

# Figure Skating Injuries At Home and Abroad

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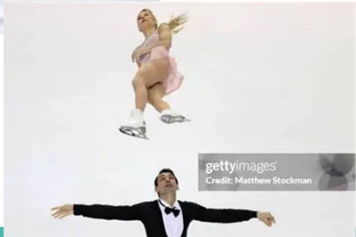
## Objectives

- Review competitive figure skating disciplines
- Review common injuries in competitive figure skaters
- Discuss return-to-play principles that are helpful when working with this population of athletes and coaches
- Discuss medical coverage for competitive figure skating and Team USA

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# Figure skating disciplines

- Singles
  - ◆ Multi-revolution jumps & spins
  - ◆ Gliding maneuvers, steps, turns, choreography, acrobatic moves
- Pairs
  - ◆ Two skaters, synchronized jumps & spins
  - ◆ Throw jumps, overhead lifts
- Ice dance
  - ◆ Intricate deep-edged footwork, turns, steps
  - ◆ Acrobatic lifts and spins without jumps or throws



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# Figure skating disciplines

- Synchronized skating
  - ◆ Team event with 16-20 skaters at a time
  - ◆ Interconnected through various upper-body hold techniques
  - ◆ Similar elements as seen in ice dance and pairs skating without multi-revolution



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## Figure skating disciplines

### → Additional categories

- ◆ Solo dance
- ◆ Showcase
- ◆ Theater on ice
- ◆ Adaptive



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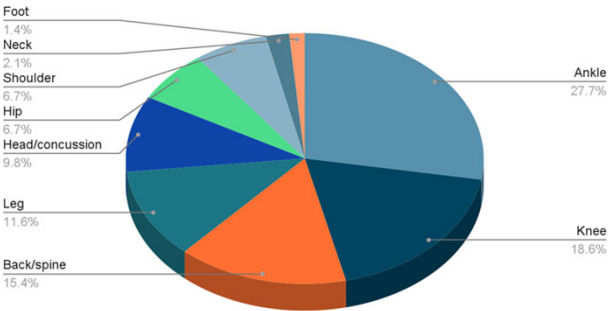
## Injury epidemiology

- 1.37-3 injuries per 1000 hours of training (3:1 overuse:acute ratio)
  - ◆ My 16-year-old trains ~20 hr/wk to compete at her level, 4 wks off/yr (~1000 hr/yr)
  - ◆ Team USA athlete might be 25-40 hr/wk including on & off-ice training
- Incidence: 0.97 injuries in dance, 1.32 singles, 1.83 pairs skaters per year
  - ◆ Singles 70.5% overuse
  - ◆ Pairs 60.2% acute
  - ◆ Dance 65.4% acute
  - ◆ Synchro 8:1 acute to overuse ratio

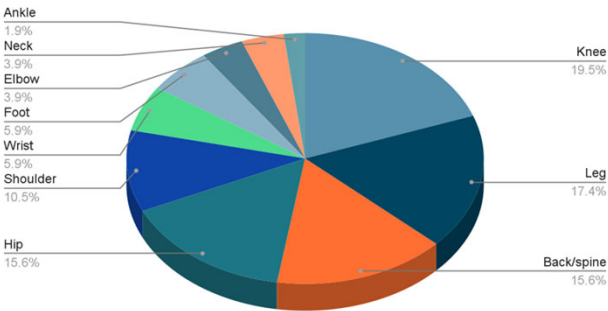
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## Injury location

→ Personal Report:



→ At an event:



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## Foot & ankle injuries

- **Retrocalcaneal bursitis** 34% of all skaters
  - ◆ More symptomatic on the landing leg
- **Lace bite** - tenosynovitis of the extensor tendons/tib anterior due to friction
- **Pump bump**/haglund deformity
- **Achilles tendinopathy** 12% of all skaters
  - ◆ Lack of dorsiflexion in the boot, often worse with off-ice training
- **Ankle sprain** >50% of all skaters
  - ◆ Multi-rotation off-ice jumps (singles, pairs)



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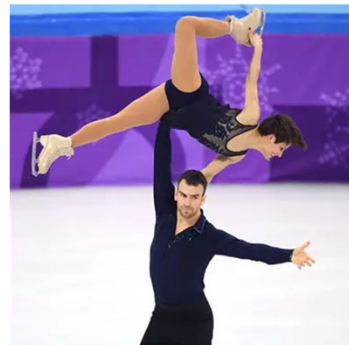
## Knee & Hip injuries

- **Anterior knee pain** (PFS 20%, patellar tendon 25%, Osgood-schlatter 10%)
  - ◆ Tight quad, relatively poor hamstring/IT mobility
- Meniscus and ligamentous injury is relatively rare
- **Groin, hip flexor, adductor, oblique strains, apophyseal injury**
  - ◆ Common in triple jumps, muscle imbalance in strength and mobility with relative lack of core strength
- **Hip impingement & labral tears**
  - ◆ Increased ROM & impact with advance spins and jumps
- **SI joint dysfunction**

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## Upper extremity injuries

- **Overuse injuries**, most common in pair > dance > synchro
  - ◆ Rotator cuff, labrum, biceps tendon
- **Acute injuries**, most common in singles > pairs
  - ◆ Wrist fractures due to FOOSH mechanism



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## Spine injuries

- **Generalized low back pain** in 13% of singles & pairs
  - ◆ Rigid boot limits ankle/knee motion and thus prevents absorption of force
  - ◆ Extreme hip angle and lumbar extension
  - ◆ Approx 3x body weight to land double axel, 7x for triple axel
- Increased risk of **spondylolysis and spondylolisthesis**
  - ◆ Impact plus hyperextension in jumps and spins
  - ◆ Additional factors include tight hip flexors, relatively weak core, repeated falls, unilateral absorption of force in jump landings.
  - ◆ **Nearly  $\frac{1}{3}$  of every skater with low back pain has a bone stress injury**



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## Head injuries

- Increasing research and identification.
  - ◆ Early data - 3%, recent data 15%-27%
  - ◆ Pairs > dance & singles > synchro
- Of those who have experienced concussion 42% report that they haven't sought medical attention



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## Stress fractures

- Most common in the **lower extremity, then spine**, ~12% of all injuries
  - ◆ Tibia, fibula, navicular, metatarsals, lumbar spine
  - ◆ Most often during increased training/off-ice training
  - ◆ 20% of female and 13% of male junior skaters report stress injury in their career

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## Common medical issues

- **Exercise induced bronchospasm**
  - ◆ Commonly triggered by cold, dry air and zamboni fumes
  - ◆ 21% of the 1998 olympic team
  - ◆ Consider vocal cord dysfunction as possibility
- **Disordered eating**
  - ◆ Disordered body image vs “occupational hazard”
  - ◆ High risk of low bone density and increased stress injury

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## Return to “play” considerations

- High degree of **distrust** for medical community
  - ◆ “They won’t let me skate”
- High degree of **tradition**, long history of doing things a certain way, risk of overtraining, poor understanding of periodization, etc
- Develop an understanding of the **basic movement patterns** and sport requirements
- Be willing to **work with athlete**, parent, coach to get back to the ice in some capacity whenever safe to do so
  - ◆ A list of things the athlete can do, with recommended progression

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## RTP for upper extremity injury

- **Are they in a cast?**
  - ◆ Return to skate ASAP, ok to spin, may take a couple of days to jump
  - ◆ I rarely limit any of this.
  - ◆ These kids are more coordinated on skates than they are in shoes!
  - ◆ May consider limits on “new” skills (things they can’t consistently land yet) if I have concern about unstable fracture
- **Overuse injury** (usually a pair/dance athlete)
  - ◆ Limit lifts, maybe throws while doing rehab until “safe for your partner and you”
  - ◆ Allow for most anything else that isn’t painful

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## RTP for lower extremity injury

- **Skate boots are like casts**, sometimes this works like a walking boot
  - ◆ Can be useful for milder foot/ankle issue.
  - ◆ I often let athletes jump on-ice before they can run/jump off-ice
- **Common instructions:**
  - ◆ Period of relative rest off-ice based upon injury severity
  - ◆ On-ice edges, choreo run-throughs of programs, cardio
  - ◆ Add "base" spins (no flying, no extreme positions), single jumps
  - ◆ Add double jumps, flying spins
  - ◆ Add combo jumps, difficult jumps (double axel, triples), extreme spin positions
  - ◆ Return to off-ice run/jump
  - ◆ Full competition run throughs

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## Concussion RTP

- **Rotation is often the most difficult part of RTP**
  - ◆ Light off-ice activity (bike, walk, stretch, easy strength)
  - ◆ On-ice edges, choro, cardio
  - ◆ Add "easy" jumps
  - ◆ Add "easy" spins
  - ◆ Add jump combos, medium difficulty jumps
  - ◆ Add flying/difficult spins
  - ◆ New/difficult jumps, full programs
- Skaters pretty much never have a 5-day return.



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## Team USA travel medicine

- Illness
  - ◆ Zofran & imodium
  - ◆ Zyrtec, claritin, nose spray
  - ◆ Tylenol, ibuprofen, hot tea
- Injury
  - ◆ Lacerations
  - ◆ Manage ongoing chronic issues
    - Bring a photo/video of how you like things taped
  - ◆ Acute injury
    - Wrist fracture, hip avulsion, tarsal tunnel, SI joint dysfunction, all the hips
- Hugs & high fives
  - ◆ Lots of encouragement, psych support, management of safety versus success, bandaids & kleenex, home sickness
- Officials & coaches and other countries

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## Selected references

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