Interpositional Jump-Graft Using a Hybrid Artificial Nerve-Conduit with Adipose-Derived Stem Cells for Rat Facial Nerve Paralysis Model

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PURPOSE: Facial nerve paresis such as Bell’s palsy and Hunt’s syndrome appears suddenly in healthy individuals and recovers by conservative treatments in some cases. However, a non-recovery situation considerably reduces the quality of life of patients. Interpositional jump-graft (IPJG) technique with the hypoglossal nerve for supercharging can be applied in the case and becomes the subjects of many clinical reports. However, in IPJG case, an autologous nerve is required, and the donor site morbidity is unavoidable. Bio-degradable nerve conduits are made from polyglycolic acid (PGA) and used recently without donor site complications after providing autologous grafts. Hybrid artificial nerve conduits with adipose-derived stem cells (ASCs) also attract attention as a nerve-regeneration enhancing agent. This study used hybrid artificial nerve conduits to obtain IPJGs closely similar to autologous nerve grafts.

MATERIALS AND METHODS: A ligature clip was used to crush the facial nerve trunk, thereby creating a partial facial nerve paresis model. A 10-mm-long biodegradable artificial nerve-conduit containing ASCs used to create an IPJG between the facial nerve trunk and the hypoglossal nerve (Hybrid PGA group). Thirteen weeks after the surgery, the outcome was physiologically compared with conventional IPJG with autograft using the greater auricular nerve (autograft group), non-ASCs artificial nerve group (PGA group) and non-treated group (control group).

RESULTS: Compound muscle action potential amplitude was highest in the autograft group (4352±1587 μV), followed by the Hybrid PGA group (3224±1778 μV), PGA group (1960±445 μV), and then control group (687±490 μV). In the Hybrid PGA group, amplitude was significantly higher than in the PGA group (P < 0.05). Myelin thickness of autograft group (0.79±0.03 μm) was significantly higher than that of Hybrid PGA group (0.68±0.29 μm) (P < 0.01), and that of Hybrid PGA group was significantly higher than that of PGA group (0.44±0.03 μm) (P < 0.01). Autograft, PGA, and Hybrid PGA groups showed a myelinated nerve regeneration with double innervation in hypoglossal and facial nerve nuclei for vibrissal muscle.

CONCLUSION: This study found that a conventional IPJG technique with an autologous nerve can be substituted with a hybrid artificial nerve-conduit with ASCs in a rat model with partial facial nerve paresis.

Prediction of Resection Weight in Reduction Mammaplasty: Validation of the Galveston Scale

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INTRODUCTION: Reduction mammaplasty (RM) is one of the most commonly performed plastic surgery procedures. Prediction of resection weight is important both for the patients and the surgeons. Current literature suggests that symptomatic relief does not correlate with resection weight, however, insurance carriers are still using resection weight as one of the most important criteria to determine medical necessity. A number of prediction scales have been proposed, none of which are validated and widely accepted. The purpose of our study was to assess the validity of current scales in our patient population and propose a more accurate tool for prediction of resection weight.

METHODS: A retrospective chart review of patient that underwent reduction mammaplasty at the University of Texas Medical Branch from 2012–2017 was performed. Multiple regression analyses were applied to all patients. The prediction models were created using the Galveston scale, as well as other possible predictors of resection weight.
operated by the senior author (L.G.P.) to identify independent predictive factors for breast resection weight. A new prediction scale was created. Established prediction scales and the new Galveston scale were then applied to patients operated by different surgeons, excluding the patients that were operated by the senior author, and compared for accuracy of prediction of resection weight. Results were analyzed through linear regression analysis and p-values <0.05 were considered statistically significant.

RESULTS: A total of 184 patients were used for the initial single-surgeon analysis. The new Galveston scale included BMI, breast measurements and age as independent predictive values. 130 patients were included in the multiple-surgeon group for validation of the new scale. There was no overlap in patients between the single- and multiple-surgeon groups. The mean age was 39.2 years, mean BMI 34.5 and the average resection weight was 907 grams. 62.3% of the patients underwent inferior pedicle wise pattern reduction, 26.9% medial or superiomedial pedicle and 10.8% amputation style with free nipple grafting. Galveston scale demonstrated the best predictive value ($R^2 = 0.71$). Appel and Descamps performed worse with $R^2=0.69$ and $R^2=0.68$ respectively. Schnur scale demonstrated the poorest prediction value with $R^2=0.28$.

CONCLUSION: Prediction of resection weight in RM remains important for patient counseling and as an adjunct tool for the plastic surgeon preoperatively and intraoperatively, as a guide to estimate the amount of tissue to be resected. We recommend a patient-specific and surgeon-specific approach, instead of the “one-scale-fits-all” paradigm. We propose the Galveston scale for older patients with higher BMI and breasts requiring large resections. Symptomatic relief does not correlate with amount of tissue removed and medical necessity should be based on patient symptoms, physical examination and the physician’s clinical judgment.

“Facial Regeneration” By Nanofat. A Randomized Case-Control Study

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PURPOSE: The promising applications of nanofat in regenerative and aesthetic surgery have recently become “hot topics” in the international literature1-3. The purpose of this study was to investigate in a randomized case-control fashion the efficacy and safety of nanofat in facial rejuvenation.

METHODS: We enrolled 12 consecutive female patients, between 40 and 50 years of age, affected by moderate to severe facial rhytides at our private practice. Each patient face was vertically and symmetrically divided in case and control areas following randomization. Each patient was treated with nanofat on case area and saline on control area. Nanofat was obtained from the liposuction aspirate using the Tulip Nano™ kit device.

Each patient underwent blind assessment of the case and control areas and at baseline, and then 1, 3, and 6 months post treatment through the Wrinkle Severity Rating Scale (WSRS) and the Global Aesthetic Improvement Scale (GAIS). At the same time points patients underwent instrumental assessment by spectrophotometric examination (Antera 3D™) of a series of cutaneous parameters (vascularization, pigmentation, texture, etc). A patient satisfaction multi-item FACE-Q score was also recorded at the post-treatment visits. Adverse events were recorded at each follow up by physicians and by patient through the FACE-Q.

RESULTS: Each treated area in every patient showed an improvement in blinded WSRS and GAIS, as well as in spectrophotometric parameters, superior to the control area, starting at the 1 month follow up, peaking at 3 months, and persisting at 6 months. The patient case area FACE-Q score increased similarly, with max mean values at 6 months, significantly higher than control areas. Besides transient edema and erythema, no adverse events were reported.

DISCUSSION: The literature, just like the cosmetic market, is full of countless therapeutic options targeting facial rejuvenation and revitalization4-5. Most commercially available solutions lack the potential to provide tissue regeneration and thus true rejuvenation. Our experience indicates a significant and enduring response to treatment with a single session of nanofat in facial rejuvenating in females between 40 and 50 years of age with moderate to severe rhytides. At 6 months the results persisted in all cases, although to varying degrees. Considering that these patients were treated with a single session of nanofat and did not undergo any other rejuvenating treatment these results are significant. Only minor adverse effects were recorded during our