Tympanoplasty, Mastoidectomy, and Stapes Surgery

Ugo Fisch

in collaboration with John May

140 illustrations by Ugo Fisch and Ivan Glitsch
36 tables
Important Note: Medicine is an ever-changing science undergoing continual development. Research and clinical experience are continually expanding our knowledge, in particular our knowledge of proper treatment and drug therapy. Insofar as this book mentions any dosage or application, readers may rest assured that the authors, editors and publishers have made every effort to ensure that such references are in accordance with the state of knowledge at the time of production of the book.

Nevertheless this does not involve, imply, or express any guarantee or responsibility on the part of the publishers in respect of any dosage instructions and forms of application stated in the book. Every user is requested to examine carefully the manufacturers' leaflets accompanying each drug and to check, if necessary in consultation with a physician or specialist, whether the dosage schedules mentioned therein or the contraindications stated by the manufacturers differ from the statements made in the present book. Such examination is particularly important with drugs that are either rarely used or have been newly released on the market. Every dosage schedule or every form of application used is entirely at the user's own risk and responsibility. The authors and publishers request every user to report to the publishers any discrepancies or inaccuracies noticed.

Any reference to or mention of manufacturers or specific brand names should not be interpreted as an endorsement or advertisement for any company or product.

Some of the product names, patents and registered designs referred to in this book are in fact registered trademarks or proprietary names even though specific reference to this fact is not always made in the text. Therefore, the appearance of a name without designation as proprietary is not to be construed as a representation by the publisher that it is in the public domain.

This book, including all parts thereof, is legally protected by copyright. Any use, exploitation or commercialization outside the narrow limits set by copyright legislation, without the publisher's consent, is illegal and liable to prosecution. This applies in particular to photostat reproduction, copying, mimeographing or duplication of any kind, translating, preparation of microfilms, and electronic data processing and storage.
Every surgical move should be, as in a chess-game, the result of a logical plan. Surgical disasters are usually the consequence of ill-conceived and therefore hazardous actions. Only the constant use of reasonable and logic principles based on knowledge and experience will allow the surgeon to react adequately, even when facing the most unexpected situation.

The aim of this book is to convey a logical approach to the most common problems in otologic surgery. To realize this purpose we have not reviewed all available techniques of tympanoplasty, mastoidectomy, and stapes surgery, but only considered those that have proven of value during 30 years of otologic practice and teaching. Particular care has been taken to explain the reasons determining the choice of a particular technique. Revision surgery, which is the natural harvest of prolonged activity in the otologic field, offered sufficient opportunity to assess the validity of the surgical principles illustrated in this book. Adequate exposure remains the main prerequisite for successful surgery. Most failures of myringoplasty are the consequence of inadequate canalplasty. Wet open cavities are usually the result of insufficient exteriorization. Failures in stapes surgery often derive from limited exposure through a narrow external auditory canal. To achieve adequate exposure, one must be prepared to enlarge a microsurgical keyhole rather than to use inadequately small keys.

The joint preventive efforts of pediatricians and ENT specialists have reduced, in developed countries, the number of patients in need of otologic surgery. The corresponding dilution of surgical expertise has increased the need for simple and reliable otologic techniques. We prefer the endaural approach to the transcanal use of the ear speculum because it provides a larger exposure and allows the use of both hands for ossicular reconstruction and stapes surgery. In view of the reduced opportunities for surgical experience, residents and practicing otologists should also learn to accept their limitations. One should be prepared to refer rare and complex pathologies to those with greater experience and to step out in due time from too difficult surgical adventures to avoid disaster.

The danger of a surgical manual is that it may give a false impression of simplicity and ease. This is why we have attached great importance to the meticulous description of each surgical step. The illustrations in this manual were made by the author and are intended to convey essential surgical features rather than to be a realistic reproduction of a given anatomical situation.

Of course, the manual skills required to perform safe surgery can only be acquired by temporal bone dissection in the laboratory and by carefully supervised surgery in the operating room. Only in this way can one learn to perform an adequate canalplasty reducing the overhang of the anterior canal wall without breaking into the temporoman-dibular joint, to safely skeletonize the semicircular canals and the tympanomastoid segments of the fallopian canal for the correct ex-enteration and exteriorization of the retro-
and supralabyrinthine pneumatic spaces, and to perform the steps of stapes surgery with sufficient delicacy of touch. We have tried to make the reader aware of these difficulties throughout the book, particularly in the "rules and hints" sections following each chapter.

A book like this is the result of the effort of many people. I am very grateful to my wife, Monica, for having gracefully accepted that many weekends and vacations were absorbed by the preparation of this book. Sincere thanks go to Mrs. Ch. Hofmann for the invaluable help in typing the manuscript, to Mrs. B. Schmugge for the precious computer instructions, and to Mrs. A. Rapold for trying the impossible and giving me time to write this book within my endless working schedule. I also have to acknowledge the invaluable and dedicated help of Mrs. R. Brandstatter and Mrs. E. Haukenfrers in the operating room, and in compiling the list of instruments cited in this book. My special gratitude goes to Mr. I. Glitsch, who has agreed to give his unique professional touch to the illustrations in spite of his well-deserved retirement and to Dr. John May who, after spending a year of fellowship with us, has taken the trouble to revise the manuscript and to offer many suggestions for its improvement. My thanks also go to Dr. R. Zane, Houston, for his help in correcting the galley proofs. Finally I have to acknowledge the great help of Mr. Menge, Mr. Schafer, and Ms. Solaro of Thieme, who have used all their expertise to put this book in the proper printed shape.

It is my hope that this manual will help residents find a reliable way through the complex and fascinating world of otologic surgery and be of value to the ENT practitioners in solving some of their challenging daily problems.

Zurich, Spring 1994

U. Fisch
Chapter 1

Tympanoplasty

General Considerations .......................... 2
1. Definitions ..................................... 2
2. Aims of Tympanoplasty .......................... 2
3. Preoperative Care ............................... 2
  3.1 Preoperative Investigations ................. 2
  3.2 Rules for Preoperative Treatment .......... 3
  3.3 Antibiotic Treatment ........................ 3
  3.4 Preoperative Preparation .................... 3
4. Postoperative Care ............................. 4

4.1 Myringoplasty, Tympanoplasty ................. 4
4.2 Open Cavity (Radical Mastoido-Epitympanectomy with Tympanoplasty) ................. 4
5. Anesthesia ..................................... 4
  5.1 Local Anesthesia .............................. 4
  5.2 General Anesthesia ............................ 5
6. Facial Nerve Monitoring .......................... 6
7. Instrumentation ................................. 6
8. Rules and Hints ................................. 7

Chapter 2

Myringoplasty

General Considerations .......................... 10
1. Definitions ..................................... 10
2. Surgical Approaches ............................ 10
  2.1 Transcanal Approach .......................... 10
  2.2 Endaural Approach ............................ 10
  2.3 Retroauricular Approach ...................... 12
3. Selection of Surgical Approach ................. 13
4. Grafting Technique ............................. 13
  4.1 Anterior Underlay ............................ 14
  4.2 Overlay ...................................... 14

Specific Surgical Techniques ..................... 15
1. Transcanal Approach ............................ 15
  1.1 Surgical Technique ........................... 15
  1.2 Surgical Highlights .......................... 15
  1.3 Surgical Steps ............................... 16
2. Endaural Approach .............................. 17
  2.1 Surgical Technique ........................... 17
  2.2 Surgical Highlights .......................... 17
  2.3 Surgical Steps ............................... 18
3. Retroauricular Approach ....................... 19
  3.1 Surgical Technique ........................... 19
  3.2 Surgical Highlights .......................... 19
  3.3 Surgical Steps ............................... 19
## Contents

1.2 Permanent Ventilating Tube (Grommet) ................................... 122
2. Temporary Round Window Electrode ...................................... 123
3. Canalplasty for Exostosis .................................................. 126
4. Canalplasty for Otitis Externa Obliterans .............................. 130
5. Congenital Aural Atresia .................................................. 133
5.1 Surgery for Aural Atresia .............................................. 134
5.2 Surgery for Aural Atresia in Combination with Plastic Reconstruc-

## Chapter 5

### Mastoidectomy

#### General Considerations ........................................ 146
1. Definitions ......................................................... 146
2. Cholesteatoma ...................................................... 146
3. Classification of Cholesteatoma ........................................ 146
4. Surgical Treatment of Acquired Cholesteatoma ................... 151

#### Specific Surgical Techniques for Cholesteatoma Removal ...... 154
1. Closed Mastoido-Epitympanectomy with Tympanoplasty (closed MET) ................................................... 154
2. Open Mastoido-Epitympanectomy with Tympanoplasty (open MET) ................................................... 164
3. Tympanoplasty in Open Mastoido-Epitympanectomy ............ 180
4. Anterior Underlay Grafting ......................................... 180
5. Overlay Grafting .................................................... 182
6. Exteriorization of Open Cavity ....................................... 184
7. Poorly Pneumatized Mastoid ......................................... 184
8. Highly Pneumatized Mastoid ......................................... 186
9. Exteriorization of the Epitympanum ................................ 188
10. Meatoplasty ....................................................... 190
11. Wound Closure and Packing ........................................ 193
12. Results of Surgery for Cholesteatoma .............................. 194
13. Recurrent and Residual Cholesteatoma ............................. 194
14. Postoperative Cavity Problems ...................................... 195
15. Revision Surgery in Open Cavity ................................... 195
16. Rules and Hints ..................................................... 197

## Chapter 6

### Special Applications of Mastoidectomy ............................. 199
1. Reconstruction of Open Cavity ..................................... 200
1.1 General Concepts .................................................. 200
1.2 Surgical Technique .................................................. 200
2. Cochlear Implant ...................................................... 201
3. Results ............................................................. 208
4. Rules and Hints ...................................................... 208
Chapter 7

Stapes Surgery

General Considerations ........................................... 212
1. Stapedotomy versus Stapedectomy .................. 212

Specific Surgical Techniques ............................. 214
1. Stapedotomy ............................................. 214
2. Stapedectomy ........................................... 228
2.1 Construction of Wire Connective-Tissue Prosthesis .. 230

Chapter 8

Special Applications of Stapes Surgery ............. 235
1. Incus Replacement with Stapedotomy (IRS) for Malleus and/or Incus Fixation in Otosclerosis .................. 236
2. Obliterative Otosclerosis .............................. 240
3. Floating Footplate ...................................... 242
4. Narrow Oval Window Niche ............................ 243
5. Short Incus ............................................. 245
6. Anomalous Facial Nerve ................................. 246
6.1 Vestibulotomy ......................................... 246
6.2 Promontorial Cochleostomy ......................... 248
7. The Missing Stapes ....................................... 248
7.1 Identifiable Oval Window Niche ................. 248
7.2 Unidentifiable Oval Window Niche ............... 248
8. Revision Stapedectomy or Stapedotomy ............. 253
8.1 Reobliteration of Oval Window .................... 253
8.2 Migration of Prosthesis Shaft ..................... 253
8.3 Detachment of Prosthesis Loop .................... 255
9. Stapedotomy in Fenestrated Ears ..................... 258
10. Stapes Surgery in Tympanosclerosis ................ 260
11. Results of Stapes Surgery ............................. 263
11.1 Stapedectomy versus 0.6-mm Stapedotomy ........ 263
11.2 Stapedotomy (0.4 mm) .............................. 265
11.3 Sensorineural Deafness Following Stapes Surgery .. 267
11.4 Revision Surgery ....................................... 267
11.5 Results of Stapedectomy in the Presence of Unmeasurable Preoperative Hearing ...................... 269
11.6 Results of Stapes Fixation without Otosclerosis .. 269
12. Rules and Hints ......................................... 270

Appendix: Instrumentation, Manufacturers, and Suppliers of Microsurgical Equipment ................................................. 273

Index ..................................................................... 279
Tympanoplasty, Mastoidectomy, and Stapes Surgery. Author: Fisch, May, Linder, Porcellini. Line diagrams used throughout the book are clear and easy to follow...One is taken step by step through the various surgical processes in such a logical way that one is tempted to wonder why one never through of some of the solutions before...This second edition can be regarded as the standard reference and surgical guide for this subject...Few surgeons will ever amass Fisch's experience but, with this book, they will be prepared to tackle almost all eventualities.--The Annals of the Royal College of Surgeons of England

Praise for the previous edition:
Very well written...the definitive re