



Children's Hospital Colorado

ORTHOPEDICS INSTITUTE

ANTERIOR TIBIAL SPINE FRACTURE WITH
CONCOMITANT ANTERIOR CRUCIATE
LIGAMENT RUPTURE IN PEDIATRIC PATIENTS
A RETROSPECTIVE REVIEW OF 67 CASES

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Background

Anterior tibial spine fracture (ATSF) considered the pediatric equivalent of anterior cruciate ligament (ACL) injury in adults

- Weaker strength & elasticity of the incompletely ossified ATS relative to the ACL may underlie primary failure
 - Injuries to the ligament are considered extremely rare
 - Cases reported in which ATSF is associated with complete ACL insufficiency

The purpose of this study was to determine incidence of ATSF with concomitant ACL rupture among pediatric patients

Methods

- Retrospective analysis of 67 skeletally immature patients
 - Sustained ATSF between 1/1/06 & 12/31/11 and between 5-18 y/o
 - Meyers and McKeever classification used
 - ACL injury graded using MRI and/or arthroscopic imaging
 - Clinical records, imaging, and intraoperative reports obtained

| Fracture Type | Degree of Displacement | Usual Treatment Course |
|---------------|---|------------------------|
| Type I | Minimal/no displacement | Conservative |
| Type II | Bird's beak appearance with superior displacement of anterior aspect of the fracture with an intact posterior section | Case by case |
| Type III | Complete displacement | Surgical Reduction |

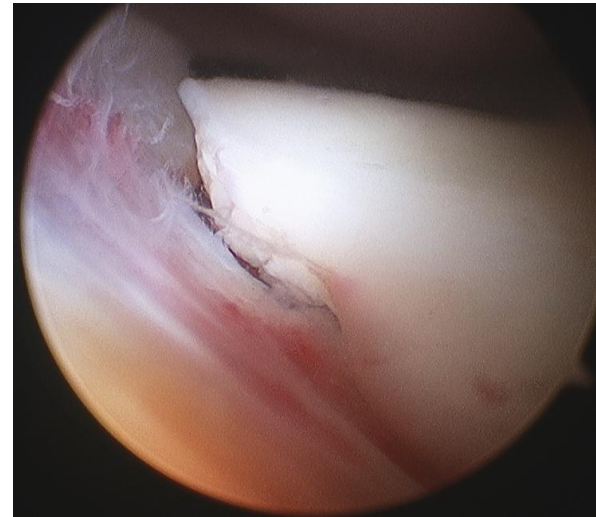
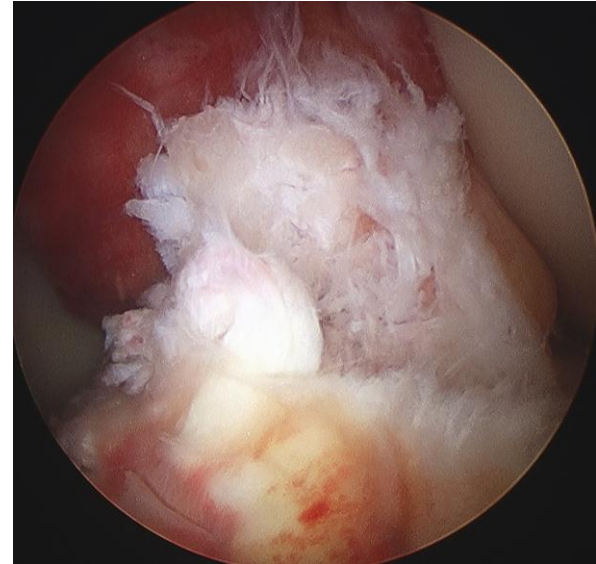
Results: Grossly visible ACL Damage at time of surgery

| Fracture Type | Included Patients | ACL Damage at time of Injury | Went on to ACL Reconstruction |
|---------------|-------------------|------------------------------|--|
| Type I | 6 | 0 (no operative cases) | 0 |
| Type II | 35 | 7 | 2 (Delayed after initial tibial spine only fixation) |
| Type III | 26 | 4 | 2 (Immediate) |

Results

20% of Type II Injuries Had Gross ACL Damage → 40% of those required reconstruction in a delayed fashion after initial fixation of only the tibial spine

15% of Type III Injuries Had Gross ACL Damage → 50% underwent Reconstruction in an immediate setting



Arthroscopic image of complete ACL tear with Type II anterior tibial spine fracture

Conclusion & Significance

- Incidence of ATSF with concomitant ACL rupture is more common than previously described
 - Diagnostic evaluation of pediatric patients with suspected ATSF pathology must involve MRI &/or arthroscopy
- This cohort of patients with ATSF & concomitant ACL injury has not previously been described
 - Data suggests a need to scrutinize radiographic & arthroscopic findings closely to see associated ACL injuries, specifically in type II and III fractures.
 - More data needed to evaluate possible need for ACL reconstruction when associated with anterior tibial spine fracture