

Performing Arts Safety Primer

Dancers and MSI



Actsafes Performing Arts Safety Primers

This book is one in a series of Performing Arts Safety Primers that also includes:

- The Performing Arts Safety Primer
- Musicians and MSI

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Introduction

MSI is the most frequently reported medical problem among classical and modern dancers. The majority 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.

An 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.

There are many things you can do to help prevent and treat musculoskeletal injury (MSI). An MSI can be painful and can interfere with both your professional and personal life, so it's important to use prevention strategies. If you already have an MSI, there are treatment options that will help you stop the injury from getting worse and speed up the healing process.

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. Symptoms may include: pain, weakness, numbness, tingling, stiffness (reduced range of motion), and/or loss of muscular control.

It is important to pay attention to early symptoms that may indicate a developing MSI. This can prevent the development of chronic injuries that require 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 often a 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 early.

There are five levels of MSI symptoms in performers. If you are at Level 1 or 2, modify your activities to prevent further progression of symptoms. If you are at Level 3 or higher, seek professional assistance.

Level 1

Pain occurs after class, practice, rehearsal, or performance, but you are able to perform normally.

Level 2

Pain occurs during class, practice rehearsal, or performance, but you are not restricted in performing.

Level 3

Pain occurs during class, practice, rehearsal, or performance, and begins to affect some aspects of daily life.

At this point, you should alter technique or reduce the duration of activity or risk further injury.

Level 4

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 5

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
- poor dietary habits

Other possible factors include:

- overtired or overworked dancers
- inadequate warm-up
- cold environments
- unstable or unsuitable flooring
- physically demanding choreography
- inappropriate choreography for stage design
- costume restrictions

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 stress management can reduce the incidence of injury in dancers.

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.

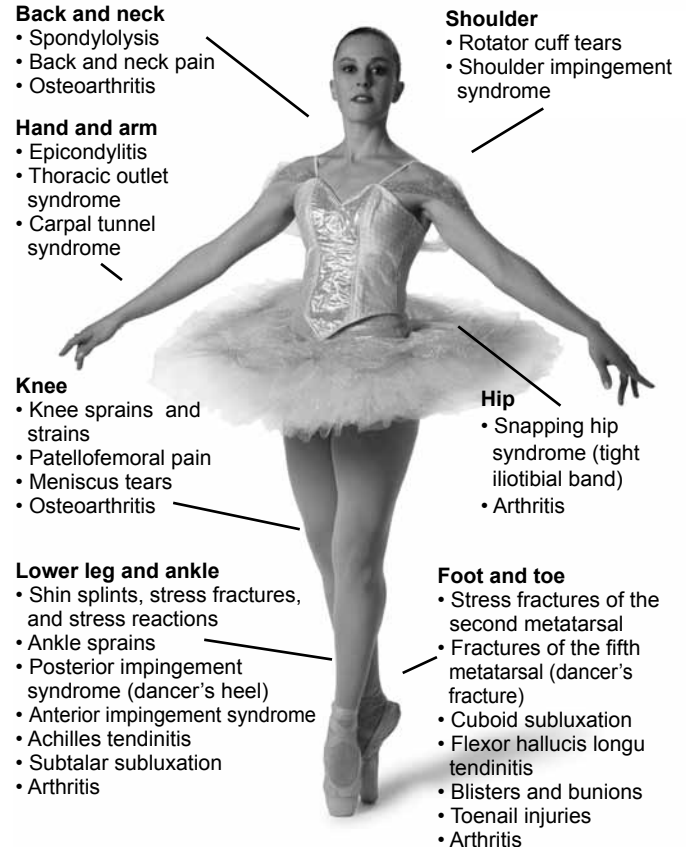
Arthritis

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. As cartilage breaks down, the joint loses smooth movement and may result in bone on bone contact.

Back and neck injuries

Spondylolysis is a stress fracture of one or more lumbar vertebrae that can have a hereditary component, but is also attributed to repeated stress to the lumbar spine, which may occur in

Types of MSI common to dancers



dance with overstretching and hyperextension of the low back. 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 when nerve roots are compressed or irritated where they leave the spine, or anywhere along the nerve path. 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. Repeatedly stressing may eventually lead to small cracks in bone (stress fractures) if left untreated. A common symptom of all three conditions is aching pain that may become more severe during activity. Compart-

ment syndromes involve pain in the shin area related to muscle overuse. This is often related to changes in choreography that involve repeated foot extensions.

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 an instability (loss of proprioception) in the ankle that increases risk of reinjury.

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 foot or in relevé, which is 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 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 may 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 toes 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 in the top layer of the skin generally filled with a watery liquid. 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 involve injury to one or more of the tendons that are involved with shoulder movement. 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.

Prevention

Although it is important for dancers to take responsibility for their own health and safety, choreographers, instructors, stage managers, and other individuals who work with dancers should also strive to ensure that dancers are adequately protected against injury. The prevention strategies described here are not only for dancers but also for those who work with them.

Warm up before dancing

Warming up before dancing helps reduce the risk of injury by:

- increasing the temperature of muscle and connective tissue, which is associated with a decreased risk of soft tissue injury
- stimulating the cardiovascular system to adjust blood flow from the body's core to the active muscles, where the need for oxygen increases in response to exercise
- stimulating joint lubrication and preparing the joints for full range of movement

An adequate warm-up should accomplish each of these three goals.

Stay warm while dancing

Warmer studios help increase blood flow and prevent injury. Cold environments are associated with decreased blood flow to the extremities. When blood flow is decreased, the affected body parts are more prone to injury.

Use proper technique

Improper technique is a major contributor to injury. Injuries resulting from improper technique tend to recur even after successful treatment because dancers tend to resume dancing with the same technique that first led to the injury. This illustrates the importance of long-term dance training that includes a focus on correcting improper technique.

Dance on sprung floors

According to Newton's third law, for every action there is an equal and opposite reaction. When jumping and completing high-impact manoeuvres, a dancer exerts a force on the floor, while the floor exerts an equal force on the dancer. These forces can have a strong impact on the dancer's feet and joints. Sprung floors absorb some of the force, decreasing the acute impact on the body.

Remain aware of limitations

When instructors and choreographers are aware of dancers' physical and mental limitations and requirements, dancers are less likely to feel pressure (whether real or interpreted) to push themselves beyond their capabilities. Dancers who become fatigued and push themselves beyond their physical capacity are more likely to adopt sloppy technique or make unsafe movements, increasing their risk of injury. Dancers should remain aware of their own limitations and know when to stop.

Maintain communication

Maintaining communication between dancers and artistic instructors, choreographers, and directors helps maintain the health of dancers. Brief conversations in class or rehearsal help those involved monitor the physical and mental status of dancers. Identifying problems early may help reduce the likelihood of injury. Open communication provides both an opportunity and permission to identify symptoms of developing soft tissue injuries before they become problematic.

In addition, showing a genuine interest in the well-being of dancers can have a positive effect on their level of stress and state of mind. A dancer's status can provide valuable information regarding the balance between the intensity of the workout and the adequacy of rest and recovery.

Rest between workouts

Any type of fitness training, including dancing, is based on the overload principle. To see an improvement in fitness, the body must work harder than it is accustomed to working. This principle works well as long as the muscles get adequate rest between workouts. Without rest, muscles become fatigued and can no longer do the same amount of work. Stress then shifts from the muscles to other soft tissue such as tendons and ligaments. Most soft tissue injuries occur when the muscles are fatigued.

With adequate rest between workouts, muscles become increasingly strong and able to sustain more force, and thus do more work. Adequate rest breaks allow dancers to feel refreshed and ready to continue working near their physical limitations without progressively increasing their levels of pain, discomfort, or fatigue.

Rest when injured

Deal with acute MSI immediately to prevent further damage — care during the first 72 hours of an acute injury is critical to its outcome. The RICE treatment protocol (see “Treatment”) is an effective treatment for acute soft tissue injury.

Most soft tissue injuries require rest in the form of modified activity to allow the damaged tissue to heal. Modified activity may range from reducing the intensity of activities that stress the damaged tissue to completely stopping all activities that affect the injured region. Consult with a healthcare professional who is familiar with sports or occupational injuries and the dance industry. Knowing the difference between delayed-onset muscle soreness and pain resulting from injury is important for determining when to rest and when to continue physical activity.

Additionally, dancers must ensure that they're always well hydrated. People typically lose up to two litres of water each day in perspiration and moisture loss from basic body functions. It's important to consume fluids throughout the day.

Avoid strain when carrying equipment

Carrying equipment, clothing, costumes, and other items can place a significant amount of stress on the neck, shoulders, arms, and hands. Select appropriate containers for your gear, preferably lightweight containers with padded handles or shoulder straps. Avoid using bags with narrow straps or handles because these increase the effects of contact stress. If possible, use wheeled carts or bags (such as overnight travel suitcases) with handles that allow you to pull them while in a full standing posture.

Treatment

The first level of injury management is recognizing early warning symptoms and administering simple self-help techniques such as the RICE protocol. Ideally, dancers should learn to identify symptoms and use self-help techniques at an early age. The second level is recognizing symptoms that are persistent or unusual and seeking professional healthcare assistance.

Early warning symptoms

Learn to recognize MSI symptoms. Early warning symptoms include:

- discomfort, pain, tingling, or numbness while dancing
- weakness or difficulty with fine control of movement
- stiffness or limited range of motion
- postural changes (for example, shoulders elevated or rounded forward)
- local swelling or redness

If you notice discomfort or pain while dancing and circumstances allow it, take a break until the symptom subsides. Avoid working through the

pain. In most cases it will only get worse if you continue to dance.

Early self-help techniques

If you experience early symptoms of MSI, try the following techniques:

- Identify aspects of your training habits or dance technique that may be contributing to the symptom. Correct bad habits or improper technique.
- Increase the amount of rest and decrease the duration of continuous dance time until you can dance without symptoms. This may mean allocating more rehearsal hours with more frequent breaks to obtain the same amount of daily dance time.
- Perform a thorough warm-up at the start of your rehearsal or performance sessions.
- Determine which movements contribute to the symptoms, and reduce your intensity and level of repetition while rehearsing those movements.
- Alternate physical rehearsal with mental rehearsal (visualization or imagery) to balance your physical demands with adequate rest, while maintaining a focus on performance.

RICE Protocol

Use the RICE protocol (rest, ice, compression, and elevation) during the immediate stages of injury (the first few days) to help reduce the amount of damage to your body. The protocol helps decrease swelling, discomfort, and muscle spasm as well as prevent further injury. Although the protocol will help manage your injury, seek guidance from a healthcare professional to manage persistent or worsening symptoms.

Rest

Rest the injured area to avoid further aggravation. You can continue with a normal workout routine but should avoid any activity that results in discomfort or stress to the injured tissue.

Ice

Apply ice or cold packs to the injured area for 15–20 minutes to help reduce swelling and manage pain. Never place ice directly on your skin because this can result in frostbite. Place crushed or cubed ice in a wetted towel and then place the towel on the affected area. If ice is not available, a pack of frozen vegetables works just as well.

Do not use alternative methods of icing (creams, balms, or rubs) because they only cool the first layers of skin and not deeper into the injured area. Never use ice to numb an area so you can keep performing through pain. This only masks the symptoms and you may make the injury worse.

Compression

Wrap the injury in a tensor bandage, using a criss-cross method. Compression reduces the swelling of the injured body part by forcing fluid away from the injured tissue. Compression and ice often can be combined by wrapping the ice in the tensor bandage. Do not sleep with compression wrapping as it may be harmful to normal circulation.

Please consult a healthcare professional for proper wrapping techniques.

Elevation

Elevate the injured area above the level of the heart to help move fluid away from the injury.

Other treatment methods

An injury that persists or becomes worse and begins to affect your ability to continue dancing should be addressed first using conservative (nonsurgical) treatment methods. Involving sports-medicine specialists in the treatment program has been shown to result in a high success rate.

Conservative treatment methods may include:

- activity modification
- correction of dance technique
- physical therapies
- nutrition advice
- medication
- splints
- orthotics
- taping
- ultrasound
- acupuncture

If you are unable to dance during rehabilitation, consider keeping fit by using other strength and fitness programs such as the Pilates Method.

When conservative treatment methods are ineffective or the initial injury is particularly severe, more aggressive (surgical) approaches may be necessary. Dance injuries that require surgical intervention are likely to benefit from dance-specific rehabilitation that includes a focus on maintaining and re-establishing joint mobility, flexibility, and strength.

Rest and proprioception

Rest after injury, particularly lower limb injury, plays an important role in maintaining or restoring proprioception. Proprioception is the sense of perception, usually on a subconscious level, of the movements and position of the body. Sense organs in the joints provide awareness of the positions of the joints, which is critical for posture, balance, and coordinated movements.

Proprioception is important for dancers who are trying to coordinate difficult choreography and to balance in difficult positions. Postural stability requires adequate proprioception from the ankle joint.

Proprioception is decreased for several weeks in dancers who have sprained their ankles but will gradually improve as the injury heals. Dancers with ankle injuries have decreased postural stability and are more likely to suffer reinjury if they return to dancing before regaining full proprioception.

When to seek medical assistance

If symptoms continue to occur each time you dance, continue to get worse, or are unusual for you, seek medical assistance. If symptoms continue to persist after you have stopped dancing or if they appear at times other than when you are dancing (for example, during sleep), seek immediate help from a health-care professional who is experienced in treating dancers' injuries.

Addendum: Good nutrition for dancers

The benefits of good nutrition are numerous, and even more so for dancers. Constant training takes a toll on muscles, joints and bones. Good eating habits can improve the recovery from such strain, and even assist with lean muscle growth and soft tissue repair. Eating the right foods can increase energy, focus and concentration. Finding the proper balance of nutrients not only prevents fatigue and injury, but also supports a long healthy career in dance.

Before class, rehearsal and/or performance

How can I increase my energy, concentration and focus?

- eat breakfast
- combine protein and carbohydrate
- eat small meals throughout the day

Eat breakfast

Just like your mother said — it's true. Breakfast is the meal that jump-starts your metabolism and gives you energy for the day. Though you

may not feel hungry first thing in the morning, it is important to at least eat something small to stimulate the mind and body. Often it is a case of habit that we do not feel inclined to eat breakfast. By simply tempting the taste buds with a little something (fruit or toast), digestive juices will kick in and hunger will awaken. Another way to stimulate digestive juices is to drink a glass of lemon water first thing in the morning (pure filtered water with fresh squeezed lemon in it). *Eating a small breakfast before morning dance class will invigorate you and help you focus, setting you on the right track for the day.*

How can I sustain my energy longer?

Combine protein with carbohydrate

While carbohydrate is the primary fuel source for the body, protein stabilizes blood sugar levels and maintains steady energy throughout the day. Carbohydrate is the macronutrient that we most easily breakdown for immediate energy. It is therefore essential for dancers to consume enough carbohydrate foods to keep the body fuelled. However, eating carbohydrate (or “sugar”) on its own causes an increase of sugar in the bloodstream (or blood sugar). This can give instant energy for a short period of time

but is then followed by an energy crash. Drastic spikes in blood sugar levels are strenuous on the body and can lead to disorders including hypoglycemia and diabetes. *Eating carbohydrate is tremendously important for providing energy, but should be combined with protein and healthy fats for optimum performance.*

Examples of carbohydrate rich foods:

- bread products (bagels, crackers, toast, etc.)
- fruit
- pasta
- rice and other grains (quinoa, oats, barley)
- potato and starchy vegetables
- less healthy options (muffins, pancakes with syrup, chocolate, candy, honey)

Combine protein with carbohydrate not only at breakfast but throughout the day. You will feel more satiated and keep hunger at bay for longer periods of time. Avoid high-sugar snacks and simple carbs such as fruit leathers and muffins to prevent quick rises and falls in blood sugar. By stabilizing blood sugar you will have even states of energy, concentration and focus.

It is not always easy to find breakfast foods that have protein. Some common choices include:

- eggs
- cheese
- milk
- meat products (such as bacon or sausages)
- peanut butter
- yogurt
- soy beverage

Other less common protein foods for breakfast are:

- tofu
- nuts
- quinoa (a grain found in the bulk section at health food stores, cooks up similarly to rice)
- other nut butters such as almond or cashew butter
- meat leftovers
- beans

How will protein improve my focus?

Along with its many functions in the body, protein (broken down into amino acids) enters the brain and stimulates it to produce neurotransmitters. Two of these neurotransmitters, dopamine and norepinephrine, promote alertness and activity. Protein awakens the brain and guides and influences the building of nerve cells. It also makes enzymes, hormones and red blood cells and is used to build structures throughout the body.

How can I prevent fatigue?

Eat small meals throughout the day

One of the best ways to maintain energy is to provide the body with fuel throughout the day. There are two key ways to stay fuelled:

1. Plan ahead and have small meals or snacks between rehearsals and classes (ie. fruits, vegetables, cheese)
2. Include a small amount of protein in each meal/snack

What is wrong with food on the go?

Snacks that are most readily available on the run are not necessarily the best choices for staying healthy and building a strong energized body. Even foods touted as healthy such as bran muffins and orange juice contain high amounts of sugar and/or fat and do not provide dancers with the necessary nutrients for building lean muscle and staying mentally focused over a period of time. Choose meal type foods (“real food”) such as soup, sandwiches, leftovers, or sushi instead of “snacky” foods for better nutrition and vitamin/mineral availability. Eat smaller amounts of these foods at one time to avoid the “too full” feeling, especially when having to dance within a short

period of time. Try making homemade snacks with healthy foods including vegetable sticks, fresh fruit, nuts and seeds and homemade dips, such as hummus or a low fat yogurt dip.

Make sure you get some protein (even just a little bit) with each snack or small meal. Cheese on a bagel, nuts with fruit, hummus with veggies and tuna on a cracker are just a few ways to combine protein and carbohydrate. *The nutrients from carbohydrates and proteins combined work as a team to help build lean muscle and keep energy levels sustained.*

After class, rehearsal and/or performance

Post workout nutrition is the key to recovery for many, if not all, high performance sports, and dance is no exception. Eating the right foods at the right time can be helpful in ways including:

- muscle repair
- soreness prevention
- lean muscle growth
- ability to bounce back and rehearse the next day

How can I improve my recovery with nutrition?

- eat within 40 minutes after exercise
- combine carbohydrate and protein at a 4-1 ratio
- hydrate (see page 41 for more details)
- eat whole foods

The body becomes depleted of essential nutrients and stored energy after intense exercise and physical exertion. Replacing these stores as quickly as possible is critical in order to bounce back from the strain being put on the body.

When is the best time to eat after dancing?

Eat within 40 minutes after exercise

Or as soon as possible. Sport nutrition research shows that a window period exists within 30-40 minutes after intense activity when the body is at its peak for absorption. During this period, glycogen stores (stores of energy in muscles) need to be replaced and cells are ready for nutrient uptake. *Getting food into the body during the window period will help prevent soreness, improve the recovery of muscles and tendons and encourage the growth of lean muscle tissue.*

The quality of recovery is dependant on what foods are eaten during this 40 minute window period.

What should I eat to maximize my recovery?

Combine carbohydrate and protein in a ratio of 4-1

The ideal ratio for combining carbohydrate to protein during the window period is *four parts carbohydrate to one part protein*. Carbohydrate (broken down into glucose) raises insulin levels and allows the transport of protein into muscles and cells so they can repair damage and increase muscle growth. Getting carbohydrate quickly into the bloodstream allows:

1. glycogen stores to be replaced — preventing fatigue and making energy available for future rehearsals
2. protein to enter the cells — for building lean muscle and repairing damaged cells

High performance athletes go to great lengths to find foods that raise glucose levels as quickly as possible. Sport nutrition companies have engineered post workout drinks and powders

that aim to achieve this. Because the body is so sensitive at this time, it makes sense that what is consumed should be nutrient dense as well as easy to digest. High glycemic whole foods that will allow for a quick release of insulin are potatoes, rice and rice cakes/ crackers, fruit and fruit juices, bread products and pasta. All of these combined with protein foods are ideal for helping muscles and tissues recover from intense exercise.

How can I prevent soreness, decrease inflammation and stay healthy?

Eat a variety of whole foods

Whole foods generally grow in the earth or on a tree and do not come packaged from the grocery store. They generally do not have added preservatives and chemical colourings or flavourings. Eating whole foods is important not only because they have enzymes that are useful for digesting, but also because they are full of nutrients, antioxidants and phytochemicals that help us stay healthy and fight the strain and wear on our bodies.

Some of the top nutrients from whole foods that are essential for dancers to stay healthy, especially after extreme training and performing, include:

- Essential fatty acids
- Antioxidants- Vitamins A, C, E
- Minerals such as calcium and magnesium

Essential fatty acids (EFAs) come from oils in foods such as fish, flax, avocado, nuts and seeds. They are essential because the body does not produce them. Some EFAs have been proven to decrease inflammation. Foods containing the omega 3 fatty acids EPA and DHA such as salmon and flaxseed have shown to be most effective for this purpose. Eating a balanced diet with foods that contain omega 3 fatty acids or getting these EFAs from a supplement (as a secondary option) will contribute to the repair of joints and overworked muscles.

Antioxidants are naturally occurring chemicals in foods that prevent oxidation (food turning brown or going rancid) and are important for dancers and athletes because of their ability to rid

the body of excess damaging by-products that circulate in the blood (known as free radicals). Intense training increases the abundance of free radicals in the body. By consuming foods high in Vitamin C, in particular, as well as Vitamins A and E, you will have a better chance to ward off these free radicals and be better protected from getting sick and feeling too sore.

Examples of foods high in antioxidants:

- citrus fruits (lemons, oranges, grapefruit, etc)
- brightly coloured fruits and vegetables (red peppers, tomatoes, squash, beets, carrots, blueberries, etc.)

How can I prevent muscle soreness?

Hydrate

In addition to over training, the two major nutritional factors that contribute to muscle soreness are lack of hydration and electrolyte imbalance. Our body fluids are like seawater in that they are primarily water and salt. We generally lose up to two litres of water each day in perspiration and moisture loss from basic body functions. It is important to consume fluid throughout the day and not wait until you feel thirsty—a sign that it is too late!

Additional information

All of the documents listed below are available at no cost from our website (www.actsafe.ca) or in hardcopy from our office. For further details, contact us at info@actsafe.ca.

Good Nutrition for Dancers

The benefits of good nutrition are numerous, and even more so for dancers. Constant training takes a toll on muscles, joints and bones. Good eating habits can improve the recovery from such strain, and even assist with lean muscle growth and soft tissue repair. Eating the right foods can increase energy, focus and concentration. Finding the proper balance of nutrients not only prevents fatigue and injury, but also supports a long healthy career in dance. **Please note:** *This is the full version of the Good Nutrition for Dancers chapter in this Primer.*

Pain is Optional For Office Workers

Actsafe produced comic book discussing MSI symptoms and prevention common to office workers. Great information for anyone who works on a computer.

The amount of water needed varies between people. One way to calculate your approximate required fluid intake for the day is to first know your body weight in kilograms, and then match one ounce of water per kilogram of body weight. For example, if I weigh 64 kilograms, I need on average 64 ounces of water in a regular day. That would be eight 8oz glasses of water.

Along with consuming water throughout the day, a pinch of good quality Celtic sea salt can be added to a full litre of water to stabilize electrolyte levels. This can be especially important in hot weather and during increased physical activity. It is at these times when you need to drink more water—and the salt will help your body to retain it.

Actsafes would like to thank Registered Nutritionist, Stacey Horton, RHN, BFA, for her assistance in the preparation of the information in Good Nutrition for Dancers.

Stacey is a professional dancer working in British Columbia. She presents high-performance nutrition seminars and counsels individuals on smart food choices for better health and illness prevention.

Performing Arts Safety Bulletins

Safety guidelines for the performing arts industry in British Columbia focusing on a variety of health and safety topics.

Performing Arts Safety Primer

A 36 page booklet that contains concise and relevant information and guidelines that relate to issues that all artists, managers, and crafts people may encounter. Answers basic health and safety questions that may come up in day to day production and rehearsal.

Performing Arts Safety Primer: Musicians and MSI Primer

Includes information on symptoms, prevention and treatment for MSIs common to musicians.

To see our full library of health and safety information and materials, please visit our website at www.actsafe.ca.

What is Actsafe?

Actsafe is dedicated to the promotion of health and safety in British Columbia's motion picture and performing arts industries. Our role is to provide arts workers and employers with the necessary support to ensure everyone goes home safely at the end of the day.

Actsafe is governed by the industries it represents. We operate through two standing committees that represent the motion picture and performing arts communities. Membership on these committees includes both employer and worker representatives.

Our mandate includes providing subsidized training and free industry-related communication, education, services and advice.

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Performing Arts Safety Primer

Dancers and MSI

Musculoskeletal injuries (MSI) are the most frequently reported medical problems among classical and modern dancers. The majority 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.

There are many things you can do to help prevent and treat MSI. An MSI can be painful and can interfere with both your professional and personal life, so it's important to use prevention strategies. If you already have an MSI, there are treatment options that will help you stop the injury from getting worse and speed up the healing process.

This primer provides information on symptoms, prevention and treatment of MSIs common to dancers.

