



COMMON INJURIES IN FIGURE SKATING

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Ankle Sprain

Ankle sprain is one of the most common injuries in figure skaters. Some clinicians attribute the higher risk of ligament injuries to the stiffness of the skate; stiffer skates, in an attempt to provide the skater adequate support for double- and triple-rotation jumps, may contribute to imbalanced work in lower leg muscles. This injury appears to occur more often during dry land training than it does on the ice; however, more research needs to be done. Ankle and foot strengthening and balance training should be incorporated into off-ice training programs.

[Kowalczyk, 2019, Porter, 2007, Porter, 2013]

Achilles Tendinopathy

Achilles tendon problems are common overuse injuries in figure skating, likely related to the requirement for repetitive jumping. These issues are often exacerbated by the skating boot. For example, a stiff skating boot places the skater's foot into a slightly pointed position, which shortens the calf muscles and may create a decreased ability for calf muscles to control the jump landing. Achilles tendon problems may also be caused by compression of the boot over the tendon. Tendinopathy can be associated with overtraining, and may resolve with decreased time in the boot. It is important to emphasize proper boot fitting as well as incorporate ankle and intrinsic foot strengthening into training programs.

[Kowalczyk, 2019, Porter, 2007]

Retrocalcaneal Bursitis

Retrocalcaneal bursitis, an inflammation of the bursae between the Achilles tendon and calcaneus, may be attributed to excessive motion of a narrow heel in a wide heel cup for figure skaters. Greater body weight as well as greater ability to bend the ankle in the skate are significantly associated with increased risk of developing retrocalcaneal bursitis in the landing foot. Most issues could be resolved with appropriately fitting boots as well as improved heel cup design.

[Han 2018, Campanelli, 2015]

Tibialis Anterior Tendinopathy ("lace bite")

Tenosynovitis of the anterior tibialis and toe extensor tendons, otherwise known as "lace bite," is caused by the pressure exerted from excessive bending motions of the ankle and knee.

Contributing factors include improper boot tongue padding and/or uneven lacing technique.

Treatment options include altering tongue padding and lacing technique to avoid pressure over the concentrated area.

[Han 2018, Porter, 2007, Porter, 2013]

Stress Fracture: Navicular, 1st/2nd Metatarsal

Stress fractures mostly occur in the first and second metatarsal followed by tarsal navicular bones, mainly of the take-off foot. Treatment includes reducing load placed on the foot as well as screening for eating disorders/RED-S (Relative Energy Nutrient Deficiency in Sport). Once a skater is able to return to sport, a “jump count,” similar to baseball “pitch count,” may be beneficial to optimize recovery.

[Han 2018, Kowalczyk, 2019, Porter, 2007, Porter, 2013]

Patellofemoral (PFP) pain syndrome and related knee issues

Frequent load of the quadriceps muscles from repetitive jumping and high-force landings could contribute to knee pain in figure skaters, and occur more commonly in the landing leg. Common findings associated with patellofemoral pain syndrome include poor or abnormal knee cap tracking, hip-knee alignment, movement pattern of foot, knee, and/or hip, excessive knee valgus, quadriceps or iliotibial band tightness, hip and/or quadriceps muscle weakness, or a combination of any of the above. However, the relationships between PFP and the mechanics of each impairment are unclear. Other overuse conditions that affect adolescents ages 9-14 include apophysitis, such as Osgood Schlatter and Sinding-Larsen-Johansson. Because knee pain could be due to many factors and not all conditions present similarly, it is imperative that the physical therapist assess not only the knee but also hip and foot, perform functional movement analysis, and address impairments accordingly. Treatment protocol may include rest from activity, icing, stretching, and strengthening the hip and core musculature.

[Han 2018, Herrington, 2014, Powers, 2017, Porter, 2007, Porter, 2013]

Lumbar Spondylolysis and Spondylolisthesis

Due to the repetitive backward bending and the forces absorbed by the body with jump landings, low back pain is not uncommon in figure skaters. The figure skating boot limits ankle mobility, which results in excessive hip flexion and compensatory lumbar hyperextension during jump landing. This forced hyperextension during jump landing increases the risk of lumbar vertebral stress fracture (spondylolysis). If untreated, stress fractures can develop into spondylolisthesis, or forward slippage of the vertebrae, which may result in cord compression or nerve damage. Early detection is vital in limiting further injury. Initial treatment options include rest, bracing, injections, and physical therapy. Surgery may be warranted in severe cases.

[Lipetz, 2000, Porter, 2007]

Hip Muscle Strain

Irritation of internal/external oblique and hip flexor muscles and tendons is common in figure skaters due to the repetitive rotation of the trunk and hip flexion of the swing leg during jumping. Iliac crest apophysitis, or irritation of the oblique muscles attaching at the pelvis, is also common in figure skaters. This type of injury is more common in younger and skeletally immature skaters. Muscle and tendon injuries typically develop over time, are associated with increases in training, and are exacerbated by movements that use the affected muscle. With appropriate rest, ice, and compression, strains typically resolve within 3 months.

[Lipetz, 2000, Porter, 2007, Riney, 1995]

Contusion

Frequent falling during practice often results in contusions to various body parts. Areas most vulnerable to contusions from falling include the wrist, elbow, lateral hip, sacrum, and knee. Ice can be used initially to reduce pain and swelling. Padding of the affected area is often beneficial to prevent further injury from subsequent falls.

[Riney, 1995]

Acetabular Labral Tear

The labrum is fibrocartilage that lines the acetabular rim and increases congruency and stability of the hip joint. Due to the repetitive impact from jump landings and frequent external rotation of the hip in figure skating, microtrauma over time can contribute to degeneration of the labrum. Figure skaters will commonly report deep, sharp pain in the joint that may be aggravated by the combined motions of hip flexion and internal or external rotation. Labral tears are typically diagnosed with MRI with contrast, and treatment may include injections and physical therapy. If symptoms do not respond to conservative management, surgery may be warranted.

[Bolia, 2018, Han, 2018]

References

1. Kowalczyk AD, Geminiani ET, Dahlberg BW, Micheli LJ, Sugimoto D. Pediatric and adolescent figure skating injuries: a 15-year retrospective review. *Clin J Sport Med.* 2019;0(0):1-9.
2. Porter EB, Young CC, Niedfeldt MW, Gottschlich LM. Sport-specific injuries and medical problems of figure skaters. *Wis Med J.* 2007;106(6):330-335.
3. Porter EB. Common injuries and medical problems in singles figure skaters. *Curr Sports Med Rep.* 2013;12(5):318-320.
4. Han JS, Geminiani ET, Micheli LJ. Epidemiology of figure skating injuries: a review of the literature. *Sports Health.* 2018;10(6):532-537. doi:10.1177/1941738118774769.
5. Campanelli V, Piscitelli F, Verardi L, Maillard P, Sbarbati A. Lower extremity overuse conditions affecting figure skaters during daily training. *Orthop J Sport Med.* 2015;3(7):1-12. doi:10.1177/2325967115596517.
6. Herrington L. Knee valgus angle during single leg squat and landing in patellofemoral pain patients and controls. *Knee.* 2014;21(2):514-7.
7. Powers CM, Witvrouw E, Davis IS, Crossley KM. Evidence-based framework for a pathomechanical model of patellofemoral pain: 2017 patellofemoral pain consensus statement from the 4th International Patellofemoral Pain Research Retreat, Manchester, UK: part 3. *Br J Sports Med.* 2017;51(24):1713-1723.
8. Lipetz J, Kruse RJ. Injuries and special considerations of female figure skaters. *Clin Sports Med.* 2000;19(2).
9. Riney SM, Goldman SI, Moyer M, Johns J. Prevention of lateral hip injuries in competitive figure skaters. *J Athl Train.* 1995;30(1):75-76.