

Common Conditions and Injuries of the Knee

Iliotibial Band (ITB) Syndrome

What is it?

- The ITB is fascia, a connective tissue that gives structure to the body. Its function is to protect the knee from sideways movement and to provide knee stability. It does this by tightening, but when it gets too tight, it can cause quite a bit of pain.

Causes

- Repetitive legwork tightens the band
- Using turnout increases its torque, compounding the problem.
- Dehydration
- Increased hip internal rotation and knee adduction
- More common in women

Common signs and symptoms

- Stinging sensation lateral knee with activity
- Swelling of the lateral thigh just above the knee
- To test for ITB syndrome, bend your knee at a 45-degree angle. If you have an IT band problem, you'll almost always feel pain on the outside of the knee.

Prevention

- Address any noticeable muscle dysfunctions
 - Strengthen the gluteal muscles and hip abductors of the leg.
- Foam Rolling to stretch and release the ITB
- Address trigger points in the biceps femoris, vastus lateralis, gluteus maximus, and tensor fascia latae muscles.
- Stretch the ITB before dancing!

Management

- Avoid dancing if ITB syndrome is expected and practice RICE and cross train with lower intensity exercises if not severe. If pain is really intense, refrain from athletic activity and seek advice from a professional.
- Address muscle dysfunction by strengthening gluteal muscles and hip abductors of the leg.
- Foam Rolling for the ITB
- Address trigger points in the biceps femoris, vastus lateralis, gluteus maximus, and tensor fascia latae muscles.
- Passive or static stretching the ITB



- Sawing stretch (see instructions at <https://www.dancestudiolife.com/a-better-you-babying-your-it-bands/>)
- Figure 4 stretch (see instructions at site listed above)
- Standing doorway stretch (see instructions at site listed above)
- Standing barre stretch: Stand in fourth position turned out (with your feet aligned as in fifth position, not in an open fourth) and place your weight primarily over the front foot. Cambré forward, keeping your weight on the front leg, and remain inverted as you breathe six times. Slowly roll upright. You can also do this stretch in a parallel first position (feet about 4 inches apart).¹
- What physical therapy can do to help:
 - Deep myofascial release or instrument-assisted massage
 - Ice, heat, ultrasound.
 - Ultrasound (phonophoresis) with topical cortisone
 - Extracorporeal shockwave therapy
- Last resorts include cortisone shots to break up tissue and surgery to release the ITB.

Reference

1. Dance Studio Life | Dedicated to Quality Dance Education. *Dancestudiolifecom*. 2017. Available at: <https://www.dancestudiolife.com/>. Accessed February 11, 2017.

Patellofemoral Pain

What is it?

- Patellofemoral pain or ‘anterior knee pain’ is a general term for pain around or under the patella (kneecap). Chondromalacia is due to breakdown of cartilage under the kneecap.

Causes

- Tight iliotibial bands or weak hip abductors (gluteus medius)
- Excessive turn out, Wide hips
- Too much or too little motion of the kneecap (patella)
- Flat-feet or high arches
- Changes in footwear or flooring, or more time barefoot
- Sudden increases in amount of training
- Alignment of the hip, knee, and foot contribute greatly to the stress on the patella, patellar tendon, and iliotibial band.
- Ballet dancers are more susceptible due to a higher prevalence of tight iliotibial bands, caused by muscle imbalances from when the abductors and external rotators of the leg are left rather flexible.



Common signs and symptoms

- Pain under the kneecap
 - Pain worse when walking, dancing, or after sitting in a chair for long periods of time.
- Little to no swelling of the knee.
- Knee may buckle upon standing.
- May hear or feel popping or grinding upon movement of the knee from a bent position.
- Pain with demi-plié, landing jumps, and developpe movements.

Prevention

- Do not focus on turnout from the ground up, as gripping at the feet instead of from the hip external rotators can cause excessive torque at knee.
- Core strengthening and pelvic stability exercises.
- Hip abductor strengthening; stretching or strengthening other imbalances at the hip and knee.
- Correcting flat foot posture and reducing any rolling in of the feet.

Management

- Avoid grand plie, deep squatting, and jumps until symptoms are diminished completely for a couple of weeks.
- What Physical Therapy can do to help
 - Customized exercises to address your muscle length/strength imbalance, balance and proprioception
 - Patellofemoral taping using McConnell tape
 - Joint mobilizations to improve patellar mobility if it is stiff
 - Neuromuscular electrical stimulation of the VMO
 - KT taping to improve patellofemoral alignment
 - <https://www.youtube.com/watch?v=vMz0PvAoRKs>
- Shoe inserts, orthotics, or taping to improve alignment of the ankle
- Options for symptoms management include the following:
 - RICE
 - Medications (as prescribed by a physician, typically NSAIDs)
 - Surgery only as last resort or if damaged cartilage in the joint is the main cause. Surgery often fails in hypermobile patients.

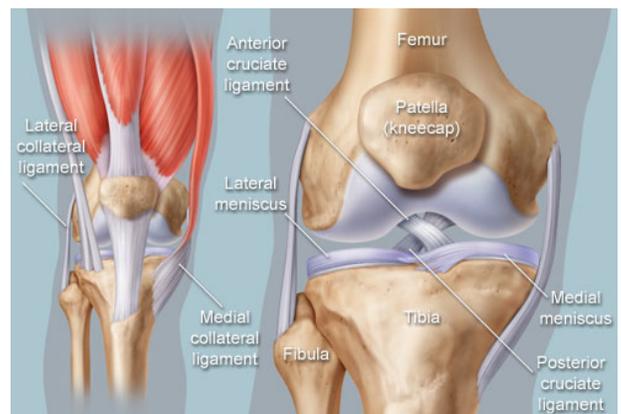
Knee Sprains

What is it?

- An injury to one of the ligaments in the knee.

Causes

- Hyperextending
- Quick turns or sideways motions
- Twisting while your feet are on the floor
- Accidental run ins with other dancers
- Landing with bad knee alignment
- Landing on the knee from a fall
- Poor foot alignment (Sickled feet)



Common signs and symptoms

- Most affected dancers will note the following symptoms:
 - A popping sound or feeling upon impact
 - Pain localized to the involved ligament
 - Immediate swelling and stiffness at the knee
 - Redness, bruising if the sprain is severe
 - Feeling unstable in the knee

Prevention

- Always warm-up and stretch before dancing!
- Core stability and strengthening exercises.
- Learning proper jump and landing technique. Bending the knees and landing on balls of the feet to absorb the shock of landing after jumping.
- Hamstring strengthening

Management

- Avoid the activity that caused the damage.
- RICE for 2-3 days to reduce swelling and inflammation.
- Do not use heat or massage the area! This can increase blood flow to the area making inflammation even worse.
- If weight bearing through the knee joint by standing or walking is difficult, use crutches until seen by a professional. But do not stop walking or moving if being careful, as babying the injury can decrease the surrounding muscle strength.
- What physical therapy can do to help
 - Treatment depends on which ligament is damaged and the severity of the injury.
 - Transverse friction massage to outside (collateral) ligaments
 - Ice, ultrasound, and interferential electrical stimulation for pain & swelling
 - KT taping of the knee
 - Strengthening of intrinsic muscles of the feet, quadriceps, hamstrings, and calves with focus on joint stability.
 - Balance tasks with focus on joint stability
- Surgery may be needed depending on the severity of the injury.

Strains of Muscles Around the Knee

What is it?

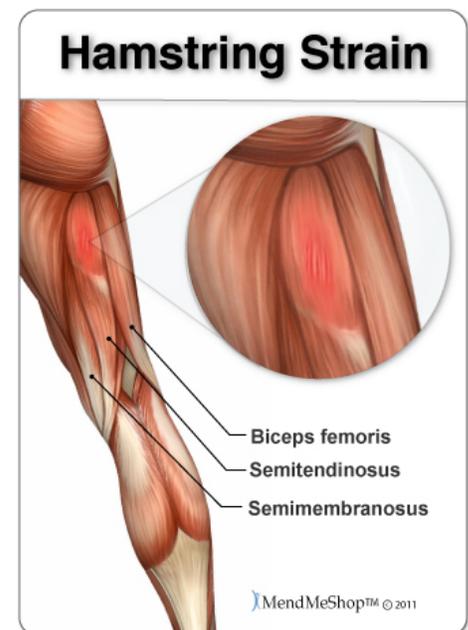
- An injury of one of the muscles around the knee.
Commonly in hamstrings or quadriceps.

Causes

- Extreme and fast movements, end range of knee and hip
- Quick turns or lateral motions
- Twisting while your feet are on the floor
- Accidental collisions with other dancers
- Landing with a bad knee posture

Common signs and symptoms

- Most affected dancers will note the following symptoms:
 - Pain
 - A popping sound or feeling upon impact
 - Swelling in the muscle, redness, bruising if severe
 - Reduced flexibility at the knee or hip
 - Feeling unstable in the knee



Prevention

- Core stability and strengthening exercises.
- Bending the knees and landing on balls of the feet to absorb the shock of landing after jumping.
- Hamstring strengthening

Management (Very similar to knee sprains)

- Avoid repetitions of the exercises that caused the damage.
- RICE for 2-3 days to reduce swelling and inflammation.
- Do not use heat or massage the area! This can increase blood flow to the area making inflammation even worse.
- If weight bearing through the knee joint by standing or walking is difficult, use crutches until seen by a professional. But do not stop walking or moving if being careful, as babying the injury can decrease the surrounding muscle strength.
- What physical therapy can do to help
 - Treatment is very dependent on which tendon is damaged and the severity of the injury.
 - Massage and mobilization techniques
 - Ice, ultrasound, and interferential
 - KT taping of the knee
 - Dry needling
 - Strengthening of quadriceps, hamstrings, and calves with focus on joint stability.
 - Balance tasks with focus on joint stability
- Surgery may be needed depending on the severity of the injury.

Meniscus Tear

What is it?

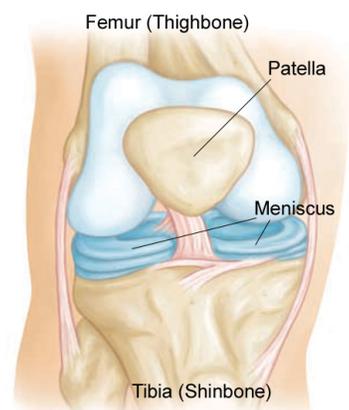
- The meniscus is a disc of cartilage that lies in the knee joint to reduce friction, provide lubrication, and distribute forces evenly at and across the joint, so that repetitive movements between the femur and tibia occur smoothly and painlessly.

Causes

- Meniscus tears are typically secondary to ligament tears; it is important to realize that quick rotational or lateral motions are typically the cause to these injuries.
- Overuse is also a common factor, repetitive squatting or kneeling can cause damage to the meniscus over time and make it more susceptible to tears.
- Age and nutrition affect the durability and resiliency of the meniscus during movements.

Common signs and symptoms

- Most affected dancers will note the following symptoms:
 - Sharp, intense pain at the joint line, usually inside of knee



- A popping sound or feeling upon impact
- Difficulty walking due to pain or catching sensation
- Swelling, slow to develop and can be intermittent
- Reduced range of motion, difficulty straightening knee

Prevention

- Core stability and strengthening exercises
- If dancing en pointe, evaluate your ability to pass the Airplane Test before spending hours training with poor knee posture.
- Strengthen quads and hamstrings, do not stretch weak muscles!

Management

- RICE immediately! If a meniscus tear is suspected, immediately stop exercise that affects the area, as exercise can cause permanent damage to the joint surface.
- Low impact exercises, e.g. swimming or biking
- What Physical therapy can do to help?
 - Depends on severity of the injury.
- May require arthroscopic surgery. This involves the placement of a small camera into the joint.



The "Airplane" test starts with the dancer standing on one leg, trunk tipped forward, arms horizontal (like an airplane), and the non-support leg extended to the back. The dancer then performs 5 plies (bends) while pointing the toe to touch the ground. A pass is defined as 4 of 5 plies maintaining neutral leg alignment.

This procedure allows not only accurate diagnosis of the injury, but also repair. Recovery time after the surgery varies with the individual and the severity of the injury.

Helpful sources:

- American Academy of Orthopedic Surgeons at www.orthoinfo.aaos.org
- Safety and Health in Arts Production and Entertainment. Preventing Musculoskeletal Injury (MSI) for Musicians and Dancers: A Resource Guide. 2002. Available at <http://www.actsafe.ca/wp-content/uploads/resources/pdf/msi.pdf>
- Russell J. Preventing dance injuries: current perspectives. *Open Access Journal of Sports Medicine*. 2013;4:199-210. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3871955/>