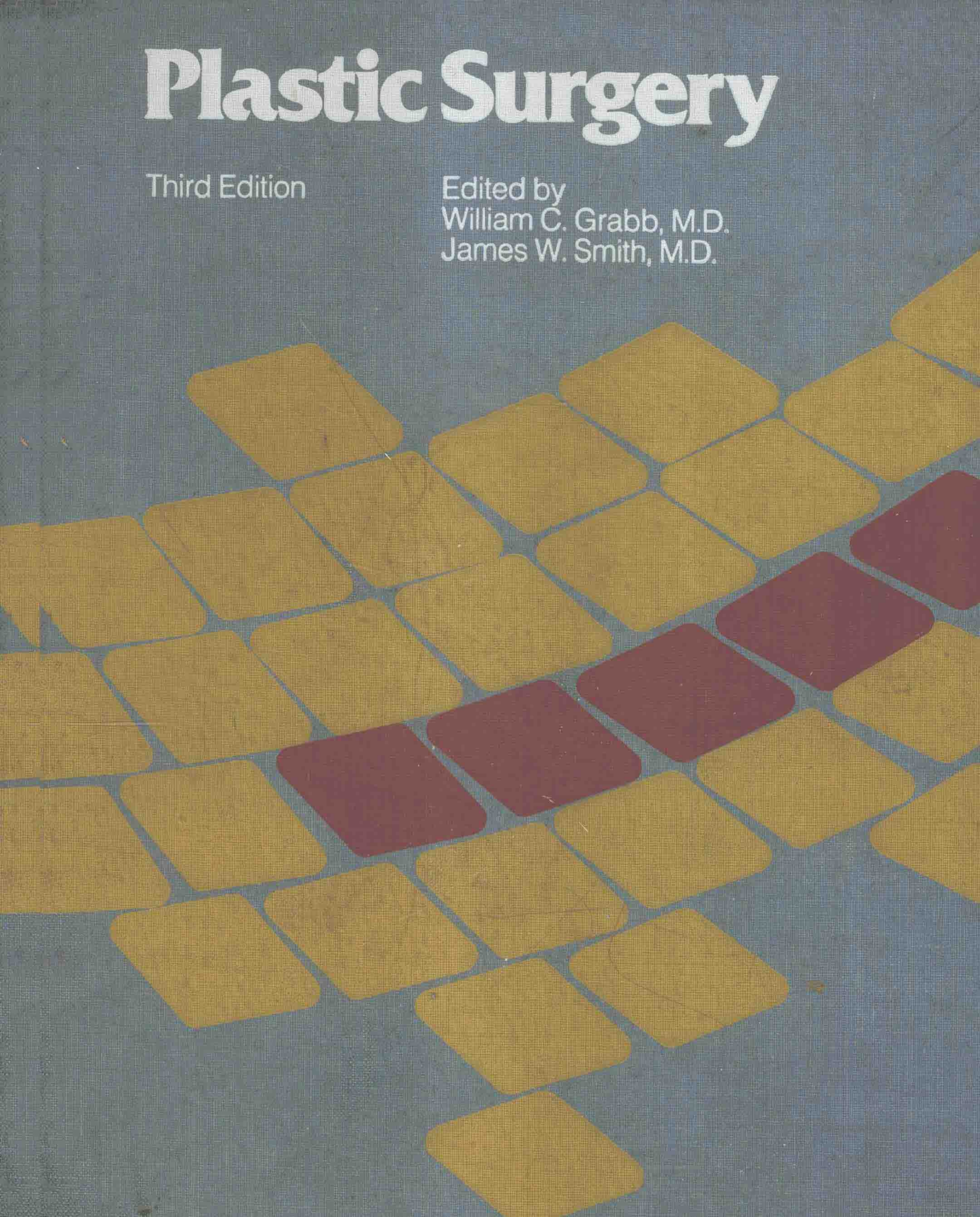
Plastic Surgery

Third Edition

Edited by
William C. Grabb, M.D.
James W. Smith, M.D.



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EDITED BY

WILLIAM C. GRABB, M.D.
Professor of Surgery (Plastic Surgery)
and Head of the Section of Plastic Surgery,
The University of Michigan Medical School;
Staff Surgeon, University of Michigan Hospital,
Ann Arbor, Michigan

JAMES W. SMITH, M.D.
Associate Professor of Clinical Surgery,
Cornell University Medical College;
Associate Attending Surgeon, The New York
Hospital–Cornell Medical Center,
New York, New York

Foreword by
Reed O. Dingman, M.D., D.Sc.
Emeritus Professor of Surgery,
The University of Michigan Medical School,
Ann Arbor, Michigan

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Dedicated with love to our wives, Cozette and Nancy, and to the wives of all our co-authors.

Foreword

This book, edited by William C. Grabb, M.D., and James W. Smith, M.D., is now in its third edition, the first having been printed in 1968 and the second in 1973. In the short period of eleven years *Plastic Surgery* has gained worldwide recognition as a comprehensive and accurate source of information on all aspects of plastic and reconstructive surgery. Because of the increased size and scope of their text, the authors have elected to drop "A Concise Guide to Clinical Practice" from the title. A larger format was necessary to accommodate the explosion of scientific information and new developments since the second edition.

Not only has there been exciting change in the attitudes, concepts and teaching of plastic and reconstructive surgery, but new authorities have emerged, requiring complete revision of the text. More than half of the authors are new collaborators in this work. Many new subjects have been included in the third edition, while some have been deleted.

Both editors are involved in administration, teaching, research, and patient care. They are active in writing, editing, and in the affairs of organized plastic surgery and are attuned to advances, progress, and changing concepts. This information forms the basis of frequent revisions which keep this book alive and current.

The editors have not lost sight of their original concept: to produce an inexpensive text with broad current coverage, written by aggressive, knowledgeable authorities in a readable, interesting, well-illustrated manner. This book has already had significant influence on the development of world plastic surgery and will continue as a living compendium of progress in the art.

Bill Grabb and Jim Smith with their great experience and ability have reached surgical maturity which is evident in this third edition.

Reed O. Dingman

Preface

Within the past several years we have entered a period in the history of plastic surgery in which there has been a great outpouring of new ideas – a future shock of information that is in such abundance that we cannot consume all of it and still have time for caring for patients and for living. There are now 23 journals relating to plastic surgery and a feast of excellent books, movies, sound-slide programs, videotapes, and symposia. It is our prediction that this future shock will gather momentum as we enter the next period in which in-depth research will receive well-deserved emphasis. This abundance of information will lead more plastic surgeons to become subspecialists in their areas of special interest.

Against this background we have pressed ahead in the third edition to include some information from all aspects of plastic surgery, keeping the same two main objectives: (1) to provide a current and succinct guide to clinical practice and (2) to make available an inexpensive text on the entire field of plastic surgery for the student, medical house officer, and practicing physician.

To keep the text in one volume we have eliminated parts of some chapters and combined others. To remain vital and current we have added or replaced approximately half of our contributing authors and have added ten chapters, including two entirely new sections on microsurgery and the breast. All other chapters have been rewritten or updated. With each subsequent edition we are determined to remain flexible, current, and concise.

As in the previous editions we wish to express what a joy it has been for us to put the book together – what a pleasure it has been to write, read, and edit the changing body of knowledge that makes up the specialty of plastic surgery.

We wish to acknowledge the authors of all articles included in the chapter references and the Selected Reading List, for this book, or any book, is a distillation of their contribution to our knowledge. In particular we extend our thanks to Lauralee Lutz and Richard Thirlby. The copyediting by Patricia H. Gross, the editorial supervision by Robert M. Davis, and the support by Fred Belliveau of Little, Brown and Company have been outstanding.

W. C. G.
J. W. S.

Contributing Authors

Jerome E. Adamson, M.D.
Professor of Plastic Surgery, Eastern Virginia Medical School; Chief of Plastic Surgery, DePaul and Medical Center Hospitals, Norfolk, Virginia
Chapters 37, 53

Joseph Agris, D.D.S., M.D.
Cora and Mading Department of Surgery, Division of Plastic Surgery, Baylor College of Medicine; Chief of Surgery, Texas Institute of Rehabilitation, Houston, Texas
Chapter 31

James L. Baker, Jr., M.D.
Chief of Plastic Surgery, Holiday Hospital, Orlando, Florida
Chapter 44

Ralph Blocksma, M.D.
Clinical Professor of Surgery, Michigan State University College of Human Medicine, East Lansing, Michigan; Chief, Plastic Surgery Division, Butterworth Hospital, Grand Rapids, Michigan
Chapter 3

William W. Blackburn, II, M.D.
Private Practice, Atlanta, Georgia
Chapter 46

Silas Braley, Jr., B.S.
Former Director, Dow Corning Center for Aid to Medical Research, Dow Corning Corporation, Midland, Michigan
Chapter 3

Burt Brent, M.D.
Assistant Clinical Professor and Research Adviser in Plastic Surgery, Stanford University Medical Center, Pala Alto, California
Chapter 13

Harry J. Buncke, Jr., M.D.
Associate Clinical Professor – Surgery, University of California Medical School; Co-director, Microsurgical Research Laboratory and Member of Surgical Staff, Ralph K. Davies Medical Center, San Francisco, California
Chapter 40

Ronald R. Cameron, M.D.
Assistant Clinical Professor of Surgery, George Washington University Hospital, Washington, D.C.; Attending Surgeon and Chief, Department of Surgery, Montgomery General Hospital, Olney, Maryland
Chapter 14

James H. Carraway, M.D.
Associate Professor of Plastic Surgery, Eastern Virginia Medical School; Chief of Plastic Surgery, Medical Center Hospitals, Norfolk, Virginia
Chapter 53

Salvador Castañares, M.S., M.D.
University of Southern California School of Medicine; Past Senior and Chief of Plastic Surgery Department, Plastic Surgery Division, Hospital of the Good Samaritan, Los Angeles, California
Chapter 19

Richard J. Coburn, D.M.D., M.D.
Senior Clinical Instructor, Department of Surgery, Mount Sinai School of Medicine of the City University of New York, New York, New York
Chapter 11

Bard Cosman, M.D.
Professor of Clinical Surgery, Columbia University; Attending Surgeon, Division of Plastic Surgery, Presbyterian Hospital, New York, New York
Chapter 15

Lester M. Cramer, D.M.D., M.D.
Attending Plastic Surgeon, Department of Surgery, Penrose Hospital, Colorado Springs, Colorado
Chapter 17

Thomas D. Cronin, M.D.
Clinical Professor, Plastic Surgery, Baylor College of Medicine; Attending and Director, Plastic Surgery Residency Program, St. Joseph Hospital, Houston, Texas
Chapter 47

Norris K. Culf, Jr., M.D.
Associate Director, National Board of Medical Examiners, Philadelphia, Pennsylvania
Chapter 17

Raymond M. Curtis, M.D.
Associate Professor of Plastic Surgery and Associate Professor of Orthopaedic Surgery, The Johns Hopkins Hospital; Chief, Division of Hand Surgery, The Union Memorial Hospital, Baltimore, Maryland
Chapter 34

Rollin K. Daniel, M.D., M.Sc., F.R.C.S. (C)
Associate Professor of Surgery, McGill University; Chief of Plastic Surgery, Royal Victoria Hospital, Montreal, Canada
Chapter 41

Charles J. Devine, Jr., M.D.
Chairman and Professor of Urology, Eastern Virginia Medical School; Attending Urologist, Medical Center Hospitals and DePaul Hospital, Norfolk, Virginia
Chapter 53

Richard K. Dortzbach, M.D.
Assistant Clinical Professor of Ophthalmology, University of Wisconsin Medical School, Madison, Wisconsin
Chapter 10

Bruce J. Dubin, M.D.
Acting Instructor of Surgery (Plastic and Reconstructive Surgery), Stanford University School of Medicine, Stanford, California
Chapters 55 and 56

Richard G. Eaton, M.D.
Associate Professor of Surgery, Columbia University College of Physicians and Surgeons; Co-Chief Hand Service, Roosevelt Hospital, New York, New York
Chapter 33

Frederick R. Eilber, M.D.
Associate Professor of Surgery, University of California, Los Angeles, School of Medicine, Los Angeles, California
Chapter 27

John Gibney, M.D.
Clinical Associate, Phoenix Plastic Surgery Residency, Phoenix, Arizona
Chapter 25

Edward W. Gibson, M.S., F.R.A.C.S.
Lecturer in Plastic Surgery, University of Sydney; Head, Department of Plastic Surgery, Royal Prince Alfred Hospital, Sydney, Australia
Chapter 26

William C. Grabb, M.D.
Professor of Surgery (Plastic Surgery) and Head of the Section of Plastic Surgery, The University of Michigan Medical School; Staff Surgeon, University of Michigan Hospital, Ann Arbor, Michigan
Editor; Chapters 1 and 4

B. Herold Griffith, M.D.
Professor of Surgery and Chief, Division of Plastic Surgery, Northwestern University Medical School; Senior Attending Plastic Surgeon: Northwestern Memorial Hospital, Children's Memorial Hospital, Rehabilitation Institute of Chicago, and Veterans Administration Lakeside Hospital, Chicago, Illinois
Chapter 50

Randolph H. Guthrie, M.D.
Associate Professor of Surgery, Cornell University Medical College; Associate Attending Surgeon, The New York Medical Hospital, New York, New York
Chapter 39

Dwight C. Hanna, M.D.
Chief, Division of Plastic Surgery, University of Pittsburgh School of Medicine; Western Pennsylvania Hospital, Pittsburgh, Pennsylvania
Chapter 16

Shattuck W. Hartwell, Jr., M.D.
Department of Plastic Surgery, Cleveland Clinic Foundation, Cleveland, Ohio
Chapter 25

E. Carmack Holmes, M.D.
Associate Professor of Surgery, Division of Oncology, Department of Surgery, University of California, Los Angeles, School of Medicine, Los Angeles, California
Chapter 27

John E. Hoopes, M.D.
Professor of Surgery (Plastic Surgery), The Johns Hopkins University School of Medicine; Plastic Surgeon-in-Charge, The Johns Hopkins Hospital, Baltimore, Maryland
Chapter 18

Charles E. Horton, M.D.
Chairman and Professor of Plastic Surgery, Eastern Virginia Medical School; Director, Eastern Virginia Graduate School of Medicine, Norfolk, Virginia
Chapter 53

Julius A. Howell, M.D.
Attending Surgeon, Section on Plastic and Reconstructive Surgery, Bowman Gray School of Medicine of Wake Forest University, Winston-Salem, North Carolina
Chapter 54

John T. Hueston, M.S., F.R.C.S., F.R.A.C.S.
Consultant Plastic Surgeon, Royal Melbourne Hospital, Melbourne, Victoria, Australia
Chapter 38

Lynn D. Ketchum, M.D.
Consultant to Hand Rehabilitation Center, Suburban Medical Center, Overland Park, Kansas
Chapter 30

Harold E. Kleinert, M.D.
Clinical Professor of Surgery, University of Louisville School of Medicine; Attending Surgeon, Jewish Hospital, Louisville, Kentucky
Chapter 43

Donald R. Laub, M.D.
Associate Professor of Surgery; Stanford University School of Medicine, Chief, Division of Plastic and Reconstructive Surgery, Stanford University Medical Center, Stanford, California
Chapters 55 and 56

Graham D. Lister, M.B., F.R.C.S.
Clinical Assistant Professor of Plastic Surgery, University of Louisville School of Medicine; Attending Surgeon, Jewish Hospital, Louisville, Kentucky
Chapter 43

Jorge Lopez-Garcia, M.D.
Department of Plastic Surgery, National University of Mexico, Ciudad Universitaria, Mexico City, Mexico; Attending Staff, Hospital Espanol de Mexico, Polanco, Mexico
Chapter 26

Allan L. Lorincz, M.D.
Professor of Medicine, University of Chicago/The Pritzker School of Medicine; Head, Section of Medicine, Los Angeles, Dermatology, University of Chicago Hospitals, Chicago, Illinois
Chapter 29

J. B. Lynch, M.D.
Professor and Chairman, Department of Plastic Surgery, Vanderbilt University School of Medicine, Vanderbilt University Medical Center; Professor and Chairman, Department of Plastic Surgery, Vanderbilt University Hospital, Nashville, Tennessee
Chapter 24

John M. Markley, Jr., M.D.
Clinical Assistant Professor, Section of Plastic Surgery, Department of Surgery, The University of Michigan Medical School; Primary Active Staff, St. Joseph's Mercy Hospital, Ann Arbor, Michigan
Chapter 32

John B. McCraw, M.D.
Associate Professor of Plastic Surgery, Eastern Virginia Medical School; Director, Plastic Surgery Residency Program, Eastern Virginia Graduate School of Medicine, Norfolk, Virginia
Chapter 49

Paul K. McKissock, M.D.
Assistant Clinical Professor, Department of Surgery, University of California, Los Angeles, School of Medicine, Los Angeles, California
Chapter 45

D. Ralph Millard, Jr., M.D.
Light-Millard Professor of Plastic Surgery and Chief, Division of Plastic Surgery, University of Miami School of Medicine, Miami, Florida
Chapter 7

Timothy A. Miller, M.D.
Associate Professor of Surgery/Plastic, University of California, Los Angeles, School of Medicine; Chief, Plastic Surgery, Wadsworth Veterans Administration Hospital, Los Angeles, California
Chapter 51

Hanno Millesi, M.D.
Professor of Plastic and Reconstructive Surgery, University of Vienna; Head, Department of Plastic and Reconstructive Surgery, Surgical University Clinic, Vienna, Austria
Chapter 42

Donald L. Morton, M.D.
Professor of Surgery and Chief, Division of Oncology, University of California, Los Angeles, School of Medicine, Los Angeles, California
Chapter 27

Ian R. Munro, M.A., M.B., B.Chir., F.R.C.S. (C)
Assistant Professor, Department of Surgery, University of Toronto Faculty of Medicine; Division of Plastic Surgery, Sunnybrook Hospital and The Hospital for Sick Children, Toronto, Canada
Chapter 5

John C. Mustardé, F.R.C.S.
Emeritus lecturer in Plastic Surgery, Glasgow University; Emeritus Consultant Plastic Surgeon, West of Scotland Plastic Surgery Unit, Canniesburn Hospital, Glasgow, Scotland
Chapter 12

Paul Natvig, D.D.S., M.D.
Associate Professor of Plastic and Reconstructive Surgery, The Medical College of Wisconsin, Milwaukee, Wisconsin; Chief of Plastic Surgery, Veterans Administration Hospital, Wood, Wisconsin
Chapter 10

Jorge Niklison, M.D.
Buenos Aires, Argentina
Chapter 15

Robert M. Oneal, M.D.
Clinical Associate Professor of Surgery (Plastic), University of Michigan Medical School; Staff Surgeon, University Hospital, University of Michigan Medical Center; Head, Department of Plastic Surgery, St. Joseph Mercy Hospital, Ann Arbor, Michigan
Chapter 46

George C. Peck, M.D.
Associate Professor of Plastic Surgery, Temple University School of Medicine, Philadelphia, Pennsylvania; Attending Plastic Surgeon and Director of Department of Plastic Surgery, Beth Israel Hospital, Passaic, New Jersey
Chapter 21

Rex A. Peterson, M.D.
Director, Phoenix Plastic Surgery Residency, Chief of Plastic Surgery, Arizona Children's Hospital, Good Samaritan Hospital and Maricopa County General Hospital, Phoenix, Arizona
Chapter 25

Austin D. Potenza, M.D.
Attending Plastic Surgeon, Sunrise Hospital, and Desert Springs Hospital, Las Vegas, Nevada
Chapter 37

Peter Randall, M.D.
Professor of Plastic Surgery, University of Pennsylvania, School of Medicine; Acting Chief, Division of Plastic Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania
Chapter 8

Thomas D. Rees, M.D.
Clinical Professor of Surgery (Plastic), New York University Medical Center, Chairman, Department of Plastic Surgery, Manhattan Eye, Ear, and Throat Hospital, New York, New York
Chapter 11

Paule Regnault, M.D.
Private practice, Montreal, Canada
Chapter 52

Kenneth Rothaus, M.D.
Chief Resident, Plastic Surgery, The New York Hospital – Cornell Medical Center, New York, New York
Selected Reading List

Richard C. Schultz, M.D.
Professor of Surgery and Chairman, Division of Plastic Surgery, Abraham Lincoln College of Medicine, University of Illinois; Chicago, Illinois; Head, Division of Plastic and Reconstructive Surgery, Lutheran General Hospital, Park Ridge, Illinois
Chapter 9

Jack H. Sheen, M.D.
Assistant Clinical Professor, Department of Surgery, Division of Plastic Surgery, University of California, Los Angeles, School of Medicine, Los Angeles, California
Chapter 22

Bernard E. Simon, M.D.
Clinical Professor of Surgery, Mount Sinai School of Medicine; Attending Surgeon and Chief of Division of Plastic Surgery, Mount Sinai Medical Center, New York, New York
Chapter 48

James W. Smith, M.D.
Associate Professor of Clinical Surgery, Cornell University Medical College; Associate Attending Surgeon, The New York Hospital – Cornell Medical Center, New York, New York
Editor; Chapters 20, 35, 36, and 39

Richard A. Sperling, M.D.
Fellow in Hand Surgery, The Roosevelt Hospital, New York, New York
Chapter 33

Melvin Spira, M.D.
Professor and Head, Division of Plastic Surgery, Baylor College of Medicine, Houston, Texas
Chapter 6

Sten J. Stenström
Professor of Plastic Surgery, University of Benghazi Medical School; Consultant Plastic Surgeon, Al-Jalaa Hospital, Benghazi, Libya
Chapter 23

Zoltan Szabo
Technical Director, Multidisciplinary Microsurgical Laboratory, Ralph K. Davies Medical Center, San Francisco, California
Chapter 40

Noel Thompson, M.S., F.R.C.S.
Consultant Surgeon, Regional Plastic Surgery Centre, Mount Vernon Hospital, Northwood, Middlesex, England
Chapter 2

Hugh G. Thomson, M.D., M.S., F.R.C.S. (C)
Associate Professor of Surgery, University of Toronto; Plastic Surgery Department, The Hospital for Sick Children, Toronto, Canada
Chapter 28

Luis O. Vasconez, M.D.
Professor of Surgery and Chief, Divison of Plastic Surgery, University of California, San Francisco, School of Medicine, San Francisco, California
Chapter 49

Harvey A. Zarem, M.D.
Professor of Surgery, University of California, Los Angeles, School of Medicine; Chief, Division of Plastic and Reconstructive Surgery, UCLA Medical Center, Los Angeles, California
Chapter 29

Contents

I

General

Basic Techniques of Plastic Surgery

WILLIAM C. GRABB

The techniques of plastic surgery are most often applied to the skin and soft tissues. In their most basic form they relate to the *excision of skin lesions, closure of skin wounds, skin grafts, flaps,* and *Z-plasty.*

EXCISION OF SKIN LESIONS

Factors in Obtaining a Fine Line Scar

The final appearance of the scar after the excision of a lesion depends on a great number of factors. Of importance are the use of atraumatic technique, the placement of the scar in the same direction as skin lines, the age of the patient, the region of the body, the type of skin, and such complicating factors as skin disorders and infection.

Atraumatic Technique

Careful handling of tissues is essential if one is to obtain a fine linear scar and maintain function. Skin and the subcutaneous tissues that have been crushed, dried by exposure to the air, damaged with hot sponges, or strangled by a suture under too much tension will undergo some degree of necrosis. The necrotic cells may serve as a culture medium for infection and at least will be replaced by scar.

The concept of care for skin and subcutaneous tissue should be a histological one [5]. All cells, whether of epidermal, fibrous, elastic, or fatty origin, are served by a network of blood vessels, lymphatics, and nerves. The simple crushing effect of a forceps or hemostat causes an appreciable amount of trauma to both cells and vessels, resulting in a loss of protoplasm, blood, and lymph into the interstitial spaces. Destroyed or damaged cells provide the substance on which organisms can multiply, create sepsis, and destroy more tissue. An atraumatic technique aids in minimizing this trauma. Sharp knives, scissors, needles, and skin hooks, as well as sutures of the proper size, swaged to a needle, are all important to this end.

Even the normal tremor of the surgeon's hand can be detrimental. Both the operator and his assistant should brace their elbows against their bodies (or the arm board in hand surgery) or brace their hands on the patient whenever possible to reduce this tremor. This is similar to the bracing which we do every day when we write at a desk.

Hot sponges have no place in atraumatic surgery. They increase not only capillary bleeding [26] but also, as the applied heat approaches 66°C. (the temperature produced by electric sponge basin warmers), the incidence of wound infection [16]. Such infections are probably the direct result of an increase in tissue necrosis caused by heat.

Skin Lines

Mature, fine linear scars result from excisions or incisions planned so that the final scar lies in, or parallel to, the adjacent skin lines. Borges [3] has written extensively about skin lines and has listed 36 descriptive terms in the literature, including changing dimension lines, dynamic facial lines, force lines, Langer lines, Kocher lines, and relaxed skin tension lines. It is my observation that scars are less conspicuous if they follow *any* skin line. If there are conflicting directions of two or more lines, it is preferable to follow the relaxed skin tension line. An example of this line can be seen on the volar surface of the forearm, where the skin lines formed between a wide pinch with thumb and forefinger are longitudinal when the elbow is extended, but horizontal with the elbow flexed and the skin *relaxed.* In areas without skin lines, such as the open plain of the cheek of a young person, scars can be especially noticeable.

As a practical matter, scars will be least conspicuous when the following factors are considered:

WRINKLE LINES (INCLUDING THE LINES OF FACIAL EXPRESSION AND THE RELAXED SKIN TENSION LINES). The wrinkle lines of the skin generally lie perpendicular to the long axis of the underlying muscles and are caused by the wrinkling that accompanies muscular contraction [14]. Wrinkle lines of the face, known as the *lines of expression* [12] (Fig. 1-1), develop in a rather predictable pattern and are frequently used as a criterion for judging a person's age. The lines of facial expression are accentuated with smiling, grimacing, frowning, pursing the lips, and closing the eyes tightly. If for some reason these active responses are not possible, the skin can be approximated passively with a wide pinch of the thumb and index finger in various directions (relaxed skin tension lines). In this way the most prominent ridges and furrows will be produced in the natural wrinkle lines of the skin. In most instances, these relaxed skin tension lines will be the same as the lines of facial expression. Wrinkle lines in many parts of the body can best be seen by having the patient flex or extend the part.

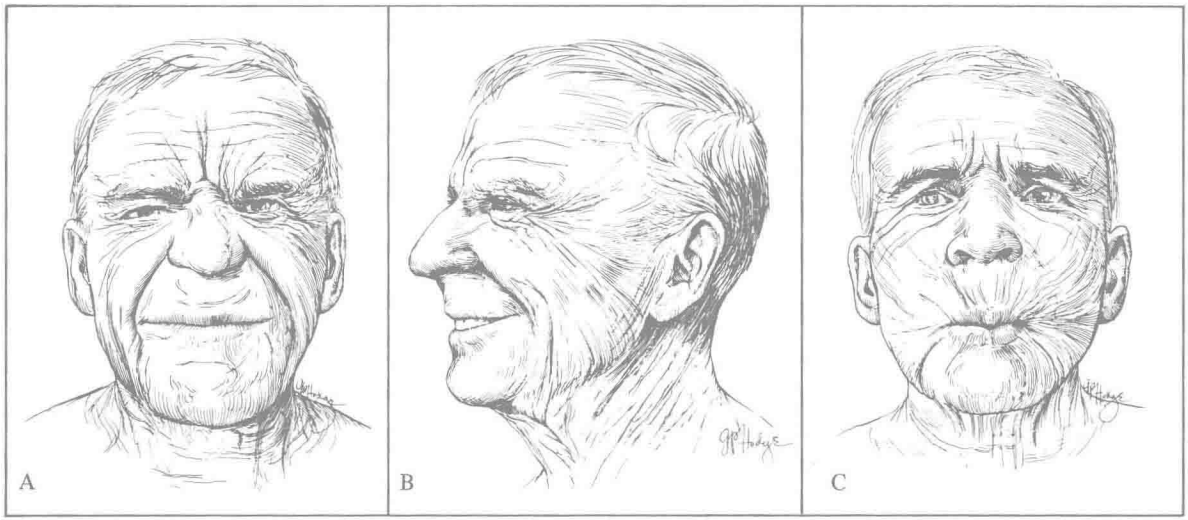

Fig. 1-1. Skin lines – the lines of facial expression, contour lines, and lines of dependency.

CONTOUR LINES. Contour lines are the lines of division at the juncture of body planes [20]. Examples are found at the juncture of the cheek with the nose, the cheek with the ear, the scalp with the ear, the skin of the lips with the vermilion (vermilion-cutaneous line), the cheek and neck skin in the submandibular region, and the juncture of the inferior aspect of the breast with the chest wall (inframammary fold). A favorite place to hide a scar is in the horizontal wrinkle line just under the chin, where it is usually out of sight.

LINES OF DEPENDENCY. The lines of dependency occur in older people due to the effect of gravity on loose skin and fatty tissue. The "turkey gobbler fold" in the submental region and the more laterally located jowl lines of the submandibular region are typical lines of dependency. The cross-hatching pattern of lines on the facial skin of elderly persons is partly due to the intersection of lines of dependency and lines of facial expression [20].

CONCEALING SCARS IN THE HAIR OF THE SCALP OR EYEBROW. This is an excellent way to camouflage a scar. Incisions in the lateral aspect of an eyebrow can be used for removing dermoid cysts from the lateral supraorbital rim and for internal wiring of fractures of the zygomaticofrontal suture line. The skin in this region is mobile, a factor that aids exposure even if the operative area does not lie exactly beneath the incision.

Scars located at the juncture of the scalp and facial skin are often poorly concealed because the fine hairs in this region are too short and sparse. However, in women this is not so much of a problem as the hair usually can be arranged to hide such scars. Scalp scars in men can be uncovered by progressing degrees of baldness.

In many areas of the body scars can be covered by clothing. This is particularly true for men, in whom scars on the lower neck, supraclavicular region, and extremities are covered by collars, shirts with sleeves, and trousers.

Age of the Patient

Children's scars can remain erythematous and hypertrophic for prolonged periods of time, and the final result may be less satisfactory under these circumstances. In general, such scars have a less desirable final appearance than scars of persons of middle age and older. A time lapse of two years or more is important to allow the normal process of maturation to alter the raised red scar into a flat white one.

Regions of the Body

Scars resulting from excisions or incisions in the eyelids, palms, soles, and in the vermilion or mucous membranes are usually finer and less conspicuous than those seen elsewhere [6]. This is especially true when contrasted with such areas as the sternal area, shoulder, and back. Before incisions are made in these areas, the patient should be warned that the scar will probably become hypertrophic. Particularly disappointing are scars of the sternal region in women, where a butterfly-shaped keloid often develops. When a keloid in this region is excised, a new and larger one may recur in its place. A further discussion of scars and keloids can be found in Chapter 29.