

## The Female Athlete

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### Title IX

- "In 1971, fewer than **295,000** girls participated in high school varsity athletics, accounting for just 7 percent of all varsity athletes; in 2001, that number leaped to **2.8 million**. In 1966, **16,000** females competed in intercollegiate athletics. By 2001, that number jumped to more than **150,000**



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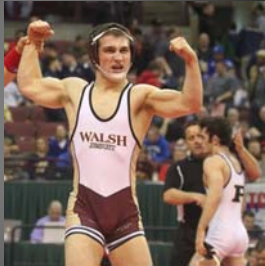
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### The Downside

- Between 1981 and 1999 university athletic departments cut 171 men's wrestling teams, 84 men's tennis teams, 56 men's gymnastics teams, 27 men's track teams, and 25 men's swimming teams



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### Women Athletes

- Higher body fat %
- Lower maximal oxygen consumption and hemoglobin
- Lower cardiac output
- Decreased muscle mass and strength
- Ligamentous laxity



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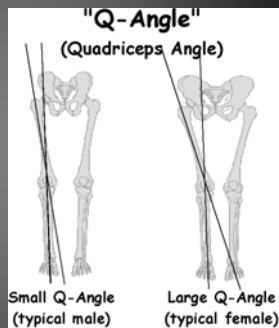
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### Female Athletic Injuries

- Patellofemoral disorders / joint laxity instability
- ACL injuries
- Female athletic triad / Stress Fractures



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### Joint Laxity Sulcus Sign



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### Patellofemoral syndrome in women Causes and Fixes

- Weakness of the medial Quadriceps, specifically **VMO dysplasia**
- Tight iliotibial bands
- Tight hamstring muscles
- Weakness or tightness of the hip muscles (adductors, abductors, external rotators)
- Tight calves can lead to **compensatory foot pronation** and, like tight hamstrings, can increase the posterior forces on the knee.

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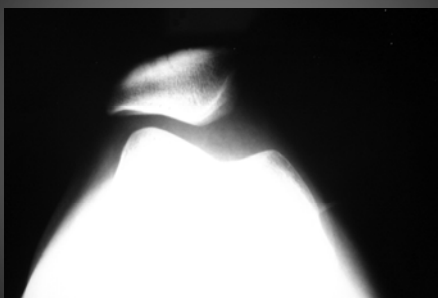
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### What you hope you don't see



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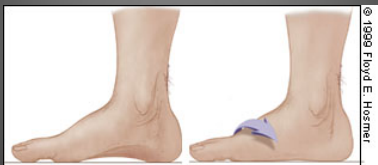
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Treatment  
**PT, PT, PT, PT**  
Try medial arch supports



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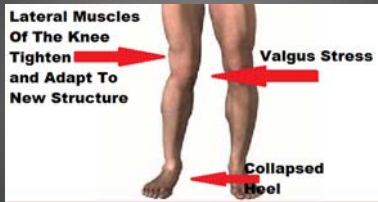
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## Medial Arch Supports



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## Female ACL

- Risk of injury is 2-10x greater than males
- Pivoting sports
- Noncontact
- Twist, pop and an effusion gives you a 60% ACL tear rate



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## Why?



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## Flexion is a good thing



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## Why do females tear their ACLs?

- Landing biomechanics and neuromuscular control differences
- Females land with their knees in more extension and valgus due to hip internal rotation



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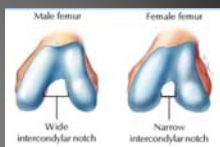
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## Secondary Reasons

- Smaller notches
- Smaller ACL size
- Cyclic hormonal levels
- ACL at greater risk for injury during the first half (preovulatory phase) of the menstrual cycle (Estrogen receptor presence)



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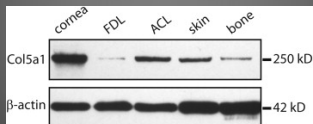
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### Genetics?

- underrepresentation of CC genotype of a COL5A1 gene sequence in females with ACL ruptures



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### Drop Test



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### Neuromuscular Issues

- Quadriceps dominant knee
- Incidence can be reduced with neuromuscular training (jump training)
- Core strengthening



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### Lessen Quad dominance Strengthen the Hamstrings



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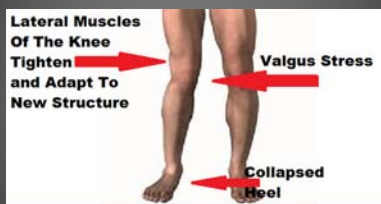
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### What about medial arch supports?



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### Reconstruction

- I would not use an allograft hamstring in a young female
- BTB OK.....?
- Autograft Hamstrings gaining popularity



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### The female athletic triad

- Amenorrhea
- Disordered eating
- Osteoporosis



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### Female Triad

- Amenorrhea resulting from energy imbalance, low body fat, and hypothalamic-pituitary axis changes
- incidence in elite runners is nearly 50%
- leads to bone demineralization and stress fractures

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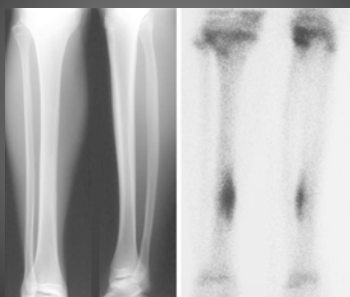
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### Radiographically silent Stress Fractures



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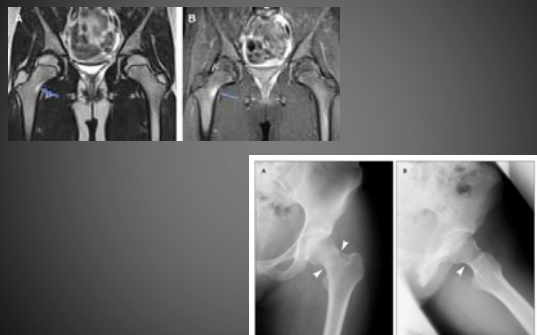
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### Stress fractures



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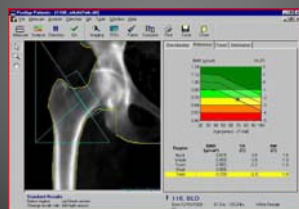
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### Osteoporosis

- Obtain a DEXA scan in female athletes with a history of amenorrhea and stress fractures



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Bone Loss is never completely recoverable.



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### Treatment

- Counselling
- Modify activities
- Eat



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### Shoulder Instability



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### Beware the Voluntary Dislocator



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PT and RUN



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Thanks

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