

Sports Medicine

FOR THE PRIMARY CARE PROVIDER

Aquatic Exercise

By Deborah Werner, DPT

Physical therapy referrals are traditionally for land-based exercise and modalities. However, aquatic-based exercise programs used by athletes recovering from a variety of injuries could be helpful, but are often overlooked. Patients with acute injuries, including ankle and knee sprains, overuse injuries (such as stress fractures) or post-surgical recovery, can all benefit from aquatic therapy. Initiation of early rehabilitation in the pool can lead to a faster return to athletic activities.¹

Water provides a unique environment for patients to exercise.

At Penn State Physical Therapy located at 30 Hope Drive in Hershey, a Hydroworx 2000 pool allows therapists to develop individualized aquatic treatment plans for each patient. The pool is heated to 93 degrees, which is ideal for aquatic therapy.² Patients who suffer from joint pain and stiffness have greater ease-of-motion in the warm water compared to on land.

The hydrostatic principle of water is an important concept to remember when prescribing treatment for patients in the pool. Post-operative patients can have weight-bearing restrictions for several weeks to months. During this time, limited exercise can be performed on land. A unique feature of the Hydroworx pool is a hydraulic platform lift allowing the therapist to adjust pool depth for each patient. Water depth at the neck reduces body weight on the legs by 90 percent; at the chest, by 75 percent; and at the waist, by 50 percent.³ These patients initiate gait training and lower extremity strengthening earlier in the rehabilitation process allowing for an easier transition to land-based exercise.

The underwater treadmill allows patients to begin limited weight-bearing ambulation. Patients undergoing procedures, such as ACL reconstruction, OATS procedure or meniscectomy need gait re-training. The buoyancy of the water allows for muscle re-education without the stress of gravity on the surgical limb. Runners who experience stress reactions and fractures in the lower leg can often resume running on the underwater treadmill sooner and without pain. With early return to running, these patients are able to prevent deconditioning and reach their training and racing goals. In addition, use of the underwater cameras with a TV display, provide feedback for both the runner and physical therapist.

A primary goal for physical therapy patients is pain relief. Water exercises, particularly for patients with knee and hip osteoarthritis, allow greater joint mobility and decreased joint stress.

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Dear Fellow Health Care Provider,

I hope this finds you well and enjoying the winter months!

Enclosed you will find the latest edition of our primary care sports medicine newsletter, a biannual newsletter of seasonal sports topics. We hope you find the information useful and appreciate any feedback you have to enhance our efforts.

For questions, feedback and inquiries about future issues, please contact Tracie Kirkessner at tkirkessner@PennStateHealth.psu.edu or me at msilvis@PennStateHealth.psu.edu.

Enjoy,

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Jumper's Knee

By Lindsay Lafferty, MD | SPORTS MEDICINE FELLOW

As we jump into winter sports, overuse injuries begin to make their way into primary care offices. Overuse injuries, including tendinopathies, account for nearly 7 percent of all injury-related physician visits in the U.S. Tendon injuries are often mislabeled as tendonitis, due to the misconception that overuse tendon injuries are always inflammatory. Instead, the tendon exhibits degradation without acute inflammation. Therefore, the terms tendinopathy or tendinosis are used to describe chronic tendon conditions.

Patellar tendinopathy, also known as jumper's knee, occurs in 20 percent of jumping athletes, due to repetitive forceful eccentric loading of the patellar tendon. It is most common in those younger than 40 years of age. Athletes in basketball, volleyball, gymnastics, and track and field are at greatest risk. Predisposition to this includes those with abnormal patellofemoral tracking and poor hamstring or quad flexibility.

Pain is insidious in onset and localized to the anterior knee over the patellar tendon. Initially, pain occurs following activity, but progresses to occur during activity and is exacerbated by jumping, prolonged sitting, climbing stairs, squatting or kneeling.

Physical examination elicits pain predominantly at the inferior pole of the patella, but may extend into the patellar tendon. Tenderness with palpation increases with full extension of the leg and improves when knee is in full flexion, known as Basset's sign. Knee motion and strength are preserved without joint effusion, but localized swelling can occur. Performing a decline squat or jump often replicates the pain. Though very rare, inability to complete a straight leg raise should raise concern for an extensor mechanism tear; prompt, urgent orthopaedic evaluation should be pursued.

Imaging is not necessary for the diagnosis; plain films are usually normal. However, in chronic cases imaging can show small traction osteophytes or osteopenia at the distal patellar pole and calcification of the tendon. MRI is reserved for recalcitrant cases where surgical treatment is being considered.

The differential includes patellofemoral syndrome, prepatellar bursitis or partial rupture of the extensor mechanism. Osgood-Schlatter's and Sindig-Larsen-Johansson syndrome or traction apophysitis at the tibial tubercle and distal pole of the patella respectively, can present with similar complaints in a younger age group.

Treatment is typically conservative and includes the following regimen: rest from aggravating activities, pain control and physical therapy. Ice, anti-inflammatories and analgesic creams can be used for pain. Local steroid injections should be avoided, as they increase the risk of tendon rupture. In addition, a counterforce brace can be used to reduce tension across the area. Physical therapy can help to regain pain-free range-of-motion, hamstring, quadriceps and calf flexibility, quadriceps strengthening and eccentric loading of the tendon. Manual soft-tissue instrument-assisted mobilization by physical therapy may be utilized, as well.



Athletes going through recovery are advised that total healing may take four to six months. They may gradually return to activity as tolerated, based on symptoms, but therapeutic exercises should be continued. Chronic cases refractory to prolonged conservative management should be referred for discussion of nitroglycerin, platelet-rich plasma injection or surgical debridement.

References

1. Brukner et al. *Clinical Sports Medicine*: 4th edition. McGrawHill. 2012: 700-707.
2. O'Connor FG, Casa DJ, Davis BA et al. *ACSM's Sports Medicine: A Comprehensive Review*. Lippincott, Williams and Wilkins. 2013: 436.
3. Sarwark JF et al. *Essentials of Musculoskeletal Care*. American Academy of Orthopedic Surgeons. 2010: 692-694.
4. Seidenberg PH, Beutler AI. *The Sports Medicine Resource Manual*. Saunders. 2008: 337.
5. Wilson JJ, Thomas BM. Common Overuse Tendon Problems: A Review and Recommendations for Treatment. *Am Fam Physician*. 2005 Sep 1;72(5):811-818.
6. Woodwell DA, Cherry DK. National Ambulatory Medical Care Survey: 2002 summary. *Adv Data*. 2004;346:1-44.

Figure Skating: MOST COMMON INJURIES THROUGHOUT SEASON

By Cynthia J. Thomasson, MPAS, PA-C, DFAAPA

In 2003, the United States Figure Skating Association (USFSA) implemented new judging elements. Technical difficulty factors have substantially increased over the years and, with this, requirements for spinning, jumping, connecting moves, lifts and throws have been elevated, as well.

With increased physical demands, traumatic and overuse injury occurrence has escalated. Some of the most common injuries result in various diagnoses: stress fractures to the foot or spine; stress fractures/reactions or medial tibial stress syndrome of the lower extremity; tendonitis of the Achilles, patella or peroneal tendons; strain injuries involving the hip or patella (patellofemoral syndrome); apophyseal injuries such as Osgood-Schlatter syndrome or iliac crest pain; and ankle bursitis (lace bite injuries of the tibialis anterior or toe extensor tendons). Common traumatic injuries in skaters include ankle sprains and fractures; dislocation of the patella or shoulder; ACL injuries and meniscal tears; head injuries and concussions; hip labral tears; and lacerations.

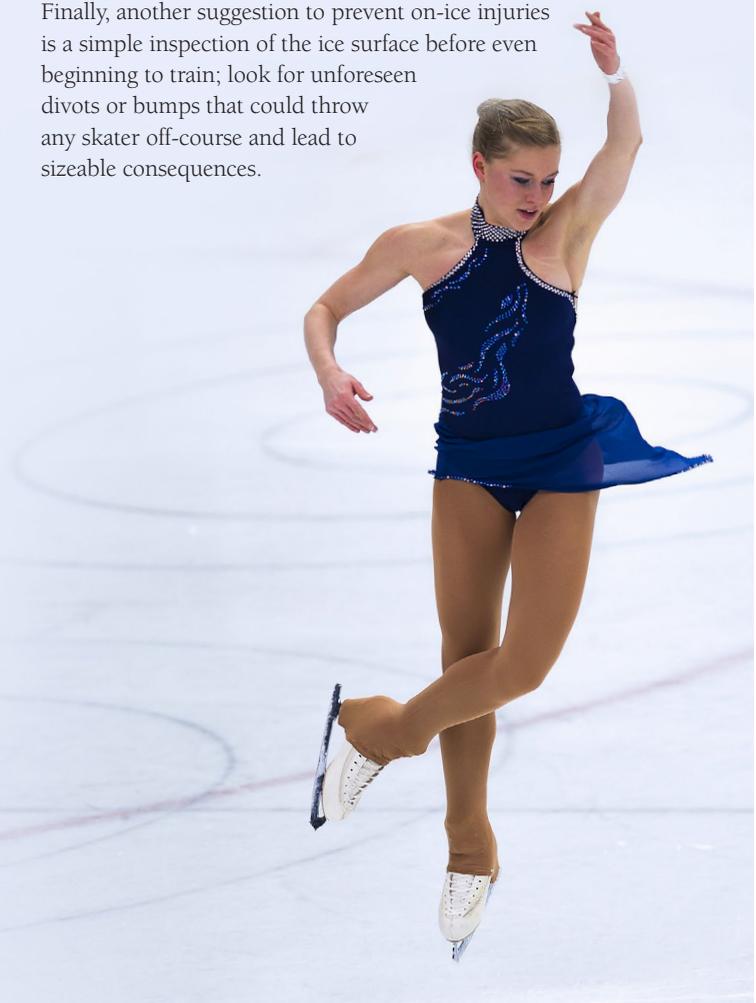
Over-training and poor technique can contribute to on-ice injuries. The impact of landing jumps in figure skating is powerful. In adolescent skaters alone, it can generate forces up to 100 Gs with bodies that are still in musculoskeletal development. This force transmits through the lower extremity, then up into the axial skeleton.

Typical treatments of most injuries include rest, ice, compression, elevation above heart level (the combination of the four also commonly referred to as 'rice'), bone stimulators, corticosteroid injections, platelet-rich plasma (PRP) injections and NSAIDs.

Injury prevention is the most helpful component to keep figure skaters in top competitive shape. Skaters should avoid learning new elements during growth spurts, if possible. Off-ice training, stretching and strengthening programs are of utmost importance. Skaters should limit the amount of repetitive jumps and high impact skills during each ice session. Doing off-ice warm-ups and stretching,

as well as core strengthening, can help alleviate on-ice injuries to a certain extent. Another preventative measure includes limiting the number of skaters at a time during freestyle ice time to avoid impact injuries with other skaters. Wearing pads and head protection during training can also be helpful to prevent serious injuries.

Finally, another suggestion to prevent on-ice injuries is a simple inspection of the ice surface before even beginning to train; look for unforeseen divots or bumps that could throw any skater off-course and lead to sizeable consequences.



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This leads to decreased pain and increased quality-of-life.⁴ For patients suffering from back pain, flotation noodles can be used in deep water to provide a traction force on the lumbar spine often resulting in decreased symptoms.⁵ Whether getting that athlete back into the game sooner or treating painful joints, aquatic exercise offers options earlier in recovery compared to traditional land-based physical therapy.

Please contact any of our physical therapists with any questions regarding patients who might benefit from aquatic physical therapy.

References

1. Eunkuk Kim MD, PhD, Taeguy Kim PT, ATC, Hyunyoung Kang PT. (2010, August). Aquatic Versus Land-based Exercises as Early Functional Rehabilitation for Elite Athletes with Acute Lower Extremity Ligament Injury: A Pilot Study. *Physical Medicine and Rehabilitation*, 2(8), 703-712.
2. (2017, December). Retrieved from <http://www.aquaticpt.org>
3. Ami R. Stuart, PhD, Justin Doble, BS, Angela P. Presson, PHD, Erik N. Kubiak, MD. (2015, Jul-Aug). Anatomic landmarks facilitate predictable partial lower limb loading during aquatic weight bearing. *Curr Orthop Pract*, 26(4), 414-419.
4. Rana S Hinman, Sophie E Heywod, Anthony R Day. (2007, January 1). Aquatic Physical Therapy for Hip and Knee Osteoarthritis: Results of a Single-Blind Randomized Controlled Trial. *Physical Therapy*, 87(1), 32-43.
5. Susanne M. Simmerman PT, ScD, Phillip S. Sizer PT, PhD, Gergory S. Dedrick PT, ScD, et al. (2011, May). Immediate Changes in Spinal Height and Pain After Vertical Traction in Patients With Persistent Low Back Symptoms: A Crossover Clinical Trial. *Physical Medicine and Rehabilitation*, 3(5), 447-457.

RESEARCH IN BRIEF: CROSSFIT

Incidence of injury among CrossFit participants compared to traditional weightlifting routine

By Joshua Elkin*, Allen R. Kunselman MA**, Jacob Kammerman*, Robert A. Gallo MD* et. al.

SUMMARIZED FROM ABSTRACT PRESENTED AT AAOS IN SAN DIEGO – MARCH 2017

BACKGROUND: CrossFit is a highly popular exercise routine consisting of widely variable, intense workouts. There are limited comparative data on the incidence of injuries sustained by CrossFit participants versus those who use a traditional weightlifting routine.

HYPOTHESIS: We hypothesize that CrossFit subjects have a higher incidence of self-reported injuries within a two-year period compared to traditional weightlifters.

STUDY DESIGN: Cross-sectional Study

METHODS: From August 2015 through January 2016, a 15-question survey was distributed to seven consenting fitness centers (four traditional, three CrossFit) and five hospital and medical school email ListServes. Anonymous volunteers participated surveying their workout routine, injury history and use of nutritional supplements. Statistical analyses were performed with Chi Square analysis or multiple logistic regression analysis, relative risks and 95 percent confidence intervals.

RESULTS: The survey was completed by 411 subjects: 122 self-identified as CrossFit members, while 289 followed a traditional weightlifting routine. There was no significant difference in number of days or hours training per week between the two groups. In the two years prior to completing the questionnaire, those following

a CrossFit routine had a 1.3 times higher risk of injury ($p=0.010$) and were 2.4 times more likely to seek medical attention following the injury ($p<0.00001$) than those using a traditional weightlifting routine. Adjusting for gender and age, the odds of having at least one injury in two years were 2.3 times larger in the CrossFit group ($p=0.001$). In both groups, shoulder injuries were most common (46.4 percent), followed by lower back injuries (38.3 percent) and hip injuries (9.1 percent). CrossFit participants were most commonly injured while performing clean and jerk movements (18.9 percent), deadlift movements (18.9 percent) and snatch movements (16.2 percent), while traditional weightlifters were most commonly injured while performing barbell and dumbbell bench press movements (23.7 percent), deadlift movements (21.5 percent) and back squat movements (17.0 percent).

CONCLUSION: Compared to traditional weightlifters, CrossFit have a higher risk of self-reported injury and likelihood to seek medical treatment after the injury. While CrossFit training offers several advantages, participants should take special precautions to limit injury risk.

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