CHAPTER 13

Misalignments and Muscular Imbalances Common in Dance

and suggestions for corrective approaches

The Process of Assessment

Sources of Problems: Two Critical Questions

Two questions are paramount in the assessment and identification of misalignments and muscular imbalances. First, "Have I accurately identified the source of the problem?" Second, "Is the source of the problem changeable?"

PAIN AS AN INDICATOR

In dealing with the first question, pain is one indicator, but we have seen that the location of pain may or may not be near the source of the problem.

For example, pain in the lumbar spine is the effect most frequently felt accompanying tight hip flexors. The standard approach to this problem has often been to treat the location of the pain and stretch the extensors of the lumbar spine with supine pelvic tilts and curls which draw the knees to the chest. If tight hip flexors are the cause of this particular lumbar pain, the normally prescribed stretches for the extensors of the spine will only postpone the return of the pain. Effective treatment of low back pain resulting from tight hip flexors can be found only by dealing with the cause of the problem, the tight hip flexors. (A warning is necessary: to be on the safe side, all low back pain should be screened by an orthopedic surgeon to rule out the possibility of structural problems, before one embarks on an exercise program to stretch the hip flexors.)

Treating a pain by focusing exclusively on the location of the pain will solve the problem if the cause and the pain are in the same location. However, if the pain is caused by a resultant contraction in response to tight-
ness of the muscles on the opposite side of the body, as described above, working on the pain site offers only temporary relief. The more complex the chain reaction causing the problem, the more difficult it is to track down the primary cause of the pain. However, if we are diligent, we can often find the source of the problem. In the search, it is necessary to combine knowledge of the muscular system (assuming this is a muscular pain) with listening to the body with our internal receptors. Dancers often “know” when stretching a given muscle is the key to relief. The response is often, “Wow! That’s it!” or “Ooooo, that hurts so good!” I have learned, over the years, to listen carefully to these comments by “body-wise” dancers as they search for a culprit muscle that is causing them pain. If a dancer responds to the question, “Is that any better?” with a statement like, “Well, sort of. I guess,” it tells me that we have not found the culprit. We then continue the search, trying other possibilities, until we get the “Wow!”

KEYS TO MANAGEMENT OF A NONCHANGEABLE PROBLEM

The second paramount question is, “Is the problem changeable?” When a muscular imbalance results from a structural, nonchangeable cause, correction is not possible and we must move into the domain of pain management. A good example here is the characteristic scoliosis that results from one leg being longer than the other. Since surgical removal of a section of the long leg is a bit extreme, the best approach to this situation is management of the pain caused by the scoliosis and corrective exercises to prevent an increase in the depth of the scoliotic curve. I know this problem well, for my left leg is almost three-quarters of an inch longer than my right. My body has compensated for this variance with a sharp curve in the lower lumbar region, concave to the left. This means that my left quadratus lumborum is very susceptible to tightening up—to the point of spasm if I neglect it. When I get that old familiar nagging in the left side of my low back, I do a set of exercises that I have found effective for me.

What are the keys to management represented in this example? First is awareness of the nonchangeable problem. Second is analysis and identification of compensatory corrections that are probable accompaniments to the problem. Third is sensory awareness of the problem area, with heightened sensitivity to the “nipping” or “gnawing” that often signals the onset of a chronic condition. Fourth is development of an effective exercise sequence that keeps the condition from progressing to the painful stage.

When a problem is structural in nature—such as leg-length variance, Morton short toe, knock-knees, bowed legs, narrow or wide pelvis, or structural scoliosis—my advice to young dancers is “Learn to fake it with class, and try to equalize muscular strength and elasticity around the problem.” Trying to change a permanent structural misalignment is an exercise in futility and only leads to frustration and self-chastisement. Acceptance of the problem and effective management of the muscle tissue surrounding the problem are a much more productive investment of time and energy.
as described above, The more complex it is to track are diligent, we can necessary to com-tors. Dancers often ief. The response is if? I have learned ts by "body-wise" ing them pain. If a with a statement found the culprit. until we get the

measurable?” When a cause, cor-ain of pain man-biosis that results removal of a sec-this situation is active exercises to know this prob-ler than my sharp curve in ns that my left —to the point of n the left side of tive for me.
example? First is and identify-animents to the ith heightened s the onset of a xeric sequence age.
mgth variance, wide pelvis, or to fake it with ty around the ment is an ex-stisement. Ac-muscle tissue ment of time

Attitude toward the Assessment Process
A dancer’s negative attitude toward the process of assessment of alignment and/or muscular imbalances can derail the best of efforts. Students in my kinesiology classes are required to do an intensive analysis of their own bodies, including bone structure anomalies, muscular strengths and weaknesses, alignment habits that are balanced and unbalanced, and patterns of muscular elasticity and tightness. I often hear the comment, “This is so depressing, to list all my problems.” This is a normal first response to the process of analysis and assessment; but if one gets stuck in that attitude, the negativity can be demoralizing and can serve to block effective use of the information. The key word here is information. A systematic analysis of alignment and assessment of strengths and weaknesses will allow the wise dancer to approach improvement and/or management from a knowledgeable position. Denial and disgust do not lend themselves to a positive approach to growth and development.

Realistic self-acceptance is essential in dealing with nonchangeable problems. Likewise, a bulldog-like determination is essential to bring about a change in habit or conditioning that can correct an identified misalignment or muscular imbalance.

Assessment of Alignment
Alignment is assessed with the subject in a standing position, weight evenly balanced on both feet, feet directly under the centers of the hip joints, and arms hanging relaxed at the sides. Because different components of alignment are more visible from certain viewpoints, three views of the subject are necessary: front, back, and side. Posture grids can help the assessor by providing a visual background of absolute vertical and absolute horizontal. Another aid is a plumb bob suspended from above, indicating the vertical coordinate. Photos of the subject from the three views can be a permanent record, as can checklists filled out by an evaluator. A helpful aid, when photos are used, is the use of "stick-on dots" (in a color contrasting with the leotard worn) which are applied at critical bony landmarks and then used as reference points in assessment.

Figures 13.1 and 13.2 illustrate the use of the posture grid and stick-on dots. In Figure 13.1, stick-on dots have been used to indicate the most anterior point on the acromion process of the scapula; the anterior and superior spines of the ilium; and the center of the superior border of the patella. The dots can assist the evaluator in identifying shoulder height, hip height, and patellar facing. In Figure 13.2, the dots are placed on the mastoid process, the center of the shoulder joint, the most superior portion of the greater trochanter, the lateral aspect of the posterior superior spine of the ilium (or on the side of the gluteus maximus at the level of the posterior superior spine of the ilium, so it can be seen from the side), the lateral aspect of the anterior superior spine of the ilium, the midpoint of the knee joint, and the lateral malleolus. These points should be familiar to you. All of them have been discussed in Section II in relation to the assessment of total alignment and the assessment of pelvic alignment.
Tables 13.1 and 13.2 are two different approaches to the same task: documentation of the assessment of alignment.

Assessment of Muscular Balance
(Strength and Elasticity)

Muscular balance is indicated by a balance in strength and elasticity of agonists and antagonists which perform opposing possible actions at the various joints of the body. Accurate testing of both strength and elasticity of musculature is frequently quite complicated, testing strength with strain gauges and testing elasticity or range of motion with goniometers (tools used to identifying degrees of motion produced at a given joint). (You will notice that I do not use the word flexibility, since I believe it can lead to inappropriate transfer by being confused with flexion. I prefer the word elasticity because it more accurately represents the condition that is being measured.)

In a laboratory setting, these kinds of specific measures are necessary to obtain accurate measurements. But although these techniques yield specific information, it is thought that the hassle of using them might dis-
Muscular System

Assessment of alignment from the side view using a posture grid and dots on the mastoid process, midpoint of the shoulder, anterior superior spine of the ilium, posterior superior spine of the ilium, greater trochanter, midpoint of knee joint, and lateral malleolus.

Figure 13.2

Courage dancers and teachers of dance. For this reason, in the following system assessment of strength is based on manual testing and range of motion is based on visual estimation. Such measurement techniques should not be used in a research project, but for general assessment they are thought to be adequate.

**Manual Strength Testing**

Manually testing for strength requires the evaluator to have knowledge of the muscle groups of the body. The evaluator places a hand on the body part, resists a given joint action, and estimates the relative strength of the muscle group as strong, average, or weak. The position of the hand is then shifted to the other side of the body part, and the antagonistic muscles are tested. Since the evaluator depends on kinesthetic perception of the force of the contraction, it is important to test both agonist and antagonist of the right and left sides in sequence, so the kinesthetic reference is immediate. A brief rest period of five to ten seconds between testing of agonist and antagonist is recommended to give the muscle groups an opportunity to deactivate before the opposite muscle is tested. Contracting against re-
### Table 13.1 Posture Screening

<table>
<thead>
<tr>
<th>Side View Check Points</th>
<th>Front View Check Points</th>
<th>Deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Mastoid process</td>
<td>Eyes level—facing front</td>
<td><strong>Side view:</strong></td>
</tr>
<tr>
<td>*Midpoint of shoulder</td>
<td>Shoulders level</td>
<td>—Forward head</td>
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<tr>
<td></td>
<td>Spine straight</td>
<td>—Round shoulders</td>
</tr>
<tr>
<td>Arms hang directly at sides</td>
<td>Hips level</td>
<td>—Swayback</td>
</tr>
<tr>
<td>Pelvis level</td>
<td>Leg length equal</td>
<td>—Increased pelvic inclination</td>
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<tr>
<td>*Slightly anterior to midpoint of hip joint</td>
<td>Knees facing front (neither knock-knees nor bowlegs)</td>
<td>(anterior lower)</td>
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<tr>
<td>*Slightly posterior to center of knee joint</td>
<td>Feet neither pronated nor supinated</td>
<td>—Decreased pelvic inclination</td>
</tr>
<tr>
<td>*Slight anterior to ankle bone</td>
<td>Quick check for scoliosis:</td>
<td>(posterior lower)</td>
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<tr>
<td></td>
<td>Have the person face away from you and bend over to the front, letting the arms, head, and torso hang toward the floor. If one side of the back is higher, scoliosis is possible and more specific tests are called for.</td>
<td>—Hyperflexed knees</td>
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<tr>
<td></td>
<td></td>
<td>—Hyperextended knees</td>
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<td></td>
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<td>—Forward lean</td>
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<td></td>
<td></td>
<td>—Backward lean</td>
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</tbody>
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*On same vertical line.*
TABLE 13.2  Posture assessment sheet

<table>
<thead>
<tr>
<th>Area</th>
<th>Possible Deviations</th>
<th>No Deviation (OK)</th>
<th>Slight Deviation</th>
<th>Moderate Deviation</th>
<th>Marked Deviation</th>
<th>Comments</th>
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<td>Hyperflex</td>
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<td>Plevis:</td>
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<td>Lumbar spine: swayback</td>
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<td>Hip flexors: (tight)</td>
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<td>Thoracic spine: Round Shoulders</td>
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<td>Pectoralis minor syndrome</td>
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<td>Cervical spine: Forward head</td>
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<td>Arm position:</td>
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<td>Tibial torsion</td>
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<td>Patella alignment</td>
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<td>Knock-knees</td>
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<td>Scoliosis</td>
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<td>Other Comments</td>
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Indicate on diagram the direction and location of existing scoliosis.
<table>
<thead>
<tr>
<th>Joint Actions</th>
<th>Strength</th>
<th>Mobility</th>
<th>Check below for major muscular imbalances</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td>Left</td>
<td>Right</td>
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<td>Tarsus</td>
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<td>Supination</td>
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<td>Pronation</td>
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<td>Ankle</td>
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<td>Dorsiflexion</td>
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<td>Plantar flexion</td>
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<td>Knee</td>
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<td>Outward rotation</td>
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<td>Abduction</td>
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<td>Hyperextension</td>
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<td>Torso</td>
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<tr>
<td>Hyperextension</td>
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<tr>
<td>Lateral flexion (right and left)</td>
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<tr>
<td>Rotation (right and left)</td>
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</table>

**Neck**

<table>
<thead>
<tr>
<th>Flexion</th>
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<tbody>
<tr>
<td>Extension</td>
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<tr>
<td>Hyperextension</td>
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<tr>
<td>Lateral flexion (right and left)</td>
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<tr>
<td>Rotation (right and left)</td>
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**Shoulder**

<table>
<thead>
<tr>
<th>Abduction</th>
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<tbody>
<tr>
<td>Adduction</td>
</tr>
<tr>
<td>Flexion</td>
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<tr>
<td>Extension</td>
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<tr>
<td>Inward rotation</td>
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<tr>
<td>Outward rotation</td>
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<tr>
<td>Horizontal flexion</td>
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<tr>
<td>Horizontal extension</td>
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</table>

*Strength scoring:* 3 = Strong; 2 = Average; 1 = Weak
*Mobility scoring:* 3 = Extreme; 2 = Average; 1 = Restricted
*Alternative scoring for greater refinement*

*Strength:* 5 = Very strong; 4 = Strong; 3 = Average; 2 = Somewhat weak; 1 = Very weak
*Mobility:* 5 = Extreme; 4 = Above average; 3 = Average; 2 = Somewhat restricted; 1 = Very restricted
sistance does create a certain amount of neuromuscular tension, and for this reason it is suggested that all of the strength testing be done at once, and a longer period of relaxation be allowed before testing for elasticity and range of motion. Of course, the order could also be reversed, with range of motion tested first.

**RANGE-OF-MOTION TESTING**

Dancers, as a group, are much more sophisticated at assessing range of motion than other groups. Dancers spend a lot of time in the studio working for increased range of motion. Therefore, they seem to be able to identify extreme mobility, average mobility, and limited mobility easily, quickly, and accurately. Admittedly, what is classified as extreme mobility for a dancer would be considered “out of sight” for the normal population.

**USE OF THE MUSCULAR IMBALANCE CHART**

Table 13.3 presents one approach to recording muscular strength and mobility throughout the body. Each set of joint actions is presented, but cross-references to actions of adjacent joints are not listed. For example, a complete testing of strength and mobility of the tarsus really should be performed in both a plantar and a dorsiflexed position of the ankle. Also, testing of inward and outward rotation of the hip joint should include base positions of both flexion and extension of the hip. This cross-referenced testing of strength and elasticity is advisable, but it would make Table 13.3 prohibitively long. The basic testing in Table 13.3 can be used as an indication of muscular imbalances. If additional information is needed, evaluators can design cross-referenced testing of both strength and elasticity. If Table 13.3 is to be used “as is,” testing of strength and elasticity on one plane of action should be performed in a neutral range of the other planes. For example, testing of abduction and adduction of the hip joint would be tested in parallel position, neither fully flexed nor fully extended. It is helpful to indicate the relative position of the joint on the other planes if subsequent testing is planned, so that the test can be replicated with some degree of consistency.

**Chain Reactions of Conditions**

We have to this point viewed the human body in segments, with only an occasional discussion of interfaces between segments. Yet the body operates not as isolated segments of action but rather as a unified whole. Misalignment in one area almost always causes a need for compensation in adjacent areas, and these compensations, in turn, cause still another set of compensations farther up (or down) the line. Radiating out from one primary misalignment may be a whole series of secondary misalignments (or accommodations)—a chain reaction. Three examples of chain reactions are given below: side effects of pronation of the tarsus, side effects of variance in leg length, and side effects of tight hip flexors. These three examples were chosen because of their frequency in the dance community.
Pronation of the Tarsus and Chain Reactions

Pronation of the tarsus has effects in both directions; distally it affects the weight-bearing patterns of the foot; proximally it affects the alignment of the knee and hip, and possibly even the spine.

A characteristic pattern of pronation of the tarsus will cause a shift of weight to the medial side of the foot. Accompanying this shift, there is a tendency to use the medial side of the head of the first metatarsal as the pushoff in locomotion. (This pattern is even more pronounced in dancers, who have a tendency to walk “duck-footed,” or in a consistently turned-out position of the hip joint.) The stress on the medial aspect of the head of the first metatarsal is extreme. The body responds by building up bone tissue, resulting in the formation of bunions.

Gravity is a pronator of the tarsus in a normal standing position. If the ligamentous structure of the foot allows for pronation of the tarsus, the supinator muscles must be stronger to counteract the pull of gravity. With the supinator muscles stronger than the pronator muscles, when the foot is not weightbearing, the tarsus will be pulled into a position of supination, because of the greater strength of the supinator muscles. If the tarsus is supinated in a non-weight-bearing position, the likelihood of ankle sprains is greatly increased. (Actually, these are tarsus sprains caused by landing on a supinated tarsus and rolling over the outside of the foot.)

The chain reaction of effects of a pronated tarsus in the opposite direction (toward the knee) has equally dangerous consequences. The shift of weight to the medial side of the foot causes a tendency to outwardsly rotate the knee joint, with the foot splaying out to the side. In this case the foot shows a greater degree of “turnout” than is shown by the facing of the knee. In extreme cases, the knees actually look cross-eyed, with the patellas seeming to look at each other. With the foot turning out farther than the hip joint, the stress localizes at the knee joint, placing an inordinate torquing and twisting pressure on the knee and increasing the likelihood of knee injuries. Dancers who force turnout can be seen doing a demiplié, turning the feet out farther, and then returning to a standing position. This technique for increasing false turnout (that which occurs at the knee and the tarsus instead of the hip) puts great stress on the knee joint and consequently should be forbidden. In extreme cases of pronation of the tarsus, there may also be a tendency to hyperextension of the knees to counteract the torque at the knee joint.

Moving up to the hip joint, the chain reaction continues. With pronation there is a tendency for the hip joint to inwardly rotate, and this means that there is greater demand for contraction of the outward rotators of the hip to maintain proper alignment of the knee over the foot. This can lead to increased tension or spasm of the deep rotators of the hip joint and a subsequent flareup of sciatic syndrome.

This chain reaction of compensations can continue up into the spine, though the consequences of pronated feet listed above are the most common.
Variance in Leg Length and Chain Reactions

When one leg is longer than the other, the pelvis will tip to one side and the torso will shift (laterally flex) toward the side of the long leg in order to maintain a vertical, upright posture, which is facilitated by the neurological righting reflexes. Thus a person with one leg longer than the other will often have compensatory scoliosis. The most common pattern of the scoliosis is a long C-curve extending up the spine that is concave toward the side of the long leg, but other patterns of scoliosis are possible. (My own left leg is three-quarters of an inch longer than my right leg. As mentioned before, my particular scoliosis is a sharp curve to the left side at the level of the fourth and fifth lumbar vertebrae, with an x-ray showing major compression of the left sides of the bodies of those two vertebrae. This scoliotic pattern results in a tightening—or shortening—of my left quadratus lumborum that can go into spasm if I don’t take care of it by stretching the left quadratus.) The patterns of scoliotic compensation for variance in leg length are specific to the individual, and careful examination is necessary to correctly identify a specific pattern.

While scoliosis is a common consequence of variance in leg length, another possible accommodation is to maintain slight flexion of the hip on the side of the long leg. Maintaining slightly greater hip flexion on one side than the other results in a twisting of the pelvis on the support structure. This twisting can result in an imbalance of strength and elasticity of the right and left hip flexors and extensors.

Still another pattern that can accompany variance in leg length occurs in moving and dancing. The dancer tends to prefer balancing on the longer leg. (After all, if he or she stands on the shorter leg, the long leg tends to hit the floor on leg swings and the unsupported side of the pelvis must be lifted to prevent this “toe-stubbing.”) This preference often results in less elasticity and greater stability with the long leg and greater mobility and less stability with the short leg. If the long leg is preferred for balancing actions, the antigravity muscles will be stronger for the long leg than for the short leg. Once again we see a chain reaction of effects radiating out both proximally and distally from the source of the problem.

Tight Hip Flexors and Chain Reactions

The extended amount of time we spend sitting in this culture allows the hip flexors to tighten up. Even though dancers spend a lot of time on their feet, they too are subject to tight—or short—hip flexors resulting from excessive sitting. When an individual with tight hip flexors stands up, the hip remains in a semiflexed position. The front rim of the pelvis is pulled down in front, causing increased pelvic inclination which in turn causes swayback. The hyperextension of the lumbar spine caused by increased pelvic inclination allows the extensors of the lumbar spine to tighten. As those muscles get shorter and shorter, two things happen: the muscles of the low back tend to go into spasm, and the thoracic spine must compensate for the backward movement of the spine by increasing the flexion curve in the thoracic region.
This chain reaction can continue upward into the cervical spine as well, but let's go back to the hip region and look at the chain reaction of tight hip flexors going downward. A dancer with tight hip flexors battles the pelvic misalignment by contracting the extensors of the hip and particularly by gripping the gluteus maximus to achieve the “look” of an aligned pelvis. This does not change the fact that the hip flexors are tight; the hip stays in a semiflexed position, and that causes the knees to flex. To counteract the flexion of the knees, the extensors of the knees are gripped (the quadriceps). The constant gripping action in the gluteus maximus and the quadriceps results in the classic “bubble butts” and “thunder thighs.” This continues the chain reaction and results in a tendency to hyperextended knees. All of this results from tight hip flexors!

The point of this rather lengthy discussion of chain reactions resulting from misalignments or muscular imbalances is, I hope, by now clear. No misalignment happens in isolation. There are always accommodations and compensations. Careful, systematic analysis of alignment and muscular balance can make ideal alignment more immediately achievable by the dancer. For this reason, specific conditions and imbalances that can cause chain reactions of compensations are presented in the next section of this chapter.

**Specific Conditions and Imbalances**

The following discussion of specific conditions and imbalances does not cover every possible problem. Additionally, there will be some individuals whose condition does not fit into the usual pattern of misalignment and/or muscular imbalance. The aim is, rather, to focus the reader’s attention on some of the most common problems in dance, and the most usual consequences of those problems. If your situation does not fit the description given, analyze and experiment with possible solutions that seem appropriate. In addition to the exercises listed in the discussions below, the reader is also referred to the chapter on conditioning (Chapter 19), and specifically to the mini-programs toward the end of that chapter, which are designed for specific problems.

Just as we started at the foundation and moved up through the body in the chapters on the skeletal system and the muscular system, this discussion will also start at the foundation.

**Foot and Lower Leg**

*Hallux valgus* is a condition in which the phalanges of the great toe angle off toward the lateral side of the foot. This condition may be congenital, or it may be caused by wearing shoes that are too narrow in childhood, when the foot is still taking its final ossified shape. In early stages, this condition may be changeable if it is due to a muscular imbalance. If, however, ossification has occurred and the joint structure itself is the cause of the mis-
alignment, change is impossible, or at best very unlikely. The foot with a hallux valgus will be less efficient in locomotion when the feet are in parallel position, since the big toe is not in straight alignment with the metatarsal to provide extra "push-off" forces. This foot may be susceptible to tendinitis of the muscles of the great toe (hallux), and attention to the strength and elasticity of the flexor hallucis longus and the extensor hallucis longus may be indicated.

For dancers, the most common location of bunions is on the medial aspect of the head of the first metatarsal. It is thought that the consistent maintenance of outward rotation of the hip joint, resulting in a duck-footed walk, may contribute to the development of bunions at this location. Walking in a turned-out position puts continual stress on the medial aspect of the first metatarsal, since it is, in outward rotation, the last part of the foot to leave the ground. The continual stress causes buildup of bony scar tissue at the site of the irritation, resulting in bunions. To reduce the stress, walking in parallel position, with the feet tracking straight ahead, is strongly encouraged. This will not remove old scar tissue, but by reducing stress it may prevent buildup of new scar tissue. Severe cases of bunions must be treated surgically.

Flat feet may be an indication of laxity of the plantar ligaments of the foot, or weakness of the musculature that supports the medial side of the foot (the supinators that also plantar-flex). There is no way to tighten up loose ligaments, but it is possible to supplement lack of ligamentous support with additional strength of the musculature of the foot and tarsus. One approach to increasing strength to supplement lax ligaments is to strengthen the intrinsic muscles on the plantar surface of the foot. These are the intrinsic flexors of the toes. Although these muscles were not individually identified in Chapter 8, they can be approached in a general sense. The toe gripper exercise in Chapter 19 (Figure 19.12) is an effective way to strengthen the intrinsic muscles of the foot. Strengthening the supinator/plantar flexors (tibialis posterior, flexor digitorum longus, and flexor hallucis longus) that cross the ankle and tarsus may also assist in supporting the arch of the foot. The ankle/tarsus series (Figure 19.15) can develop strength in these muscles. Always remember to stretch out after strengthening exercises.

In Morton short toe, as discussed in Chapter 3, the first metatarsal is shorter than the second metatarsal. There are two primary consequences of this condition: buildup of a callus beneath the head of the second metatarsal, and instability when the dancer is on relevé or half toe. There is a natural tendency to supinate the foot in this position. In studio language, this is a sickled foot. A sickled foot is dangerous because it increases the likelihood of ankle/tarsus sprains. Moving a sickled foot to an ideally aligned position requires contraction of the plantar flexors/pronators of the ankle tarsus (peroneus longus and peroneus brevis). The ankle/tarsus series noted above (Figure 19.15) is excellent for beginning the conditioning of these muscles. In addition, contracting these muscles against the resistance of a theraband or another elastic device will develop strength in these muscles rapidly, but remember to stretch out after exercise by supinating and dorsiflexing the ankle/tarsus region.
Muscular System

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Pronation and supination of the tarsus are both misalignments. (Assessment of alignment of the tarsus is discussed in Chapter 3.) Pronation is the more serious of the two, as was illustrated in the discussion of chain reactions resulting from habitual pronation. The consequences of pronated feet may be reflected in a relatively minor nagging pain in the knee joint or may appear as a serious traumatic injury to the knee due to inordinate stress when landing from a jump or leap. A dancer with pronated feet in a normal standing position will have a marked muscular imbalance between the muscles that pronate and supinate the tarsus, particularly those that also plantar-flex. (Pronation in a plantar-flexed ankle position will be almost nonexistent.) A tendency to pronate in a normal standing position translates into a tendency to supinate in a non-weight-bearing position of the tarsus (such as being midair in a jump or leap). For this reason both the pronator/plantar flexors and the supinator/plantar flexors need to be strengthened with more repetitions for the pronators to facilitate the balancing of strength. The ankle tarsus series (Figure 19.15) is specifically designed to meet this need. Once again, theraband exercises are also recommended.

Tibial torsion is a bowing and simultaneous twisting of the tibia as reflected in the line of the anterior border of the tibia. The bowing is most usually convex out to the lateral side of the lower leg, with the uppermost and lowermost portions of the tibia being more medial. The bowing and twisting of the tibia may also contribute to cross-eyed knees and/or condromalacia of the patella. This condition is structural and therefore cannot be corrected. The dancer with tibial torsion may be more susceptible to shin splints than dancers with no tibial torsion. Furthermore, tibial torsion tends to accentuate any tendency toward pronation of the tarsus, since the weight is transferred to the foot on the medial side. Exercises to strengthen and stretch the musculature of the ankle/tarsus are suggested to prevent overuse syndromes such as shin splints and tendonitis.

Knee and Thigh

Knock-knees and bowlegs are structural conditions resulting from variation in the relative height of the medial and lateral condyles of the femur. No correction is possible.

Cross-eyed knees is a condition where the patellas of the two knees seem to be looking at each other. This condition may be structural and therefore uncorrectable, or it may be a result of misalignment above or below the knee joint. Misalignment from below comes from a tendency to pronate the tarsus in a normal standing position, as discussed with regard to the chain reaction to pronation. This causes an outward rotation of the knee joint (with the tibia rotated laterally), which gives an appearance of facing medially. The other cause may be lack of outward rotation in the hip joints that is equal to the outward rotation of the feet. Clearly, both causes have the same result: oppositional rotation at the knee joint, with the thigh rotating one way and the tibia rotating the other way. Correction of this condition can be approached either from above (increasing the outward rota-
tion of the hip joints) or from below (supinating the tarsus to a neutral position). I tend to encourage dancers to correct the alignment of the tarsus, since that is the foundation. Once again, the ankle-tarsus series (Figure 19.15) is recommended to strengthen the supinators that also plantar-flex the ankle. In this instance, a theraband or some other elastic resistance device is particularly helpful, since the specific muscular actions can be targeted.

Placement of the tibial tuberosity is ideally at the center-front of the tibia. However, the tibial tuberosity may be congenitally displaced to either the medial or the lateral aspect of the tibia. The most common displacement of the tibial tuberosity is to the lateral side. Remembering that the tibial tuberosity is the muscular attachment for the quadriceps muscles, whose tendons encase the patella, it is easy to see why a laterally placed tibial tuberosity will pull the patella laterally. When this happens, the patella rides over the convex surface of the lateral condyle of the femur rather than over the concave surface of the intercondylar notch. As the knee flexes and extends, the posterior surface of the patella rubs against the lateral condyle of the femur, causing bony irritation, followed by buildup of scar tissue, and finally is accompanied by consistent grating and crunching of the knee joint on flexion and extension of the knee. This condition is called chondromalacia of the patella. It is thought that strengthening the medial vasti can serve to pull the laterally displaced patella over toward the middle of the joint, thus reducing the bony erosion of the posterior of the patella. The question becomes, How do we selectively strengthen the medial vasti? First of all, remember that the vasti are most efficient in extension of the knee in the last 10 to 15 degrees of extension. Consequently, full extension of the knee, with an emphasis on the last 10 to 15 degrees, is necessary to fully activate the vasti. To selectively activate the medial vasti, also supinate the tarsus while extending the knee. This tarsus action seems to focus the contraction more on the medial vasti. Heel presses (Figure 19.11) with a supinated tarsus are thought to selectively strengthen the medial vasti.

Tightening of the fascia lata (ilio-tibial band, also known as the I-T band) is a new one to me. In the years since the publication of the first edition, there has been a marked increase among dance students of running to maintain cardiorespiratory fitness. It seems that running has a tendency to stress the I-T band, resulting in the tightening of that fascial plane (which is what the I-T band is). What I have observed is that the tightening of the I-T band puts pressure on the knee joint from the lateral side. This seems to be a cause of knee pain, but not on the lateral side of the knee. The pain occurs on the medial, inferior aspect of the patella or slightly under the patella in that location. The pain has been described as a "nagging twinge," irritating but not excruciating. Deep massage of the I-T band just above the knee joint can sometimes manually stretch the I-T band. Poke the fingers under the band from the side and from behind, just anterior to the tendon of the biceps femoris, and then place the thumbs on the front side of the band. Then, roll the I-T band between the thumbs and fingers with moderate to deep pressure. This massage technique has given
Misalignments and Muscular Imbalances Common in Dance

immediate relief to many dancers who were complaining of nagging, twinging pain on the medial, inferior aspect of the patella. Obviously, if this pain is associated with a traumatic injury, consult a physician. However, if the pain sort of “oozes in on you” for no obvious reason, and you are increasing the amount of locomotion in your daily routine, you might try the massage technique described above. If the pain persists, see a physician.

Variance in leg length is a structural problem and simply must be accepted. You are not going to change the length of the leg. However, the consequences of the variance can be managed so that they do not worsen over time. A common consequence of having one leg longer than the other is compensatory scoliosis that is concave to the side of the long leg. The curve can vary considerably in length, but the depth of the curve will reflect the degree of difference in length of the legs. Another common consequence of variance in leg length is a slight rotation of the entire pelvis to the side of the long leg. Each of these misalignments that may result from differences in leg length needs attention so that the musculature does not become excessively imbalanced. Generally speaking, if the left leg is longer, the muscles on the left side of the spine will be tighter than those on the right, the inward rotators of the left hip will be tighter than those on the right, and the outward rotators of the right hip will be tighter than those on the left. Of course there may be individual variations on this theme. Whatever the muscular imbalances, they are likely to get more severe if they are ignored. A regular program of specific stretching is recommended. The latissimus stretch (Figure 19.10e) and the long-C stretch (Figure 19.10a) are effective for the tightness in the torso. The yoga sit stretch (Figure 19.10d), the seated frog press (Figure 19.46), the lying frog press (Figure 19.48), the lying knee press (Figure 19.47), and the hip greaser (Figure 19.50) are effective for the rotators of the hip joint.

Pelvis and Hip Joint

Pelvic width is determined by the relative width of the sacrum and is an individual difference that cannot be changed. Individuals with a narrow pelvis are likely to excel at running and jumping because the “Q angle” (the angle between the neck and the shaft of the femur) is smaller and the levers of the leg track more directly beneath the hip joints, with the femur closer to vertical. An individual with a wide pelvis will be far less efficient in locomotion because of the smaller “Q angle” and because the leg descends at an angle instead of vertically. I have observed that individuals with a narrow pelvis tend to have greater range of motion in inward rotation and those with a wider pelvis tend to have greater range of motion in outward rotation. Perhaps there is a positive correlation between pelvic width and forward- or sideward-facing acetabulae.

The structure of the acetabulae can vary in two ways. First, the sockets may face either to the front or to the side. Clearly, dancers with forward-facing sockets will have greater inward rotation and those with the sockets facing toward the side will have greater outward rotation. Second, the
sockets can vary in depth. A deeper socket will be more stable but will have less range of motion. A shallower socket will have greater mobility and less stability. Ignoring these natural limitations and trying to force rotation of the hip joint in either direction can damage the internal structure of the joint and may be a precursor of degenerative arthritis of the hip joint.

_Tight hip flexors_ can play a central role in a number of problems, including _increased pelvic inclination, swayback, low back pain,_ and _anterior snapping hip._ If a joint position is habitual, the muscles will shorten to that length. As discussed in the section on chain reactions, in our culture the amount of time spent seated is excessive. Therefore, the hip flexors tighten. When they do, they pull down on the front rim of the pelvis, causing increased pelvic inclination and swayback. In this case the muscles of the low back are the ones that frequently go into spasm as a result of the tight hip flexors. In another scenario resulting from tight hip flexors, the tendons of the sartorius, the rectus femoris, and/or the iliopsoas are pulled tight across the front rim of the pelvis. As the joint position is changed, those muscles which are pulled tight against the ascending remus “twang” as they move over the bone, much like a plucked guitar string. In fact, the iliopsoas has been nicknamed the “twanger” by some dancers. This “twanging” is the condition called _anterior snapping hip._ Any one of the three muscles (sartorius, rectus femoris, or iliopsoas) may be doing the snapping. Stretching the hip flexors in a series of positions of abduction and adduction of the hip joint may help the dancer identify which position needs the stretch most. The remedy for tight hip flexors, whether manifested in swayback, low back pain, or anterior snapping hip, is to stretch the hip flexors. The lying hip flexor stretch (Figure 19.44), the stork stretch (Figure 19.24), and the TV stretch (Figure 19.14) are all equally effective. The hip flexor lift, (Figure 19.59) is also effective for releasing the tension of the hip flexors.

_Weak and tight abductors_, as noted in Chapter 9, are quite common among dancers because standing on one leg requires constant low-grade contraction by the abductors. The common tightness and weakness of the abductors of the hip joint makes dancers prime candidates for _lateral snapping hip._ The distal attachments of the gluteus minimus and the gluteus medius attach on the greater trochanter. If those muscles are very tight, as is common with dancers, they do not slide fluidly over the greater trochanter. Instead, in certain positions or actions of the hip joint, the tendon “catches” for a moment until the force exceeds the resistance and the tendon suddenly snaps over the bone. To stretch the abductors of the hip joint, the long C-stretch and the lunge stretch (Figures 19.10a and b) are effective. To increase strength in the abductors, side leg lifts in parallel position (Figure 19.9) are recommended.

_Sciatic syndrome_, or _"sciatica,"_ is caused by pressure on the sciatic nerve. The pressure may come from bones, muscles, or other tissue pressing on the nerve. The condition that is most usual for dancers is pressure on the sciatic nerve by the six deep rotators. Remember that the sciatic nerve “basket weaves” through the deep rotators, passing under the upper mus-
The Muscular System

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cles and coming out over the lower muscles. When a dancer has been working hard to increase outward rotation in technique class or rehearsal, the six deep rotators frequently tighten up, often to the point of spasm. When that happens the six deep rotators pinch the sciatic nerve. The pain begins deep in the indentation of the buttocks; travels down the lateral and posterior aspect of the thigh, following the path of the biceps femoris; continues down to the lower leg, causing pain and/or spasm of the peroneals; and finally travels to the lateral side of the foot, causing spasm and/or pain in the extensor digitorum longus and the peroneus tertius. Any or all of these areas may be painful, depending on the severity of the pressure on the nerve. Stretching the six deep rotators is the first line of defense against sciatica that results from muscular tightness. The yoga sit stretch (Figure 19.49) is most effective. The leg-over stretch (Figure 19.10c) is also quite effective, as is the lift for the outward rotators (Figure 19.65).

Torso and Neck

Lumbar lordosis is commonly known as swayback. It is an accentuation of the normal curve of hyperextension in the lumbar region. Symptoms, in addition to the increased curve itself, often include low back pain (sometimes generalized and sometimes sharp and pinpointed). The medical profession has most frequently treated this pain with muscle relaxants, bed rest, and general stretches of the extensors of the spine. However, it is thought that this may be a little like treating a blister on the foot without changing the shoes that caused the blister. In this case, the “blister” is pain in the low back, but a frequent cause of this pain is thought to be tightness of the hip flexors. As has been mentioned earlier, long periods of time spent in a sitting position allow the hip flexors to tighten. Then, when one stands up, the tight hip flexors are not elastic enough to allow full extension of the hip. They pull down on the front rim of the pelvis, causing an increase in the hyperextension curve of the lumbar spine. Stretching and releasing the tension in the hip flexors will often bring immediate relief of low back pain. Six of the exercises described in Chapter 19 can be used to accomplish this: lying hip flexor stretch (Figure 19.44), TV stretch (Figure 19.14), stork stretch (Figure 19.24), hip flop (Figure 19.51), latissimus stretch (Figure 19.10e), pelvic clock (Figure 19.59), and hip flexor “lift” (Figure 19.55).

Thoracic kyphosis is an accentuation of the normal thoracic curve of flexion in the upper back. It is most often caused by weakness of the extensors of the thoracic region of the spine. It should be noted that this condition is quite unusual among dancers, because of the demands for strength that dance places on the extensors of the spine. However, in rare instances a dancer may experience thoracic kyphosis. The reader is warned to clearly distinguish between thoracic kyphosis (an actual increase in the thoracic curve) and pectoralis minor syndrome (which is a consistently held forward tilt of the scapula and is far more common among dancers). The common term “round shoulders” may include one or both of these conditions. Distinguishing between these two conditions al-
allows one to select the precise exercises that will correct the problem, or at least prevent it from getting worse. Corrective exercises for thoracic kyphosis include arches (Figure 19.3), flagman presses (Figure 19.35), lying frog press (Figure 19.48), thoracic clock (Figure 19.57), and mad cat (Figure 19.32). Pectoralis minor syndrome is discussed on p. 247.

Cervical lordosis is an accentuation of the normal hyperextension curve of the cervical region. This condition is often associated with a condition known as forward head. When the cervical region is hyperextended, the face will tip upward, making it "difficult" to see in front of the body. The chin juts forward to allow vision to focus forward instead of upward. It is thought that the muscular cause of this condition is tightness of the flexors of the neck, particularly the sternocleidomastoid and the anterior scaleni. Stretching the neck flexors often allows repositioning of the head directly above the center of the spine. Neck stretches and neck circles (Figure 19.38) are effective for this condition.

Scoliosis is a condition which may occur in any region of the spine. It is a more complex condition than lordosis or kyphosis because it involves two planes of action, the frontal and the transverse. Scoliosis involves both lateral flexion and rotation, or a sideward bending combined with a twisting of the spine. The lateral flexion may be concave (indented) on the right or left side, and the rotation may be toward either the right or the left side. This makes "neatly packaged" exercises difficult, if not theoretically impossible, to prescribe. However, as one simply listens to the body, corrective exercises can be found. As a person with scoliosis does exercises for the torso region, it is common to find one side more difficult than the other. If in doing strength exercises such as abdominal curls (Figure 19.2) or arches (Figure 19.3), one side is stronger than the other, do more repetitions on the weak side. If in doing torso stretches, such as those in Figure 19.10, one side is tighter than the other, spend more time stretching the tight side. While this may be a simplistic approach to a complicated condition, it will at least begin to initiate the necessary balancing of strength and mobility in a scoliotic spine. The thoracic clock (Figure 19.57) may serve to identify additional tight or weak zones.

Upper back and neck tension is common among dancers because of the simultaneous contraction of antagonistic muscles (particularly the upper and lower trapezius) called for by proper dance technique. Stretching is an effective way to reduce tension in this area. Some exercises that are thought to be effective for this are neck stretches (Figure 19.38), the arm-throw stretch (Figure 19.36), the latissimus stretch (Figure 19.10e), the reciprocal stretch for pectoralis major (Figure 19.39), the doorjamb hang (Figure 19.40), the water ski stretch (Figure 19.58), the shoulder flop (Figure 19.37), the thoracic clock (Figure 19.57), and the shoulder clock (Figure 19.56). Experimentation with these stretches and releasing exercises will point to the exercises that are most effective for an individual. When weakness of the shoulder region is contributing to the tension, the shoulder sequence (Figure 19.29), seated arm circles (Figure 19.28), and flagman presses (Figure 19.35) are also recommended, but remember to stretch out after doing the strength exercises.
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Shoulder and Scapula

pectoralis minor syndrome occurs when the pectoralis minor is tight and
constantly pulls the scapula into a forward tilt. The syndrome includes
shoulders that angle forward from the chest so that the tip of the
acromion process is well in front of the frontal plane that bisects the rest
of the body; and a cupping of the shoulders when viewed from the front so
that there is a hollowed-out look just beneath the clavicle. The sensory ex-
perience of pectoralis minor syndrome includes any combination of the
following: severe pain and/or spasm in the area of the upper trapezius, lev-
ator scapulae, and/or the rhomboids (this sometimes progresses to the
muscles of the neck, so that turning the head is extremely painful, if it is
possible at all); and pain radiating down the medial (ulnar) side of the
arm, sometimes all the way down to the fourth and fifth fingers. Unfortu-
nately, the pectoralis minor is difficult to stretch: no “backward tilt” is pos-
bable, because the scapula makes contact with the rib cage at an inferior
angle. For this reason, the most direct route to relief is through deep mas-
sage of the pectoralis minor (Figure 19.41). Some stretches provide relief
if the condition has not progressed too far: They are the arm-over stretch
(Figure 19.36), doorjamb stretch (Figure 19.40), reciprocal stretch for the
pectoralis major (Figure 19.39), shoulder flop (Figure 19.37), and shoulder
clock (Figure 19.56).

Triceps-biceps interface is a muscular imbalance I discovered at a time
when I was playing a lot of golf. The tendon of the biceps brachii, where it
runs through the bicipital groove, became very tender, making me think of
bursitis or tendonitis. One day, after twenty-seven holes of golf, I was pok-
ing around the shoulder, letting my “fingers do the walking” in search of
the source of pain. Without thinking about it, my hands started to mas-
sage the short head of the triceps, on the posterior of the upper arm. As
my fingers probed, I yowled “Ouch!” I long ago learned that any point that
tender is a potential source of other problems, and I did some painful,
depth massage on the tender spot. The next day the pain in the tendon of
the biceps was gone—and it stayed gone as long as I stretched out the tri-
ceps periodically and continued to do the deep massage on the short head
of the triceps. I share this information now, even though I have not yet fig-
ured out the exact reason for the interfacing pain, except that the two
muscles are antagonistic.

Elbow joint pain is another golf-related pain, presumably related to the
amount of pronation and supination of the radio-ulnar joint required in
the golf swing. When the elbow starts to throb, stretching the elbow, wrist,
and finger flexors seems to reduce the pain. To do the stretch, reach the
painful arm straight out in front of you with palm facing up and elbow
straight. With the opposite hand, reach underneath, take hold of the fin-
gers, and pull them down toward the floor while keeping the stretching el-
bow straight. Hold the stretch for at least thirty seconds, and up to two
minutes. (Note: One of my friends was taking ibuprofen for pain so that
she could play golf. Once she started doing this exercise, she found herself
pain-free and no longer needed medication.)
Serratus anterior tightness is a condition that I discovered while working on this very book. Hours and hours at the keyboard (with the arms slightly in front of the body and the scapula slightly abducted) required a continuous low-grade contraction of the serratus anterior. The pain was somewhat similar to pectoralis minor syndrome, focused in the upper back but a little lower (perhaps the middle trapezius?), and radiating around the rib cage (following the path of the serratus anterior). Like the pectoralis minor, the serratus anterior is difficult to stretch, so I just reached up just under the armpit with the opposite hand and did deep, circular massage on the attachments of the serratus on the lateral side of the rib cage. After the massage, the scapula settled back into a nonabducted position and the pain disappeared.

Weakness of the adductors of the scapula and weakness of the outward rotators of the shoulder joint are two conditions that are quite common to dancers and nondancers alike. This muscular weakness may be one reason why rotator cuff injuries are on the rise. For most of us, the inward rotators of the shoulder joint are quite strong because we use them in everyday activities like driving an automobile. The outward rotators, on the other hand, are often very weak because they are seldom used against resistance. Strengthening the outward rotators of the shoulder joint, coupled with strengthening the adductors of the scapula, may be a wise preventive measure. Rowing exercises are excellent, and flagman presses (Figure 19.35) will also strengthen these muscle groups.

Whole Body—Side View

Forward or backward lean most often results from an imbalance in weight distribution on the front and back of the foot. The site of the shift and the resultant stress is usually the ankle joint. In forward lean, carrying too much weight on the ball of the foot means that the heels seldom make solid contact with the ground. A state of semi-plantar flexion is maintained almost continuously. Achilles tendonitis (the gastrocnemius and soleus) might result from this imbalance of weight distribution. The backward lean, on the other hand, places more weight on the heels, and the dorsiflexors of the ankle must contract to prevent falling on the tush. It is likely that shin splints (particularly of the tibialis anterior and the extensor digitorum longus) will result from carry too much weight on the heels. For anterior shin splints, do the shin splint stretch (Figure 19.17); for Achilles tendonitis and/or posterior shin splints, do the gastrocnemius and soleus stretch (Figure 19.22). Also, for both of these conditions, Rest, Ice, Compression, and Elevation (RICE) are indicated. In addition, some measures should be taken to change standing habits to rebalance the distribution of weight between the front and the back of the foot.

Hyperextended or hyperflexed knees must be analyzed separately because the two conditions result from different causes.

The most common cause of hyperflexed knees is tightness of the hamstrings, although tightness of the gastrocnemius may also be a factor. This condition is most common in, but not exclusive to, men who enter dance
after intense participation in athletics. Men and women with tight hamstrings and hyperflexed knees have taken my conditioning class, and in the first two or three weeks of the class, many of them have insisted that their hamstrings simply will not stretch. My ever-so-subtle reply is, "Horse puckey! You just haven't been determined enough about stretching. Give it six weeks of every-other-day stretching, and you will see a remarkable change." (I must add here that I have never been disappointed, but I must also note that I was there to nag, nag, nag.) Stretching exercises for the hamstrings include the second half of the plow (Figure 19.6), the seated reciprocal hamstring stretch (Figure 19.26), and the supine hamstring stretch (Figure 19.45).

Hyperextended knees are a postural habit. The habit is often a side effect of tight hip flexors and/or lumbar lordosis. Changing the primary misalignment often reduces the degree of hyperextension. Still, the habit sometimes persists. For students with a stubborn habit of hyperextension of the knees, I recommend taping an "X" behind the knee joint when it is ever so slightly flexed. Then, when the knee is hyperextended, the tape pulls on the skin, giving immediate sensory feedback regarding the misalignment. Of course, if the tendency to hyperextension is extreme, the tape pulls off altogether. When that happens, I encourage the student to try to keep the tape on for gradually longer and longer periods in class. Quite a few students have corrected their tendency to hyperextended knees using this taping technique. There is still a problem, however. Some dance techniques actually encourage a hyperextended knee for such skills as arabesque because of the aesthetically pleasing line of the leg when the knee is hyperextended. A dancer must decide for himself or herself which is more important, safety or aesthetic line. It is indeed a choice.

Whole Body—Front or Back View

This final check is to assess the relative equality of the right and left sides of the body. While much of this information is gleaned from the analysis of muscular strength and elasticity (see Table 13.3), there are some features that need special attention.

Feet: Are there differences in degree of pronation and/or supination? If so, you will want to adjust the number of repetitions of exercises done on each side, to bring the feet closer to balance.

Knees: Are the knees facing in the same direction (with center of patella directly over the space between the first and second toe)? See cross-eyed knees and chondromalacia of the patella, discussed above.

Hips: Are the hips of equal height? (This is related to variance in leg length.) Clearly, there is nothing to be done to make the legs of equal length, but the musculature can be checked for equal strength and elasticity, and programs can be designed to come closer to balance.

Shoulders: Are the shoulders of equal height? Variance here would be related to torso scoliosis.

Head to one side or the other, or wry neck, is related to cervical scoliosis. The neck stretches (Figure 19.38) can be done in all directions to identify
the direction that is most limited. Once identified, that segment of the stretch should be done regularly. This condition may also be related to hearing loss in one ear.

**Applying the Information**

All of the information gained from the assessment of alignment and the relative balance or imbalance of strength and mobility is simply worthless unless it is put to use. Going through the whole assessment process does not ensure change. Each dancer must ask, “What am I going to do with this information?” Uses of the information can be classified into two categories: (1) understanding and self-acceptance and (2) taking control of one’s own growth and development.

**Self-Acceptance and Understanding**

In the past, I have been puzzled and dismayed by the demoralizing self-chastisement and self-degradation of dancers who discovered imperfections in their instrument. It seemed that one flaw in an otherwise perfect body became the obsessive focus of all perceptions. Dancers do tend to personalize any limitation they may have and generalize it to everything. (“If I have limited outward rotation of the hip”—or some other limitation—“I am a bad person.”) That kind of response to information about capacities and limitations is certainly not the intention of the assessment process. Dancers must realize that there is no such thing as the perfect body for dance. *The demands of dance are too all-encompassing for one body to meet all them.* If a dancer is extremely flexible, it is likely that he or she will have problems with stability, and vice versa. A dancer with a narrow pelvis is likely to have limited range of motion in outward rotation of the hip joints, but is also likely to have a more efficient “machine” for locomotion and will be capable of higher and longer jumps and leaps. A condition which from one perspective seems to be a limitation may be considered a capacity when it is viewed from a different perspective. Kinesiologically analysis allows for viewing body function from many different perspectives.

The purposes of assessment of capacities and limitations are (1) to realistically appraise capacities and limitations; (2) to identify those limitations which can be transformed into capacities through exercise and training; (3) to accept those limitations which cannot be changed and learn to work with them, not against them; and last, but certainly not least, (4) to take responsibility for modifying limitations which can be changed. This brings us to the second category of uses of the information: taking control of one’s own growth and change.

**Taking Control**

Dancers often seek the “perfect” technique teacher, in the hope that this teacher will solve all their problems and transform them into perfect
Muscular System

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dancers. I call this the “do me” or “dance me” phenomenon. The emotion-
ally mature dancer comes to the realization that improvement is to be
found only through self-direction and self-discipline. No single teacher is
a magic key to dancing—the key is to be found within each dancer,
through honest self-appraisal, determined self-discipline, and educated
self-direction.

Dance kinesiology plays an important role in self-direction. Through
careful assessment of alignment and muscular imbalances, the dancer can
identify limitations and strengths. He or she can reduce chronic pain
caused by correctable misalignments or muscular imbalances, and can
initiate the transformation of some limitations into strengths.

The first time one actually uses kinesiological analysis to identify the
source of a recurring pain, correct the problem, and stop the pain, there is
an incredible sense of appreciation of the information gained through
dance kinesiology. One steps out of the role of a helpless victim and into
the role of a knowledgeable practitioner who can make changes to reduce
the likelihood of recurrence of pain. There is a very real sense of power in
this moment: the power of self-knowledge, self-correction, and self-con-
trol. Likewise, there is a deep sense of pride when one transforms a limita-
tion into a capacity through self-discipline. Every truly successful dancer
has a personal list of physical victories over bad habits. In the “old days”
dancers were left on their own to find solutions to their problems. Perhaps
now, with a solid kinesiological background, dancers will be able to make
the transformation more rapidly and effectively. This is not meant to im-
ply that change becomes easy. No matter how you slice it, changing habits
is difficult. But it does help considerably to be working on the right thing.

Kinesiological information, however, should never be used as a cop-out.
It is sometimes tempting for a dancer to say, “I have Morton short toe. I’ll
never be able to balance, so why should I try?” Admittedly, the length of
the toe cannot be changed. But the strength of the musculature which sta-
bilizes the ankle/tarsus region can be increased to facilitate better balance.
Kinesiological information allows the dancer to identify the problem and
create an alternative, workable solution to a seemingly unchangeable
problem.

Honest self-appraisal, realistic goals, and determined self-discipline are
all critical elements in the making of a dancer. Dance kinesiology can as-
sist in the first two; the dancer must provide the self-discipline.