



Dancers and MSI: Symptoms, contributing factors, and types of injuries

Musculoskeletal injury (MSI) is any injury or disorder of the muscles, bones, joints, tendons, ligaments, nerves, blood vessels, or related soft tissues. This includes a strain, sprain, or inflammation that is caused or aggravated by activity.

MSI is the most frequently reported medical problem among classical and modern dancers. Approximately 60–80% of dancers have reported at least one injury that has affected their dancing or kept them from dancing and approximately 50% of dancers report at least one chronic injury. To find out more about MSI, see the information sheet “Dancers and MSI — Prevention and Treatment.”

MSI symptoms

If you develop an MSI, you may experience symptoms that interfere with your ability to perform at the level you are accustomed to, including:

- pain
- weakness
- numbness
- tingling
- stiffness (reduced range of motion)
- loss of muscular control

It is important to pay attention to early symptoms that may indicate a developing MSI. Many dancers do not report minor injuries for long periods and subsequently develop chronic injuries. By the time these dancers report an injury or seek treatment, the damage has intensified to a level that requires major rehabilitation.

Dancers may be hesitant to report injuries and may try to mask the effects of developing injuries partly because of a performance culture in which there is a long-standing

philosophy that “the show must go on” and partly because of concerns about being labelled as a dancer with an injury.

There is also a predominant medical perspective that MSI is neither life-threatening nor medically serious. However, an MSI can be artistically and professionally limiting, or even career-ending, with devastating effects on your physical, emotional, and financial well-being. If you experience symptoms that may indicate MSI, take steps to deal with the problem.

Table 1 describes five levels of MSI symptoms in performers. If you are at Level I or II, modify your activities to prevent further progression of symptoms. If you are at Level III or higher, seek professional assistance.

Table 1 Progression of MSI symptoms

Level I	Pain occurs after class, practice, rehearsal, or performance, but you are able to perform normally.
Level II	Pain occurs during class, practice, rehearsal, or performance, but you are not restricted in performing.
Level III	Pain occurs during class, practice, rehearsal, or performance, and begins to affect some aspects of daily life. You must alter technique or reduce the duration of activity.
Level IV	Pain occurs as soon as you attempt to participate in class, practice, rehearsal, or performance, and is too severe to continue. Many aspects of daily life are affected.
Level V	Pain is continuous during all activities of daily life, and you are unable to participate in class, practice, rehearsal, or performance.



Delayed-onset muscle soreness versus injury

It is also important to differentiate between the delayed-onset muscle soreness that normally accompanies a physically demanding workout and the pain or symptoms that indicate injury.

Delayed-onset muscle soreness is muscle stiffness that may develop 24–36 hours after intense or unaccustomed physical activity. Delayed-onset muscle soreness is a normal part of a physically challenging training program. It usually does not limit further activity and subsides within a few days.

Muscle, tendon, or ligament injuries typically have a more rapid and localized onset of pain and take longer (weeks or months) for full recovery. Because dancers commonly experience delayed-onset muscle soreness, there is a danger that they may ignore pain from an injury and continue to train or rehearse in the same way.

Factors contributing to injury

Researchers have attributed the high incidence of injury in dancers to:

- excessive dance training at an early age (before puberty)
- extensive and intense rehearsal
- the physical characteristics of dance footwear
- dancing on pointe
- improper technique
- the dietary habits common to dancers

Other possible factors include:

- overtired or overworked dancers
- inadequate warm-up
- cold environments
- unstable or unsuitable flooring

Stress and anxiety

The majority of soft tissue dance injuries occur at performances or rehearsals. This suggests that the physical, mental, and environmental stresses of performance and rehearsal are more intense than those present during class or practice; dancers are more likely to push their physical limits during performance or rehearsal.

The mental demands of dance can manifest as physical stress (for example, muscle tightness or hyperventilation) and mental anxiety. Interpersonal conflicts in the dance environment may also influence the stress levels of dancers. Researchers have found that treating stress disorders in dancers reduces the incidence of injury.

Types of MSI

The most common types of MSI in dance are strains, sprains, and bone disorders affecting the back or lower extremities. Most dance injuries occur in the hips, knees, ankles, and feet. The lower limbs are particularly vulnerable to injury because of the stress and strain that dance requires in these areas. In classical ballet dancers, the high incidence of lower extremity injury has been attributed to forcing turnout and dancing on pointe.

Arthritis

Arthritis, the most common type of joint injury in dancers, is characterized by pain and often swelling at a joint. Osteoarthritis is a degradation of cartilage that often affects the hips, ankles and feet of ballet dancers.

Back and neck injuries

Spondylolysis, the most common back injury among dancers, is a stress fracture that occurs in one of the lower back vertebrae. You may not notice any obvious symptoms or you may feel a pain across the lower back that feels like a muscle strain.

Back and neck pain can be mechanical or nerve-related. Mechanical pain injuries include sprains and strains. Nerve-related pain occurs when nerve roots are compressed or irritated where they leave the spine. Back injuries are characterized by localized tenderness and pain at the site of the injury, but may also result in referred pain or numbness in the buttocks, groin, or legs. Neck injuries may result in headaches or pain radiating into the shoulders or arms. You may also experience muscle spasms or cramping as well as a reduced range of back or neck motion.

Lower leg and ankle injuries

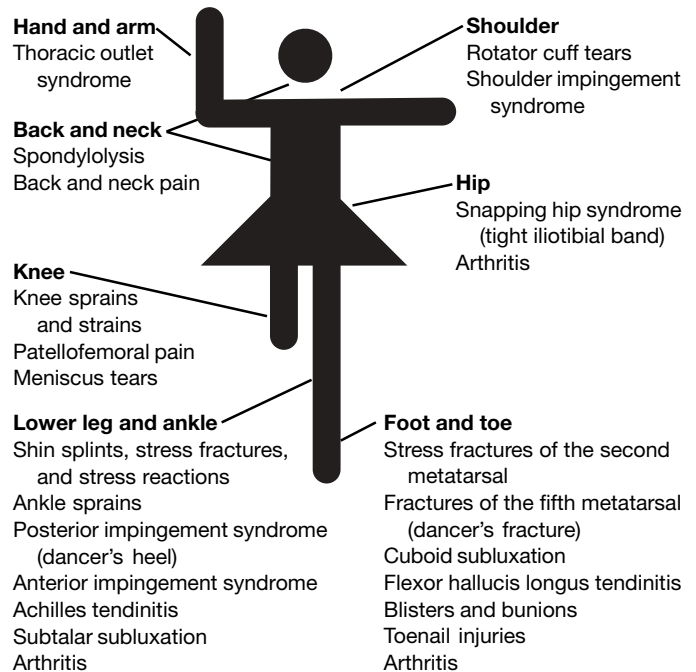
Shin splints, stress fractures, and stress reactions are overuse injuries of the lower leg usually associated with forceful, repetitive activities such as running or jumping. Shin splints involve pain in the shin region. A stress fracture is a small crack or cracks that occur when muscles are fatigued and the bone is repeatedly stressed. Repeatedly stressing bone can weaken a localized area of the bone (a stress reaction) and may eventually lead to stress fractures if left untreated. A common symptom of all three conditions is aching pain that may become more severe during activity.

Ankle sprains, the most common ankle injury in dancers, involve excessive stretching or tearing of the ligaments that support the ankle. You will experience pain and swelling in the sprained area, which may cause a loss of ankle movement. These symptoms may go away quickly, but you may be left with a feeling of instability in the ankle.

Posterior impingement syndrome, commonly known as *dancer's heel*, involves compression of soft tissues by a bony formation at the back of the ankle. You will feel discomfort at the back of the ankle when you point your toe. The pain is aggravated by relevé and relieved somewhat by standing with the heel on the ground.

Anterior impingement syndrome is similar to posterior impingement syndrome, except it involves the top of the

Figure 1 Types of MSI common to dancers



ankle where the shin bone meets the ankle. A bump forms and compresses the soft tissue at the front of the ankle. The first sign is a loss of depth in the dancer's pliés, often accompanied by generalized ankle pain.

Achilles tendinitis is inflammation of the large tendon at the back of the leg that attaches the calf muscles to the back of the heel bone. Under too much stress, the Achilles tendon tightens and works too hard. This causes it to become inflamed and, over time, can produce a covering of scar tissue, which is less flexible than the tendon. You may notice pain when performing pliés or landing jumps.

Subtalar subluxation is a minor dislocation of the ankle in which the talus and adjoining bones are slightly displaced from their normal position. You will notice pain in the area of the heel and the mid-foot. You may feel a strange sensation of forward shifting of the painful foot. Immediately after a subtalar subluxation, dancing is no longer possible and walking may also be difficult.

Knee injuries

Knee sprains occur when ligaments are stretched, torn, or completely ruptured. *Knee strains* occur when tendons are overstretched or torn. Sprain or strain symptoms include pain, popping at the knee, swelling, redness, bruising, and limited or stiff range of motion.

Patellofemoral pain occurs when repeated bending and straightening of the knee irritates the inside surface of the kneecap. You may feel pain while walking, running, or sitting for long periods. You may also experience swelling and feel or hear snapping, popping, or grinding.

A *meniscus tear* is a tear in the cartilage that cushions and lubricates between the bones at a joint. You may feel discomfort at the front or sides of the knee and notice swelling and discomfort after exercising. The knee may also feel as if it is catching or locking and may not be able to straighten fully, or it may give way.

Hip injuries

Snapping hip syndrome involves the iliotibial band, a long band of muscle-tendon that runs along the outside of the thigh from the buttocks to the knee, rubbing against bone or bursae at the hip. Symptoms include discomfort and inflammation at the knee or hip areas and a snapping sound during movements such as walking.

Foot and toe injuries

Stress fractures of the second metatarsal may cause aching pain that becomes more severe during activity. Pain and swelling tend to remain localized over the fracture site.

A *fracture of the fifth metatarsal* (the little toe metatarsal) is commonly known as a *dancer's fracture*. Unlike a stress fracture, the bone breaks. You may notice inflammation, pain, swelling, redness or bruising, and heat.

Cuboid subluxation is a dislocation of the mid-foot bone. Common symptoms include pain in the side of the

mid-foot and weakness during the push-off of walking. The pain may radiate or travel to the bottom of the foot arch or to the front portion of the ankle.

Flexor hallucis longus tendinitis is an injury to the tendon of the muscle that passes along the bottom of the foot and works to flex the big toe to a pointed position. Symptoms include pain and possibly localized swelling. You may experience this pain when jumping or when in plié in the fifth position, tendu, or relevé.

A *blister* is an elevation, generally filled with a watery liquid, in the top layer of the skin. A *bunion* is an enlargement of the joint at the base of the big toe that develops when the big toe bends toward the second toe. Symptoms include restricted range of motion in the big toe and pain that is usually aggravated by footwear. Dancing on pointe or any dance manoeuvres that stress the big-toe joint may aggravate the bunion.

Toenail injuries include bruised toenails and ingrown toenails. Bruised toenails are caused by the toenail pushing back into its base. Ingrown toenails are generally caused by crowding of the toes (particularly in pointe shoes), pressure on the toes, and poorly cut toenails.

Shoulder injuries (rotator cuff injuries)

Rotator cuff tears occur when one or more of the rotator cuff tendons are torn partly or completely. You may feel pain and weakness and possibly be unable to move your shoulder properly.

Shoulder impingement syndrome is irritation and inflammation of the rotator cuff tendons and the bursa that lubricates the shoulder joint. It may occur when the arm is raised above shoulder level repetitively or for an extended period. Early symptoms are a general ache and sensitivity in the shoulder area, particularly when the arm is raised. Later, the pain becomes more acute and may be experienced when the arm is extended backward.

