

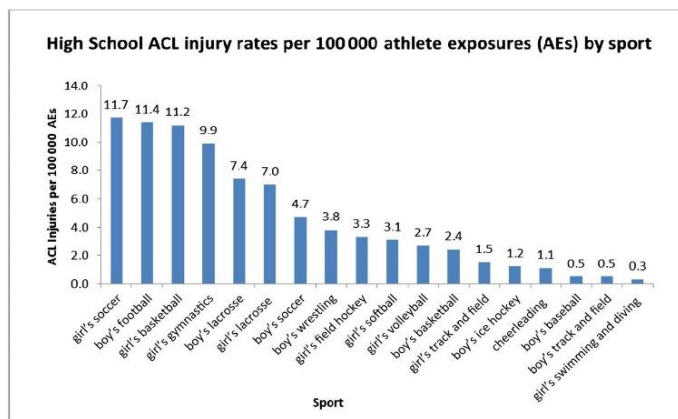


SOUTH TEXAS BONE AND JOINT Physical Therapy and Rehabilitation

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THE STUDENT ATHLETE and KNEE PAIN

- Almost 80% of ACL injuries are non-contact in nature.
 - Landing from a jump
 - Cutting or deceleration
 - Combination of anterior tibial translation and increase knee valgus
 - Quadriceps dominance
 - Strength outside normal ratio
 - Hamstrings are firing less in females



WHAT WE SEE FROM ATHLETES OF THE COASTAL BEND

- **Highly limited Core and Glute Max (Med/Min) strength**
 - Average strength range 20 pounds of force vs 80#+needed
- Decreased kinetic chain stability
 - Increase femoral internal rotation
 - Increase knee valgus
 - Increase pronation through feet
- Asymmetry in between Hip and LE musculature
 - Safe single plane run must be less than 5-10% asymmetric
 - Quad dominance outside of 3:2 ratio and weakness
 - Hyperextension at knee
 - 100# or less in strength
- Major difficulty with balance and agility
- Poor biomechanics to transfer ground forces
- Poor bioawareness: poor disassociation

HOW CAN WE IDENTIFY WHO IS AT RISK AND WHAT IS CORRECT?

- Drop Vertical Jump
 - Proper knee alignment
 - Soft landing
 - Transfer WB to rearfoot
 - Increase hip and knee flexion
- Squat Form
 - Knee in line with 2nd toe
 - Limited to no valgus
 - Limited sagittal plane excess mobility over 7cm beyond toe
 - Increase hip flexion
 - Increase posterior WB through BL feet
- Lunge Form
 - Similar to the squat form
- Cutting
 - Knee not hyperextending on plant limb
 - Knee not caving in to valgus
- Single Leg Stance or Functional Reach
 - Are they able to control a balance test?



Evidence-Based Interventions for Patellofemoral Pain

RECOMMENDED	NOT RECOMMENDED
✓ Exercise Therapy	X Patellofemoral, Knee & Lumbar Mobilisations
✓ Combining Hip & Knee Exercises	X Electrophysical Agents
✓ Combined Interventions	
✓ Foot orthoses	

Reference:
Crossley, K. M., van Middelkoop, M., Callaghan, M. J., Collins, N. J., Rathleff, M. S., & Barton, C. J. (2016). 2016 Patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Research Retreat, Manchester: Part 2: recommended physical interventions (exercise, taping, bracing, foot orthoses, and combined interventions). *Br J Sports Med*, 50(34), 844-852.

INJURY PREVENTION – WHAT WORKS

- Education
 - Video, photos, and information of high risk alignment
 - Ettlinger et al: reduction of 62% compared with the normalized expected number of ACL injuries in the trained individuals - with just visual and auditory education
- Warm up – jogging or activity to promote blood flow
- Stretching through the BL LE
- Functional and isolated: strength, power, and conditioning
 - Highly focused on form and control
 - Resistance training at 80% 1 rep max for 10-15 reps= strength/endurance
 - Eccentric as well as concentric
 - Progress to 80-90% 1 rep max performed at functional speed to achieve functional quality of power
- Proprioceptive Training
 - Caraffa et al: duration/frequency was 20 min/ day for 2–6 days/week including a minimum of 3 times per week during season
- Neuromuscular Control
 - Cutting, plyometrics, agility, body mechanics
 - Henning: intervention group had an 89% reduction in the rate of occurrence of ACL injuries
 - Mandelbaum, Bert R. et al: Year 1 = 88% decrease, Year 2 = 74% decreased in anterior cruciate ligament injury and tears in the enrolled subjects compared to the control group.
 - Renstrom P, et al: approximately 4–6 weeks to impart a benefit to the athlete
- PROPER CUES: Studies show that long term carry over of changes in body mechanics come from:
 - Increased reps of practice: 10,000 reps or more
 - Functional cues with **EXTERNAL** focus vs internal focus

TABLE 1. SAMPLE EXTERNAL CUES

<http://www.ideafit.com/fitness-library/sample-external-cues>

MOVEMENT:	Bench Press	Pull-Up	Squat	Jump
Case #1	"Drive the bar toward the ceiling."	"Pull the bar toward the ground."	"Push the floor away."	"Explode away from the ground."
Case #2	"Push the bar away from the bench."	"Squeeze the bar as if to bend it as you rise."	"Spread the floor as you stand tall."	"Accelerate toward the ceiling like a rocket taking off."
Case #3	"Accelerate the bar as fast as possible."	"Explode toward the ceiling as if to go above the bar."	"Squat down as if to hover above a chair just behind you."	"Focus on the ceiling, and try to reach out and touch it."
Case #4	"Apply inward pressure on the bar as you push away."	"Stay long and pull up as if there were a wall behind you."	"Keep the bar over your shoelaces the entire time."	"Get away from the ground as fast as possible."

If you have any questions or are interested in a formal injury prevention program, please contact us.