

Pediatric Anterior Cruciate Ligament Injuries- Is non-operative treatment an option?

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I have no disclosures



What is the anterior cruciate ligament and what is its function?

- **Definition-** An intra-articular ligament of the knee obliquely oriented between the lateral femoral condyle and the medial tibia plateau.
- **Primary Function**
  - Resists anterior translation of tibia
  - Prevents excessive rotation of knee
  - Stabilizes knee with regular ADLs
  - Jumping, cutting, and twisting stress your ACL the greatest



## Are all pediatric ACL problems from Trauma?

NO- pediatric knee ACL issues can be congenital

- Proximal focal femoral deficiency
- Congenital knee dislocation
- Congenital thrombocytopenia
- Congenital absence or malformation of the PCL or menisci
- Tibia or Fibular hemimelia



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## The primary cause, though, is trauma...

- .11 per 10,000 at 8 yo
- 2.42 per 10,000 at 14 yo
- 16 per 1000 in all adolescents
- 80% < 12 associated tibial spine fracture
- Up to 60% of pediatric ACL injuries are partial tears



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## Are pediatric knee injuries on the rise? Yes!

United States National Electronic Surveillance System (NEISS)

- 2009 569,146 pediatric injuries (<14) basketball, baseball, soccer, football
- 2001 229,298 pediatric (<18) knee injuries
  - Female 90,714
  - Male 154,586
- 2008 234,585 pediatric (<18) knee injuries
  - Female 92,105
  - Male 142,421
- Increasing trend in pediatric knee injuries
- Increasing trend in female knee injuries

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## What are the common mechanisms of injury?

94% are sports related

Most commonly one or a combination of -

- Hyperextension
- Sudden deceleration
- Valgus force
- Rotational force with foot planted



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## How do kids ACL injuries present?

- Audible 'pop'
- Pain
- Effusion (Hemarthrosis)
  - 47% preadolescents with a traumatic knee effusion
  - 10-65% adolescents with a traumatic knee effusion
- Knee Instability
- Gait deviations with anterior tibial thrust



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## Pediatric Knee Injury Imaging

- Plain films
  - Rule out osseous injury
  - Tibial spine fracture, the classic pediatric ACL injury
- MRI-
  - Evaluate ACL and possible additional injuries



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## Treatment-

- To operate or to not operate, that is the question!



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## What makes taking care of pediatric patients different from adults?

- Parental involvement
  - The patient may not be the decision maker
- Physis
  - Each patient will have varying degrees of growth remaining
- Activity Level



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## Decision making-

- Decision making begins with the patient and families expectations-
  - What is the athletic demand of the patient?
  - Can the patient withhold from activities that would put them at risk for additional injuries?
  - Are the parents expectations for the patient's performance and activity level appropriate for non-operative treatment
  - Has the family predetermined their treatment?

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## Non-operative treatment is a good option for...

- Lower activity level kids
  - May require modification to activities
  - May decrease return to sport
  - Lower demand or knee friendly sports (swimming)
  - Non sports participating kids



From Pinterest 1000+ images about treating video game addiction

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## Non-operative treatment is best for...

- Partial ACL tears
  - <50% ACL fibers torn
  - Clinically no rotational instability (-Pivot Shift)
- Kids without any associated injuries (i.e. meniscal tears)



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## AAOS Appropriate Use Criteria

- Age/Maturity
  - Open vs closed
- Activity level
  - Participation in cutting/pivoting sports
- Meniscal injury
  - Repairable or not
- Non-operative measures
  - Failure or not of non-operative measures



Hand Bone Age film

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## Non-Operative Therapy

- Bracing
- Physical Therapy
- Potential long term activity modifications
- Objective
  - Restore normal ROM
  - Strengthen secondary stabilizers
  - Minimize rotational instability
  - Prevent additional injuries



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## Outcomes

- Need for future surgery
  - Vavken and Murray 2011
    - systemic review, 476 patients, 50.2% treated initially non-operatively went on to surgical reconstruction
  - Baldwin et al 2013
    - Meta-analysis of non-operative vs operative treatment of pediatric ACL injuries
    - 75% of non-operative patients reported feeling instability
    - Non of the non-operative patients returned to play



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## Outcomes

- Future meniscal injuries
  - Moksnes et al.
    - evaluated non-op treated patients
    - 65% returned to all activities
    - 9.5% new meniscal injuries
  - Millett et al.
    - Compared % of meniscal tears between acutely reconstructed ACLs vs chronic ACL reconstruction
    - 11% meniscal tears in acute group, 36% meniscal tears in chronic group
  - Henry et al.
    - Compared ACLs repaired while patient was skeletally immature vs delayed until skeletal maturity
    - 16% meniscal tears in immature group vs 41% in delayed group

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## Conclusion

- Patient selection is important for non-operative treatment
- The patient and family must understand the increased risk of further instability and injury
- High likelihood of needing future surgery.
- Decreased return to play.

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## THANK YOU



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