Inside Ballet Technique

Separating Anatomical Fact from Fiction in the Ballet Class

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Well Turned Out

The subject of turnout has long been a source of misunderstand
contention, especially among those who do not fully underst
technical precepts involved. In sorting through the many misc
tions, we can be sure of one fact: though all dance techniques u
turned-out position of the legs to a greater or lesser degree, c

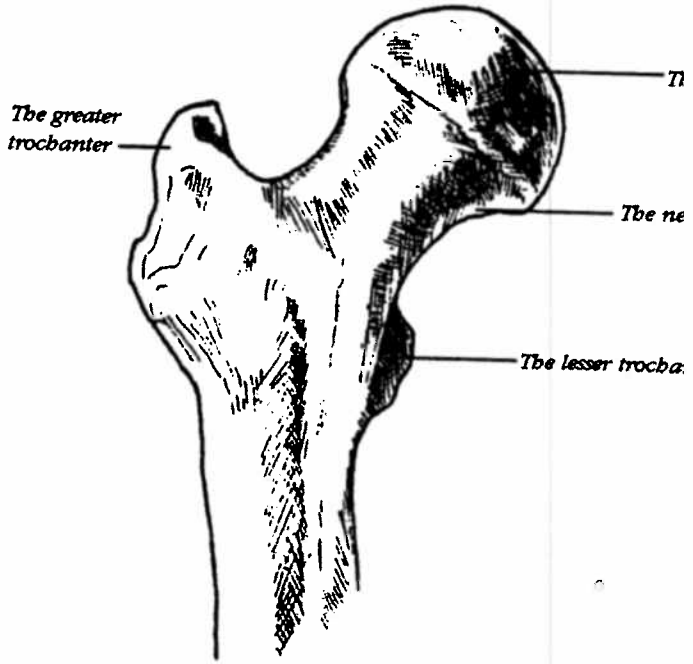

Figure 36. The thigh bone at hip level

ballet is *based* on the turnout; without it, the technique cannot exist. Far from being primarily an aesthetic concept, the turnout has a profoundly functional role. The well-turned-out leg makes a fundamental contribution to the stability, range of motion, mobility and strength of the dancer, as well as to the elongated shape of the muscles.

Our first task in examining this vital aspect of technique is to review the incontrovertible physical factors that *can* cause problems if they are not fully understood.

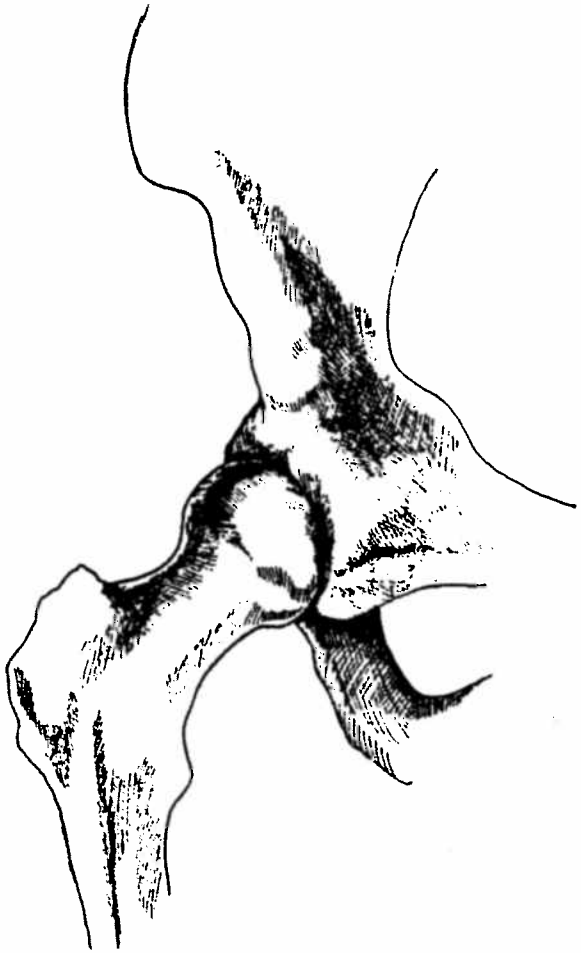

Figure 37. The hip joint

Factors Determining the Range of Turnout

At hip level, the femur, or thigh bone, is composed of a head, a neck two bony protuberances, the greater and lesser trochanters. The ro head fits snugly into its cavity on the front of the pelvis, formir ball-and-socket joint that would have almost unlimited freedon movement, and consequent lack of stability, if it were not bracec very strong ligaments holding the ball in the socket. The iliofemora Y-shaped, ligament across the front of the joint is the strongest in human body. Its relative tautness varies in each individual and factor in the amount of turnout that can be attained.

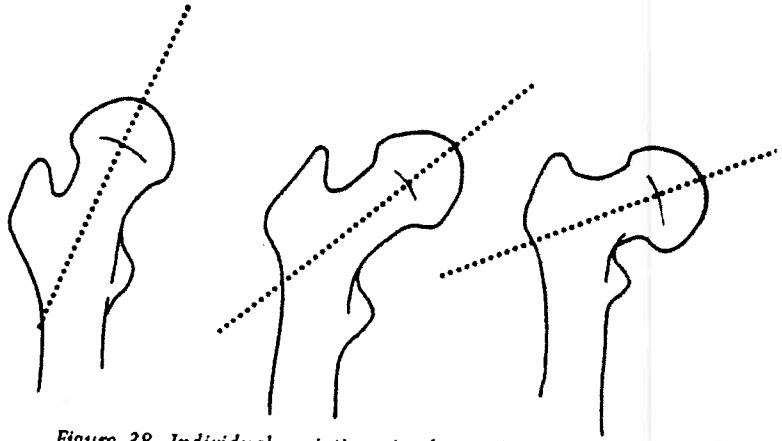

Figure 38. Individual variations in the angle of the femoral neck

Medical authorities tell us it is the bony structure of the hip that is t most important factor in determining the degree of possible turno First in importance is the shape of the femoral neck and the angle which the head of the femur is inserted into its socket. Next is t orientation of the socket itself. Third on the list is the elasticity of tl

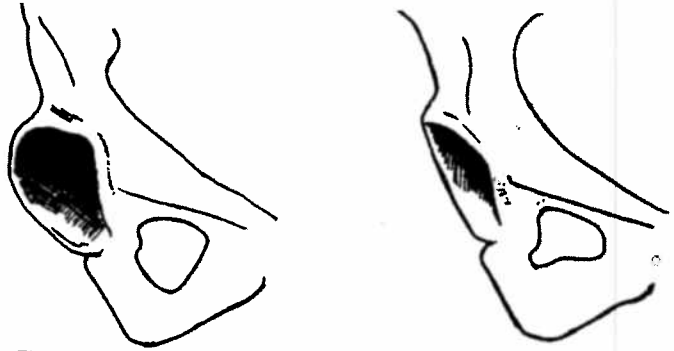

Figure 39. Orientations of the hip socket can vary considerably

hip ligaments, especially the Y-shaped ligament. Last comes the flexibility of the muscles around the hip and thigh, the only element over which we have any real control.

Dr. William Hamilton, writing in *Dance Magazine*,[12] adds that medical experts generally agree that changes in bony architecture can and do occur, the most rapid being from birth to the age of eight, with the process being mostly completed by the age of ten, though not totally finished until age sixteen. The prevailing opinion seems to be that ballet exercises may have an influence on the developing neck of the femur before the age of eleven, and that after this age no further change is possible. But we also know that bone growth can vary somewhat from child to child; sometimes a ten-year-old has the bone age of a teenager or, more often, an adolescent has an immature bone structure that may be amenable to some change.

Early training also brings about changes in the ligaments and soft tissues surrounding each joint. As the ligaments slowly begin to respond to the training, it is vital to remember that the bony structure must be protected by systematic strengthening of the reinforcing musculature. The potent ballet exercises will gradually and safely do their work of strengthening and stretching, provided they are induced to do so. The power of these seemingly gentle exercises makes it extremely unwise for a child to begin formal ballet training before the age of eight or nine.

On the whole, turnout is predetermined; the youngster with naturally turned-in hips will never attain the degree of rotation needed for safe execution of upper-level technique, and should not be forced. Fortunately, a process of self-selection seems to prevail at an elementary level. Children who find it difficult to progress to the intermediate level become frustrated or bored, and drop out. Teachers of the better-endowed children who continue their training must be assiduous in their efforts to coax young limbs into the fullest possible outward rotation while their bodies are still malleable. It is a slow process, but the goal must be clear and the aim constant if the full benefits of the training are to be reaped.

As the body matures, it is more difficult to increase turnout. The shape of the neck of the femur has been determined, and the ligaments are increasingly unyielding. The late starter who has professional aspirations in the field of classical ballet should already possess flexible hip joints and some degree of natural turnout. Without these, the student who reaches the upper levels of technical training must make constant compensations, with destructive effects on the body, especially on the knees.

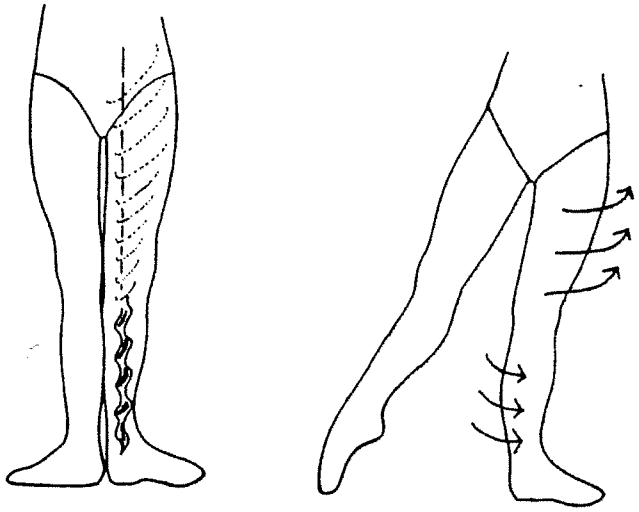

Figure 40. The turnout is a movement

The Turnout Is a Movement

The rotation of the thigh bone in the hip socket is a *movement*; it is an *action* the dancer takes, an action that must be learned and practiced. Visibly, the results take place in the thigh just below the pelvis, and continue into the knee, ankle and foot. The whole leg is rotated as one, and the relationship of each part to the other remains the same as when the leg is in a neutral position. A neutral position in standing does not necessarily imply parallel feet. There is a small natural turnout in the ankle that can be utilized and enhanced (see page 95).

The ability to maintain the turnout is as important as the amount of turnout attained and requires a good deal of strength in all the muscles concerned, strength that must be developed gradually, along with flexibility. In spite of the proliferation of warnings to the contrary, some teachers and many students persist in trying to force rotation from the feet, with little or no participation of the thigh and hip joint. As soon as movement commences, the turnout disappears. This practice also causes distortions throughout the whole body, affecting, among other things, the placement of weight, the tilt of the pelvis, and the curves of the spine. It is especially dangerous for the knees. Conscientious teachers need to keep a sharp eye out for students who determinedly adhere to this practice.

In their zeal to encourage maximum effort in the thighs, however, many teachers err in the opposite direction. They seem to have forgotten that, even in the tight-muscled bodies of some avocational students, although the

turnout is *initiated* in the hip joint and thigh, the knee, calf, ankle and foot are dynamic partners in the action.

In a paper delivered with Martha Myers to the 1984 Olympic Scientific Congress in Eugene, Oregon, Dr. William Hardaker and Dr. Lars Erickson of Duke University Medical Center estimated that the 180-degree turnout is ideally achieved by 60 to 70 degrees of rotation in each thigh, with the remaining rotation taking place in the lower leg, principally at the ankle. They go on to point out that the full 70 degrees is rarely present even in the most distinguished professional dancers, yet trained dancers with a "natural" turnout usually have no difficulty in eventually achieving the overall 180-degree turnout without undue stress elsewhere in the body.[13]

The fully activated turnout is reflected throughout the entire body. In the same way that each leg rotates away from the other, the upper-level dancer will be familiar with the feeling of each side of the trunk widening from its central axis so that, from head to foot, one side of the body counteracts the other. The power thus generated is impossible to reproduce without a proficient turnout.

We hear a great deal about the potential dangers of the turnout, and there is no doubt that adult students in open classes and university courses should approach the matter with a clear head. Yet approach it they must, if they wish to benefit from their ballet classes. "Take care" must not be misconstrued as "do nothing." These dancers should learn to activate fully all the turnout they can command; in so doing, they will gain in strength and stability as they energize the entire body in the manner just described. They will also begin to see a change in the shape of their muscles, a welcome happening that is discussed in the following pages.

Up to a point, turnout can be improved by consistent steady work on the muscles of hip and thigh, though it is here that prudence must prevail. Too much enthusiasm in stretching the muscles around the hip can reach into the ligaments and the cartilage in the hip socket, risking damage to both. "Make haste slowly" is a good motto for all adult students.

The Turnout in Action

Since the turnout presents so many difficulties, why must we pay it so much attention? What are the benefits and advantages this troublesome action brings with it? First, observe the manner in which the range of motion for the legs is greatly enhanced by the simple device of moving the greater trochanter backward and getting it out of the way. The femur is thus given much more freedom in the hip socket, particularly in

extensions to the side and to the back. The turnout allows the dancer to move with equal ease in any direction; in fact, most forms of dance employ a modified turnout for just this purpose. Stability is much increased because of the effect of the pull and counter-pull of the forces already discussed, and you will find more later in this chapter about the security as well as the mobility afforded by that greatest of all aids to the classical ballet dancer, fifth position.

Less frequently understood is the effect of turnout on the dancer's musculature. The radical change in a student's body over the course of a few years' training is often the subject of comment, yet gainsayers rarely give the credit where it is principally due: to the turnout. By altering the normal way the muscles function, the fully turned-out position of the legs plays a major role in developing the long, slender muscles of the ballet-trained dancer. Although it is true that a dancer's proportions are related to bone structure and cannot be altered, a beautiful musculature creates an illusion of harmony and compensates for many a flaw. On the other hand, when performed with perfunctory turnout, the powerful exercises of classical ballet can easily encourage overworked, chunky muscles, even in a beautifully proportioned body.

In advanced technique, with its constantly shifting equilibrium and lightning-swift changes of direction, ultimate demands are made on the turnout. Flexibility of the hips must match that of the spine in all twisting movements of the trunk, to relieve both the knees and spinal column of stress.

Muscles Activating the Turnout

There has been much disagreement among dance teachers about which muscles achieve and maintain the turnout. It now seems to be generally acknowledged that the powerful buttock muscle, gluteus maximus, should be used only very lightly for this purpose—only as much, in fact, as it is *automatically* activated by the action of turning out.

Although in its lowest fibers this muscle is a strong outward rotator of the thigh when the dancer is standing upright, and is almost always active to some degree whenever the leg is turned out, its principal mechanical function, in anatomical language, is to extend the hip, which means to align the pelvis and the thighs, and to realign them after they have been flexed. This muscle also contracts to produce any battement to the back; those lower fibers work strongly with the lateral hamstring to maintain the working leg in an arabesque. But in a situation where the hip is flexed, as in demi-plié, or at the height of a grand battement to the front or side, the muscle is forced to relinquish its hold. Dancers for whom gripping the buttocks is an article of faith can

easily verify these statements: just stand in first position and place your hand on the lower part of the muscle. Tense with all your strength; then begin to bend your knees. Unless you are tucking your pelvis—an unpardonable sin—you will feel the muscle relaxing. Make the same test with a battement tendu to the back, and then swish through first position to the front. You can easily feel the release as the leg moves forward, and if you continue to raise the leg, increasing the flexion, the muscle will eventually be totally inactivated. If you are maintaining your turnout in the working leg, you are certainly not doing it with those lower fibers of the gluteus maximus.

It makes more sense to encourage the combined efforts of other muscles to establish and hold the turnout. The six small muscles collectively known as the deep outward rotators (see page 48), though normally not very powerful, are strengthened significantly by ballet training and play a major role in maintaining the turnout — provided the powerful gluteus maximus, which covers them, is not allowed to completely take over their job. Like many deep muscles in the body, you cannot ordinarily feel these small muscles, though it is possible to sense them. If you perform petit battement sur le cou de pied for a sufficient number of measures with a correctly placed pelvis and maximum turnout of the hips, you will feel a slight prickling sensation under your buttocks, a sensation caused by the outward rotators working hard to hold your turned-out thigh bone immobile, resisting the movement of your lower leg.

Ronds de jambe à terre is the exercise par excellence for increasing turnout. The circular movement of the leg rotates the head of the femur in its socket, which in turn goes to work on the ligaments and muscles around the hip, stretching them infinitesimally with the persistence of water dripping on a stone. Unfortunately, this exercise is rarely performed correctly from an anatomical viewpoint; too often it is used merely as an opportunity for pretty choreography at the barre. The action of rotating the thigh bone in its socket must be performed continuously, rhythmically, for many measures and, at an advanced level, at a brisk pace. Merrill Ashley, in *Dancing for Balanchine,* describes the master's requirements for the performance of a rond de jambe. The circle does not reach the tendu front or back positions, but makes an elliptical pattern which places the emphasis on the action taking place in the hip socket, rather than on the shape the foot is making on the floor. The hips must remain immobile, of course, and the toes of the working leg must be anchored firmly to the floor while they make the circle. We often performed the exercise this way in my student days. It may seem unusual to some of you, but it makes sound anatomical sense.

As you might expect, muscles of the thigh also act on the femur in either inward or outward rotation. These muscles are described at the end of this chapter. Remember the rule: stretch the inward rotators and strengthen the outward rotators.

Fifth Position

Fifth position is the ballet dancer's home base. By no means a position of the feet only, it is an attunement of the entire body. Fifth position is the smallest possible base for the weight of the body; freeing one leg requires no sideways adjustment and only a minuscule forward-backward adjustment is needed. It is the best possible position from which to propel the body in any new direction or into a combination of directions. The dancer standing in fifth position on straight legs is alerting the muscles of the thigh and calf that will be brought into action as soon as one leg is disengaged.

But perhaps the greatest value of fifth position is in plié, when the relaxed ligaments cause a slight additional turnout of the knee (see page 84), enabling the dancer to center the weight — or spine, or line of gravity — over this very small base. In this centering action the full effects of a good turnout are fully realized. An inadequate turnout will force the dancer to sit back in the plié (or, heaven forbid, allow the knees to fall forward) thus limiting, however slightly, full control and mobility. In motion the dancer continually returns to this centered position, if only for a split second, restoring balance momentarily before the quick transition into the next movement.

The small extra turning of the foot that is eventually required in order to take a secure fifth postion is described later, in the chapter on feet.

Claiming Our Heritage

The turnout is the foundation of ballet technique. Properly applied, it benefits the avocational dancer as much as the career dancer. By all means, let us handle it with care and banish any hint of related distortions in the feet, knees or spine. But then let us claim it as our legitimate heritage and use it up to the hilt — every degree we can mobilize.

The Muscles of the Thigh

Four groups of muscles control the actions of the thigh. For convenience they have been included in this chapter on turnout, though they function primarily in some other important capacities: they act on the pelvis to stabilize it, and they are responsible for flexion or extension of

the leg at the hip joint. In each of the four groups there is at least one two-joint muscle acting on both hip and knee and, with the exception of the quadriceps, all make a contribution to either inward or outward rotation of the thigh.

The balance of each group with its opposite, or antagonist, group is a prime factor in controlling the stability of the pelvis when the dancer is standing on one leg. The adductors and the abductors, on opposite sides of the thigh, work against each other with balanced strength, while the hip flexors on the front of the thigh are only slightly stronger than the extensors on the back. (A ratio of 60:40 in the strength of quadriceps to hamstrings is considered normal.) The dancer who cannot "get up on his leg" probably has an improper balance in one of these muscle groups.

Weakness in any of these muscles not only limits the range of motion at the hip, but also places undue stress on the knee. Turnout will be diminished if the outward rotators are weak, though a much more likely problem is tightness in the inward rotators, the antagonists.

The *quadriceps femoris*, or *quadriceps extensor* as this muscle group is sometimes called, consists of four muscles (rectus femoris, vastus medialis, vastus intermedius and vastus lateralis) joining together to form a common tendon which is inserted into the patella, or kneecap. It is described in some texts as a muscle with four heads. The three vasti muscles arise from the femur in the vicinity of the greater trochanter but the principal muscle of the group, the rectus femoris, arises from the pelvis in the vicinity of the hip socket, making it a two-joint muscle, acting on both hip and knee.

Known familiarly in dance studios all over the world as "the quads," the main function of the quadriceps is to extend (stretch) the knee, and in this function it acts virtually alone, with some insignificant assistance from the tensor fasciae latae. The prime mover in this undertaking is the rectus femoris, but the vasti muscles take over in the final few degrees of stretch.

How happy we would be if we could confine the activities of the quads to this single function, as, of all the muscles in the dancing body, this one is the most susceptible to gaining unwanted bulk. But because of the origin of the rectus femoris, the quadriceps is also a powerful hip flexor, second in strength only to the iliopsoas. If there is any weakness in the action of the psoas or the other hip flexors, the rectus femoris takes over with alacrity. As well as increasing in bulk, an overactive quadriceps will diminish activity in the hamstrings, resulting in a loss of strength and efficiency in those important muscles.

The dancer uses several strategies to prevent unwanted bulk in the quadriceps. The turnout of the thighs is an important line of defense; it

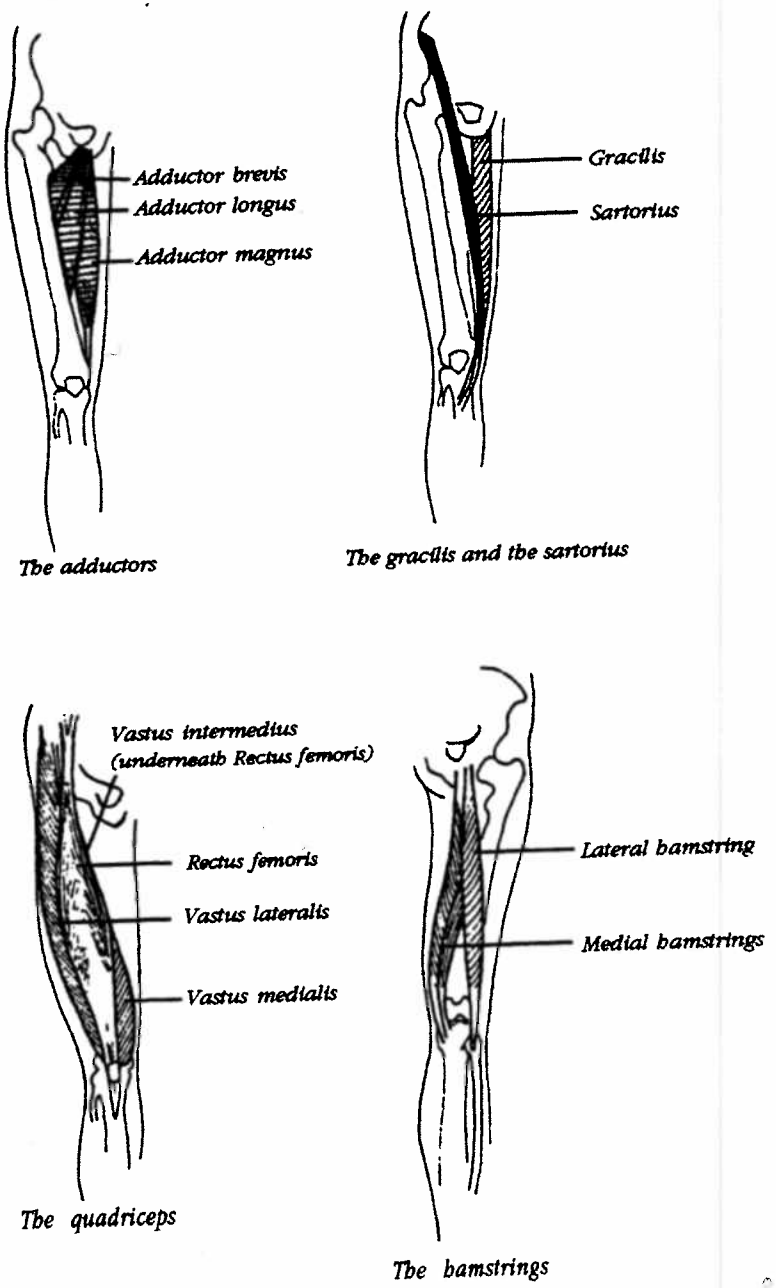

Figure 41. The muscles of the thigh

activates the other thigh flexors and places them in an optimal position to assist with flexion in battements to the front or the side. A correctly placed pelvis and habitual lengthening of the lumbar spine will facilitate proper usage of the iliopsoas which, as we have seen, is a principal flexor of the hip. As the leg rises, the rectus femoris, which has initiated the movement, gradually relinquishes its activity to the psoas.

Attention to the proper mechanics of the plié is important, too. On the downward movement, strong abdominals and a stable pelvis will absorb some of the pressure as the quadriceps contracts *eccentrically* to resist gravity. On the way up, a good push into the floor activates the calf muscles and the hamstrings and helps to minimize the "grabbing" of the rectus femoris as it contracts *concentrically* during the movement. Efficient use of the feet will relieve all these muscle groups of undue strain in landing from high jumps.

It is not just in pliés that the quadriceps acts in eccentric, or lengthening, contraction to resist gravity; the same contraction occurs as the leg is lowered from a raised position in front or to the side. The bunching of the thighs in such movements is a fairly familiar sight. It is usually caused by a foreshortening of the leg as it lowers, hiking up the hip and causing the muscle to clench as it contracts. This foreshortening can be prevented by a prompt recovery of the turnout, which has probably been partially lost at the height of the flexion, and by encouraging the hamstrings to participate in the movement. Imagery is a great reinforcement: "feel the inside muscles lengthening," and "draw a line with your toe, way out in space," are two favorites that work particularly well.

The quadriceps is the only major muscle group of the thigh that does not contribute to either inward or outward rotation.

The muscles at the back of the thigh are universally known as the *hamstrings*. In the turned-out position of the legs, these are the "inside muscles" to which teachers so often refer. They are long muscles, arising in the area of the sitting-bones, underneath the gluteus maximus, and running the entire length of the thigh. There are three of these muscles, but to all intents and purposes they act as two. The two muscles running down the inside of the thigh, with long tendons inserted below the knee into the tibia, are known as the ***medial hamstrings***. The outside muscle is known as the ***lateral hamstring***; its tendon is inserted into the fibula, just below the outside of the knee.

The two-joint hamstring muscles are the prime movers in flexion of the knee. They also act with the gluteus maximus and posterior fibers of the gluteus medius to extend the hip, bringing the pelvis and thighs into alignment. Their action in this respect comes into play in any movement where there has been flexion at the hip — in returning the leg from a battement, for example, or most notably in jumps after the flexion of the plié. The hamstrings also act with the gluteals in backward extension of the leg. Every battement to the back, every arabesque, is initiated by the hamstrings and the gluteals.

The lateral hamstring has an important role to play in accomplishing and maintaining turnout. By helping to turn the outside of the thigh backward, it works with the adductors as they bring the inside of the thigh forward. The controlling action of the lateral hamstring is especially strong at the point of its insertion into the fibula. In arabesque or any battement to the back, it becomes the principal muscle of the thigh to hold the turnout of the working leg, assisting the gluteals and the deep outward rotators. The medial hamstrings are inward rotators; turnout is restricted if they are tight.

Weak and malfunctioning hamstrings encourage inappropriate work in the quadriceps; by the same token, improper usage of the quadriceps results in weakness in the hamstrings. A good balance between these two muscle groups is of prime importance. Incorrect positioning of the pelvis, lordosis (hollow back) and faulty placement of weight are all conditions which, separately or together, will contribute to weakness in the hamstrings, as the traditional exercises will be performed without engaging these muscles sufficiently.

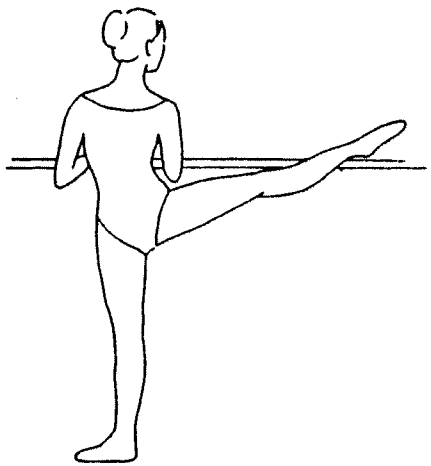

Figure 42. Initial position for stretching the hamstrings

Tightness in the lower fibers of the hamstrings, which pass behind the knee, will prevent the quadriceps from fully stretching the knee in a développé, and will limit flexion at the hips in a cambré forward, making it impossible to complete the movement. The hamstrings are

not easy muscles to stretch, but the traditional exercises designed for the purpose will eventually reward a persistent dancer. Keep in mind the lesson of the stretch reflex, and remember, too, that a relaxed muscle stretches more readily than a tightly contracted one; ambition, therefore, must be tempered with reason.

The anatomical names of the hamstring muscles are the *biceps femoris* (lateral), and the *semimembranosus* and *semitendinosus* (medial).

The flat, ribbon-like *sartorius* muscle is also a two-joint muscle, arising at the top of the pelvis and running diagonally across the thigh and around the inside of the knee, culminating in a tendon which is inserted into the tibia, or shin bone, of the lower leg. The longest muscle in the body, the sartorius participates in flexion of the hip joint and outward rotation of the thigh, making it active in all battements to the front or to the side. It is a strong stabilizer of the knee in plié.

The muscles running down the inside of the thigh (when you are standing with parallel feet) are known collectively as the *adductors*. They arise in the vicinity of the pubis and, with the exception of the gracilis, are all inserted into the thigh bone. The *gracilis*, the only two-joint muscle in the group, is also the only inward rotator. It is inserted into the tibia, adjacent to the sartorius.

The principal function of the adductors is to draw the legs toward each other, an action that takes place continually when the dancer is in motion. These muscles are also outward rotators and flexors of the hip joint. Some authorities give the adductors the primary role in producing and holding turnout, but this is a minority opinion. The work of these muscles in presenting the inside of the thighs forward, though, is constant and important. The role of the adductors as flexors is enhanced in the turned out position of the legs, particularly as the leg is raised to fourth position front. The anatomical names of these muscles are *adductor brevis, adductor longus, adductor magnus, pectinius* and *gracilis*.

The *iliotibial tract* is a band of deep connective tissue, part of the *fascia lata* that runs down the outside of the thigh from pelvis to knee. It is controlled by the egg-shaped muscle, the *tensor fasciae latae*, which is inserted into this band and tenses it. The tensor fasciae latae works cooperatively with the anterior fibers of the gluteus medius. These muscles abduct the thigh and are also powerful inward rotators; if tight, they will effectively prevent turnout. An over-developed, rigid tensor is a very difficult muscle to stretch, and many dancers have found it necessary to enlist the aid of a masseur in this undertaking.

Although "sitting" in the hip can be produced by imbalance in any of the opposing muscle groups (or even improper work in the ankles), weak abductors, especially the tensor fasciae latae, is the most frequent cause. This muscle group is one of the very few that is not well served by

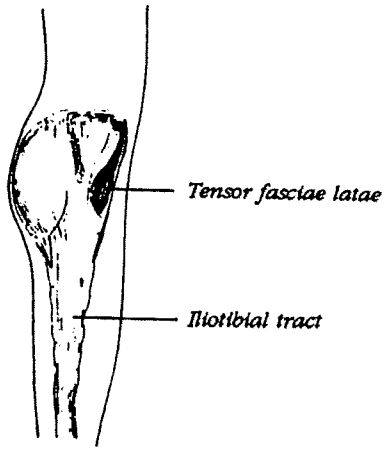

Figure 43. Diagram of iliotibial tract

traditional ballet exercises; the almost constant outward rotation of the thigh is apt to impede the development of strength in the inward rotators. Parallel grands battements to the side, preferably performed lying on the floor, is an effective strengthener of these muscles. Some innovative ballet teachers have added exercises performed in parallel positions to their warm-up at the barre, but probably the most useful strategy is for the dancer to leave the turnout behind when the studio door closes.

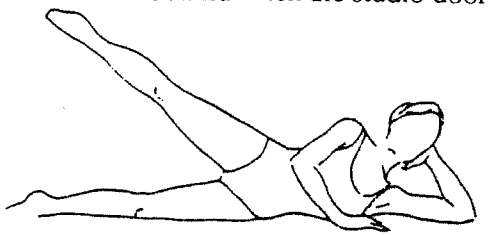

Figure 44. Strengthening the abductors

Questions For You To Answer:

What are the four factors that determine our ability to turn out in the hips?

Why is the turnout so important? What are the benefits it affords?

Is turnout confined solely to the hips?

What is the value of fifth position?

Name (in ordinary English), or point to, some of the muscles that accomplish the turnout.

Point to some muscle groups that, if tight, will prevent turnout.