Title

Preservation of Extracellular Matrix in Decellularized Human Auricular Cartilage for Recellularization

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Authors

Pham, Jason
Willette, Dominique M
Melkonian, Jacklyn A
et al.

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TRACK: AESTHETIC

One Stage Periareolar Mastopexy Augmentation with Light Weight Implants: Shifting the Paradigm

Presenter: Maisam Fazel, MD

PURPOSE: Single stage mastopexy augmentation using the periareolar (donut) technique is sometimes criticized due to the widening of the areola, poor scar formation and inadequate lift effect achieved. It has been suggested that the stretch and weight produced by the implant contributes to the areolar widening and poor scar formation.1 Light weight implants (B-lite, G&G Biotechnology Ltd., Haifa, Israel) are up to 30% lighter and have been shown to place less strain on the breast parenchyma.2 The purpose of this study was thus to evaluate the impact of using these light weight implants on areolar widening, scar formation, degree of lift achieved and patient satisfaction in patients undergoing a one stage periareolar mastopexy augmentation.

METHOD: Consecutive patients with ptosis of 2cm (or less) requiring a primary periareolar mastopexy augmentation and who were happy to receive the light weight implant were included in the study. Data collected include patient age, implant size, length of follow up, preoperative and postoperative measurements of the sternal notch to nipple distance, areolar diameter, patient satisfaction with the scar as well as patient satisfaction with the result as measured by a Likert scale of between 0 to 10, with 0 representing the lowest degree of satisfaction and 10 the highest degree of satisfaction.

STUDY: 32 patients were included in the study with 2 lost to follow up. The mean age was 37 years (range 24 years to 46 years). The follow up duration was 6 months (range 4.5 months to 13 months). The implants sizes ranged from 230cc to 545cc with a mean of 325cc. All implants were round medium profile light weight implants.

RESULTS: The mean nipple elevation achieved was 1.85cm (range 1.62cm to 2.45cm). The mean increase between the pre and postoperative areolar diameter over the follow up period was 15% with a range of 5% to 25%. Patient satisfaction with the scar was rated at 7 (range 5 to 8.5) while patient satisfaction with the result was rated as 8.6 (range 6 to 9). Two complications were recorded; the first involving a palpable suture know and the second involving an area of delayed healing.

CONCLUSION: The use of light weight implants in single stage periareolar mastopexy augmentation is not associated with any unexpected complications and appears to counter some of the traditional short comings of this procedure frequently seen with standard heavier implants. Longer term follow up is desirable to establish the longevity of these results.

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TRACK: RESEARCH/TECHNOLOGY PAPER

Preservation of Extracellular Matrix in Decellularized Human Auricular Cartilage for Recellularization

Presenter: Jason Pham

Co-Authors: Dominique M. Willette, Jacklyn A. Melkonian, Andres Staben, Melinda Lem, Mary Ziegler, MD, PhD, Gregory R.D. Evans, MD, FACS, Alan Widgerow

Affiliation: The University of California, Irvine Department of Plastic Surgery, Orange, CA

PURPOSE: Bioengineering advances have been made in the field of auricular reconstruction, but many challenges still exist due to the lack of compatible biomaterials, the unique characteristics of cartilage, and its avascular nature. Decellularized tissue has gained popularity as a biomaterial scaffold for repopulating human cells.1 While decellularizing human auricular cartilage has been performed and proven in many bioengineering material studies, our protocol was developed with the goal of maintaining the optimal cell structure and integrity for recellularization. Many current protocols focus on complete decellularization, but not preservation of the components and structure of the cartilage itself, including the maintenance of glycosaminoglycans (GAGS).2-5 Other studies, however, have shown very time-intensive or expensive methods to ensure structural integrity of the cartilage. Therefore, we hypothesize that

the optimization of auricular cartilage decellularization will be beneficial in the clinical setting as human decellularized tissue will become more commonly used in reconstructive procedures, such as the treatment of microtia.

METHOD: Human adult auricular cadaver cartilage was obtained. The skin and perichondrium were removed to create a uniform structure. After an initial dry 12-hour freeze, the specimen was thawed at room temperature. The sample was then placed in phosphate-buffered solution (PBS) at -20°C and subsequently washed in deionized water. For the decellularization, the cartilage was agitated with 4% sodium deoxycholate at room temperature and washed with PBS. Next, the sample was placed in 2% deoxyribonuclease followed by 0.25% trypsin at room temperature. This process was repeated for 14 cycles in total. Trypsin was only utilized for the initial 4 cycles. The tissue was analyzed histologically to show complete decellularization and preservation of the cartilaginous structure. The overall structure and cellular content were assessed by hematoxylin and eosin (HE) staining. Alcian blue staining was performed to assess the presence of GAGs, Masson's Trichrome for collagen fibers, and Verhoeff Van Geison's stain for elastic fibers.

RESULTS: Our histological data showed complete decellularization when analyzed with HE staining with preservation of the cartilaginous structure when analyzed with Masson's Trichrome. There were preserved extracellular matrix (ECM) components with well-defined structures that were comparable to those seen prior to decellularization.

CONCLUSION: Decellularization was successful with the new protocol. These new changes are significant in that our protocol utilizes inexpensive resources to process a human auricular ear with optimal preservation of structural integrity. Compared to current protocols, trypsin was optimized to ensure proper decellularization without interrupting surrounding ECM and removal of GAGs. The updated protocol will allow us to utilize a structure closer to the native scaffold. The next step is to recellularize the decellularized scaffold to create a structure for clinical use.

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TRACK: RECONSTRUCTIVE
Maxillary and Mandibular Healing after Facial Allotransplantation

Presenter: Irene Chang

Co-Authors: Bahar Bassiri Gharb, MD, PhD, Antonio Rampazzo, MD

PURPOSE: Facial transplantation has emerged as a viable option in treating devastating facial injuries. Despite the high healing rate of Le Fort I-II-III and bilateral sagittal split osteotomies (BSSO) in non-transplant patients (with reported non-union rates of 1.6% and 2.6%, respectively),[1,2] previous studies have reported nonunion between the allograft and the recipient's bone at the area of maxillary and mandibular osteotomies. [3,4] This suboptimal bone healing remains unexplained and is still yet to be investigated. In this study, we present three patients that received facial transplantation at our institution with a focus on the healing of the mandibular and maxillary osteotomies after osteocutaneous face transplantation.

METHOD: A retrospective chart review was conducted of facial allotransplantation patients at the Cleveland Clinic from December 2008 to inception. Demographics such as age, date of birth, and sex were recorded. Additional variables included procedures, revisions, reoperations, medications, and bone stability and healing. Computed tomography (CT) images assessed alignment of skeletal components, bony union quality, and stability of fixation.