cohort, surgical patients had significantly elevated levels of inflammatory cytokines (GM-CSF, IL-7, IFNγ, IL1-RA and MCP-1) compared with non-surgical patients (p < 0.05). Among the surgical patients, numerous inflammatory and anti-inflammatory cytokines were changed after intervention and showed significant correlation to improved pain scores (e.g. IP-10, r²=0.23; VEGF, r²=0.25; p<0.05). At one year following surgery, two circulating cytokines (GM-CSF and IL-7) changed to levels comparable to the non-surgical cohort at baseline (p>0.05).

**Conclusion:** These preliminary data suggest that there may exist TM OA phenotypes based on cytokine profiles. Observed cytokine responses demonstrate different potential phenotypes that may be useful for predicting response to treatment. Definitive associations of cytokine expression profiles to disease phenotype and treatment response will require a greater number of patients as this longitudinal TM OA cohort and biobank continues to grow.

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**The Impact Of Dividing The Flexor Tendon Pulleys On Tendon Excursion And Work Of Flexion In A Cadaveric Model**

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**Purpose:** The A2 and A4 pulleys of the flexor tendon system have traditionally been considered critical components of efficient digital flexion. This dogma has recently been challenged. The practical implications of understanding true pulley function are most apparent when deciding to sacrifice pulleys to achieve a high-quality flexor tendon repair, especially in Zone 2. Using fresh cadaveric hands and a novel model to measure force and excursion, we sought to clarify the clinical significance of releasing different pulleys.

**Methods:** Combinations of A1, A2, and A4 pulleys were released on the index through small fingers of fresh, never frozen cadaveric hands. Excursion was measured as the distance the tendon was pulled by the motor to achieve palm touchdown. The force applied by the motor was constant (25 Newtons); work was derived from the product of force and excursion (distance). The change in excursion and work needed to achieve palm touchdown before and after pulley compromise was measured. Excursion varies amongst digits and specimens at baseline; therefore, the percent change from the intact state was used to compare groups. The following comparisons were made: A2 versus A1, A4 versus A1, A4 versus A2, A1+A2 versus A2, A1+A4 versus A4.

**Results:** Isolated A2 or A4 release had the greatest individual impact on excursion. When A1 was released with A2, the additional impact was significant; however, when A1 was released with A4, the impact was marginal. No clinically or statistically significant change in the work of flexion was detected.

**Conclusions:** Sacrifice of the A2 and A4 pulleys made a statistically significant difference in flexor tendon excursion. The addition of A1 release was significant when added to A2 release, but not when added to A4 release, which is likely because of the interposed intact A2 pulley. We did not find a significant difference in the percent work between groups. We found the absolute change in excursion in millimeters after pulley release to be statistically significant, although clinically negligible. Because the absolute change is not likely clinically significant, we argue that A2 or A4 sacrifice to achieve an excellent tendon repair is justified. A1 may play a larger role than previously believed if other proximal pulleys are sacrificed.

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**Upper Extremity Infections In The Solid Organ Transplant Population: The Cleveland Clinic Experience**

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**Purpose:** As the length of lifetime survival after organ transplantation continues to increase, the consequences of long-term immunosuppression, such as opportunistic and
rare infections of the hand and upper extremity, are thought to be a high-risk reality. This study examines our experience with upper extremity infections (UEI) in the solid organ transplant population to further provide clinical, treatment and outcome data in this growing population of patients, as very limited studies with few patients are available in the literature.

**Methods:** A large tertiary care center institutional database of 16,640 transplant patients was queried for UEI events between years 2005-2017, revealing 238 patients with UEIs, defined by the clinical suspicion of an infectious in an area between the shoulder and fingertip. Multivariable analysis using linear and logistic regression models to assess for the length of hospital stay and the likelihood of surgical intervention were performed using the SPSS software.

**Results:** The mean age at the infection was 54.2 ± 15.1 years of age. The infections were diagnosed at a median of 5 (IQR 10) years after transplantation. The most common infections were diagnosed in patients transplanted with kidneys (51.3%) and livers (19.7%). The most common location of infection was the forearm (31.1%), digits (27.5%), and upper arm (17.2%). The most common infection type was cellulitis (68.9%), abscess (31.9%), joint sepsis (7.0%), infectious tenosynovitis (3.7%), and osteomyelitis (1.1%). By far Staphylococcus Aureus was the most common pathogen cultured (11%). In 15.8% of the patients cultures were negative. In 93.4% of the patients the infection resolved after treatment and in 87.9% there was no recurrence. Only 8.1% of patient had recurrent infections, 3.7% ended up with an unresolved infection, and one mortality due to UEI. Immunosuppression with Tacrolimus or Prednisone were associated with shorter time to infection after transplantation. 43.2% of the patients were treated with IV antibiotics, 23.1% with oral antibiotics. 16.1% of the patients require bed side I&D and 13.9% formal OR debridement. Multivariable analysis revealed that patients with lung and bowel transplants, hypertension and patients on prophylactic antifungal medication were associated with a longer hospital stay, while patients on Azathioprine and Sirolimus immunosuppression and azithromycin prophylactic antibiotics were associated with shorter length of hospital stay (P < .001). Abscess, tenosynovitis, and septic joints were associated with higher odds of surgical intervention (P = .001).

**Conclusion:** This data demonstrates high cure rates and low recurrence rates for treatment of upper extremity infections. Based on culture driven data, it suggests that prompt recognition and treatment covering for common bacteria is not unreasonable as a first line. Providers should therefore escalate treatment regimens based on culture driven data. Patients who have been able to reduce their immunosuppression regimens to maintenance levels should still be considered high risk for soft tissue infections, and constant vigilance is advised.

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**Posteriorly Based Buccal Artery Myomucosal Flap For Cleft Palate Repair: An Anatomical Study**

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**Purpose:** The Buccinator myomucosal flap is a versatile flap for lengthening and repair of cleft palate defects. Posteriorly-based pedicled flaps are supplied either by the buccal artery or a branch of the facial artery. Clinical applications of this flap have been well reported in the literature, however few anatomical studies have shed light on the main pedicle and the vasculature within the flap. Therefore, the aim was to study the buccal neurovascular pedicle in order to design a new posteriorly based island flap.

**Methods:** Dissections were performed in 11 fresh adult cadavers. External carotid (3 cadavers) or buccal (8 cadavers) artery was isolated and injected with red latex. In addition, indocyanine green (ICG) was injected directly into the buccal artery in 6 hemifaces and ICG angiography was performed before the application of latex. Entrance of the buccal neurovascular bundle into the flap was localized and marked intra-orally. Diameter of the buccal nerve and artery, flap length (distance from pterygomandibular raphe (PTM) to the corner of the mouth) horizontal distance from PTM to the pedicle entrance, and vertical distance of the pedicle entrance from maxillary tuberosity was measured with a digital caliper. Then, the whole mucosa and underlying soft tissue of the cheek area was harvested and examined with the surgical microscope in order to study the microanatomy of the flap.

**Results:** The mean diameter of buccal artery and nerve was 0.95±0.29 mm and 1.29±0.20 mm, respectively. The Average diameter of the communicating branch with the facial...