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

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What is the anterior cruciate ligament and what is it's function?

- Definition- An intra-articular ligament of the knee obliquely oriented between the lateral femoral chondyle 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?

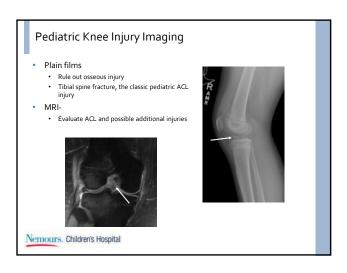
94% are sports related

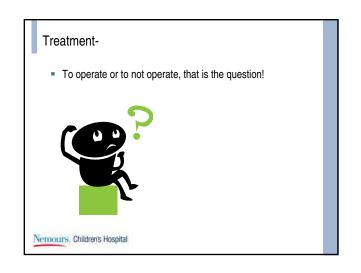
Most commonly one or a combination of -

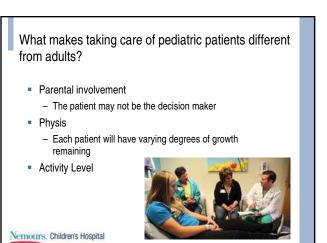
- Hyperextension
- Sudden deceleration
- Valgus force
- Rotational force with foot planted











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 nonoperative 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



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From Pinterest 1000+ images about treating video game addiction

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

Non-Operative Therapy

- Bracing
- Physical Therapy
- Potential long term activity modifications
- Objective
 - Restore normal ROM
 - Strength 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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