

Melvin A. Shiffman
Editor

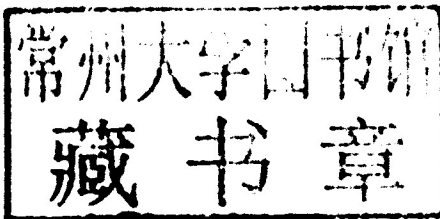
Advanced Cosmetic Otoplasty

Art, Science,
and New Clinical
Techniques

Melvin A. Shiffman
Editor

Advanced Cosmetic Otoplasty

Art, Science, and New Clinical
Techniques



Springer

Editor

Melvin A. Shiffman, M.D., J.D.
Tustin, California
USA

ISBN 978-3-642-35430-4 ISBN 978-3-642-35431-1 (eBook)
DOI 10.1007/978-3-642-35431-1
Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2013941900

© Springer-Verlag Berlin Heidelberg 2013

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed. Exempted from this legal reservation are brief excerpts in connection with reviews or scholarly analysis or material supplied specifically for the purpose of being entered and executed on a computer system, for exclusive use by the purchaser of the work. Duplication of this publication or parts thereof is permitted only under the provisions of the Copyright Law of the Publisher's location, in its current version, and permission for use must always be obtained from Springer. Permissions for use may be obtained through RightsLink at the Copyright Clearance Center. Violations are liable to prosecution under the respective Copyright Law.

The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.

While the advice and information in this book are believed to be true and accurate at the date of publication, neither the authors nor the editors nor the publisher can accept any legal responsibility for any errors or omissions that may be made. The publisher makes no warranty, express or implied, with respect to the material contained herein.

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)

Advanced Cosmetic Otoplasty

Foreword

It gives me great pleasure and privilege to write a foreword to this book titled *Advanced Cosmetic Otoplasty: Art, Science, and New Clinical Techniques*. Having been involved with cosmetic surgery for over 30 years, I find that very little has been focused on the aesthetic otoplasty in facial rejuvenation, and details of various techniques are lacking. The ears are a vital part in the beauty and symmetry of the face, and it is often forgotten or neglected. Over the years, children and adults can have a huge complex about their ears. It also varies with trends, as adults sometimes wear their hair short, or with career moves, for instance, if a person goes into the army. Also children are often teased at school because of their ears.

Otoplasty (Greek *ōtoûs*, ear + *plassein*, to shape) denotes the surgical and nonsurgical procedures for correcting the deformities and defects of the pinna (external ear).

All those who practice otoplasty surgery are very aware that this seemingly simple surgery is far from straightforward. In fact, it is very difficult to achieve consistently good results. Any text to improve the knowledge of otoplasty is welcomed. If you as a surgeon sometimes feel overwhelmed to organize the fundamental concepts of certain fields, it is great to have one book at hand, as an invaluable resource to enlarge your knowledge and practice.

Very little advances have been noted over the years since otoplasty was developed in ancient India, in the fifth century BC by Sushruta, the ayurvedic physician. He developed otoplastic and other plastic surgical techniques and procedures at that time. Then in the nineteenth century Johann Friedrich Dieffenbach (1794–1847) reported the first surgical approach for the correction of prominent ears. This was a combination otoplasty procedure that featured the simple excision (cutting) of the problematic excess cartilage from the posterior sulcus (back groove) of the ear and the subsequent affixing, with sutures, of the corrected pinna to the mastoid periosteum, the membrane covering the mastoid process at the underside of the mastoid portion of the temporal bone, at the back of the head.

In 1920, Harold D. Gillies (1882–1960) first reproduced the pinna by burying an “external-ear support framework,” made of autologous rib cartilage, under the skin of the mastoid region of the head, which reconstructed the pinna. He then separated this from the skin of the mastoid area by means of a cervical flap. In 1937, Dr. Gillies also attempted a similar pediatric ear reconstruction with a pinna support framework fabricated with maternal cartilage. That otoplasty correction technique proved inadequate, because of the problems inherent

to the biochemical breakdown and elimination (resorption) of the cartilage tissue by the patient's body. After this came the Mustardé technique for creating an antihelical fold, the Merck method technique, and the incisionless Fritsch otoplasty. As you can see, after that period very little advancements have been made in this field, hence the importance of this book.

The trend of the last century is to look younger. This is due to many factors: improved technology and emphasis on beauty – we have become a society of “appearance.”

This book is aimed at all types and ages of surgeons, to help them to choose the best technique that works for them, and the preoperative and post-operative management.

A big thank you to Dr. Shiffman on this book for imparting his time and knowledge in this field.

The format is splendid. The heading and the text are richly articulate and it is a pleasure to read. Dr. Shiffman has helped to create a beautiful surgical text book, for all surgeons interested to learn about otoplasty, at all levels of expertise. This book delivers to the reader basic principles, advanced techniques, and innovations. This book is an essential tool for the contemporary surgeon. It defines what we do, how we do it, and, most importantly, why we do it.

Congratulations to Dr. Shiffman on such hard work. I wish the book every success.

Mr. (Dr.) Anthony Erian, M.D., FRCS (Lon), FRCS (Edin)

Consultant Plastic Surgeon

President of the International Board of Cosmetic Surgery

President of the European Society of Aesthetic Surgery

Wimpole, Cambridge, UK

Anthony Erian, M.D.

Preface

There are only a few books on rhinoplasty and most are limited to the editor's techniques or those of a few contributors. These give restricted information on the variety of procedures that are available and are mainly for teaching the inexperienced and somewhat experienced surgeons how to do rhinoplasty and possibly stay out of trouble.

This book on *Advanced Aesthetic Otoplasty: Art, Science, and New Clinical Techniques* gives a history of otoplasty and a detailed analysis of the newer techniques that are available in otoplasty. National and international experts of newer procedures report on subjects covering ear embryology and anatomy, surgical techniques of otoplasty, the possible risks and complications of otoplasty, and outcomes in otoplasty. This concept of gathering new techniques from international experts is not present in any other book on otoplasty, and the information is extensive and quite different from even recent books on otoplasty. The book is for the inexperienced, experienced, and the very experienced surgeon doing rhinoplasties.

The editor wishes to present advanced technology and clinical techniques in otoplasty from unique contributors experienced with these procedures that are modified or original procedures. The contributors are inventive and eloquent in presenting to the reader a way to progress from inexperienced or experienced surgeons in rhinoplasty to better understanding that there is more than following simplified techniques as a template to performing a procedure that is fraught with possible risks and complications.

All cosmetic surgeries are potential problems if the patient is not properly evaluated preoperatively, not only physically but also mentally. This is most true with the patient considering otoplasty. However, the satisfaction of the patient who has a good result is inestimable.

Tustin, CA, USA

Melvin A. Shiffman, M.D., J.D.

Contents

Part I Anatomy

- 1 Embryology and Anomalies of the External Ear** 3
Jeremiah C. Tracy, Arnold S. Lee, Andrew R. Scott,
and Collin S. Karmody
- 2 Anatomy of the External Ear** 15
Peter M. Prendergast
- 3 Anatomy, History, and Utility of the Posterior
Auricular Fascia in Otoplasty** 23
Kayvan Shokrollahi and James P. Taylor

Part II Preoperative

- 4 The Timing of Otoplasty** 37
Patrick M. Spielmann and Michel Neeff

Part III Techniques

- 5 History of Otoplasty: Review of Literature** 43
Melvin A. Shiffman
- 6 Current Trends in Otoplasty** 65
Rajanya S. Petersson
- 7 Hair Preparation in Otoplasty** 81
Esta S. Bovill
- 8 Practical Perioperative Otoplasty Preparation** 83
Richard A.J. Wain
- 9 Practical Tips for Otoplasty** 89
Ahmad F. Bhatti and Antonio Orlando
- 10 Nuances of Otoplasty** 95
Nathan T.N. Schreiber and Steven R. Mobley
- 11 Anterior Versus Posterior Approach to Otoplasty** 111
Rosa Maria Echarri, Mónica Hernando,
and Guillermo Plaza

12 Minimally Invasive Otoplasty: Technical Details and Long-Term Results	119
Antonio de la Fuente and Gustavo Sordo	
13 Treatment of Prominent Ear Anomalies	127
Amy S. Xue, Edward I. Lee, Shayan Izaddoost, and Samuel Stal	
14 Precision and Suture Positioning in Otoplasty: Aspiring to the “Virgin” Ear	139
Kayvan Shokrollahi	
15 Otoplasty with Mustarde Suture Cartilage Scratching and Rasping	143
Kutlu Sevin and Asuman Sevin	
16 The Négrevergne Otoplasty Technique	149
Murat Songu	
17 Island Technique for Prominent Ears	163
Ivo Pitanguy and Henrique N. Radwanski	
18 Otoplasty and Earlobe Repair	171
David J. Archibald and Edward H. Farrior	
19 The Bauer Otoplasty Technique	183
Ahmed M.S. Ibrahim, Samuel J. Lin, and Bruce S. Bauer	
20 Use of Multiple Techniques for Otoplasty (Stenstrom, Mustarde, Furnas)	197
Jack A. Friedland and Renata Souza Maricevich	
21 Combined Technique in Aesthetic Otoplasty	209
Marzia Salgarello and Giuseppe Visconti	
22 Incisionless Otoplasty	235
Yaşar Çokkeser	
23 Incisionless Otoplasty	245
Michael H. Fritsch	
24 Carbon Dioxide Laser-Assisted Cartilage Reshaping Otoplasty for Prominent Ears	249
Ahmed Ragab	
25 Sutureless Otoplasty: Anterior Scoring of the Antihelical Fold	267
Asif Zubair Bhatti and Muhammad Ijaz	
26 Anterior Scoring of the Upper Helical Cartilage as a Refinement of the Chong-Chet Technique in Otoplasty	271
Corrado Rubino, Francesco Farace, and Mario Faenza	
27 Anterior Scoring Technique in Otoplasty	279
Louise Caouette-Laberge and Patricia Bortoluzzi	

28 Prevention of Intra-Auricular Deformity in Prominent Ear Correction	297
Tomohisa Nagasao	
29 Can Diathermy Enhance Scoring in Otoplasty?	311
Terry Gourlay and Ekpemi Irune	
30 Diamond Burr Drill Use in Otoplasty	323
Yogesh Bajaj and Natasha Choudhury	
31 Conchal Setback Without Resection in Prominent Ear Deformity	329
Naci Karacaoglan, Mustafa Keskin, and Bulent Cigsar	
32 Cartilage Folding Technique in Otoplasty	337
Cristina Isac and Aurelia Isac	
33 Cartilage-Sparing Aesthetic Otoplasty	363
Fernando D. Burstein	
34 Posterior Suturing with Postauricular Fascial Flap Otoplasty	371
Mark V. Schaverien and Kenneth J. Stewart	
35 The Role of the Postauricular Fascia in Otoplasty: A Complete System for Otoplasty	381
Kayvan Shokrollahi	
36 Posterior Auricular Muscle Flap with Otoplasty	399
Ilker Yazici	
37 Various Applications of Retroauricular Advancement Skin Flap to Treat the Surgical Defect of the Ear	407
Peter Kim	
38 The Tubular Technique in Otoplasty	415
Vladimir Kljajic, Ljiljana Vlaski, Jovan Radmanovic, and Slobodan Savovic	
39 The Deep Conchal Bowl: Accentuation of the Helical Crus	421
Sapna Patel and Kathleen C.Y. Sie	
40 Otoplasty for the Treatment of Protuberant Ears	425
Payal Patel, Emil Bisaccia, and Dwight A. Scarborough	
41 Separating the Helix from the Antihelix: A New Concept in Prominent Ear Correction	437
Augusto Sette Câmara Valente	
42 Balanced Otoplasty: Dividing the Ear into Vertical Thirds	453
Samuel M. Lam	

43 Reduction Otoplasty for Correction of the Large or Asymmetrical Ear	469
Christopher J. Coombs and Alex Yuen	
44 Correction of the Protruding Lobule	477
Cristina Isac and Aurelia Isac	
45 Repair of Split Earlobe with Free Conchal Cartilage Sandwich Graft	481
Rajiv Agarwal	
46 Prominent Lobule Correction in Otoplasty: With Step-by-Step Description of the “Y to V Setback” Technique	493
Yigit Ozer Tiftikcioglu and Ufuk Bilkay	
47 Compression Treatment of Ear Keloids by a Modified Oyster Splint Technique	499
Jessica C. Hassel, Alexander Kreuter, and Alexander J. Hassel	

Part IV Postoperative

48 A New Postoperative Otoplasty Dressing Technique Using Cyanoacrylate Tissue Adhesives	509
Volker Wedler, Miriam Vetter, and Matthias Foehn	
49 Head Bandage After Otoplasty	511
Ahmad A. Orabi	
50 Postoperative Care Using a Silicone-Based Occlusive Dressing	517
Jonathan K. Frankel and Diana C. Ponsky	

Part V Complications of Otoplasty

51 Otoplasty Complications	523
Melvin A. Shiffman	
52 Understanding and Correcting the Unfavorable Results After Otoplasty	527
Ashley K. Lentz and Bruce S. Bauer	
53 Solving Sharp Edges of the Antihelix After Otoplasty	535
Renato da Silva Freitas, Maria Cecilia Closs Ono, and Nivaldo Alonso	
54 Prophylactic Z-Plasty to Prevent the Notch Deformity of the Helical Rim Following the Wedge Excision of the Ear	539
Peter Kim	

55	Otoplasty Revision	543
	Philip A. Young	
Part VI Outcomes		
56	Sensibility of the Ear After Otoplasty	557
	Pedro Soler Coltro and Marcus Castro Ferreira	
57	Measurement of Postoperative Cephaloauricular Distance to Evaluate and Compare Results of Otoplasty	565
	Stuart D. Richards	
58	Otoplasty: Focusing on Patient Benefit and Health-Related Quality of Life	569
	Thomas Braun, Alexander Berghaus, and John Martin Hempel	
59	Psychosocial, Behavioral, and Emotional Effects Following Otoplasty	575
	Raquel Aguilar Cuesta and Carmen Soto Beauregard	
Part VII Miscellaneous		
60	Evolution of Consent and Alternatives to Traditional Consent Forms	583
	Kayvan Shokrollahi and Adeyinka Molajo	
	Index	587

Part I

Anatomy

Embryology and Anomalies of the External Ear

1

Jeremiah C. Tracy, Arnold S. Lee, Andrew R. Scott,
and Collin S. Karmody

J.C. Tracy, M.D. (✉)

Department of Otolaryngology,
Tufts University School of Medicine,
800 Washington Street,
Boston, MA 02111, USA

Department of Otolaryngology,
Tufts University School of Medicine,
116 Harrison Avenue, Boston,
MA 02111, USA
e-mail: jtracy@tuftsmedicalcenter.org

A.S. Lee, M.D.

Facial Plastic & Reconstructive Surgery,
Otolaryngology-HNS,
Tufts University School of Medicine,
Tufts Medical Center, 860 Washington Street, South 1,
Boston, MA 02111, USA
e-mail: alee2@tuftsmedicalcenter.org

A.R. Scott, M.D.

Department of Otolaryngology – Head & Neck Service,
Tufts Medical Center, 800 Washington St.,
Box 850, Boston, MA 02111, USA

Department of Otolaryngology Pediatrics,
Tufts University School of Medicine,
Boston, MA, USA

Divisions of Pediatric Otolaryngology
and Facial Plastic & Reconstructive Surgery,
Tufts Medical Center,
Boston, MA, USA

Cleft Lip and Palate Team,
Floating Hospital for Children,
Tufts Medical Center,
Boston, MA, USA
e-mail: ascott@tuftsmedicalcenter.org

C.S. Karmody, M.D.

Department of Otolaryngology,
Tufts University School of Medicine,
116 Harrison Avenue, Boston, MA 02111, USA
e-mail: ckarmody@tuftsmedicalcenter.org

Introduction

A basic knowledge of normal ear development allows for an understanding of the full spectrum of congenital auricular abnormalities. The embryology of the ear provides insight into the fundamentals of surgical reconstruction and support to the concepts that guide our approaches to complete excision of redundant elements. The external ear develops from ectodermal and mesodermal elements of the first and second branchial arches. Anomalies of the ear may therefore reflect abnormal development of either first or second arch structures. Accurate recognition of syndromic ear anomalies also allows for the potential detection of other systemic conditions.

Embryology

Overview

The external ear is divided broadly into three components: auricle, cartilaginous external auditory canal (EAC), and bony EAC. These structures are formed over the course of fetal development, predominantly in weeks 5 through 20. The structures of the external and middle ear are made up of endodermal, mesodermal, and ectodermal elements of the first and second branchial arches. The external auditory canal is itself the physiologic remnant of the first branchial cleft.

In brief, inner ear structures develop from the otic placode. This ectodermal structure is first

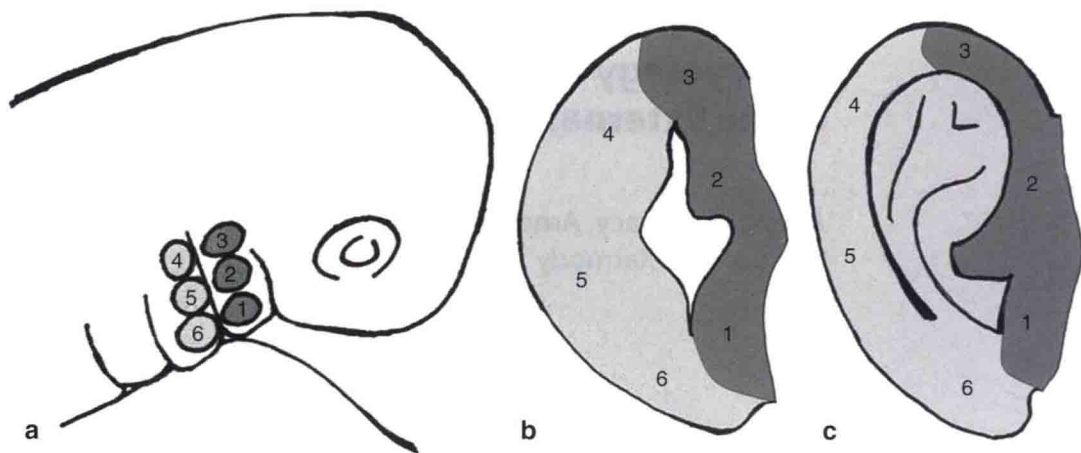


Fig. 1.1 Auricular development. (a) Hillocks 1–3 are derived from the first branchial arch and 4–6 from the second. (b) Fusion of the hillocks begins to form the auricle

in the seventh week of gestation. (c) Contributions of the hillocks of His to the fully formed ear

visible in the embryo at week 3, and as development proceeds, it invaginates medially. By week 4, this structure has lost its connection with the ectodermal surface and has migrated medially, forming what is termed the otocyst. This structure will give rise to all inner ear structures with the significant exception of the stapes footplate [1].

It is therefore notable that inner ear structures develop independent of middle ear and outer ear elements and that critical periods of development occur at different times. This is why children with inner ear malformations may have normal external anatomy and children with markedly abnormal surface anatomy may in fact have perfectly normal inner ear structures.

The development of the external ear is generally complete by 20 weeks' gestation and always complete by birth. Through childhood, the external ear and EAC will grow in size but in relative proportion to the scale present at birth. In contrast, the middle and inner ear are fully formed and of adult size at birth and do not grow significantly with the child.

Auricle

Development of the external ear begins at about the fifth week of fetal growth. The first stages of auricular development manifest in the form of small mesenchymal prominences around the first

branchial cleft, an ectodermal groove that will eventually develop into the external auditory canal. There are six discrete prominences, which are termed the hillocks of His. It is generally accepted that hillocks 1–3 develop from first branchial arch mesoderm (rostral to the first branchial cleft) and hillocks 4–6 develop from the second branchial arch, just caudal to the cleft. As development proceeds, the relative contribution of cells from the first arch decreases, such that second branchial arch derivatives contribute about 85 % of the mature external ear (Fig. 1.1) [2–5].

Some recent studies have questioned this classic division of the hillocks of His, indicating that only the first hillock is derived from the first branchial arch and that hillocks 2–5 are second branchial arch derivatives [6].

The hillocks of His achieve maximal prominence by the end of week 6. In the seventh week of fetal development, the hillocks undergo directional growth such that they fuse and begin to form the shape of the auricle. Hillock 1 gives rise to the tragus. Hillocks 2 and 3 form the crus of the helix and the helix proper. Cells of hillock 4 and 5 constitute the anti-helix; and the anti-tragus and lobule are formed from hillock 6 [3]. These assignments are general and there almost certainly is overlap in terms of the primordial contributions to the developed ear (Fig. 1.1).

The formation of the auricle centers on the growth and migration of the hillocks of His.

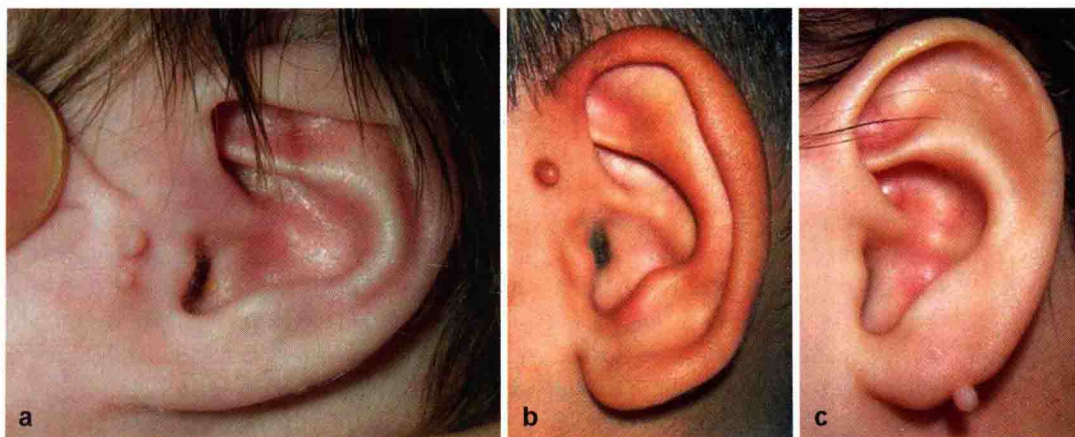


Fig. 1.2 Auricular appendages representing duplications of the hillocks of His. (a) Three preauricular appendages likely representing a duplication of the 1–3 hillocks. (b) Auricular appendage at the root of the helix likely repre-

senting a duplication anomaly versus failure of incorporation of the second hillock into the mature auricle. (c) An auricular appendage at the lobule likely representing a duplication anomaly of the sixth hillock

Failure of fusion, or duplications of the hillocks can be observed in the form of auricular appendages (Fig. 1.2). The earliest event is the fusion of hillocks 2 and 3 and the growth of these tissues in a caudal direction, eventually creating the auricular helix. The fusion of hillocks 4 and 5 begins shortly thereafter, and then growth of the antihelix continues concurrently with that of the helix. The overall migration of the developing auricle is cephalad relative to other first and second branchial arch derivatives. This is reflected in the sensory innervation of the mature auricle, which is predominantly from branches of the cervical plexus, with only minor contributions from cranial nerves V, VII, IX, and X. Additionally, syndromic children with first arch anomalies will often exhibit posteriorly rotated, low-set ears.

The dimensions of the external ear are well characterized, and knowledge of the appropriate proportions is essential to the clinician. The height of the adult ear is 5.5–6.5 cm. On average the width of the ear is 55 % that of the height. The overall angle of the auricle seen laterally is about 25–30 % from the vertical. Normal protrusion from the mastoid is about 2 cm (or an angle of 15–25°). The ear at birth is about 66 % of the total size of the adult ear, although, as noted above, the proportions at birth remain unchanged throughout life. Adult ear size is generally achieved in adolescence at about 13–15 years of age, though the majority of growth is complete by 5–7 years of age.

External Auditory Canal

The development of the cartilaginous and bony EAC is not so well-defined. The EAC itself is the remnant of the first branchial cleft, and mesenchymal elements of the canal are derived from the first branchial arch. The cartilaginous canal is in continuity with the cartilage of the auricle and likely develops and fuses with the cartilaginous elements of the hillocks of His at the time of auricle formation.

The canal itself forms as the first branchial cleft extends medially. Eventually, the endodermal lining of the first branchial pouch is in close proximity to the ectoderm of the cleft. In this location the mesoderm thins to a single translucent layer, contributing the fibrous middle layer of the mature tympanic membrane. At this point in development of the EAC, the entire canal is cartilaginous. At about week 12 of development, ossification of the medial-most aspect of the canal begins, forming the bony tympanic annulus and (more laterally) the bony canal [3, 7].

Dysmorphogenesis of the Auricle

Congenital deformities of the ear may be secondary to genetic abnormalities or through sporadic developmental anomalies. The second category