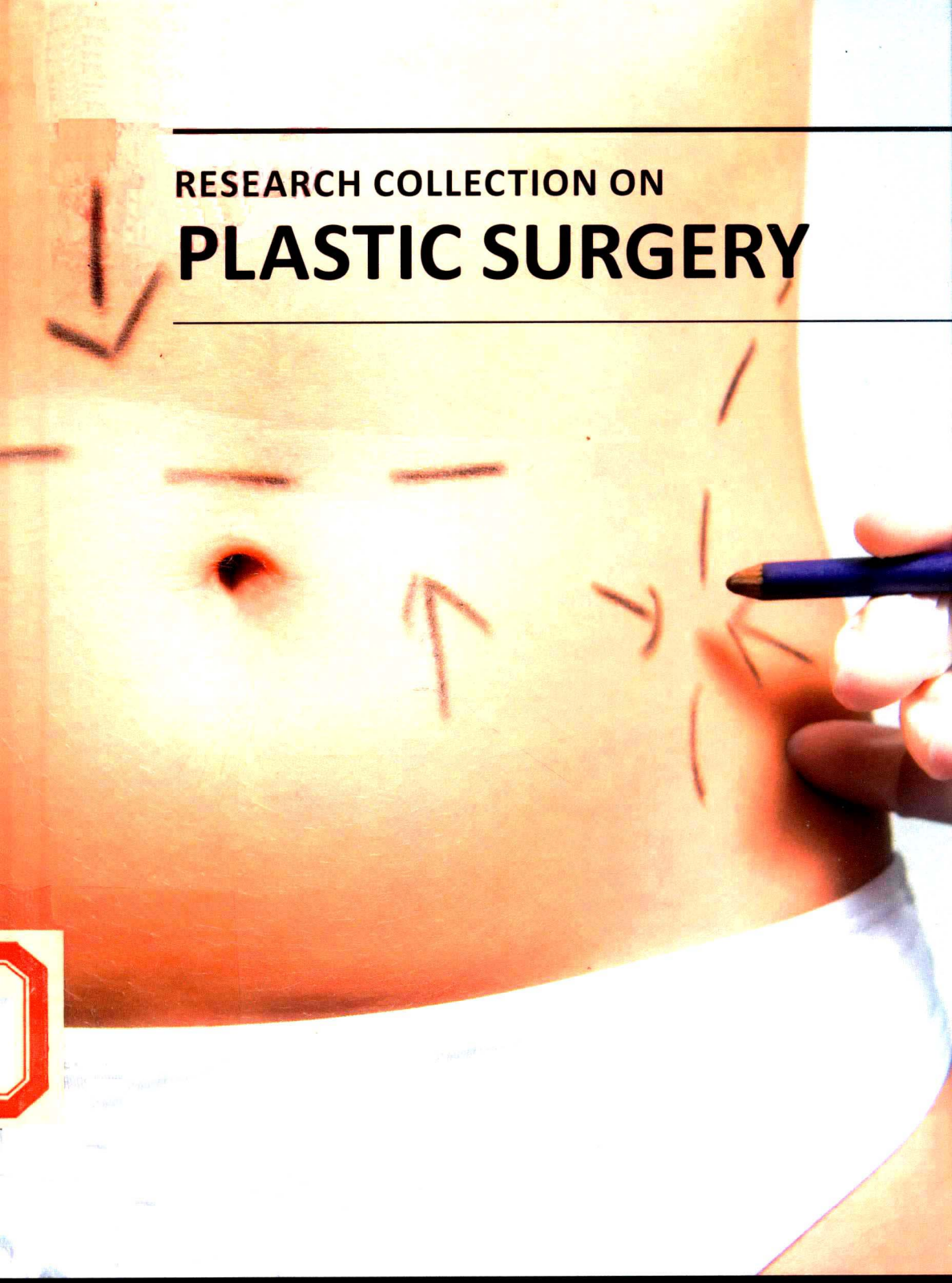
RESEARCH COLLECTION ON

PLASTIC SURGERY



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Research Collection on Plastic Surgery

http://dx.doi.org/10.5772/ 58109
Chapters from books edited by: **Frank Agullo, Stefan Danilla, Michael Brenner** and **Nikolay Serdev**

Published by InTech

Janeza Trdine 9, 51000 Rijeka, Croatia

Edition 2014

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Research Collection on Plastic Surgery

p. cm.

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Preface

Plastic surgery is a rapidly growing field with many advances in recent years, along with improvements in safety and efficacy. The scope of plastic surgery is not just limited to cosmetic procedures, but also encompasses reconstructive surgery after serious injury/trauma. This book discusses several topics in reconstructive plastic surgery, including osseointegrated implants for the anchoring of auricular prostheses; head and neck reconstructive surgery; reconstruction of the perineum and abdominal wall after tumor resection, radiotherapy or aggressive infection; and the effects of radiotherapy (such as fibrosis, microthrombi, tissue hypoxia and necrosis) that may influence the outcome of breast reconstruction.

Further sections in the book focus on two main techniques: rhinoplasty (both cosmetic and reconstructive), and techniques and applications in liposuction and fat transfer, such as facial contouring, buttock shaping/lifting, lipedema treatment, radio frequency-assisted liposuction, liposhifting for the correction of post-liposuction irregularities, and techniques for isolating mesenchymal stem cells used in tissue repair/regeneration.

This book is a highly topical and useful source of insight and ideas for practitioners in both cosmetic and reconstructive plastic surgery.

CURRENT CONCEPTS IN PLASTIC SURGERY

Edited by **Francisco J. Agullo**

Implant Retained Auricular Prostheses

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1. Introduction

Reconstruction of a facial defect is a complex modality either surgically or prosthetically, depending on the site, size, etiology, severity, age, and the patient's expectation. The loss of an auricle, in the presence of an auditory canal, affects hearing, because the auricle gathers sound and directs it into the canal. The auricle acts as a resonator to slightly amplify lower frequency sounds and helps to localize sounds, especially in conjunction with the other ear. (Wright et al., 2008 Karakoca et al., 2010, Toljanic et al., 2005)

Recently developed surgical reconstruction techniques, including microsurgical tissue transfer and autogenous or alloplastic grafts, have been used for the reconstruction of auricular defects. More than 40 different cartilaginous, osseous, and alloplastic frame materials for auricular reconstruction have been described since 1891. Reconstructive techniques for auricular defects include second intention healing simple linear closures, skin grafts if the perichondrium and soft tissue are intact, local rotation flaps, two-lobed advancement flaps from the post-auricular sulcus, and post-auricular interpolation flaps for larger defects of the ear ear rim(Vergilis-Kalner et al, 2010, Goldberg et al, 1996). Away from the helical rim, donor skin from the posterior surface of the ear is easily obtainable and the defect can be closed with a vertically oriented side-to-side closure. Other reconstruction options for an auricular defect, adjacent to and on the helical rim, include the helical rim advancement flap, helical advancement flap, wedge excision, or a post-auricular interpolation flap from the scalp (Justiniano & Eisen, 2009, Vergilis-Kalner et al, 2010). Most of the local options involve extensive undermining, often into the hair-bearing portions of the scalp (Cordeiro et al, 2007, Vergilis-Kalner et al, 2010) [3]. Closing the ear defects still represents a reconstructive challenge because of the lack of available freely mobile skin anteriorly, superiorly, and inferiorly to the defect. (Vergilis-Kalner et al, 2010) According to Vergilis-Kalner et al., the choice of the bilobed flap circumvents this challenge by using skin from the posterior surface of the ear and, as necessary, from the post-auricular groove. In addition, bilobe flap is a one-stage repair in which donor tissue is transferred from the area of excess, such as from the post-auricular sulcus, lower pole of the posterior ear, or superior neck adjacent to the posterior ear, rotated anteriorly, folded forward, and fitted into the defect over the exposed cartilage. (Vergilis-Kalner et al, 2010) Vergilis Kalner et al suggested that, the bilobed flap is a useful technique for transferring local tissue while simultaneously minimizing donor-site deformity and described two cases in which a bilobed flap was used to rotate skin from the post-auricular surface to reconstruct full

thickness skin defects involving the helical rim and posterior ear, with excellent cosmetic resultsCombined with coverage of the framework by a temporoparietal fascia flap and autologous skin grafts, this surgical approach of auricular reconstruction is reported not only to yield reliable results but also to be associated with a low complication rate. However, an auricular prosthesis is the efficient alternative, when aesthetic and functional demands cannot be surgically fulfilled. Complete rehabilitation of patients with auricular defect is achieved using a multidisciplinary team approach, involving surgical and prosthetic personnel. Treatment requires cooperation between those treating the disease and those responsible for the emotional wellbeing of the patient. Retention and stability of prostheses improve the patient's confidence and sense of security.

However, especially in pediatric patients, the impact of surgical invasion and donor-site morbidity can be severe, and the collectable volume of autologous cartilage is limited. Therefore, Yanaga et al (Yanaga et al ,2009) proposed regenerative surgery for microtia using cultured ear chondrocytes. Through the development of a multilayer chondrocyte culture system and two-stage implantation technique, the authors successfully generated human ears. In culture, the chondrocytes are expanded to a sufficiently large volume, produce rich chondroid matrix, and form immature cartilaginous tissues. First, the cultured chondrocytes are injection-implanted into the lower abdomen of the patient, where the cells grow into a large, newly generated cartilage with neoperichondrium in 6 months. Following this, the cartilage is harvested surgically, sculptured into an ear framework, and implanted subcutaneously into the position of the new ear. The cultured chondrocytes formed a mature cartilage block with sufficient elasticity for use as an auricular cartilage. The formed block had the same histologic origin as elastic cartilage. The ear framework was implanted into the auricular defect area, and an auricle with a smooth curvature and shape was subsequently configured. In the 2 to 5 years of postoperative follow up, the neocartilage maintained good shape, without absorption. The authors have suggested that, the benefits of the technique are minimal surgical invasion, lower donor-site morbidity, lessened chance of immunologic rejection, and implantation stability. (Yanaga et al, 2009)

The use of medical-grade skin adhesives, solvents, eyeglasses, the use of hard and soft tissue undercuts, and other modalities became traditional means of retaining facial prostheses. However these techniques were often wrought with difficulties associated with retention, stability, adverse tissue reactions, discoloration and prosthesis deterioration, inconvenience of use or application, poor hygiene, discomfort, and lack of acceptance. The use of osseointegrated implants in craniofacial reconstruction has minimized some of these disadvantages and has provided patients with predictable cosmetics, improved retention, and stability of the episthesis. (Wright et al., 2008 Karakoca et al., 2010, Toljanic et al., 2005, Karayazgan Saracoglu et al., 2010, Tolman& Taylor, 1996)

Nowadays, methods of retention varied within each prosthesis type. Retention methods for auricular prostheses are bars, adhesives, magnets, and mechanical devices. Since the early 1970s, the use of osseointegrated implants to retain facial prostheses has become an integral part of treatment planning for facial reconstruction. Implant retention is currently considered the standard of care in many situations because of the advantages it offers over conventional retention methods such as the use of adhesives. (Arcuri & Rubinstein, 1998, Karakoca et al., 2010, Toljanic et al., 2005, Karayazgan Saracoglu et al., 2010, Tolman& Taylor, 1996, Gumieiro et al, 2009, Niparko et al., 1993)