

RECONSTRUCTIVE
AND
REPARATIVE SURGERY

BY
HANS MAY, M. D.



RECONSTRUCTIVE AND REPARATIVE SURGERY

by HANS MAY, M.D., F.A.C.S.

Assistant Professor of Surgery, Graduate School of Medicine, University of Pennsylvania; Associate Surgeon, Lankenau Hospital, Children's Hospital of the Mary J. Drexel Home, and Chestnut Hill Hospital; Surgeon, Germantown Hospital; Consulting Plastic Surgeon, Abington Memorial Hospital, Memorial Hospital (Roxborough), Misericordia Hospital, Nazareth Hospital, and St. Christopher's Hospital for Children.

Foreword by
JAMES BARRETT BROWN, M.D., F.A.C.S.

*With 963 Illustrations
17 in Color*

PHILADELPHIA
F. A. DAVIS COMPANY • PUBLISHERS
1947

RECONSTRUCTIVE
AND REPARATIVE
SURGERY

COPYRIGHT, 1947,
BY
F. A. DAVIS COMPANY
Copyright, Great Britain. All Rights Reserved.

PRINTED IN THE UNITED STATES OF AMERICA

FOREWORD

MODERN plastic surgery got its start in World War I, and what was learned then was transferred to civilian use. During the intervening twenty-five years, great strides were made, and the tables were turned in World War II in that this civilian-gained knowledge could be turned back to the service for immediate use. Within the United States Army and Navy, during World War II, were built the largest plastic-surgery services in the history of surgery, and again young civilian surgeons gained knowledge in the services that can now be given back to civilians.

Plastic surgery has grown up, and the field has enlarged far beyond the knowledge of the few pioneers early connected with it. In this growth, new ideas have come forth from fields little known, and some worn-out edicts have been slowly evaded. Further growth is needed. To a large extent, this can only come from wide understanding of others, but the challenge is to the individual surgeon who is called on to make substitution for the deformed or the lost normal physiology and anatomy.

Contact with Dr. May has given me a chance of realizing his deep desire to produce a worthwhile record on these subjects, and to bring into book form discussions of many procedures and ideas that exist mainly in original articles.

Dr. May has gathered together the results of a large experience of his own in this country and from his former work in Germany with Dr. Lexer. He has also combed the literature of this and foreign countries, and has listed a great many procedures of other surgeons with drawings of their methods, and he has included appropriate editorial comment on them.

His concept of reconstructive surgery goes into many fields, especially orthopedics, and one will find bone, tendon, joint, nerve, blood-vessel, and genitourinary repair work included in his efforts. For this reason, the book will probably find a wide sale among those in general work or in isolated areas where surgeons are called on to perform multiple types of reconstructive procedures. Moreover, the reconstructive surgeon limited to a single field will find much of value and interest, for actual procedures are relatively few and they may be carried from field to field.

Dr. May's bibliographies include every surgeon identified with the work, and a liberal and fair evaluation has been given the whole gamut of endeavor. The large amount of bibliographical data is evidence of the growth of reparative surgery, and a few late articles and those to come in a year or so will not outdate the book. Where Dr. May has preferred one procedure to another, he has made it unequivocally plain. Disparagement has found no active place in his effort. Because of the wide field he has chosen to cover, and because he has done it in such a cumulative manner, procedures are emphasized according to his personal vantage point, from which he analytically surveys the approaches of others in the light of his own experience.

This book may be taken as a challenge to surgeons to keep up with the methods described, and many will be indebted to the author and will be looking forward to his willingness to undertake successive editions that reflect the best state of the work as the years go by.

JAMES BARRETT BROWN, M.D.

PREFACE

IN THE Preface of a book it is customary to explain why the book has been written or why in its particular form. There are good books available on reconstructive surgery; and if another one is to be added and is to be useful, it must present something new.

This book is intended to make general plastic and reconstructive surgery better known to the general surgeon. The trend of present-day medicine is toward specialization—justifiably so. If the tree is to grow, it must branch. But, as a rule, the more specialized the surgical field and the smaller its compass, the more it is removed from the domain of general surgery; yet each specialty contains much of interest to the general surgeon. Hence, the purposes of this book are to combine in one volume those attributes of the reconstructive specialties which may be of practical or theoretical interest to the general surgeon and to demonstrate the basic interrelationship of the various reconstructive fields.

A book like this can be of benefit only if it has practical value. Therefore, in the selection of material, an effort has been consistently made to present methods that have proved satisfactory in practice and final results, not only in my own experience but also in that of leading specialists. I wish to take this opportunity for expressing my appreciation for their valuable contributions. If sins of omission or actual errors have been committed, corrections will be gratefully accepted.

The book has five divisions: one on general principles, three on regional features, and one dealing with clinical examples. Division One contains general technic, grafting of tissue, transplantation of flaps, treatment of burns, wounds, and scars. Divisions Two to Four demonstrate the various reconstructive principles in the different parts of the body: head and neck, trunk, extremities other than hand and foot, and hand and foot. Reconstructive surgery deals mainly with the closure of defects and reconstruction in malformations; hence it was considered logical and practical to carry this theme throughout the discussions on regional procedures. Thus, these chapters have been subdivided, whenever possible, under the headings: Defects, Deformities (or Dysfunctions).

Since there is in each of us a little of Thomas the Doubter, I felt it important to give concrete evidence of the possibilities of the various methods by including a large number of clinical examples, which the reader may readily regard as important for their teaching-value. It turned out that each case involved numerous photographs and detailed descriptions, and, if interspersed in the main text, would inevitably have caused distraction; many of the cases also were referred to from different parts of the book. Therefore, to make the book more usable and practical, most of these clinical examples were gathered together in Division Five.

It is a source of great satisfaction to add that my interest in the profession of medicine is due to the influence and example of my beloved father, Julius May, M.D.; but the impetus of the book came as a result of my seven years of training (1927-1934) under Professor Erich Lexer in general and reconstructive surgery. These years were of lasting inspiration. Subsequent practical experience, research work, and visits and friendships here and abroad with authorities in the surgical reconstructive field further extended my horizons. I wish particularly to acknowledge my indebtedness to Dr. Robert H. Ivy and to Mr. William B. Davis, prominent Philadelphian, whose sustained interest in me gave hope that I should succeed in my chosen profession in this my adopted country.

HANS MAY, M.D.

ACKNOWLEDGMENTS

It is a particular pleasure to acknowledge the practical values that others have contributed to this book. For these activities, and for the cordial and sympathetic attitudes that accompanied them, I am deeply grateful.

The drawings were made by the celebrated medical illustrators, Mr. and Mrs. William B. McNett. Mrs. McNett made many drawings from actual operations, and her fine work and her patience were an exceptional contribution. The photography throughout was the work of Mr. E. Richard Deats.

Two authors have contributed writings to the book, Drs. David M. Davis and Coverley Smith. Dr. Davis wrote the material on congenital malformations of the urethra in the male (in Chapter XIX), and Dr. Smith, Chapter XIII, "Prosthetic Appliances for the Face." The author acknowledges their valuable contributions. Colonel James Barrett Brown reviewed much of the material of the book. Comments from such an illustrious source should be of great value to the profession.

To Drs. Robert H. Ivy, Chevalier L. Jackson, Sumner L. Koch, Ralph W. Maio, and Edmund B. Spaeth go my sincere thanks and acknowledgment for their help in reviewing chapters dealing with their specialties.

I also wish to express my appreciation and gratitude to Mrs. Laura M. Muller for bringing her mastery of languages to bear on the wording of the text; to my secretaries who transcribed the manuscript (Miss Marian E. Esterly, who is also responsible for the painstaking task of preparing the Index, and Mrs. Lucy Ford Steen); to those authors who so graciously permitted reproduction of their illustrations; to the Alien Property Custodian, who gave me permission for the use of illustrations from German books; and, last but not least, to the F. A. Davis Company—particularly Mr. Wendell H. Grenman, head of the medical editorial staff—for their excellent work in publishing the book.

HANS MAY, M.D.

CONTENTS

CHAPTER	<i>Division One. General Principles</i>	PAGE
I.	PREOPERATIVE PREPARATION, INSTRUMENTS, AND SUTURES.....	3
	Preoperative Preparation	3
	Instruments, Suture Materials, and Sutures.....	4
	Bibliography	12
II.	SHIFTING OF TISSUE, FREE TISSUE-GRAFTING, TRANSPLANTATION OF	
	FLAPS	13
	Shifting of Tissue for Closure of Surface Defects.....	13
	Free Tissue-Grafting	18
	Skin-Grafting	19
	Split Skin Grafts.....	25
	Full-Thickness Grafts	35
	Small Deep Skin Grafts	37
	Sieve Grafts	38
	Tunnel Grafts	38
	Cutis, or Dermal, Grafts.....	39
	Implantation, or Seed, Grafting.....	40
	Mucous-Membrane Grafts	40
	Fat-Tissue Grafts	40
	Fascia Grafts	42
	Striated-Muscle Grafts	43
	Tendon Grafts	43
	Blood-Vessel Grafts	45
	Nerve Grafts	47
	Cartilage Grafts	49
	Bone Grafts	51
	Transplantation of Flaps.....	56
	General Principles	57
	Open Pedicle Flaps.....	61
	Open Single-Pedicle Flaps.....	61
	Open Double-Pedicle Flaps.....	64
	Tube Flaps	66
	The Partly Tubed Flap	75
	The Thoracoepigastric Tube Flap.....	76
	Bibliography	79

CHAPTER	PAGE
III. WOUND-HEALING AND TREATMENT OF WOUNDS.....	84
The Healing Process.....	84
Treatment of Wounds.....	85
Emergency Treatment	86
Final, or Definitive, Treatment.....	86
Wounds in Stage of Contamination.....	87
Wounds in Stage of Infection	96
Bibliography	98
IV. TREATMENT IN MAJOR AND MINOR BURNS.....	102
Treatment of Extensive Burns.....	106
Immediate Treatment	107
Late Treatment	111
Burns of Face, Extremities, Perineum, and Genitalia..	112
Treatment of Minor Burns	113
Bibliography	113
V. OPERATIVE CORRECTION OF SCARS.....	117
Simple Scars	117
Extensive Scars	120
Bibliography	122

Division Two. The Head and Neck

VI. INTRODUCTORY ASPECTS OF HEAD AND NECK.....	125
General Considerations	125
Anesthesia in Surgery of Head and Neck.....	126
Bibliography	127
VII. THE CHEEK, TEMPLE, AND SKULL REGIONS.....	128
Defects	128
Defects Involving Skin Only.....	128
Defects of Skin and Subcutaneous Tissue	129
Defects of Skin and Muscle	130
Defects of Full Thickness of Cheeks.....	130
Defects of Lining of Cheeks.....	131
Defects of Skull	131
Defects of Stensen's Duct (Salivary Fistula)	135
Deformities	136
Palsy from Peripheral Lesion of Facial Nerve.....	136
Depressions from Skeletal Injuries or Destruction...	143
Depressions Due to Destruction or Atrophy of Soft	
Parts	143
Correction of Facial Wrinkles.....	145
Bibliography	147

CHAPTER

PAGE

VIII. THE LIPS, CHIN, AND PALATE.....	149
Defects.....	149
Wounds of Lips.....	149
Defects of Vermilion Border of Lips.....	149
Full-Thickness Defects of Lips.....	152
Vertical Defects.....	152
Horizontal Defects.....	157
Defects of Lower Lip and Chin without Loss of Bone.....	164
Defects of Lower Lip, Chin, and Mandible.....	173
Defects of Commissure of Mouth and Parts of Adja- cent Cheek.....	174
Clefts of Lip and Palate.....	175
Classification of Clefts.....	175
General Considerations.....	176
Cleft Lip.....	179
Total Unilateral Cleft.....	183
Complete Cleft Lip.....	199
Incomplete Cleft Lip.....	200
Total Bilateral Cleft Lip.....	203
Secondary Deformities Following Repair of Cleft Lip.....	208
Cleft Palate.....	214
Cleft of Soft Palate and Posterior Part of Hard Palate.....	217
Unilateral Cleft Palate.....	231
Extensive Postalveolar (Bilateral) Clefts....	234
Clefts Associated with Short Palate.....	238
Secondary Repair of Palatine Defects.....	244
Speech-Training and Orthodontia.....	244
Deformities.....	245
Microstoma.....	245
Cicatricial Ectropion of Lips.....	246
Cicatricial Entropion and Reconstruction of Obliter- ated Gingivolabial Sulcus.....	246
Cicatricial Displacement of Angle of Mouth.....	246
Hypertrophy of Lip and Double Lip.....	247
Bibliography.....	248
IX. THE NOSE AND INTRANASAL REGIONS.....	251
Defects.....	252
Defects of Skin of Nose.....	253
Defects of Columella.....	253
Defects of Tip of Nose.....	254

CHAPTER

Defects (*Continued*)

PAGE

Defects of Ala	254
Small Defects of Ala Near Nasal Tip.....	255
Medium-Sized Defects of Ala Near Nasal Tip....	255
Small and Medium-Sized Defects Near Base of Ala	256
Defects of Rim of Ala.....	257
Defects of Entire Ala	257
Full-Thickness Defects of Parts of Osseous or Carti-	
laginous Vaults	262
Subtotal and Total Defects of Nose.....	262
Forehead Flap	263
Arm Flap	265
Deformities	267
Hump Nose	268
Long Nose	272
Deformities about Nasal Tip.....	273
Deformities of Columella	276
Deformities of Nostrils	276
Saddle Nose	277
Traumatic Saddle Nose	277
Syphilitic Saddle Nose	279
Loss of Framework and Lining.....	279
Loss of Skin, Framework, and Lining	281
Deflection of Nose.....	281
Rhinophyma	285
Bibliography	285
X. THE EYELIDS, EYEBROWS, AND ORBITS.....	287
Defects	287
Defects of Eyelids.....	287
Wounds of Eyelids.....	288
Defects of Skin of Eyelids.....	289
Defects of Full Thickness of Eyelids.....	291
Defects of Margin of Lower Lid.....	293
Vertical Defects (Colobomas)	295
Defects of Canthal Angles	298
Defects of Entire Lid.....	298
Defects of Eyelashes and Eyebrows.....	304
Defects of Orbits	306
Contracted Socket	306
Exenteration of Orbit and Repair	308
Bony Defects of Orbit.....	310
Deformities	310

CONTENTS

xv

CHAPTER	Deformities (<i>Continued</i>)	PAGE
	Ectropion	310
	Paralytic or Senile Ectropion.....	311
	Entropion	313
	Spastic Entropion	313
	Cicatricial Entropion	313
	Blepharoptosis	315
	Incomplete Ptosis	317
	Shortening and Advancement of Musculus	
	Levator Palpebrae Superioris	317
	Complete Ptosis with Paralysis of Musculus Rectus	
	Superior	318
	Utilization of Action of Musculus Epicranius	318
	Complete Ptosis without Paralysis of Musculus	
	Rectus Superior	321
	Utilization of Action of Musculus Rectus	
	Superior	321
	Epicanthus.....	323
	Redundant Skin of Eyelids	325
	Bibliography	326
XI.	THE EXTERNAL AUDITORY STRUCTURES	328
	Defects	328
	Holes in Concha	329
	Partial Defects of Concha and Helix.....	331
	Total Defect of External Ear.....	332
	Absence of Helix	336
	Absence of Lobe	337
	Deformities	337
	Protruding Ears	337
	Large Ears	341
	Cauliflower Ears	342
	Bibliography	342
XII.	THE OSSEOUS FRAMEWORK OF THE FACE.....	343
	Defects	343
	Fractures of Mandible.....	343
	Anatomy	343
	Symptoms, Signs, and Diagnosis	345
	Treatment	346
	Treatment in Special Cases.....	352
	Fractures of Maxilla	357
	Fractures of Alveolar Process.....	357
	Unilateral Fractures of Body of Maxilla.....	357
	Bilateral Horizontal Fractures of Body of Maxilla	358

CHAPTER	Defects (<i>Continued</i>)	PAGE
	Fractures of Malar Bone and Zygomatic Arch.....	362
	Fractures of Nasal Bones	365
	Deformities and Dysfunctions.....	366
	Mandibular Prognathism	366
	Retrusion of Mandible.....	368
	Open Bite	369
	Bony Ankylosis of Temporomandibular Joint.....	370
	Bibliography	370
XIII.	PROSTHETIC APPLIANCES FOR THE FACE.....	373
	Pure Silver in Facial Prosthesis.....	376
	Prevulcanized Latex in Facial Prosthesis.....	381
	Bibliography	382
XIV.	THE NECK, LARYNX, AND TRACHEA.....	383
	Defects	383
	Deformities	384
	Cicatricial Contractures	384
 <i>Division Three. The Trunk</i> 		
XV.	INTRODUCTORY ASPECTS OF THE TRUNK.....	389
	Anesthesia	389
	Bibliography	389
XVI.	THE ABDOMINAL WALL AND THE BACK.....	391
	Defects of Abdominal Wall.....	391
	Incisional Hernia Requiring Tissue Grafts for Closure	391
	Deformities of Abdominal Wall.....	392
	Adipose Abdomen	392
	Defects of Back.....	395
	Decubital Ulcers	395
	Bibliography	396
XVII.	MAMMAPLASTIC PROCEDURES IN THE FEMALE.....	397
	Hypertrophic Pendulous Breasts.....	397
	Plastic Amputation	406
	Small Breasts	409
	Inverted Nipples	410
	Bibliography	411
XVIII.	CONSTRUCTION OF EXTRATHORACIC ESOPHAGUS.....	413
	Survey of Procedures.....	413
	Jejunodermatoesophagoplasty	416
	Total Intestinal Esophagoplasty.....	421
	Bibliography	424

CONTENTS

xvii

CHAPTER	PAGE
XIX. THE GENITALIA IN MALE AND FEMALE	425
Defects	425
Loss of Skin of Penis and Scrotum.....	425
Absence of Vagina.....	426
Deformities	428
Hypospadias	428
Epispadias	443
Phimosis	446
Meatal Stenosis	450
Accessory Urethra	451
Occlusion of Meatus.....	451
Bibliography	451
XX. DEFECTS OF SPHINCTER ANI MUSCLE.....	453
Total Defect of Sphincter Muscle.....	453
Partial Defect of Sphincter Muscle.....	457
Bibliography	459

Division Four. The Extremities

XXI. INTRODUCTORY ASPECTS OF THE EXTREMITIES	463
Anesthesia in Surgery of Extremities.....	463
Bibliography	464

SECTION ONE. THE EXTREMITIES OTHER THAN HAND AND FOOT

XXII. SKIN, SUBCUTANEOUS TISSUE, AND THE FASCIAE.....	467
Defects	467
Accidental Defects	467
Chronic Ulcers	468
Varicose Ulcers	468
Chronic Undermining, Burrowing Ulcers.....	470
Deformities and Dysfunctions.....	472
Cicatricial Contractures	472
Axilla	473
Elbow Joint	476
Wrist	477
Hip Joint	477
Knee Joint	478
Ankle Joint	479
Elephantiasis	480
Acquired Elephantiasis	480
Congenital Elephantiasis (Milroy's Disease)	482
Bibliography	483

CHAPTER	PAGE
XXIII. THE MUSCLES AND TENDONS.....	484
Traumatic Defects	484
Hernia of Muscles.....	484
Rupture of Muscles and Tendons.....	484
Rupture of Musculus Supraspinatus	485
Rupture of Musculus Biceps Brachii	486
Rupture of Musculus Quadriceps Femoris	488
Rupture of Tendo Calcaneus	490
Dysfunctions	490
Dislocation of Tendons	490
Lengthening of Tendons	491
Shortening of Tendons.....	492
Transposition of Tendons.....	494
Bibliography	495
XXIV. THE MOTOR NERVES.....	497
Open Injuries	497
Subcutaneous Injuries	501
Bibliography	502
XXV. THE BLOOD VESSELS	503
Open Injuries	503
Subcutaneous Injuries and Lesions	508
Rupture of Vessels.....	508
Acute Arterial Occlusion (Arterial Embolism)	508
Arterial Aneurysm	513
Arteriovenous Aneurysm	518
Bibliography	521
XXVI. THE BONE STRUCTURES.....	523
Surgical Approaches	523
Humerus	523
Radius and Ulna.....	526
Femur	531
Fibula	533
Tibia	536
Defects	536
General Directions	536
Humerus	541
Ulna and Radius.....	542
Femur	543
Tibia	550
Deformities	553
Diaphysis	553