implant based breast reconstruction. The source of this significant variation in hospital charges are unknown. Research into the source of this cost variation will help reduce overall health care expenditures. Our study analyzes the factors influencing hospital charges relating to implant based breast reconstruction.

**Methods:** The Healthcare Cost and Utilization Project (HCUP) National Inpatient Sample (NIS) database was analyzed via secondary cross-sectional analysis from January 2009 to December 2014. All female patients who were diagnosed with breast cancer or at a high risk for breast cancer who underwent mastectomy followed by immediate one or two stage implant based breast reconstruction were included. Variables of interest included demographic data, hospital characteristics, hospitalization data and total hospital charges. All charges were adjusted using the consumer price index from May 2019 to inflate all dollar values to the most up-to-date value. Univariate and generalized linear models were used to examine associations between various factors of interest and the final adjusted charge associated with each hospitalization.

**Results:** 659,220 female patients were diagnosed with breast cancer or had a high risk of breast cancer during hospitalization between January 2009 and December 2014. Of these patients, 44,175 (6.7%) received implant-based breast reconstruction and were included in the study. The mean total hospital charge for these patients was $55,188.89 (interquartile range: $37,860.40 - $81,351.37). Regression analysis showed that the proportion of patients who received the procedure to the total population of patients diagnosed with breast cancer did not significantly change between 2009 and 2014 (p = 0.113). However, the average total charges for the hospitalization increased significantly (p < 0.001), despite an overall decrease in length of stay (p < 0.001). Procedures performed in the West were associated with significantly higher charges when compared to other regions ($84,908.78). Higher hospital charges were also associated with urban hospitals, regardless of teaching status.

**Conclusion:** There are significant differences in hospital charges associated with patients undergoing implant-based breast reconstruction. Although the overall demand for the procedure did not change significantly within the patient population over the years analyzed, the procedures are associated with increasing hospital charges. This increase in cost is seen over the years despite an overall decrease in length of stay, originally thought to be the main contributor to regional cost variation. Further studies should be done to develop strategies to better target increased hospitalization charges, as the overall healthcare burden of this procedure is expected to rise if current trends continue.

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**Cytokine Expression In Trapeziometacarpal Osteoarthritis: Predicting Prognosis, Progression And Treatment**

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**Purpose:** A tremendous interest exists in defining the role of inflammatory cytokines in patients with symptomatic osteoarthritis (OA) for prognostic, personalized therapeutic and regenerative purposes. Our overall objective is to discover which cytokines are capable of differential disease stratification through the longitudinal characterization of trapeziometacarpal (TM) OA patients.

**Methods:** This prospective, longitudinal cohort of TM OA patients collects clinical outcomes (patient-reported pain and function), demographics, and plasma at multiple timepoints. Baseline plasma inflammatory cytokine panel screening was performed using Multiplex analysis. Principal component analysis (PCA) was used to identify cytokine clustering patterns. Baseline inflammatory cytokines were compared between surgical and non-surgical cohorts of patients. In surgical patients, inflammatory cytokine levels were compared from baseline to 3 months post-surgery and correlated to patient-reported pain (McGill Pain Questionnaire). Comparative analyses used independent sample t tests and χ2 tests as appropriate. The Pearson correlation coefficient was calculated for correlative relationships.

**Results:** The cohort (N = 73) was primarily female (74%), mean age of 58.9 (±17) with median Eaton-Littler Radiographic score = 3. An unbiased subset of clustered cytokines in plasma may represent an inflammatory phenotype among a TM OA subpopulation (elevated G-CSF, II-1B, TNFa, II-10, II-17A, II12p70, MCP-1, II-6 and VEGF). Within this
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