CHAPTER 18

Prevention of Dance Injuries

It has been only since the late 1970s that dancers have come to the attention of orthopedic surgeons and sport medicine specialists. The appearance of articles in journals and in the press on dance injuries, their prevention and care, is most encouraging. Previously, little attention was given to dancers, even though dancers are as active, and as susceptible to athletic injuries, as almost any group. The dancer is, indeed, an athlete and deserving of the specific attention of the medical profession.

Dancers and Doctors

In the past, dancers were practically forced to treat themselves because medical professionals simply were not conversant with the physical demands placed on the dancer, nor were they familiar with the psychology of the dancer. Many dancers heard the all-too-frequent advice, "Just stay off of it," or even worse, "Just don't dance any more." Fortunately, there are a growing number of physicians who understand that the dancer is as committed to dance as any athlete is committed to sport. As understanding grows, the dancer is receiving better medical advice than ever before, if he or she is able to find a specialist who is interested in dance. The dancer looking for a doctor (particularly if on tour or in an unfamiliar city) must have sufficient knowledge to screen doctors before selecting one. One of the best leads is to find a physician recommended by the local athletic teams. If there are professional or university teams in the city, a call to the team trainer can frequently yield valuable advice.

The Psychology of the Injured Dancer

The injured dancer is as fanatical about getting back to activity as any athlete. If the dancer is faced with an upcoming performance, the pressure is even more intense. Almost all dancers subscribe to the old adage "The show must go on," no matter what the consequences. At the time of the in-
Pain

Dancers have a remarkable ability to dance through pain. The performance "high" often overshadows immediate pain. Yet it is important for dancers to recognize that pain is actually valuable information about the status of the body. Pain is a valuable warning signal, and the wise dancer pays attention to pain. For that reason, analgesic balms, or any forms of anesthetic, cut the dancer off from the valuable information available from pain. If the injury or condition is so painful that performance is impossible without an anesthetic, the dancer has no business performing. Common sense and an understanding of the difference between good pain and bad pain are essential to the dancer.
Good Pain and Bad Pain

Obviously, no pain feels good. But certain pains are good because they lead to increased capacity. "The burnies" are a perfect example of good pain. In conditioning the muscular system for increased muscular endurance or strength, a person reaches the point when the muscles start to burn. That very burning is a key to conditioning; it says that the muscle is working beyond previous capacities. The human body responds positively to the stress caused by working beyond one's capacity, providing that the stress is not so extreme as to cause spasm or other major problems. Stretching out after a heavy workout of a given muscle group (always wise) brings the dancer face to face with another good pain: "the stretchies." Stretching out a tight muscle gives the sensation of warm, generalized prickling.

Good pain—that which accompanies an increase in capacity—is generalized and rather dull. In contrast, bad pain is sharp, piercing, highly localized, and sometimes shooting to other parts of the body. Bad pain should not be ignored. It may be the localized pain of tendonitis, in which case treatment is necessary. It may be the sharp pinching sensation (impingement) caused by bone contacting bone in a mobility exercise, in which case the dancer knows that he or she has reached the bony limitation of movement. Any sharp, shooting, bad pain should cause the dancer to pause and investigate its possible causes. This type of pain is a warning signal from the body, and dancers simply must listen to their bodies. Pain accompanying an injury is the result of three factors: the injured tissue itself, the spasm of muscles around the site of the injury, and the swelling which immediately follows and puts pressure on surrounding nerve endings. There is immediate vasodilation at the site of an injury. The swelling which results can be increased by damage to the blood vessels in the area, and by the increased metabolism at the site of the injury. Reduction of swelling through rest, ice, compression, and elevation (RICE) not only serves to reduce pain but also reduces excessive buildup of scar tissue. Gentle stretching can reduce muscle spasm around the injury.

Muscle Soreness

Another type of pain common among dancers is muscle soreness lasting a day or two after a heavy exercise bout. The peak of muscle soreness occurs twenty-four to forty-eight hours after exercise. Stretching out immediately following exercise seems to reduce muscle soreness for many people. Delaying the stretch until soreness peaks is less effective, but still helps.

Three steps can be taken to reduce muscle soreness.

1. Identify the sore muscle by analysis and exploration: Where does it hurt? What muscles are located in that area? What action causes pain? What muscle(s) perform that action or are stretched by that action? Is the pain a "stretch" pain, or a "contraction" pain? From the answers to these questions, identify the sore muscle.

2. Identify the joint actions performed by the sore muscle.
3. Do a gentle long sustained stretch of the muscle by assuming a position opposite to the joint action performed by the muscle and releasing into the stretch for at least one minute.

It is hoped that you will be able to identify the muscle and its attachments without consulting a book. Whether you consult a book or not, the technique is very effective in reducing normal muscle soreness resulting from a heavy exercise bout. It is even better if the dancer is aware, at the time of the exercise, that there has been excessive stress on a muscle or muscle group and stretches it (them) out before stopping for the day. Careful selection of stretches during the cool-down period can do much to reduce muscle soreness.

Causes of Injury

We all know the primary causes of injury: ignorance and stupidity. The only difference among causes of injury is the point at which stupidity occurs. Ignoring misalignments can lead to chronic aches and pains due to muscular imbalance. Dancing on a hard surface can lead to shin splints or stress fractures. Dancing when one is out of shape can lead to a galaxy of injuries. Dancing in excessive heat without paying attention to dehydration and the depletion of body salts can lead to muscle spasms and more serious consequences. Poor health habits (for example, unbalanced eating habits, lack of sleep, or use of drugs) can lead to injury. Trying to perform a combination that is beyond one’s ability often leads to injury. Ignoring one’s own warning signals of fatigue increases the likelihood of injury. Maintaining a body weight that is higher than ideal puts extra stress on weight-bearing joints. Being underweight for a dancer is just as serious as being overweight, for the body is less able to fight off disease and heal itself. Dancing when one is under severe emotional or psychological stress can reduce concentration and increase the chance of injury. Dancing without proper preparatory conditioning (such as strength, endurance, or warm-up) often leads to injury.

Prevention of Injury

The smart dancer pays careful attention to environmental conditions (floors, heat, cold, altitude, hazards, etc.); takes particular care to condition the body effectively; is aware of his or her strengths and weaknesses and allows for them; concentrates with great intensity; maintains a consis-

1. There is no such thing as a smart injury. One may be unaware of potential problems (ignorance) or may disregard warning signals (stupidity).

2. All the causes of injury listed above are, in one way or another, stupid. Don’t be offended. No one is immune to occasionally doing “dumb stuff.” The critical issue becomes “How often do we do the same dumb stuff?”
tent ideal body weight; tries to get enough rest; eats well; recognizes his or her own warning signals of fatigue; and cuts back on the activity or intensity that caused the fatigue. Yet even the smartest dancer can be injured. The cause of injury then shifts from stupidity to bad luck. One simply cannot prevent bad luck. There are times when even the “smartest” dancer has the misfortune to be injured. However, attending to the factors listed above can certainly reduce the likelihood of injuries. When an injury does occur, whether because of stupidity or bad luck, it is important for the dancer to be aware of the types of injury in order to make decisions about seeking medical assistance or not and continuing activity or not.

**Types of Injury**

The usual classification of injuries has two categories: traumatic or acute injuries and chronic injuries. Traumatic injuries happen suddenly and often involve a fall or some other sudden accident. Chronic conditions are those which recur over time and are more usually due to misalignment, overuse, poor training habits, or compensation for performance errors. Systemic conditions must also be considered.

*Traumatic Injuries*

*Traumatic injuries* include such conditions as fractures, sprains, strains, bruises and contusions, concussions, cuts, lacerations and punctures, dislocations and subluxations, and other results of accidents. Each type of traumatic injury deserves definition and discussion.

*Fractures.* All fractures are destruction of the structural integrity of bone tissue caused by the application of force. A fracture may be classified as simple or compound, or as greenstick, spiral, or stress. It is not true that one cannot move the body part if there is a fracture, but can move the body part if there is not a fracture. The only way to conclusively rule out the possibility of a fracture is by x-ray, and even then it is difficult to identify some greenstick fractures and stress fractures. A bone scan (considerably more expensive than an x-ray) is more reliable for identifying stress fractures than the x-ray. Clearly, whenever there is any possibility of a fracture, the dancer should see a physician.

*Sprains.* A sprain is a consequence of overmovement of a joint that results in injury to connective tissue (ligaments or joint capsule) and may also include a strain or injury to surrounding soft tissue (blood vessels, muscle tissue, and nerves). Common locations of sprains include the ankle/tarsus region, the knee, and the low back. Improper mechanics and misalignment are the most common causes of sprains. Depending on the severity of the sprain, it may require total or partial immobilization. It is wise to have severe sprains x-rayed to rule out the possibility of fracture.

*Strains.* The term *strain* is limited to injury of the soft tissue, and the term is most usually related to muscle tears. A strain often accompanies a sprain because overmovement of a joint frequently results in muscle tears.
It is also possible to incur a strain when antagonistic muscles are powerfully and simultaneously contracted. Tears to the hamstring muscle are perhaps the most frequent strains, followed closely by the strains of the groin (pectineus, iliopsoas, sartorius, rectus femoris, adductor brevis, adductor longus, or adductor magnus). The pain resulting from a relatively minor strain can often be relieved with gentle stretching, but severe strains should be examined by a doctor.

**Bruises and contusions.** These are common in dance. (Perhaps there is some truth to the idea that dancers are clumsy, except in performance.) A bruise is the result of a blow to or a tearing of blood vessels. The blood then flows into the surrounding area, and the “pooling” of blood and other fluids can cause swelling and pressure on nerves, in turn causing pain. In severe cases, the bruise may need to be aspirated (drained) by a physician to reduce the swelling.

**Concussions.** A concussion is really a bruise to the head, inside the skull. Because of the sensitivity of the brain tissue to pressure, a concussion can have very serious consequences. Symptoms of concussions include headache, nausea, dizziness, inequality of pupil size, sleepiness, and general disorientation. A dancer incurring a blow to the head should be carefully watched for these symptoms, and should see a physician if these symptoms appear.

**Cuts, lacerations, and punctures.** These should be treated according to first aid procedures, using gloves and other necessary protection. Bleeding should be stopped, and the wound should be carefully cleaned and bandaged to prevent reopening. The area of the wound should be kept sterile to prevent infection. A tetanus shot and stitches may be necessary in severe cases.

**Dislocations and subluxations.** These are the injuries that result in loss of joint integrity. If the bones of the joint return to the normal position after joint integrity is disturbed, it is called a subluxation. If the bones remain disarticulated, it is a true dislocation. These injuries are very painful and are accompanied by strains and sprains of surrounding tissue. In addition, the muscles around the joint will often spasm. It takes training and knowledge to relocate a joint, and amateurs should not try. The injured dancer should see a physician immediately. The first few days after a dislocation or subluxation are critical. Any movement of the joint can result in reinjury because of the injury to all of the supporting tissue around the joint. Rest and immobilization of the injured joint should be judiciously observed.

**Chronic Conditions**

The suffix -itis refers to inflammation. Inflammation of tissue at areas of high stress is common in chronic conditions. Misalignment, inadequate conditioning, and muscular imbalances are the most common causes of chronic conditions such as tendinitis, bursitis, myositis and fascitis.

**Tendonitis.** Inflammation of the tendon and the tendon sheath is called tendonitis. With tendonitis, the dancer will experience pain on contraction of the muscle, tenderness of the area around the tendon, and crepitus
(creaking and crunching in the area of the tendon on movement of the joint). Ice and rest are the first lines of defense for tendonitis. Mild stretching of the muscle may also relieve some of the pain, at least in the very early stages of the condition. Ignoring tendonitis is the worst possible treatment. Early and careful attention is essential. The condition will seldom go away by itself. Aspirin (an anti-inflammatory drug) may be helpful in reducing inflammation, if the dancer's stomach will tolerate aspirin. If these treatments do not reduce the pain, a physician may prescribe a heavy-duty anti-inflammatory drug. The most common locations of tendonitis in dancers are the Achilles tendon, the tendon of the biceps brachii, and the tendon of the flexor hallucis longus. If immediate attention (ice, rest, gentle stretching) is given at the first sign of tendonitis, the dancer may avoid a severe case that requires total rest, anti-inflammatory drugs, and an extended time away from dancing.

_Bursitis_. Bursae are the ball bearings of the body. They are fluid-filled sacs located at points of high friction in the body. Undue stress at a given area may cause an irritation of the bursa, resulting in an inflamed condition and tenderness. Often there is the sensation of a hot spot, and swelling may be quite localized. Doing a lot of knee work (in a kneeling position, without knee pads) may cause an inflammation of the bursae of the knee. Two other locations that are common sites for bursitis are just beneath the anterior deltoid muscle of the shoulder, and just beneath the tendon of the iliopsoas where it crosses the anterior rim of the pelvis. As with tendonitis, the first lines of defense for bursitis are rest, ice, and aspirin. Severe cases of bursitis are often treated with cortisone. Cortisone is an effective anti-inflammatory drug, and cortisone shots can effectively pinpoint the location of the inflammation; but these should be used only as a last resort because of possible side effects. There are some situations in which a cortisone shot is not appropriate. Consult a physician and ask questions about possible consequences before using cortisone.

_Myositis and fasciitis_. Both myositis and fasciitis are conditions of generalized inflammation. Myositis is an inflammation of muscle tissue and fasciitis an inflammation of the fascia. Both conditions result in generalized soreness and spasm in a broad area surrounding the inflamed tissue. Sometimes massage is an effective way to reduce the muscle spasm, but it should be accompanied by the standard treatment for all inflammation: application of cold. In extreme cases, it may be necessary to take a general muscle relaxant to relieve the spasm. The dancer experiencing either of these conditions should carefully analyze his or her alignment, for it is very likely that there is major misalignment contributing to the condition.

**Systemic Conditions**

In addition to traumatic and chronic conditions, there are a number of systemic conditions to be considered in a discussion of dance injury. Examples of these conditions include shock, hyperventilation, salt defi-
ciency, anemia, and hypoglycemia, but these are not the only systemic conditions to have an effect on dancers.

Shock. Shock is a very serious systemic condition and may accompany any traumatic injury. Symptoms of shock include cold, paleness, light-headedness, nausea, and a shallow, weak, rapid pulse. The injured dancer should be encouraged to lie down with the feet and legs slightly higher than the head (unless the injury prohibits this position), and body temperature should be kept as close to normal as possible. An injury severe enough to cause shock will almost always require medical attention. To be on the safe side, always call for medical help.

Hyperventilation. Hyperventilation is, literally, breathing too much, resulting in the presence of more oxygen in the system than needed. Symptoms of hyperventilation include deep, panicky breathing, accompanied by weakness, dizziness, and nausea. In extreme cases, the dancer may lose consciousness. Standard first aid for hyperventilation involves rebreathing the expired air, which is higher in carbon dioxide concentration. This process serves to equalize the oxygen and carbon dioxide present in the system. Having the hyperventilating dancer breathe into a paper bag is the most common technique, but if a paper bag is not available, cupping one's hands over the nose and mouth can be a relatively effective technique. Hyperventilation can have serious consequences, and the dancer should always see a physician after hyperventilating.

Salt deficiency, anemia, and hypoglycemia. Systemic deficiencies can have a drastic effect on the performance of the dancer, whether the deficiency is in salt, iron, or blood sugar. Each of these deficiencies will result in weakness and fatigue. There may be other accompanying conditions such as muscle spasm, nausea, or dizziness, depending on the deficiency. Dancing when the temperature is high can quickly lead to dehydration. The best fluid replacement is plain (tap) water. Drinks with caffeine (coffee, tea, or soft drinks) do not replace body fluids as effectively as plain water and should be avoided. A dance studio that operates in the hot months should replace the soft drink machine with a water cooler.

Salt and potassium deficiency can also result from extreme perspiration. Normally, dietary intake is sufficient to make up the loss, but occasionally salt tablets may be an appropriate addition to the regular diet.

Both iron deficiency anemia and low blood sugar (hypoglycemia) result in fatigue, but for different reasons. Iron has a critical role in the formation of hemoglobin, the element in the blood which carries oxygen. Depletion of iron lowers the hemoglobin count of the blood, thus making the system less efficient in transporting oxygen. Blood sugar (glycogen) is necessary for the resynthesis of lactic acid. If blood sugar is low, the resynthesis rate is lowered. Both of these conditions contribute to systemic fatigue. Food intake—both the substances ingested and the timing of meals throughout the day—can have an effect on these deficiencies. The dancer who is prone to any of these deficiencies should consult a physician and take particular care with his or her eating habits.
Tissue Repair

The human body has a remarkable capacity to repair itself while continuing some level of activity. Of course, the more serious the injury the greater the need for rest and recuperation.

Scar Tissue

Tissue repair is accomplished by the formation of scar tissue at the site of the injury. Fibroblasts are the human body's cellular unit of repair. They are always present in the system but congregate at the site of an injury as the presence of body fluids (swelling) increases. The fibroblasts, specialized in some cases to repair specific tissue types, form a fibrous network at the site of the injury which eventually becomes scar tissue. Scar tissue is seldom as sound as the original tissue; thus the ideal healing process involves a minimum of scar tissue. However, when it comes to scar tissue, the body is a lot like a four-year-old gluing: the puddle of glue far exceeds the amount needed. Likewise, the body tends to overproduce scar tissue at an injury site, and this is one of the reasons for trying to minimize swelling. It is thought that by keeping swelling down, less scar tissue is produced. Scar tissue is inelastic and has no circulation and thus it cannot perform the function of normal muscle tissue. Scar tissue is extremely strong and inelastic. The collagen fibers are laid every which way, rather than parallel to the fibers of the injured muscle. The muscle is readily reinjured in approximately the same spot because the muscle fibers tear away at the "seam" of the scar tissue "patch." It is often recommended that very mild stretching be begun early in the rehabilitation process because it encourages the collagen fibers to be laid parallel to the muscle fibers and thus interferes less with the muscle's capacity for stretch.

While scar tissue is certainly necessary at the site of an injury, it is essential to keep scar tissue to a minimum. This concept guides the immediate care of an injury.

Immediate Care of an Injury

The first decision the dancer must make on incurring an injury is whether it requires medical attention. Excessive pain, swelling, or both clearly warrant medical attention. If there is a possibility of a fracture, medical attention is needed. If there may be major damage to ligamentous tissue, medical attention is needed. While these few guidelines may be helpful, they certainly do not represent a hard and fast rule. The ultimate decision is the dancer's, but if there is any doubt, see a doctor.

It is essential to minimize swelling at the injury site until the swelling subsides (at least 72 hours following the injury). Four techniques are commonly accepted for reducing the swelling that accompanies an injury.

1. Icing or application of cold
2. Elevation of the injured area
3. Compression on the injured area
4. Immobilization or rest of the injured area

The application of ice should include some form of insulation so that the ice is not placed directly on body tissue. Periods of cold application should not exceed 20 minutes at a time. Frostbite can occur if ice is applied directly to the injured area or if application of cold continues for more than 20 minutes. Compression to the area can take many forms, but the most common is an elastic bandage applied to the injured area. Elevation of the injured area also decreases swelling. Rest and immobilization are self-explanatory, but dancers tend to keep “testing” an injury to see if it still hurts. The dancer should avoid this tendency. Rest means just that: don’t move the injured area any more than is absolutely necessary.

Long-Range Care

The long-range care of an injury actually begins as soon as the swelling at the injury site subsides. This may seem early to begin the rehabilitation process, but the more immediately a carefully designed exercise program is begun, the better. There are two separate types of care required. First, one certainly must consider the rehabilitation of the injured area. Second, one must consider the maintenance of conditioning in unaffected areas. The approaches for the injured area and the unaffected area are quite different. One must be patient, gentle, and careful with the injured area. However, one can be quite demanding of the unaffected areas. Often the injured dancer thinks that rest and recuperation applies right across the board. In most cases, there is no reason why a strenuous exercise program cannot be maintained in unaffected areas of the body as long as stress is not placed on the injured area.

Care of injured areas. As soon as the swelling goes down, the injured dancer should take inventory. One must first get the “go ahead” from the physician; then the dancer can gently check for range of motion and strength. A certain amount of atrophy (weakening of the musculature) is certainly to be expected, and so is a limitation of the normal range of movement. Musculature around the injury can be gently stretched by moving through the range of motion. A mild form of strength conditioning may begin, using very low resistance. It is critical for the dancer to check with the doctor prior to even these mild exercises, for in some conditions, such as dislocations, even mild exercise may be contraindicated. Careful analysis of the condition of the injured area and a patient approach to reconditioning are essential. The distinction between good pain and bad pain can be a powerful aid to the dancer trying to recondition an injury. If it hurts (bad pain), don’t do it. One certainly cannot expect to jump back into activity at the same level that had been attained prior to the injury. One must start slowly and carefully and take real care to monitor the injured body part constantly. Remember, pain is an ally in the rehabilitation process. The level of pain is an accurate indicator of “how much is enough.” For this reason, it is my opinion that painkillers should not be used during the rehabilitation process. The injured dancer needs the valu-
able information provided by pain. Without pain, the dancer may seriously reinjure the area. In the most conservative rehabilitation, one waits until the pain disappears before returning to class or rehearsals. But dancers are an impatient lot, and they often return before the pain has disappeared. Willingness to risk reinjury can be dangerous, but the danger can be lessened if the injured dancer approaches class or rehearsal with common sense. Careful analysis of the demands of class or rehearsal and choosing activities which place little or no stress on the injured area make sense. For example, after an ankle sprain a dancer would be wise to “sit out” during the “across the floor work” and not perform on relevé or on pointe. Again, the pain will make it very clear when one is doing too much. When it hurts, stop. Returning to full use of the injured area should be postponed until preinjury strength is regained and exceeded. To really prevent reinjury, one needs greater strength than that which existed at the time of the injury.

Care of uninjured areas. The fact that one area of the body is injured is no reason to let the whole system turn to sand. It is essential to maintain condition in the unaffected areas of the body. Strength, mobility, muscular endurance, and cardiorespiratory endurance can all be maintained with a creative approach to conditioning. Injured dancers often have more time than usual because they are not attending classes or rehearsals. In addition to maintaining normal conditioning, it is even possible to do some specialized conditioning for muscular imbalances or misalignments which have been previously ignored. One can actually use the time to great advantage if one is aware of conditioning needs and is knowledgeable about the principles of conditioning. Doing so would also help the psychological condition of the dancer.

Review of Common Injuries

Dancers are very aware of every sensation received from their bodies. Often, even a relatively minor condition can cause distress and worry. While some conditions certainly make worrying justified, there are some conditions that occur with relative frequency for dancers but are not terribly serious. One very valuable ability for the dancer is to be able to distinguish which are the “big worry” conditions and which are the temporary nuisances. Table 18.1 lists some common dance injuries, symptoms, and one approach to treatment. It is hoped that the chart will be valuable in assessing injuries, but if there is any doubt at all, the dancer should see a physician. Table 18.2 presents one system for dealing with a problem common among modern dancers, the split callus.

Table 18.3 (later in this chapter) presents some general guidelines for dealing with dancers’ everyday aches and pains. Dancers regularly encounter aches and pains that are not sufficiently severe to need a physician, but are a source of irritation and distraction and can become a major problem if ignored. Some of these aches and pains recur often enough
<table>
<thead>
<tr>
<th>Body Area</th>
<th>Injury or Condition</th>
<th>Symptoms</th>
<th>Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foot</td>
<td>Calluses and splits</td>
<td>Buildup of hardened superficial tissue, which can split and become very painful.</td>
<td>Bob Small’s technique for care of calluses (Table 18.2).</td>
</tr>
<tr>
<td></td>
<td>Tendonitis of flexor hallux longus</td>
<td>Pain on flexion of big toe against resistance. Pain on relevé or on pointe Pain on locomotor pushoffs.</td>
<td>Standard treatment for tendonitis: ice, rest, aspirin, gentle stretching. (If pain persists, see a physician.)</td>
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<tr>
<td></td>
<td>Flat feet</td>
<td>Ligamentous looseness on plantar surface of foot.</td>
<td>Strengthen the intrinsic muscles which flex the toes and support the arch.</td>
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<td></td>
<td>Muscle cramps in toes</td>
<td>Weakness of intrinsic muscles which flex the toes.</td>
<td>Grip toes forcefully while dorsiflexing the ankle and gripping the hands to fortify the flexor reflex. Repeat three or four times a day.</td>
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<td></td>
<td>Pronated feet</td>
<td>Weakness of the supinator muscles that also plantar-flex the ankle, often accompanied by a tendency to supinate in relevé and non-weight-bearing positions.</td>
<td>Strengthen the supinators and plantar flexors. Also strengthen pronators and plantar flexors.</td>
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<td></td>
<td>Morton’s neuroma</td>
<td>Localized point of pain which feels similar to a stone bruise. Actually, it is an irritation of a nerve ending that can be caused by ill-fitting shoes or some other pressure.</td>
<td>Rest and ice. Sometimes gentle massage can relieve the pain somewhat.</td>
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<td></td>
<td>Stone bruise</td>
<td>Single point of tenderness on the sole of the foot. Most often occurs on calcaneus and on head of second metatarsal when one has Morton short toe.</td>
<td>Rest, ice, and application of “doughnut pad.” Doughnut pad: Cut chiropodist’s felt in shape of small doughnut. Tape over the bruise so the doughnut hole is directly over the most tender point.</td>
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<td></td>
<td>Sesamoiditis</td>
<td>Tenderness of the sesamoid bones beneath the head of the first metatarsal.</td>
<td>Treat like stone bruise, but if pain persists, consider the possibility of a stress fracture. Examine weight-bearing mechanics for misalignment and correct any habitual misalignment.</td>
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<td></td>
<td>Bunion and bone spurs</td>
<td>Bony scar tissue develops on the foot at point of high stress. The area is tender, inflamed (red) and usually swollen.</td>
<td>(continued)</td>
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<tr>
<td>Body Area</td>
<td>Injury or Condition</td>
<td>Symptoms</td>
<td>Care</td>
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<tr>
<td>Ankle and Lower leg</td>
<td>Ankle sprains</td>
<td>Pain, with swelling, bruising, or both, of the ankle region after a fall.</td>
<td>See a physician. Apply cold compression and elevate to reduce swelling. Rest. When no longer painful to move, begin conditioning the musculature around the sprain to increase stability. Use some form of support such as adhesive taping (not an elastic bandage) to provide extra support in first phases of weight-bearing on the injured ankle. Gentle stretching, ice and rest. If pain continues for more than two weeks, consider the possibility of a stress fracture.</td>
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<tr>
<td>Shin splints</td>
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<td>Muscle soreness in the lower leg caused by excessive demands on musculature (frequently caused by dancing on concrete or improper landings from jumps, etc.). Common muscles affected are tibialis anterior, tibialis posterior, and peroneal muscles.</td>
<td>General treatment for tendonitis (see flexor hallucis longus tendonitis). See physician if condition persists. A consistent pattern of stretching out the Achilles tendon after class and rehearsals is the best prevention of Achilles tendonitis. Generally, be content with a restricted range of motion unless the restriction is quite severe, in which case surgery can be considered to remove the obstruction.</td>
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<tr>
<td>Achilles tendonitis</td>
<td></td>
<td>Pain in Achilles tendon on pointe, plié, relevé, pushoff, and landing. Often accompanied by creaking and crunching in the area.</td>
<td>See a physician. Rest, ice, and elevation are the first treatments. After a period of rest, gentle stretching is appropriate (dorsiflexed ankle with extended knee) to maintain a normal range of motion at the ankle joint.</td>
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<tr>
<td>Ankle impingement</td>
<td></td>
<td>Bony restriction of plantar flexion or dorsiflexion. The sensation of bony contact is different from muscular restriction.</td>
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<tr>
<td>syndrome (anterior or</td>
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<td>posterior)</td>
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<td></td>
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<tr>
<td>Torn plantaris</td>
<td></td>
<td>Plantaris muscle is most frequently torn when one is making sudden starts, stops, and direction changes. The rupture of the plantaris is frequently accompanied by a loud snap and immediate pain in the calf.</td>
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Knee

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<th>Ligamentous tears</th>
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<tr>
<td>Meniscus tears</td>
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<tr>
<td>Inflammation of subpatellar fat pad</td>
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<tr>
<td>Bursitis</td>
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<tr>
<td>Dislocation of patella</td>
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<tr>
<td>Condromalacia of patella</td>
</tr>
<tr>
<td>Strain of popliteus or tearing of popliteal ligament</td>
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</tbody>
</table>

Pain, swelling, and sense of instability of the knee joint.

Pain, pinching on flexion or extension, a feeling that the knee is “catching.”

Pain underneath the patellar ligament accompanying extreme extension of the knee.

Localized swelling, pain and inflammation.

Lateral or medial displacement of the patella out of the patella notch of the femur.

Erosion of the underneath side of the patella due to misaligned patella. Movement of the knee is usually accompanied by creaking and crunching.

Caused by rapid forcible extension of the knee.

Taping to prevent full extension of the knee may be wise.

See a physician immediately, preferably an orthopedic surgeon specializing in knees. Immediately following injury, apply ice, elevate, and stay off it. See a physician.

Ice, rest, aspirin. If pain persists, see a physician.

Ice, rest, and aspirin are the first line of defense. If pain persists, see a physician.

See a physician immediately.

Strengthen the quadriceps muscles, particularly the vasti.

Ice, rest, and avoidance of extension of the knee for a few days to facilitate healing.

Hip

<table>
<thead>
<tr>
<th>Sciatica</th>
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</thead>
<tbody>
<tr>
<td>Anterior snapping hip or tendonitis in one of the hip flexors (rectusfemoris, sartorius, or iliopsoas)</td>
</tr>
<tr>
<td>Lateral snapping hip</td>
</tr>
</tbody>
</table>

Pain in dimple of buttocks and radiating down the leg following the path of the biceps femoris and peroneus longus and brevis, and sometimes involving the lateral muscles of the foot.

Localized pain accompanying hip flexion.

Creaking or popping may accompany the pain with flexion (anterior snapping hip).

Loud clunking snap of the hip (deep) on grand ronde jambe and on return from dance “extension.”

Check with a physician to make sure no bone tissue is pressing on the sciatic nerve. Stretch and deep massage of the six deep rotators will give immediate relief, if the pressure on nerve is only muscular.

Ice, rest, aspirin. Stretch the hip flexors. When pain subsides, build strength in the hip flexors and continue stretching.

Stretch and strengthen the abductors of the hip joint.

(continued)
<table>
<thead>
<tr>
<th>Body Area</th>
<th>Injury or Condition</th>
<th>Symptoms</th>
<th>Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hip</td>
<td>Tight hip flexors</td>
<td>See low back pain below and anterior snapping hip above. Pain, spasm, or both of the hamstring muscles. Frequently isolated to either medial hamstrings (semitendinosus or semimembranosus) or lateral hamstrings (biceps femoris).</td>
<td>Identify which hamstrings are affected and stretch accordingly. To stretch biceps: flex, adduct, and inwardly rotate. To stretch semis: flex, abduct, and outwardly rotate</td>
</tr>
<tr>
<td>Spine (low back)</td>
<td>Spondylolisthesis</td>
<td>Displacement of the fifth lumbar vertebra on the sacrum, frequently accompanied by muscle spasms due to pressure on nerves.</td>
<td>See a physician.</td>
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<tr>
<td></td>
<td>Sacroiliac condition</td>
<td>Slight movement of the usually immobile sacroiliac joints can cause sharp pain in the area of the sacrum.</td>
<td>See a physician.</td>
</tr>
<tr>
<td></td>
<td>Herniated disk</td>
<td>Unequal pressure between two adjacent vertebrae can cause the intervertebral disk to “pooch out” from its normal placement. When this happens, there may be pressure on a nerve which can cause muscle spasm.</td>
<td>See a physician.</td>
</tr>
<tr>
<td>Low back pain can be a result of a number of different causes, including:</td>
<td>Tight hip flexors</td>
<td>Lumbar lordosis, low back pain. Increased pelvic inclination. Pain is more lateral on the low back. Generalized muscle spasm across the low back.</td>
<td>Stretch the hip flexors</td>
</tr>
<tr>
<td></td>
<td>Tight latissimus dorsi and quadratus lumborum</td>
<td></td>
<td>Stretch the latissimus dorsi and use deep message on the quadratus lumborum.</td>
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<tr>
<td></td>
<td>Fasciitis</td>
<td></td>
<td>Deep message is painful but can sometimes reduce the muscle spasm. Moist heat can sometimes relieve a muscle spasm.</td>
</tr>
<tr>
<td>Spine (upper back and neck)</td>
<td>Rib “catch”</td>
<td>Spasm or tightness of one or more of the fibers of the deep posterior muscles can pull on a rib and cause a slight displacement of the rib at its articulation with the vertebrae. When this happens, there can be a sharp “catching” pain accompanying deep breathing.</td>
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<tr>
<td>Pectoralis minor syndrome (stiff neck)</td>
<td>Spasm in levator scapula, upper trapezius, or rhomboids.</td>
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<tr>
<td>Spasm in lower or middle trapezius</td>
<td>Pain in midback, at level of lower ribs and below.</td>
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<td>Tension headaches</td>
<td>Often caused by muscular tension in the muscles of the neck.</td>
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<tr>
<td>Shoulder</td>
<td>Most shoulder injuries to dancers are the direct result of inadequate shoulder conditioning. When demands are placed on the weak musculature, injuries result.</td>
<td>Stretch the deep posterior muscles with mild rotation back and forth. If pain persists, see a physician.</td>
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<tr>
<td>Bicipital tendinitis</td>
<td>Pain and tenderness on the anterior of the shoulder right at the bicipital groove.</td>
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<tr>
<td>Bursitis below anterior deltoide.</td>
<td>Hot spot, about the size of a quarter, just below the spot where the anterior deltoid crosses over the pectoralis major.</td>
<td>Deep massage and stretch of pectoralis minor will give delayed relief (about 2 to 3 hours later) if the pectoralis minor is the cause of the pain. If not, see a physician. Stretch out the trapezius with the water ski stretch (holding onto doorknobs on either side of door and contracting abdominals to press back into the trapezius). Do the neck stretch series in Chapter 19.</td>
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<tr>
<td>Ice, rest, aspirin. Gentle stretching of the muscle. When back to normal, condition for strength, muscular endurance and then stretch out.</td>
<td>Ice, rest, aspirin.</td>
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<td><strong>(continued)</strong></td>
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</tr>
<tr>
<td>Body Area</td>
<td>Injury or Condition</td>
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<tr>
<td>Shoulder</td>
<td>Dislocation or subluxation of shoulder</td>
<td>Most frequently occurs in a handstand position or bearing a weight above the head, because the lower, posterior segment of the shoulder joint is only supported by muscle (no bony restriction). Musculature must be strong to support weight. Preconditioning prior to strenuous shoulder activities is the best prevention. Severe pain and distortion of the normal shape of the shoulder are symptoms of dislocation.</td>
<td>See a physician immediately and follow the instructions for rest and immobilization.</td>
</tr>
<tr>
<td>Arm and hand</td>
<td>Dancers seldom complain of injuries to the arm and hand because weight is seldom borne on the upper extremity. However, if the arms are expected to bear the weight of the body, preconditioning is essential.</td>
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Table 18.2  Robert Small's procedure for taping feet to alleviate splitting*

**Items needed:**
1. Dr. Scholl's callus reducer with stainless steel head
2. Johnson & Johnson Elasticon stretch elastic surgical tape
3. Foot cream with lanolin
4. Scissors
5. A & D ointment or equivalent

**Step 1.** Soak feet while in bath or shower. At end of bath or shower, sit comfortably in tub or on side. Leave some water in tub to keep soaking feet and to rinse out reducer.

**Step 2.** Clip away all flaps of skin from splits with surgical or sharp scissors.

**Step 3.** With callus reducer, gently scrape callused areas of foot.

**Caution:** Stay away from uncallused skin, as callus reducer will scratch tender areas. Use criss-cross pattern and circular motion to evenly scrape down calluses. In case of split, try to scrape and even out all areas. Scrape along line of split, not across, to prevent additional tissue splitting.

**Caution:** If you have not been using a callus reducer regularly, work on thick calluses for several sessions. Do not try to scrape all callus away until you find optimum amount of callus you need for protection of your feet.

**Step 4.** Dry feet completely with towel around all toes and then let air dry for several minutes.

**Step 5.** Cut circle of tape that will cover problem area by about one-fourth inch around all edges. **Caution:** Remove all corners from tape patches, or they will catch and the tape will roll. Tape should be cut so that stretch will go across foot to allow for expansion. Across splits to allow for expansion.

**Step 6.** Place tape patch on dry callus and press down along edge of tape with fingernail to ensure adhesion.

**Step 7.** Put moisturizing cream on other parts of feet to keep skin moist and pliable. Place A & D ointment directly under toes to keep that skin pliable.

**Step 8.** If taping in morning, put on socks so heat of foot and compression will allow patches to adhere. Take socks off with care so as not to pull patches off if tape sticks slightly to them.

**Special applications:** Tape patches can be put on any part of foot.

1. Floor burns can be covered by this method. However, do not use callus reducer on top of foot. Wash and dry the area thoroughly, put a bit of A & D ointment on burn, place a piece of tissue or Kleenex on floor burn. Then put a patch over area with one-fourth inch of clearance on all sides.

2. If tape comes off during the day, wipe off all excess dirt and tape. Wash foot, and place another patch on area. Rub the patch in some dust to set it or put on a pair of socks for a few minutes.

3. Cracks under toes. Cut a strip of tape one-half inch wide and long enough to wrap fully around the toe. Along one edge, cut several short notches into the tape.

If split is still raw, put a bit of ointment in the crack. Apply the tape with the notches toward the back of the foot to allow for stretch. One-half of the tape should be on the toe, and the other half on the soft part of the foot. Split should be completely covered and tape replaced almost every day.

To remove tape patches, carefully peel away along line of split, not across it. There will be some excess adhesive that can be removed by rubbing with moisturizing cream and tissue. Do not use the callus remover to take off the excess adhesive, as it will clog the reducer.

Replace patches when needed, usually every two days.

Once you have your calluses reduced, light scraping every other day or so should maintain proper depth of callus.

If you have no splits, but are susceptible to the condition, try to anticipate when you might be on a sticky floor and put tape patches over problem areas.

In the winter particularly, put cream on feet in morning and night to keep the skin elastic.

Sounds like a lot of time and work, but if you get into a plan of treatment, it takes very little time and will cut down a good percentage of your splits.

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* I was remiss in the first edition, in that I made no reference to Robert Small other than to include his taping procedure. Robert is Artistic Director of The Small Dance Company and teaches modern dance in guest residencies across the country.
TABLE 18.3 Procedures for self-diagnosis of everyday aches and pains

I. Analysis of Symptoms
   A. Where does it hurt? Location
      1. What muscles are in the area?
      2. What other structures are in that area (bones, ligaments, fascia, cartilage, etc.)?
      3. List the possible sources of pain, based on location.
   B. How does it hurt? Nature of pain
      1. Is the pain localized or general?
      2. Is the pain sharp and shooting or diffuse and spread out?
      3. If it is a muscle pain, is it a “contraction pain” or a “stretching pain”?
      4. Is there any “point tenderness”? Where? (This is indicative of a possible bone fracture, a flareup of bursitis, or some other point-specific condition.)
      5. Is there any radiating pain? From where to where? This may indicate that something (muscle, bone, or other body tissues) is pressing on a nerve, which is called an impingement syndrome.
   C. When does it hurt? Function
      1. What joint position or action causes or intensifies the pain?
      2. What muscles are involved in that position or action?
      3. What changes in the daily routine immediately preceded the onset of the pain?

II. Correction
   A. Do you think it is a muscular problem?
      1. What muscles?
      2. What muscles are antagonistic to the hurting muscles?
      3. Try gentle stretching and/or massage of muscles listed in (1) and (2).
         a. Does gentle stretching cause an increase in the pain? Does it feel like “good pain?”
         b. If it does feel like good pain, proceed with slightly more intense stretches. Let your body tell you how much is enough.
         c. Repeat steps a and b, using gentle massage, increasing the pressure if it “feels right.”
         d. If your body tells you “no!” see a physician.
   B. If it seems to be a bone, ligament, or nerve problem, see a physician.

III. Tracking down the cause and planning rehabilitation
   A. Why did it happen?
      1. Overuse—the muscles were not strong or elastic enough to meet the demands placed on them.
      2. Misuse—there is a pattern of misalignment and/or muscular inefficiency.
      3. Undue situational or environmental stress—such as fatigue, bad floors, demanding classes or rehearsals
   B. Analysis of relative strength, endurance, and elasticity of agonist and antagonist to identify imbalances which might contribute to the problem.
   C. Design a rehabilitation program based on the findings in A and B.
      1. Build muscular capacity through specific exercises based on the analysis above. Strengthen weak muscles; stretch tight muscles; and increase endurance for muscles that cannot continue to contract over time.
      2. Review neuromuscular patterns and, if necessary, establish new, more efficient patterns that increase the use of the prime movers.
      3. Review alignment patterns and, if necessary, establish new, better alignment habits to avoid misuse and stress.
      4. In rehabilitation, it is essential to condition beyond the capacity level that was present when the injury occurred before returning to activity.
that the dancer develops a standard set of exercises to alleviate them. However, new "naggers" (as we call them in class) seem to crop up, and then new corrective procedures must be developed. Table 18.3 is a handout that I developed for my students to use once they were familiar with the material in the preceding sections of the book. I include it here in the hope that it will help other dancers identify the specific nature of everyday aches and pains so that major problems might be avoided.

In addition to dealing with everyday aches and pains that appear periodically, it is wise to review patterns of activity that contribute to those problems. Analysis of habitual patterns that contribute to injuries or chronic conditions can be as simple and informal as remembering overexertion on the day before, or as complex and systematic as the assessment of alignment and muscular imbalances presented in Chapter 13. However formal or informal the analysis is, the secret to prevention is awareness, and awareness comes through knowledgeable observation.

Martha Eddy (1995) has written an article on the use of somatic approaches (Bartenieff Fundamentals, Laban Movement Analysis, Body-Mind Centering, and Somatic Movement Therapy) for injury assessment and intervention. The article calls for skilled observation by teachers of dance, and concludes by stating, "Increasing teachers' observational skills could both drive the curriculum and contribute to the reduction of unsafe practices" (Eddy, 1995, p. 7). 3

There are many approaches to the prevention of injuries, but perhaps the most crucial skills and attitudes for the individual dancer are common sense, respect for the body, and the ability to listen to messages the body transmits. One of the messages is pain. Pain is an ally, not an enemy, in the process of treating and preventing injury. Little nagging pains are the first signs. It is important to listen for those naggers and care for them immediately so that they don't mushroom into major problems. The information in this book can be used to identify and treat minor aches and pains. Doing so may extend your longevity as a dancer. You have made a major investment in your body: an investment of time, energy, and even money. Treat it with care and respect so that it will continue to serve you well into your advanced years.

3. I had hoped to include this article in its entirety, but it was not in its final form when the manuscript for the second edition was submitted. The article is well worth reading.