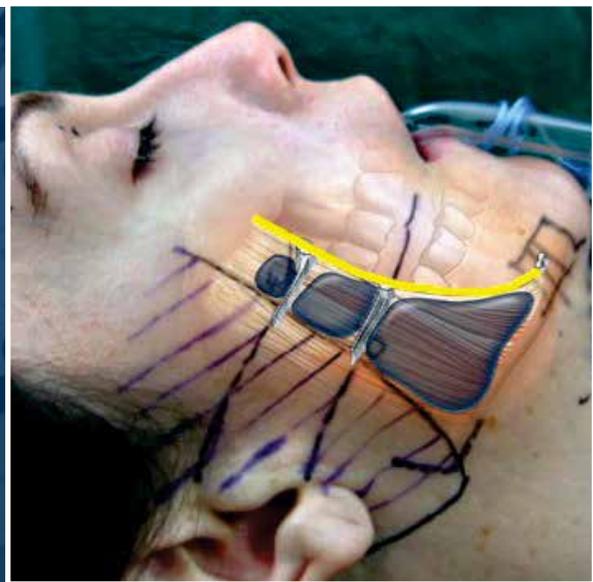




# Plastic and Reconstructive Surgery

## Approach and Techniques



Ross D. Farhadih  
Neil W. Bulstrode  
Sabrina Cugno

**WILEY** Blackwell

# Foreword

Plastic surgery is a unique specialty, defined by concept rather than anatomical area. As such, it has grown enormously over the last 70 years and continues to evolve with changes in technology, improved understanding of anatomy and patient-centred outcomes. This progression leads to a vast and ever increasing array of new techniques and options for reconstruction, benefiting both our patients and the many other medical and surgical specialties that consult the plastic surgeon. With many tools at their disposal and the wide array of clinical maladies that they treat, the plastic surgeon has evolved into a problem solver. This synergy between plastic surgery and other surgical specialties has enabled these other specialties to utilize the problem-solving skills of the plastic surgeon to expand their therapeutic spectrum and tackle increasingly more difficult problems. However, to be an effective problem solver it is incumbent on the plastic surgeon to be familiar with the latest developments of our broad and expanding field. This highlights the necessity of a single-volume text that is comprehensive and practical, covering the full spectrum of plastic surgery and presenting the current state of the art of our specialty. This is exactly what the editors of *Plastic and reconstructive surgery: Approaches and techniques* set out to achieve in producing this excellent textbook.

It is truly an international effort at all levels, as the editors, from Australia (Ross D. Farhadieh), the UK (Neil W. Bulstrode) and Canada (Sabrina Cugno), have joined forces to recruit over 130 international contributors and produce a resource of over 1100 pages that provides a well-organized and thorough, yet succinct, text of the essentials of current plastic surgery. The editors are all highly qualified and accomplished young plastic surgeons, and they have been able to provide a global perspective of our specialty. Many of the contributors are world-renowned experts; however, there is also a new generation of young rising stars whose contributions are equally good, providing a new, fresh and contemporary feel.

Each chapter is clearly organized and provides an overview of the principles and the most recently described basic science essentials, as well as clinical applications and techniques, and pertinent bibliography for additional reading. The critical core information is provided for each topic, providing an excellent synopsis and reference for the student and practitioner.

Although aimed primarily at the trainee, I believe that it will also serve as an excellent and quick reference for the seasoned practising surgeon faced with complex problems requiring reconstruction throughout the body. It will also be an especially useful resource for senior plastic surgery trainees preparing to take their Board and Fellowship exams. The final chapter, dealing specifically with the certification process and fellowship exams, is interesting, and provides useful information and different perspectives of the qualifying processes in the British, European, Australian and North American systems.

It has been an honour and pleasure for me to have been asked to contribute the Foreword to this new textbook, which very nicely fulfills one of the traditions of surgery of passing down knowledge from one generation of problem solvers to the next. The new generation is likely to face even more complex -problems and, using the latest techniques, solve them more elegantly than we can now. But the principles in plastic surgery never change, and this textbook provides the intrinsic fundamentals that all trainees must know, even as the field is ever expanding.

I congratulate the editors for their Herculean effort in recruiting an international cast of distinguished surgeons and thank the authors for flawlessly summarizing the huge avalanche of new information that has graced our specialty; finally, I thank the publishers, Wiley Blackwell, for producing this timely, impressive and comprehensive plastic surgery compendium.

Julian J. Pribaz  
Professor of Surgery  
Harvard Medical School

# Dedication

To inspirational mentors and dedicated apprentices everywhere.

## Preface

During my plastic surgery training there appeared to be a plethora of summary and broad-stroke single-volume plastic surgery textbooks, all of which lacked adequate detail. Conversely I would encounter multivolume behemoths, detailed reference texts that always seemed leaden and difficult to digest. In my experience neither of these options fully addressed the needs of a trainee surgeon, or for that matter a more senior surgeon. Thus was born, on a long flight from Sydney to London, the notion of compiling a single-volume textbook that seeks to achieve the perfect balance of detail and palatability. To that end, in compiling this textbook we approached some of the world's leading authorities in the various fields of plastic surgery. This was with the belief that not only could readers benefit from such experts' enormous experience, but they could also gain practical insights from the ability of such experts to sift through the ever increasing volume of literature and distil what is relevant and applicable to everyday practice.

My co-conspirators in this endeavour, Mr Neil Bulstrode from Great Ormond Street and Dr Sabrina Cugno from Montreal Children's Hospital, had the perfect blend of enthusiasm and sense of humour to see this work through. I am grateful to them for their advice, time, effort and, most importantly, their friendship, all of which made this compendium possible. I also wish to thank all of our colleagues who took time out of their busy lives to make this volume possible. It has been an extraordinary experience for all of us to collaborate on this project. Our special thanks go to Professor Julian Pribaz for being kind enough to review the volume and write the Foreword. We also wish to thank Wiley Blackwell for their continued support for this project.

On a personal note I wish to thank my mother Tadjvar, my brother Arash and wife Yassi for enduring me during the last 2 years, and for their unwavering support. My parents have been my guiding light in demonstrating the importance of a strong work ethic and integrity. I also wish to thank Messrs Neil Bulstrode and Adriaan Grobbelaar for the extraordinary fellowship opportunities and friendship they have afforded me. I am very grateful to Messrs Ash Mosahebi and Jian Farhadi, who kindly accommodated me in their operating theatres and taught me a great deal about the art of plastic surgery. In Melbourne I wish to extend my sincere thanks to Mr Bryan Mendelson, who during my visits showed immense patience and generosity in teaching me the philosophy and techniques of facial aesthetic surgery. My gratitude also goes to Mr Stephen Flood, who illustrated by example a sensible approach to plastic surgery and kindness in mentorship; this continues to serve as an aspiration. As a plastic surgeon I am most indebted to Professor Wayne Morrison, who has curiosity, humility, dedication to teaching and generosity of will and spirit, tempered with a crisp sense of humour, in equal inspirational measure. It was truly an honour and a privilege to serve as his registrar.

Rostam D. Farhadieh  
Sydney  
January 2015

# Contents

List of contributors, viii

Foreword, xv

Dedication, xvi

Preface, xvii

About the companion website, xviii

## Part I: Basic science and principles

- 1** Wound healing and scar formation, 3  
*Simon R. Myers and Ali M. Ghanem*
- 2** Basic skin flaps and blood supply, 12  
*Edwin J. Morrison and Wayne A.J. Morrison*
- 3** Biomaterials and structural fat grafting, 22  
*Naghme Naderi, Behzad Ardehali and Afshin Mosahebi*
- 4** Local anaesthetics, 34  
*Yasamin Ziabari*
- 5** Lasers, 44  
*Se-Hwang Liew*
- 6** Tissue expansion, 51  
*Dariush Nikkhah, Lara Yildirimer and Neil W. Bulstrode*
- 7** Tissue engineering, 62  
*Lara Yildirimer and Alexander Seifalian*

## Part II: Integument

- 8** Skin structure, 79  
*Anthony Barker*
- 9** Melanoma, 88  
*Carlo Riccardo Rossi and Antonio Sommariva*
- 10** Non-melanoma skin cancers, 100  
*Michael Findlay and Mina S. Ally*
- 11** Atypical skin lesions, 115  
*Michael Findlay and Michael A. Henderson*
- 12** Allotransplantation, 130  
*Maria Siemionow and Fatih Zor*

**13** Radiation therapy and soft tissue response, 144  
*Gurdip Kaur Azad and Carie Corner*

**14** Burns: acute care and reconstruction, 153  
*Peter Dziejewski*

## Part III: Paediatric plastic surgery and congenital disorders

- 15** Congenital melanocytic naevi, 183  
*Sabrina Cugno, Veronica Kinsler and Neil W. Bulstrode*
- 16** Vascular anomalies, 192  
*Sabrina Cugno, Alex Barnacle, John Harper and Neil W. Bulstrode*
- 17** Cleft lip, 204  
*Marc C. Swan and David M. Fisher*
- 18** Cleft palate and velopharyngeal dysfunction, 219  
*Sabrina Cugno and Brian C. Sommerlad*
- 19** Congenital ear anomalies, 238  
*Sabrina Cugno and Neil W. Bulstrode*
- 20** Craniofacial clefts, 255  
*Irene M.J. Mathijssen and Sarah L. Versnel*
- 21** Craniosynostosis, 264  
*Aina V.H. Greig and David J. Dunaway*
- 22** Orthognathic surgery, 279  
*Tim Lloyd, Ravinder Pabla, Sujta Sharma and Nigel Hunt*
- 23** Facial reanimation, 295  
*Jonathan I. Leckenby and Adriaan O. Grobbelaar*

## Part IV: Head and neck reconstruction

- 24** Head and neck malignancy: staging and neck dissections, 309  
*Andrew N. Morritt, Marlene S. See and Navid Jallali*
- 25** Oral tongue reconstruction, 318  
*Stuart Archibald, Michael Gupta and Achilles Thoma*
- 26** Mandibular reconstruction, 330  
*Christopher Glenn Wallace, Chung-Kan Tsao and Fu-Chan Wei*

- 27** Maxillary reconstruction, 338  
*Achilleas Thoma, Michael Gupta and Stuart Archibald*
- 28** Pharyngeal reconstruction, 349  
*Ross D. Farhadieh and Wayne A.J. Morrison*
- 29** Skull base reconstruction, 362  
*Ross D. Farhadieh and Wayne A.J. Morrison*
- 30** Cheek reconstruction, 366  
*Adam C. Gascoigne and Ross D. Farhadieh*
- 31** Lip reconstruction, 377  
*Marlene S. See, Andrew N. Morrirt and Navid Jallali*
- 32** Nasal reconstruction, 390  
*Jean-Brice Duron and Marc Revol*
- 33** Eyelid reconstruction, 407  
*Konal Saha and Naresh Joshi*
- 34** Ear reconstruction, 416  
*Françoise Firmin and Neil W. Bulstrode*
- 35** Scalp and calvarial reconstruction, 427  
*Christopher Glenn Wallace and Fu-Chan Wei*
- 36** Facial trauma, 437  
*David David*

## Part V: Breast

- 37** Anatomy and physiology of the breast, 479  
*Giovanni Bistoni and Jian Farhadi*
- 38** Breast augmentation, 486  
*Ross D. Farhadieh and Jian Farhadi*
- 39** Breast reconstruction, 499  
*Phillip Blondeel, Maria Athanasiadou and Andreas Tromaropoulos*
- 40** Gynaecomastia and tuberous breast, 519  
*Afshin Mosahebi and Amir Sadri*
- 41** Mastopexy and breast reduction, 530  
*Elizabeth J. Hall-Findlay*

## Part VI: Trunk and lower limb

- 42** Chest wall reconstruction, 551  
*Mazyar Kanani and Martin J. Elliott*  
*Simon Withey and Robert Pearl*
- 43** Abdominal wall reconstruction, 564  
*William A. Townley and Stefan O.P. Hofer*
- 44** Genitourinary and perineal reconstruction, 575  
*Niri S. Niranjani*  
*Paige Fox, Paul Mittermiller and Gordon K. Lee*  
*Kathryn Evans and Imran Mushtaq*

- 45** Pressure sores, 597  
*Adam C. Gascoigne and Stephen Flood*
- 46** Lower limb reconstruction, 607  
*James K. Chan, Matthew D. Gardiner, Michael Pearse and Jagdeep Nanchahal*
- 47** Lymphoedema, 628  
*Kelvin Ramsey and Peter Mortimer*

## Part VII: Upper limb

- 48** Hand examination and investigations, 645  
*J. Henk Coert, Peter Hoogvliet and Willem D. Rinkel*
- 49** Congenital hand differences, 660  
*Bran Sivakumar, Jonathan Adamthwaite and Paul Smith*
- 50** Finger tip injuries, 688  
*Donald Sammut and Robert Pearl*
- 51** Flexor tendon injuries, 707  
*Sarah Tucker and Georgina Williams*
- 52** Extensor tendon injuries, 722  
*Gregory McCarten*
- 53** Tendon transfers, 733  
*Adam C. Gascoigne and Stephen Flood*
- 54** Amputations, replantation and thumb reconstruction, 752  
*Gráinne Bourke*
- 55** Compartment syndrome in the extremities, 769  
*Steven E.R. Hovius and Tim H.J. Nijhuis*
- 56** Nerve injury, repair and reconstruction, 777  
*Renata V. Weber, Andrew Yee, Michael M. Bottros and Susan E. Mackinnon*
- 57** Brachial plexus injuries and reanimation, 797  
*Kirsty U. Boyd, Kristen M. Davidge and Susan E. Mackinnon*
- 58** Nerve compressions, 813  
*Kristen M. Davidge and Susan E. Mackinnon*
- 59** Dupuytren disease, 838  
*Paul M.N. Werker*
- 60** Fractures and dislocations in the hand, 850  
*Barbara Jemec and Nicola Burr*
- 61** Osteoarthritis and prosthetic joints in the hand, 861  
*Adam C. Watts and Ian A. Trail*
- 62** Wrist pathology, 878  
*Owen L. Ala, T. Shane Johnson and L. Scott Levin*
- 63** Rheumatoid arthritis of the hand and wrist, 890  
*Rebecca Ayers and Mark Pickford*

- 64** Lesions of the hand, 904  
*Richard D. Lawson, David A. Stewart and Michael A. Tonkin*

### **Part VIII: Aesthetic surgery**

- 65** Facial anatomy and ageing, 923  
*Chin-Ho Wong and Bryan C. Mendelson*
- 66** Non-operative facial rejuvenation, 940  
*Jean Carruthers and Alastair Carruthers*
- 67** Forehead lift, 948  
*Timothy J. Marten and Dino Elyassnia*
- 68** Upper eyelid rejuvenation, 967  
*Adil Ceydeli, Tong C. Duong and Robert S. Flowers*
- 69** Lower eyelid–cheek junction rejuvenation, 976  
*Sam T. Hamra*
- 70** Facelift, 992  
*Bryan C. Mendelson and Ross D. Farhadieh*
- 71** Neck lift, 1004  
*Timothy J. Marten and Dino Elyassnia*
- 72** Rhinoplasty, 1032  
*David Stepnick, Catherine Weng and Bahman Guyuron*

- 73** Genioplasty, 1047  
*Nicholas Lee, Deepak Komath and Tim Lloyd*

- 74** Blepharoptosis, 1063  
*Alan A. McNab*

- 75** Liposuction and liposculpture, 1075  
*Darryl J. Hodgkinson*

- 76** Abdominoplasty and body contouring, 1083  
*Alexander Stoff and Dirk F. Richter*

### **Part IX: Military, simulation training and exams**

- 77** Simulation learning in plastic surgery, 1107  
*Ali M. Ghanem and Simon R. Myers*
- 78** Military plastic surgery, 1121  
*Robert M.T. Staruch and Shehan Hettiaratchy*
- 79** Plastic surgery fellowship and board exams, 1129  
*Robert Pearl, Youssef Tahiri, Sabrina Cugno and Ross D. Farhadieh*

Index, 000