cut and repair model in comparison to no treatment group (p<.013, Fig. 1). FK506 blood levels at 4 and 6 weeks were nearly undetectable whereas concentration within the tissues of interest, the infraorbital nerve and muscle, was enriched and significantly higher than blood levels (p<0.01).

CONCLUSION: This study investigates the use of an FK506-impregnated PEUU nerve wrap to improve functional recovery following peripheral nerve injury. Sensory testing provides objective data on the effects of these wraps in the treatment of peripheral nerve injuries and the FK wraps appear to accelerate nerve recovery at 4 weeks, with minimal systemic drug exposure. The findings from this study may translate into novel treatment systems and protocols to treat nerve injuries.

Electrical Stimulation As a Conditioning Lesion for Promoting Peripheral Nerve Regeneration

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BACKGROUND: Peripheral nerve regeneration following injury is often incomplete with significant personal and socioeconomic costs. Although it has been well demonstrated that conditioning lesion (a nerve crush delivered prior to injury and repair) markedly accelerates nerve regrowth, it cannot be applied clinically because it is unethical to intentionally injure a healthy nerve. Recently, in a proof of principle study, we showed that conditioning electrical stimulation (CES) of the fibular nerve enhances upregulation of regeneration-associated-genes (RAGs) and axonal growth. However, whether similar beneficial effects can be generalized to other nerves and whether CES can improve functional recovery remain unknown. This knowledge is critical before applying CES for clinical use.

OBJECTIVES: To determine if CES upregulates RAGs, enhances nerve regeneration and improve sensory and motor function in a rat tibial nerve injury model.

METHODS: Sprague Dawley rats were divided based on the type of conditioning to the tibial nerve: i) CES, ii) conditioning crush lesion (CCL), iii) sham-CES controls, and iv) unconditioned controls. Expression of RAGs (GAP43, BDNF, pCREB, GFAP) were analyzed at 3-days post-conditioning (n=3). The length of regeneration was assessed at 7-days (n=6), and physiological and behavioral testing was performed at 7-weeks post-coaptation (n=10).

RESULTS: Similar patterns of RAG upregulation and axonal growth were found in animals conditioned with electrical stimulation and crush compared to controls. Sensory testing (von Frey filaments, intraepidermal nerve fiber density counts), gait analysis (toe spread evaluation, horizontal ladder testing) and gastrocnemius muscle reinnervation (muscle weight, neuromuscular junction analysis) were significantly improved in the CES animals compared to not only the controls, but also the crush-conditioned cohort. Nerve conduction studies shows significantly larger compound muscle action potential amplitude in CES compared to controls.

CONCLUSION: Our data supports that preoperative electrical stimulation delivers a conditioning-like effect in the tibial nerve, with upregulation of RAGs and enhanced axonal outgrowth. Interestingly, CES induced improvements in sensorimotor outcomes beyond those obtained with traditional methods of conditioning. As electrical stimulation has been shown to be safe and well-tolerated by patients, CES is likely a clinically feasible intervention that can potentially improve the sensorimotor recovery of patients with peripheral nerve injury.

Functional Recovery and Nerve Regrowth after Transection: Comparison of Repair Techniques in a Rodent Model

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PURPOSE: Peripheral nerve injury may result in impaired function and unpredictable recovery even after repair. No single tension-free repair technique for primary nerve repair
has been consistently shown to be superior in experimental studies. One limitation is a lack in consistency in outcome assessments that are selected for studying functional recovery. In addition, functional and behavioral results and other tests of regeneration, such as axon counts, often do not correlate with one another. We hypothesize that there is a key difference between nerve “regeneration” and “functional recovery.” The purpose of this study was to compare five techniques for primary nerve repair in a rodent model, and identify potential correlations between functional and histomorphometric assessments.

METHODS: Sciatic nerve transection was performed in male Lewis rats. The nerve was repaired using one of five techniques: interrupted epineural, running epineural, grouped fascicular, epineural with collagen wrap, and tension. A sham group was also included. Following recovery, a combination of behavioral (rotarod and ladder rung), electrophysiologic (compound muscle action potential (CMAP), nerve conduction velocity (NCV)), advanced imaging, and histomorphometric assessments were performed. Statistical analysis was performed using one-way analysis of variance and Spearman’s rank correlation coefficient. To create a single measurement of aggregate performance, the individual assessment scores were standardized and converted to z-scores. Z-scores reflect the number of standard deviations from the mean; this approach more fairly weights each of the assessments when evaluating overall aptitude.

RESULTS: In all animals (n=48), functional testing was performed at week 13, followed by electrophysiology and imaging at week 14. The sham group (n=7) performed the best on both behavioral assays (p<0.001) and also demonstrated the highest mean CMAP amplitude (p<0.001) and fastest NCV (p<0.001). Behavioral and electrophysiologic results were poorest in the tension group (n=9). Axons in all repair groups were more numerous and smaller compared to those in the controls (p=0.01). Qualitative inspection revealed that aberrant axon sprouting was greatest in the tension group (n=9). There was a significant difference in total z-scores, with the sham group performing best and tension group performing worst when outcomes on all assessments were totaled (p=0.04). When all test results were compared between groups, few significant correlations were observed. Ladder performance correlated positively with rotarod duration (p=0.001) and degree of myelination (p=0.02). NCV positively correlated with both degree of myelination (p=0.01) and mean axon fiber area (p=0.02).

CONCLUSION: No single tension-free repair technique was significantly different from another, supporting traditional beliefs that techniques that minimize tension lead to equivocal outcomes. The Rotarod and ladder rung behavioral assays allowed for differentiation between satisfactory and suboptimal functional results. A relative lack of correlation between outcomes assessments supports further study of the differences between assessments of nerve regrowth and functional recovery.

AESTHETIC SESSION 4

Tranexamic Acid: Current Practices and Administration Protocols in Aesthetic Plastic Surgery in Israel

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PURPOSE: Tranexamic acid (TXA), an antifibrinolytic agent, has emerged as a promising agent for reducing perioperative bleeding and subsequent blood transfusion without an increase in complications and adverse events. This accumulating evidence has led to its adoption by the Israeli Defense Forces Medical Corps as well as in a variety of elective surgical procedures in various fields. Despite its great popularity among plastic surgeons in Israel, an optimal dosing regimen has not yet been described. This study presents the current practices of TXA usage in plastic and reconstructive surgery among members of the Israeli Society of Plastic and Aesthetic Surgery towards the establishment of standardized guidelines for optimum administration.

METHODS: An online survey was sent to all members of the Israeli Society of Plastic and Aesthetic Surgery (ISPAS). The survey was organized into three general parts: (1) demographic data and practice profiles, (2) familiarity, perceptions, and experience with TXA in various aesthetic plastic surgery procedures, and (3) TXA administration protocols including dosage, mode, and time of administration.

RESULTS: 103 Israeli plastic surgeons completed the survey. 86% of respondents use TXA routinely in aesthetic surgery. The most common procedures performed under TXA are