Growth Disturbance after Surgical Treatment of Pediatric Tibial Spine Fracture: Results from a Multicenter Cohort

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Summary:
This study describes the incidence of growth disturbance after surgical treatment of pediatric tibial spine avulsion fractures.

Data:
Background: Tibial spine fractures (TSFs) are a relatively uncommon injury of the knee seen predominantly in the skeletally immature pediatric population, and often require surgical treatment. We sought to assess if surgical treatment of these fractures carry a risk of growth disturbance and investigate risk factors that may contribute to a growth disturbance. Method: A retrospective analysis of children undergoing treatment of tibial spine fractures was performed, drawing from a multicenter cohort among 10 tertiary care children’s hospitals. The entire cohort of surgically treated TSFs was analyzed for incidence and risk factors of growth disturbance. The cohort was stratified into those that were under the age of 13 years at the time of treatment in order to evaluate the risk of growth disturbance in those with significant substantial growth remaining. Patients with growth disturbance in this cohort were further analyzed based on age, sex, surgical repair technique, implant type, and preoperative radiographic measurements with chi-square, t-tests and multivariate logistic regression. Results: 661 patients were reviewed and 645 patients were available for analysis after exclusions. 9 patients (1.4%) were found to have growth disturbance. Eight out of nine patients with growth disturbance were found to have an overgrowth of the operative extremity (mean 1.075 cm, range 0.5 – 2cm). The other patient was found to have a valgus angular deformity which required a guided growth procedure. Patients that developed growth disturbance were younger than those without (9.7 years vs. 11.9 years, p = 0.019). Four out of nine patients that experienced growth disturbance had valgus mechanical axes prior to injury. In the cohort of patients under the age of 13 years, 9 out of 404 (2.2%) experienced growth disturbance. There was no association with demographic factors, fracture characteristics, surgical technique, hardware type, or anatomic placement (i.e., transphyseal vs. physeal sparing fixation) and growth disturbance. Conclusions: The risk of growth disturbance after tibial spine fracture surgery is low, with a higher risk in patients who are younger at the time of injury. In those with growth disturbance, growth acceleration of the affected limb is common. Although there is no association with surgical technique, practitioners should be aware of this potential complication when treating tibial spine fractures.

Psychological Impacts Of Orthopaedic Trauma On Paediatric Patients: A Scoping Review

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Summary:
Orthopaedic trauma can lead to mental health concerns including depression, anxiety, and fear of movement, and hamper readiness for return to sport among patients aged 18 or under; to date, no studies have assessed the effectiveness of early psychological interventions to mitigate these impacts.

Data:
Purpose: Orthopaedic trauma patients often experience elevated distress post-injury, which can increase the risk of developing mental health concerns like depression, anxiety, and post-traumatic stress disorder (PTSD). Most literature focuses on the adult population; in this review, we aimed to assess the psychological impacts (PIs) of orthopaedic injuries (OIs) on patients aged 18 or under (paediatric patients). Methodology: The EMBASE, MEDLINE, Web of Science, CINAHL, and PsyInfo databases were searched using the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) and Revised Assessment of Multiple Systematic Reviews (RAM-AMSTAR) frameworks. Original, peer-reviewed, English-language articles published between 2000 and July 2022 were screened by two reviewers using Covidence. Studies that characterized PIs of OIs on paediatric patients were included. Studies unrelated to PIs, with participants aged > 18 only, without OIs, or with chronic conditions like arthritis were excluded. Screening discrepancies were resolved by discussion. Cohen’s kappa was > 0.7 across reviewers and stages. First author, year of publication, country, study aim and design, sample size, patient demographics, and inclusion and exclusion criteria were extracted from included studies. Injury-related data including time since injury, injury type (e.g., fractures, sprains, or ACL tears), and mechanism (e.g., MVC, sports injuries, accidental, or casualties of war) were captured. PIs including outcomes (e.g., depression, anxiety, PTSD, and kinesiophobia) and methodology (e.g., psychometric instruments, interviews, clinical assessment) were recorded. Main results, potential uses for results, and limitations were documented. Methodological Index for Non-Randomised Studies (MINORS) and Risk of Bias (RoB) 2.0 were used for quality assessment. Results: Out of the 5438 papers found in the original search, 23 were included for analysis, of which 61% were conducted in the United States. Mechanisms of injury included sports injuries (57%), motor-vehicle accidents (26%), and accidental trauma (26%). Types of injuries included isolated ACL tears (30%), isolated fractures (26%), and fractures in addition to other injuries like sprains, ACL tears, or traumatic brain injury (26%). Pre-existing psychometric instruments including Tampa Scale of Kinesiophobia 11, Short-Form 36, and State-Trait Anxiety Inventory were used in 78% of studies. Lastly, 65% of studies explicitly recommended increasing screening or early intervention for PIs following traumatic injury. Studies on sports injuries primarily assessed kinesiophobia and readiness for return to sport. Psychological barriers that were identified included fear of reinjury, loss of identity, and social isolation. Protective factors included strong rapport with one’s care team and general perception of social support. Two studies found significant associations between sports injuries and reduced quality of life. Conclusions: Paediatric patients experience myriad psychological consequences beyond the physical impacts of OIs. Among patients with sports injuries specifically, this suggests that physical recovery alone is not synonymous with readiness for return to sport. We did not identify any studies that assessed the clinical utility of involving psychological supports to minimize the footprint of trauma on paediatric mental health. Future work should investigate this intervention and the best options for improving the mental health of orthopaedic patients, in different countries, cultures, and models of healthcare delivery.

Complications Following Quadriceps Tendon Anterior Cruciate Ligament Reconstruction in Pediatric Patients: A Case Series

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Summary:
In this study, we report complications encountered with soft tissue QTA for ACLR. Although the use of a QTA has recently gained popularity due to its high return to sports and low graft failure rate, surgeons must be aware of the complications and risks associated with QTA harvest.

Data:
Objectives: The purpose of this study was to analyze the complications and subsequent procedures encountered with soft tissue quadriceps tendon autograft (QTA) for anterior cruciate ligament reconstruction (ACLR) in patients =18 years old. Methods: A consecutive series of patients who underwent ACLR with a QTA with minimum 6 month-follow up were included. All patients underwent ACLR with a full thickness soft tissue QTA without a bone plug. Complications associated with the QTA harvest site and use of QTA were
reported. Results: A total of 143 pediatric patients ≈ 18 years old underwent an ACLR with a soft tissue QTA during the study period. Of these, 137 patients had minimum 6-month follow-up and were included. Six patients (4%) were deemed lost to follow-up and excluded. The mean age was 14.8 ± 1.6 (11-18 years) and 60% were male. The average follow-up time was 2.0 ± 1.1 years (0.5-4.9 years). Of the 137 patients included, 11 (8%) had a subsequent complication associated with the use of a QTA. Eight (6%) patients had a subsequent procedure to remove non-absorbable sutures used for the donor site closure. We encountered a subset of patients that developed persistent donor site irritation and pain associated with the use of non-absorbable sutures and consequently changed our technique to use absorbable sutures. Two (1%) patients developed osteochondritis dissecans (OCD) lesions in the superior aspect of the patella 1.2 ± 0.8 years on average following surgery. We speculate that the QTA harvest could have compromised the vasculature of the patella, resulting in the development of OCD and subsequent chondromalacia. Two (1%) patients had quadriceps tendon ruptures following QTA ACLR. One patient, fell onto a hyperflexed knee 6 weeks after QTA ACLR and sustained a small bony avulsion injury of the superior pole of the patella. Another patient sustained a non-contact injury while playing football 7 months post-operatively prior to being cleared to return to sports. They sustained a complete tear of the distal quadriceps tendon, adjacent to the donor site. Of note, 1 patient underwent a concomitant removal of non-absorbable sutures and patellar chondromalacia debridement and is thus represented twice. In addition, 5 (4%) patients had a graft failure and underwent subsequent revision ACLR, 6 (4%) had a second meniscus-related surgery, 8 (6%) had a subsequent lysis of adhesions procedure, and 13 (9%) underwent contralateral ACLR. Conclusion: In this study, we report complications encountered with soft tissue QTA for ACLR. The complication rate for QTA harvest was 8%. However, given that the removal of non-absorbable sutures from the donor site was caused by the surgical technique used, the revised complication rate for QTA harvest was 3%. To the authors’ knowledge, this is the first study to raise the suspicion that QTA harvest could lead to the development of superior patellar OCD as this occurred in two patients from this cohort. Although the use of a QTA has recently gained popularity due to its high return to sports and low graft failure rate, surgeons must be aware of the complications and risks associated with QTA harvest.