lecturer, Department of Surgery University of Toronto Toronto, Ontario, Canada

Philip N. Blondeel, MD

Professor of Plastic Surgery Department of Plastic Surgery University Hospital Ghent Ghent, Belgium

Benjamin J. Brown, MD

Gulf Coast Plastic Surgery Pensacola, FL, USA

Mitchell H. Brown, MD, MEd, FRCSC

Plastic and Reconstructive Surgeon Associate Professor, Department of Surgery University of Toronto Toronto, Ontario, Canada

M. Bradley Calobrace, MD, FACS

Plastic Surgeon

Calobrace and Mizuguchi Plastic Surgery Center Departments of Surgery, Divisions of Plastic Surgery

Clinical Faculty, University of Louisville and University of Kentucky Louisville, KY, USA

Grant W. Carlson, MD

Wadley R. Glenn Professor of Surgery Emory University Atlanta, GA, USA

Bernard W. Chang, MD

Chief of Plastic and Reconstructive Surgery Mercy Medical Center Baltimore, MD, USA

Mark W. Clemens II, MD, FACS

Assistant Professor Plastic Surgery M. D. Anderson Cancer Center Houston, TX, USA

Robert Cohen MD, FACS

Medical Director Plastic Surgery Scottsdale Center for Plastic Surgery Paradise Valley, AZ and; Santa Monica, CA, USA

Amy S. Colwell, MD

Associate Professor Harvard Medical School Massachusetts General Hospital Boston, MA, USA

Edward H. Davidson, MA(Cantab), MB, BS

Resident Plastic Surgeon Department of Plastic Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Emmanuel Delay, MD, PhD

Unité de Chirurgie Plastique et Reconstructrice Centre Léon Bérard Lyon, France

Francesco M. Egro, MB ChB, MSc, MRCS

Department of Plastic Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Neil A. Fine, MD

President

Northwestern Specialists in Plastic Surgery; Associate Professor (Clinical) Surgery/Plastics Northwestern University Fienberg School of Medicine Chicago, IL, USA

Jaime Flores, MD

Plastic and Reconstructive Microvascular Surgeon Miami, FL, USA

Joshua Fosnot, MD

Assistant Professor of Surgery Division of Plastic Surgery The Perelman School of Medicine University of Pennsylvania Health System Philadelphia, PA, USA

Allen Gabriel, MD

Clinical Associate Professor Department of Plastic Surgery Loma Linda University Medical Center Loma Linda, CA, USA

Michael S. Gart, MD

Resident Physician Division of Plastic Surgery Northwestern University Feinberg School of Medicine Chicago, IL, USA

Matthew D. Goodwin, MD

Plastic Surgeon Plastic Reconstructive and Cosmetic Surgery Boca Raton Regional Hospital Boca Raton, FL, USA

Samia Guerid, MD

Cabinet 50 rue de la République Lyon, France

Moustapha Hamdi, MD, PhD

Professor of Plastic and Reconstructive Surgery Brussels University Hospital Vrij Universitaire Brussels Brussels, Belgium

Alexandra M. Hart, MD

Emory Division of Plastic and Reconstructive Surgery Emory University School of Medicine Atlanta. GA. USA

Emily C. Hartmann, MD, MS

Aesthetic Surgery Fellow Plastic and Reconstructive Surgery University of Southern California Los Angeles, CA, USA

Nima Khavanin, MD

Resident Physician
Department of Plastic and Reconstructive
Surgery
Johns Hopkins Hospital
Baltimore, MD, USA

John Y. S. Kim. MD

Professor and Clinical Director Department of Surgery Division of Plastic Surgery Northwestern University Feinberg School of Medicine Chicago, IL, USA

Steven Kronowitz, MD Owner, Kronowitz Plastics

PLLC; University of Texas, M. D. Anderson Medical Center Houston, TX, USA

John V. Larson, MD

Resident Physician
Division of Plastic and Reconstructive Surgery
Keck School of Medicine of USC
University of Southern California
Los Angeles, CA, USA

Z-Hye Lee, MD

Resident
Department of Plastic Surgery
New York University Medical Center
New York, NY, USA

Frank Lista, MD, FRCSC

Medical Director The Plastic Surgery Clinic Mississauga, Ontario, Canada; Assistant Professor Surgery University of Toronto Toronto, Ontario, Canada

Albert Losken, MD, FACS

Atlanta, GA, USA

Professor of plastic surgery and Program Director Emory Division of Plastic and Reconstructive Surgery Emory University School of Medicine

Charles M. Malata, BSc(HB), MB ChB, LRCP, MRCS, FRCS(Glasg), FRCS(Plast)

Professor of Academic Plastic Surgery
Postgraduate Medical Institute
Faculty of Health Sciences
Anglia Ruskin University
Cambridge and Chelmsford, UK;
Consultant Plastic and Reconstructive Surgeon
Department of Plastic and Reconstructive
Surgery
Cambridge Breast Unit at Addenbrooke's
Hospital
Cambridge University Hospitals NHS
Foundation Trust
Cambridge, UK

Jaume Masià, MD, PhD

Chief and Professor of Plastic Surgery Sant Pau University Hospital Barcelona, Spain

G. Patrick Maxwell, MD, FACS

Clinical Professor of Surgery Department of Plastic Surgery Loma Linda University Medical Center Loma Linda, CA, USA

James L. Mayo, MD

Microsurgery Fellow Plastic Surgery New York University New York, NY, USA

Roberto N. Miranda, MD

Professor

Department of Hematopathology Division of Pathology and Laboratory Medicine MD Anderson Cancer Center Houston, TX, USA

Colin M. Morrison, MSc (Hons) FRCSI (Plast)

Consultant Plastic Surgeon St. Vincent's University Hospital Dublin, Ireland

Maurice Y. Nahabedian, MD, FACS

Professor and Chief Section of Plastic Surgery MedStar Washington Hospital Center Washington DC, USA; Vice Chairman Department of Plastic Surgery MedStar Georgetown University Hospital Washington DC, USA

James D. Namnoum, MD

Clinical Professor of Plastic Surgery Atlanta Plastic Surgery Emory University School of Medicine Atlanta, GA, USA

Maria E. Nelson, MD

Assistant Professor of Clinical Surgery Department of Surgery, Division of Upper GI/ General Surgery, Section of Surgical Oncology Keck School of Medicine University of Southern California Los Angeles, CA, USA

Julie Park, MD

Associate Professor of Surgery Section of Plastic Surgery University of Chicago Chicago, IL, USA

Ketan M. Patel, MD

Assistant Professor of Surgery Division of Plastic and Reconstructive Surgery Keck Medical Center of USC University of Southern California Los Angeles, CA, USA

Nakul Gamanial Patel, BSc(Hons), MBBS(Lond), FRCS(Plast)

Senior Microsurgery Fellow St. Andrew's Centre for Plastic Surgery Broomfield Hospital Chelmsford, UK

Gemma Pons, MD, PhD

Head Microsurgery Unit Plastic Surgery Hospital de Sant Pau Barcelona, Spain

Julian J. Pribaz, MD

Professor of Surgery Brigham and Women's Hospital Harvard Medical School Boston, MA, USA

Venkat V. Ramakrishnan, MS, FRCS, FRACS(Plast Surg)

Consultant Plastic Surgeon St. Andrew's Centre for Plastic Surgery Broomfield Hospital Chelmsford, UK

Elena Rodríguez-Bauzà, MD

Plastic Surgery Department Hospital Santa Creu i Sant Pau Barcelona, Spain

Michael R. Schwartz, MD

Board Certified Plastic Surgeon Private Practice Westlake Village, CA, USA

Stephen F. Sener, MD

Professor of Surgery, Clinical Scholar
Chief of Breast, Endocrine, and Soft Tissue
Surgery
Department of Surgery, Keck School of
Medicine of USC
Chief of Surgery and Associate Medical Director
Perioperative Services
LAC+USC (LA County) Hospital
Los Angeles, CA, USA

Joseph M. Serletti, MD. FACS

The Henry Royster–William Maul Measey Professor of Surgery and Chief Division of Plastic Surgery University of Pennsylvania Health System Philadelphia, PA, USA

Deana S. Shenaq, MD

Chief Resident

Department of Surgery - Plastic Surgery The University of Chicago Hospitals Chicago, IL, USA

Kenneth C. Shestak, MD

Professor, Department of Plastic Surgery University of Pittsburgh Medical Center Pittsburgh, PA, USA

Ron B. Somogyi, MD MSc FRCSC

Plastic and Reconstructive Surgeon Assistant Professor, Department of Surgery University of Toronto Toronto, ON, Canada

David H. Song, MD, MBA, FACS

Regional Chief, MedStar Health
Plastic and Reconstructive Surgery
Professor and Chairman
Department of Plastic Surgery
Georgetown University School of Medicine
Washington, DC, USA

The late Scott L. Spear[†], MD

Formerly Professor of Plastic Surgery Division of Plastic Surgery Georgetown University Washington, MD, USA

Michelle A. Spring, MD, FACS

Program Director Glacier View Plastic Surgery Kalispell Regional Medical Center Kalispell, MT, USA

W. Grant Stevens, MD, FACS

Clinical Professor of Surgery Marina Plastic Surgery Associates; Keck School of Medicine of USC Los Angeles, CA, USA

Elizabeth Stirling Craig, MD

Plastic Surgeon and Assistant Professor Department of Plastic Surgery University of Texas MD Anderson Cancer Center Houston, TX, USA

Simon G. Talbot, MD

Assistant Professor of Surgery Brigham and Women's Hospital Harvard Medical School Boston, MA, USA

Jana Van Thielen, MD

Plastic Surgery Department Brussels University Hospital Vrij Universitaire Brussel (VUB) Brussels, Belgium

Henry Wilson, MD, FACS

Attending Plastic Surgeon Private Practice Plastic Surgery Associates Lynchburg, VA, USA

Kai Yuen Wong, MA, MB BChir, MRCS, FHEA, FRSPH

Specialist Registrar in Plastic Surgery Department of Plastic and Reconstructive Surgery Cambridge University Hospitals NHS Foundation Trust

VOLUME SIX

Cambridge, UK

Hee Chang Ahn, MD, PhD

Professor

Department of Plastic and Reconstructive Surgery

Hanyang University Hospital School of Medicine Seoul. South Korea

Nidal F. Al Deek, MD

Surgeon

Plastic and Reconstructive Surgery Chang Gung Memorial Hospital Taipei. Taiwan

Kodi K. Azari, MD, FACS

Reconstructive Transplantation Section Chief Professor Department of Orthopedic Surgery UCLA Medical Center

Carla Baldrighi, MD

Santa Monica, CA, USA

Staff Surgeon

Pediatric Surgery Meyer Children's Hospital Pediatric Hand and Reconstructive Microsurgery Unit

Azienda Ospedaliera Universitaria Careggi Florence, Italy

Gregory H. Borschel, MD, FAAP, FACS

Assistant Professor

University of Toronto Division of Plastic and Reconstructive Surgery;

Assistant Professor

Institute of Biomaterials and Biomedical Engineering;

Associate Scientist

The SickKids Research Institute The Hospital for Sick Children Toronto, Ontario, Canada

Kirsty Usher Boyd, MD, FRCSC

Assistant Professor Division of Plastic Surgery, University of Ottawa Ottawa, Ontario, Canada

Gerald Brandacher, MD

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

Lesley Butler, MPH

Clinical Research Coordinator Charles E. Seay, Jr. Hand Center Texas Scottish Rite Hospital for Children Dallas, TX, USA

Ryan P. Calfee, MD

Associate Professor Department of Orthopedic Surgery Washington University School of Medicine St. Louis, MO, USA

Brian T. Carlsen, MD

Associate Professor Departments of Plastic Surgery and Orthopedic Surgery Mayo Clinic Rochester, MN, USA

David W. Chang, MD

Professor

Division of Plastic and Reconstructive Surgery The University of Chicago Medicine Chicago, IL, USA

James Chang, MD

Johnson & Johnson Distinguished Professor and Chief

Division of Plastic and Reconstructive Surgery Stanford University Medical Center Stanford, CA, USA

Robert A. Chase, MD

Holman Professor of Surgery – Emeritus Stanford University Medical Center Stanford, CA, USA

Alphonsus K. S. Chong, MBBS, MRCS, MMed(Orth), FAMS (Hand Surg)

Senior Consultant

Department of Hand and Reconstructive Microsurgery National University Health System

Singapore:

Annigapore, Annietant Dr

Assistant Professor

Department of Orthopedic Surgery Yong Loo Lin School of Medicine National University of Singapore Singapore

David Chwei-Chin Chuang, MD

Senior Consultant, Ex-President, Professor Department of Plastic Surgery Chang Gung University Hospital Tao-Yuan, Taiwan

Kevin C. Chung, MD, MS

Chief of Hand Surgery
Michigan Medicine
Charles B G De Nancrede Professor, Assistant
Dean for Faculty Affairs
University of Michigan Medical School
Ann Arbor, Michigan, USA

Christopher Cox, MD

Attending Surgeon Kaiser Permanente Walnut Creek, CA, USA

Catherine Curtin, MD

Associate Professor Department of Surgery Division of Plastic Surgery Stanford University Stanford, CA, USA

Lars B. Dahlin, MD, PhD

Professor and Consultant Department of Clinical Sciences, Malmö – Hand Surgery University of Lund Malmö, Sweden

Kenneth W. Donohue, MD

Hand Surgery Fellow Division of Plastic Surgery Department of Orthopedic Surgery Baylor College of Medicine Houston, TX, USA

Gregory A. Dumanian, MD, FACS

Stuteville Professor of Surgery Division of Plastic Surgery Northwestern Feinberg School of Medicine Chicago, IL, USA

William W. Dzwierzynski, MD

Professor and Program Director Department of Plastic Surgery Medical College of Wisconsin Milwaukee, WI, USA

Simon Farnebo, MD, PhD

Associate Professor and Consultant Hand Surgeon Department of Plastic Surgery, Hand Surgery and Burns Institution of Clinical and Experimental Medicine, University of Linköping

Ida K. Fox, MD

Linköping, Sweden

Assistant Professor of Plastic Surgery Department of Surgery Division of Plastic and Reconstructive Surgery Washington University School of Medicine St. Louis, MO, USA

Paige M. Fox, MD, PhD

Assistant Professor Department of Surgery, Division of Plastic and Reconstructive Surgery Stanford University Medical Center Stanford, CA, USA

Jeffrey B. Friedrich, MD

Professor of Surgery and Orthopedics Department of Surgery, Division of Plastic Surgery University of Washington Seattle, WA, USA

Steven C. Haase, MD, FACS

Associate Professor Department of Surgery, Section of Plastic Surgery University of Michigan Health Ann Arbor, MI, USA

Elisabet Hagert, MD, PhD

Associate Professor Department of Clinical Science and Education Karolinska Institute; Chief Hand Surgeon Hand Foot Surgery Center

Warren C. Hammert, MD

Stockholm, Sweden

Professor of Orthopedic and Plastic Surgery Chief, Division of Hand Surgery Department of Orthopedics and Rehabilitation University of Rochester Rochester, NY, USA

Isaac Harvey, MD

Clinical Fellow Department of Pediatric Plastic and Reconstructive Surgery Hospital for SickKids Toronto, Ontario, Canada

Vincent R. Hentz, MD

Emeritus Professor of Surgery and Orthopedic Surgery (by courtesy) Stanford University Stanford, CA, USA

Jonay Hill, MD

Clinical Assistant Professor Anesthesiology, Perioperative and Pain Medicine Stanford University School of Medicine Stanford, CA, USA

Steven E. R. Hovius, MD, PhD

Former Head, Department of Plastic, Reconstructive and Hand Surgery Erasmus MC University Medical Center Rotterdam, the Netherlands; Xpert Clinic, Hand and Wrist Center The Netherlands

Jerry I. Huang, MD

Associate Professor
Department of Orthopedics and Sports
Medicine
University of Washington;
Program Director
University of Washington Hand Fellowship
University of Washington
Seattle, WA, USA

Marco Innocenti, MD

Associate Professor of Plastic Surgery, University of Florence; Director, Reconstructive Microsurgery Department of Oncology Careggi University Hospital Florence, Italy

Neil F. Jones, MD, FRCS

Professor and Chief of Hand Surgery University of California Medical Center; Professor of Orthopedic Surgery; Professor of Plastic and Reconstructive Surgery University of California Irvine Irvine, CA, USA

Ryosuke Kakinoki, MD, PhD

Professor of Hand Surgery and Microsurgery, Reconstructive, and Orthopedic Surgery Department of Orthopedic Surgery Faculty of Medicine Kindai University Osakasayama, Osaka, Japan

Jason R. Kang, MD

Chief Resident
Department of Orthopedic Surgery
Stanford Hospital & Clinics
Redwood City. CA. USA

Joseph S. Khouri, MD

Resident
Division of Plastic Surgery, Department of
Surgery
University of Rochester
Rochester, NY, USA

Todd Kuiken, MD, PhD

Professor Departments of PM&R, BME, and Surgery Northwestern University; Director, Neural Engineering Center for Artificial Limbs

Rehabilitation Institute of Chicago Chicago, IL, USA

Donald Lalonde, BSC, MD, MSc, FRCSC

Professor of Surgery
Division of Plastic and Reconstructive Surgery
Saint John Campus of Dalhousie University
Saint John, New Brunswick, Canada

W. P. Andrew Lee, MD

The Milton T. Edgerton MD, Professor and Chairman
Department of Plastic and Reconstructive Surgery
Johns Hopkins University School of Medicine Baltimore, MD, USA

Anais Legrand, MD

Postdoctoral Research Fellow Plastic and Reconstructive Surgery Stanford University Medical Center Stanford, CA, USA

Terry Light, MD

Professor Department of Orthopedic Surgery Loyola University Medical Center Maywood, IL, USA

Jin Xi Lim, MBBS, MRCS

Senior Resident
Department of Hand and Reconstructive
Microsurgery
National University Health System
Singapore

Joseph Lopez, MD, MBA

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

Susan E. Mackinnon, MD

Sydney M. Shoenberg, Jr. and Robert H. Shoenberg Professor
Department of Surgery, Division of Plastic and Reconstructive Surgery
Washington University School of Medicine
St. Louis. MO. USA

Brian Mailey, MD

Assistant Professor of Surgery Institute for Plastic Surgery Southern Illinois University Springfield, IL, USA

Steven J. McCabe, MD, MSc, FRCS(C)

Director of Hand and Upper Extremity Program University of Toronto Toronto Western Hospital Toronto, Ontario, Canada

Kai Megerle, MD, PhD

Assistant Professor Clinic for Plastic Surgery and Hand Surgery Technical University of Munich Munich, Germany

Amy M. Moore, MD

Assistant Professor of Surgery
Division of Plastic and Reconstructive Surgery
Department of Surgery
Washington University School of Medicine
St. Louis, MO, USA

Steven L. Moran, MD

Professor and Chair of Plastic Surgery Division of Plastic Surgery, Division of Hand and Microsurgery; Professor of Orthopedics Rochester, MN, USA

Rebecca L. Neiduski, PhD, OTR/L, CHT

Dean of the School of Health Sciences Professor of Health Sciences Elon University Elon, NC, USA

David T. Netscher, MD

Program Director, Hand Surgery Fellowship; Clinical Professor, Division of Plastic Surgery and Department of Orthopedic Surgery Baylor College of Medicine;

Adjunct Professor of Clinical Surgery (Plastic Surgery)

Weill Medical College Cornell University Houston, TX, USA

Michael W. Neumeister, MD

Professor and Chairman
Division of Plastic Surgery
Springfield Illinois University School of Medicine
Springfield, IL, USA

Shelley Noland, MD

Assistant Professor Division of Plastic Surgery Mayo Clinic Arizona Phoenix, AZ, USA

Christine B. Novak, PT. PhD

Associate Professor Department of Surgery, Division of Plastic and Reconstructive Surgery University of Toronto Toronto, Ontario, Canada

Scott Oates, MD

Deputy Department Chair; Professor Department of Plastic Surgery, Division of Surgery The University of Texas MD Anderson Cancer Center Houston, TX, USA

Kerby Oberg, MD, PhD

Associate Professor Department of Pathology and Human Anatomy Loma Linda University School of Medicine Loma Linda, CA, USA

Scott Oishi, MD

Director, Charles E. Seay, Jr. Hand Center Texas Scottish Rite Hospital for Children; Professor, Department of Plastic Surgery and Department of Orthopedic Surgery University of Texas Southwestern Medical Center Dallas, TX, USA

William C. Pederson, MD, FACS President and Fellowship Director

The Hand Center of San Antonio; Adjunct Professor of Surgery The University of Texas Health Science Center at San Antonio San Antonio, TX, USA

Dang T. Pham, MD

General Surgery Resident Department of Surgery Houston Methodist Hospital Houston, TX, USA

Karl-Josef Prommersberger, MD, PhD

Chair, Professor of Orthopedic Surgery Clinic for Hand Surgery Bad Neustadt/Saale, Germany

Carina Reinholdt, MD, PhD

Senior Consultant in Hand Surgery
Center for Advanced Reconstruction of
Extremities
Sahlgrenska University Hospital/ Mölndal
Mölndal, Sweden;
Assistant Professor
Department of Orthopedics
Institute for Clinical Sciences
Sahlgrenska Academy
Goteborg, Sweden

Justin M. Sacks, MD, MBA, FACS

Director, Oncological Reconstruction; Assistant Professor Department of Plastic and Reconstructive Surgery Johns Hopkins School of Medicine Baltimore, MD, USA

Douglas M. Sammer, MD

Associate Professor of Plastic and Orthopedic Surgery

Chief of Plastic Surgery at Parkland Memorial Hospital

Program Director Hand Surgery Fellowship University of Texas Southwestern Medical Center Dallas, TX, USA

Subhro K. Sen, MD

Clinical Associate Professor Plastic and Reconstructive Surgery Robert A. Chase Hand and Upper Limb Center Stanford University School of Medicine Stanford, CA, USA

Pundrique R. Sharma, MBBS, PhD and FRCS (Plast)

Consultant Plastic Surgeon
Department for Plastic and Reconstructive
Surgery
Alder Hey Children's Hospital
Liverpool, UK

Randolph Sherman, MD, FACS

Vice Chair Department of Surgery Cedars-Sinai Medical Center Los Angeles, CA, USA

Jaimie T. Shores, MD

Clinical Director, Hand/Arm Transplant Program Department of Plastic and Reconstructive Surgery

Johns Hopkins University School of Medicine Baltimore, MD, USA

Vanila M. Singh, MD, MACM

Clinical Associate Professor Anesthesiology, Perioperative and Pain Medicine Stanford University School of Medicine Stanford, CA, USA

Jason M. Souza, MD, LCDR, MC, USN

Staff Plastic Surgeon, United States Navy Walter Reed National Military Medical Center Bethesda, MD, USA

Amir Taghinia, MD, MPH

Attending Surgeon
Department of Plastic and Oral Surgery
Boston Children's Hospital;
Assistant Professor of Surgery
Harvard Medical School
Boston, MA, USA

David M. K. Tan, MBBS

Senior Consultant
Department of Hand and Reconstructive
Microsurgery
National University Health System
Singapore;
Assistant Professor
Department of Orthopedic Surgery
Yong Loo Lin School of Medicine
National University Singapore
Singapore

Jin Bo Tang, MD

Professor and Chair Department of Hand Surgery; Chair, The Hand Surgery Research Center Affiliated Hospital of Nantong University Nantong, The People's Republic of China

Johan Thorfinn, MD, PhD

Senior Consultant of Plastic Surgery, Burn Unit; Co-Director

Department of Plastic Surgery, Hand Surgery and Burns

Linköping University Hospital Linköping, Sweden

Michael Tonkin, MBBS, MD, FRACS(Orth), FRCS(Ed Orth)

Professor of Hand Surgery
Department of Hand Surgery and Peripheral
Nerve Surgery
Royal North Shore Hospital
The Children's Hospital at Westmead
University of Sydney Medical School
Sydney, New South Wales, Australia

Joseph Upton III, MD

Staff Surgeon
Department of Plastic and Oral Surgery
Boston Children's Hospital;
Professor of Surgery
Harvard Medical School
Boston, MA, USA

Francisco Valero-Cuevas. PhD

Director

Brain-Body Dynamics Laboratory; Professor of Biomedical Engineering; Professor of Biokinesiology and Physical Therapy;

(By courtesy) Professor of Computer Science and Aerospace and Mechanical Engineering The University of Southern California Los Angeles, CA, USA

Christianne A. van Nieuwenhoven, MD. PhD

Plastic Surgeon/Hand Surgeon Plastic and Reconstructive Surgery Erasmus Medical Centre Rotterdam, the Netherlands

Nicholas B. Vedder, MD

Professor of Surgery and Orthopedics Chief of Plastic Surgery Vice Chair Department of Surgery University of Washington Seattle, WA, USA

Andrew J. Watt, MD

Attending Hand and Microvascular Surgeon; Associate Program Director, Buncke Clinic Hand and Microsurgery Fellowship; Adjunct Clinical Faculty, Stanford University Division of Plastic and Reconstructive Surgery The Buncke Clinic San Francisco, CA, USA

Fu-Chan Wei, MD

Professor Department of Plastic Surgery Chang Gung Memorial Hospital Taoyuan, Taiwan

Julie Colantoni Woodside, MD

Orthopedic Surgeon OrthoCarolina Gastonia, NC, USA

Jeffrey Yao, MD

Associate Professor Department of Orthopedic Surgery Stanford Hospital & Clinics Redwood City, CA, USA

Acknowledgments



My wife, Gabrielle Kane, has always been my rock. She not only encourages me in my work but gives constructive criticism bolstered by her medical expertise as well as by her knowledge and training in education. I can never repay her. The editorial team at Elsevier have made this series possible. Belinda Kuhn leads the group of Alexandra Mortimer, Louise Cook, and the newest addition to the team, Sam Crowe. The Elsevier production team has also been vital in moving this project along. The volume editors, Geoff Gurtner, Peter Rubin, Ed Rodriguez, Joe Losee, David Song, Mo Nahabedian, Jim Chang, and Dan Liu have shaped and refined this edition, making vital changes to keep the series relevant and up-todate. My colleagues in the University of Washington, headed by Nick Vedder, have provided continued encouragement and support. Finally, and most importantly, the residents and fellows who pass through our program keep us on our toes and ensure that we give them the best possible solutions to their questions.

Peter C. Neligan, MB, FRCS(I), FRCSC, FACS

The current edition of the Breast volume represents a complete, thorough and up-to-date body of knowledge as it relates

to all aspects of aesthetic and reconstructive surgery of the breast. I have invited academic and private practice thought leaders and experts in breast surgery from around the globe to share their knowledge and expertise that will undoubtedly serve as a valuable resource for all surgeons. I would like to thank every one of them for their hard work, time, and diligence in preparing these chapters.

There are several individuals that I would like to personally acknowledge. Dr. Scott Spear has been my greatest mentor and friend, whose inspiration and teaching has guided me for the past 12 years at Georgetown University. His untimely and unexpected passing on March 16, 2017 is a loss to our specialty and all that knew him. I would also like to thank the 66 chief residents and all the students that I have had the privilege to mentor and train over the past 22 years. They have challenged and inspired me with their ideas, innovations, and brilliance. Finally, none of this would have been possible without the love and support of my wife and two daughters: Anissa, Danielle, and Sophia Nahabedian who have enabled me to realize the importance of family and to prioritize wisely.

Maurice Nahabedian, MD

Dedicated to future plastic surgeons. Take up the torch and lead us forward!