suture closure and underwent computed tomography (CT) or 3dM.D. scans in the interval 2010–2015. Curvature analysis were performed on these images using two user-defined regions of interest (mid-forehead and lateral orbit). K-means cluster analysis was performed to test the consistency of surgical intervention threshold among the different surgeons.

RESULTS: Three-dimensional curvature and cluster analyses were performed in 43 patients. The difference in average mean curvature between patients who underwent operation and conservative treatment was 11.3 m⁻¹ and -16.1 m⁻¹ for mid-forehead strip and right/left lateral orbit, respectively. The average mean curvatures of three regions of interest were significantly different (p<0.0001). In addition, K-means clustering classified patients into two different severity groups, and there was 96% agreement between the algorithm classification and surgeons' decisions except two patients.

CONCLUSION: The described methods are effective in classifying severity and associated surgeon behavior, and offer the possibility for determining when surgical intervention may have been of questionable benefit.

30.
SUCCESSFUL CONTROL OF VIRTUAL AND ROBOTIC HANDS USING NEUROPROSTHETIC SIGNALS FROM REGENERATIVE PERIPHERAL NERVE INTERFACES IN A HUMAN SUBJECT

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PURPOSE: Regenerative Peripheral Nerve Interfaces (RPNIs) show promise in controlling neuromuscular devices. We have implanted and recorded from RPNIs in 3 subjects. Here, we present the results from our longest implanted subject with a distal transradial amputation.

METHODS: An RPNI consists of a muscle graft that is neurotized by the distal end of a transected peripheral nerve. Once revascularized and reinnervated, the RPNI muscle graft serves as a stable bioelectric amplifier for efferent nerve action potentials and produces recordable electromyography (EMG) signals. The subject was implanted with RPNIs on the residual median, ulnar, and dorsal radial nerves. Using ultrasound, RPNIs were located, and percutaneous fine-wire bipolar electrodes were inserted for acute EMG recordings. Temporal features of the EMG waveforms (100-500Hz) were used for decoding algorithms.

RESULTS: Eight months post-surgery, we recorded 300– 400 μV EMG signals from the median RPNI with signal-to-noise ratio (SNR) of 24.2 and 100–120 μV EMG signal from the ulnar RPNI with SNR of 5.84. Additionally, EMG from residual muscles was obtained including the flexor digitorum superficialis with 100–120 μV signals, SNR of 6.30, and flexor pollicis longus with ~1mV signals, SNR of 47.8. With these signals, the subject controlled a virtual robotic hand in real time with 96% accuracy, choosing 1 of 4 movements within 212 trials. Importantly, the subject controlled a physical Touch Bionics iLimb neuroprosthetic hand with 100% accuracy, choosing 1 of 3 movements within 100 trials.

CONCLUSION: RPNIs harness neural signals from transected peripheral nerves with sufficient amplitude and fidelity to control an advanced neuroprosthetic limb.

31.
EXTENSOR POLLICIS BREVIS SUBCOMPARTMENT CHARACTERISTICS IN THE 1ST DORSAL EXTENSOR COMPARTMENT: AN ANATOMIC AND RADIOGRAPHIC STUDY

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PURPOSE: We aim to characterize the 1st dorsal compartment anatomy and examine radiographic correlation with the presence of EPB subsheath.

METHODS: First, freshly-preserved cadaveric arms were dissected and data including the presence or absence of EPB
subsheath were noted. Standard wrist x-rays were obtained. Then a retrospective review of DeQuervain’s patients with 1st dorsal compartment releases was completed. Those with notation of the presence or absence of a subsheath and preoperative x-rays were included. Radiologists reviewed x-rays for an osseous ridge comparing them to cadaveric specimen standards.

RESULTS: Nine of the 10 arms were male. The APL tendon had a mean of 3.3 ± 1.3 slips. The EPB tendon had one slip in all specimens. Seven compartments (70%) had an identifiable EPB subcompartment and four (57%) were thick. An osseous ridge was seen in 2 specimens, both with a thick subcompartment. The two arms with osseous ridges revealed radiopaque ridges on x-ray. Radiologists’ x-ray reviews revealed an osseous ridge in 58.9% of reads. Inter-rater reliability using Fleiss’ kappa was 0.33 ± 0.05. Presence or absence of EPB subsheath correlated with presence or absence of an osseous ridge in 48% of radiologists’ reads.

CONCLUSION: Most EPB subcompartments were thick and well-defined which may contribute to non-operative failures. Preoperative radiographs can help screen patients for early referral for ultrasound guided injection or surgical intervention in refractory cases.

32.

INCREASED INCIDENCE OF SYMPTOMATIC DEEP VENOUS THROMBOSIS FOLLOWING LOWER EXTREMITY FLAP HARVEST FOR ABDOMINAL AND PERINEAL RECONSTRUCTION: A CASE FOR EXTENDED SURVEILLANCE

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PURPOSE: Venous thromboembolism (VTE) remains a leading cause of morbidity and data to support prophylaxis guidelines in lower extremity flap surgery are lacking. This study aims to identify the incidence of VTE in patients undergoing harvest of lower extremity flaps and define factors which could modify prophylaxis guidelines.

METHODS: One hundred twenty-seven patients undergoing lower extremity flap harvest were evaluated. Each patient had a flap harvested from the leg and inset in the perineum or abdomen. The contralateral, non-operative leg served as an internal control. Sixty comorbidity-matched patients who underwent perineal tumor extirpation without reconstruction provided an external control.

RESULTS: Sixty patients were male (47%) with mean age of 52 years. Mean follow-up was 339 days. All patients underwent flap reconstruction for an oncologic defect with 79% undergoing perineal reconstruction. Most patients underwent anterolateral thigh (41%) or gracilis flap (40%) harvest. Eleven patients developed VTEs in either leg (9%), for a total of 15 episodes of VTE. Of these, 10 were donor site (66%) and 5 were contralateral leg (33%).

Patients who underwent flap harvest had a 9 times higher odds of VTE formation when compared with their comorbidity matched controls who did not undergo flap reconstruction (OR:9.08;CI:1–82.6;p<0.05). There was a non-significant trend towards increased odds for the formation of donor-site VTE when compared with the contralateral lower extremity (OR:1.7;CI:0.80–3.4;p=0.15).

CONCLUSIONS: The rate of VTE is higher than previously appreciated for reconstructive procedures of the perineum that utilize lower extremity flaps. Routine surveillance or extended prophylaxis may be warranted.

33.

LATE SHAPE DISTORTION AFTER SPAIR MAMMAPLASTY SECONDARY TO SEROMA INDUCED SCAR CONTRACTURE

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PURPOSE: Previous reports have documented the safety and efficacy of the short scar periareolar inferior pedicle