

**RESOURCE PAPER FOR DANCERS AND
TEACHERS**

**TURNOUT FOR DANCERS:
SUPPLEMENTAL TRAINING**

**VIRGINIA WILMERDING, PH.D., AND DONNA KRASNOW, M.S. WITH
THE IADMS DANCE EDUCATORS' COMMITTEE, 2011.**

1. INTRODUCTION	2
2. CORE SUPPORT AND NEUTRAL PELVIS	2
3. ADDRESSING MUSCULAR AND NEUROMOTOR COMPONENTS OF THE HIP JOINT	9
4. ALIGNING THE LOWER LIMBS AND STANDING WORK	13
5. APPENDIX OF TERMINOLOGY	15
6. ILLUSTRATION CREDITS	16
7. RECOMMENDED READING	16
8. THE AUTHORS	17

1. INTRODUCTION

In the resource paper, *Turnout for Dancers: Hip Anatomy and Factors Affecting Turnout*, the bones, ligaments, and muscles of the hip joint in relation to turnout are described, and the five main factors affecting turnout are discussed. This paper provides an overview of useful conditioning exercises and imagery work for improving turnout.

In addition to the muscles of the hip joint, described in *Turnout for Dancers: Hip Anatomy and Factors Affecting Turnout*, the use of core support and an awareness of pelvic alignment are also crucial if turnout is to be fully functional in dynamic dancing. Generally, muscles are at a biomechanical disadvantage in poor alignment; if the pelvis is in anterior tilt (swayback) or posterior tilt (tucked), it may not be possible to use the muscles that contribute to turnout optimally. It is important for dancers to develop sufficient core support and good pelvic alignment in dynamic movement in order to have functional use of the muscles that externally rotate the hip.

Alignment and muscle balance in the lower leg also contribute to stability and control for turnout. If the dancer is standing and moving on feet that are pronated (what dancers call rolling in) or supinated (rolling out), there will not be a solid foundation to support weight, and balance will be compromised. Once the dancer is struggling with balance and adding unnecessary tension to the legs, turnout may be much more difficult to sustain, and the possibility of injury may be increased.

The exercises and imagery in this article are divided into three sections: (1) core support and pelvic alignment necessary for optimal use of turnout; (2) hip musculature exercises specifically related to external rotation of the hip joint; and (3) lower limb considerations. For those readers unfamiliar with bones and muscles discussed in this paper, there is an appendix of terms at the end.

2. CORE SUPPORT AND NEUTRAL PELVIS

While core support and pelvic alignment are related, they incorporate different muscle groups and demand a variety of conditioning exercises and images. In the neutral pelvic position, the deep rotator muscles of the hip joint work to externally rotate the femur while the abdominals work to control the pelvic motion.

To begin, it is important for the dancer to understand how to find and maintain what is known as the “neutral pelvis.” The fundamental alignment of a neutral pelvis is taught such that the bony landmarks on the front of the pelvis, the anterior superior iliac spines (ASIS) and pubic bone, lie in the same plane. Dancers can palpate these bony landmarks as they extend and flex their spines to see what happens during inefficient positions. They can

observe what happens to their turnout position while in the exaggerated positions of the pelvis. The muscle groups that work to maintain a neutral pelvis are the abdominal muscles, assisted by the psoas and the hamstrings.

1. Start by lying on the back (supine) with the arms and legs extended. Allow the breath to be natural and the body segments to lie with as little tension as possible. Imagine the pubic bone directly above the tailbone, and the back of the head, ribcage, and sacrum heavy and in contact with the floor. There will be spaces under the neck and low back due to the natural curves of the spine. Draw the thighs toward the pelvis by bending the knees, allowing the feet to stand in parallel on the floor. Be conscious of maintaining the placement of the pelvis during this action; if the pelvis tilts anteriorly (increased lumbar space) or tucks (decreased lumbar space), repeat the reach and draw of the legs until the action can be done with the pelvis quiet. Roll both legs to one side, allowing them to drop toward the floor easily. Then roll the legs back to the parallel stance position, imagining weight in the sacrum, and experiencing the space under the lumbar spine. Roll the legs to the other side and again back to center. This action can be done several times, always establishing neutral pelvis in the stance position, not rounding the lumbar spine so that it drops to the floor.
2. The same action can be done with a slight variation. Start with both legs to one side. Move the top leg to the opposite side like a clam opening and, when it has gone to its full range, bring the other leg across to meet it, like the clam closing. Go side to side with this action of one leg initiating, the second leg following. Observe that the legs will be in the fully open diamond position when the pelvis is centered. Once again, using the image of a weighted sacrum, establish a neutral pelvis. Finish the process back in neutral parallel stance, knees flexed to the ceiling, feet on the floor. This position is called "hook lying." See figures 1-4 below:



Figure 1

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.



Figure 2

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.



Figure 3

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.



Figure 4

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.

3. Now imagine a narrowing of the waist and a sinking or hollowing in the front of the pelvis. This is the action of the deepest abdominal muscle, the transverse abdominis (TA). There will be a subtle sensation of the waist and front of the body drawing or collecting inward. This muscle does not significantly flex or extend the spine so the drawing action should be accomplished without visible movement of the pelvis. There is some disagreement currently as to whether it is best to exhale or inhale on the hollowing and narrowing action. Probably the best advice is to make sure that you are continuing to breathe and not holding the breath, and that the breathing is natural and not forced. Eventually, while dancing, the TA must be recruited during the full cycle of inhaling and exhaling, and hence should be learned in whatever pattern is easiest for the dancer, and then attempted throughout the cycle.

4. The next stage is to learn to recruit this deep muscle during spine action. Begin by hollowing and narrowing and then immediately roll the pelvis into posterior tilt, or full lumbar flexion. Solomon (1988) calls this movement the “undercurve.” Be aware of maintaining contact with the floor and keeping the focus of muscle action on the abdominals, rather than squeezing or pushing with the gluteus maximus. It is useful to imagine the pubic bone being drawn toward the low back just below the navel by elastic bands, or the image of a huge ice cream scooper digging out the front of the pelvis. After the spine flexion action, return the pelvis to neutral each time.
5. When this exercise has been achieved, add the remainder of range of motion in flexion/extension. From the undercurve, go beyond neutral pelvis to the “overcurve,” a full arching of the lumbar spine, but maintaining the hollowing throughout so that the front of the pelvis does not bulge outward but there is an image of the elastic bands being pulled taut across the arch. If the breathing becomes forced or is held, sounding and vocalizing can assist in keeping the breathing natural. It should be noted that it is essential for dancers to learn hollowing in the overcurve, as this underlies so many dance movements, such as arches, arabesque, and leaps. See figures 5-7 below:



Figure 5: Neutral pelvis

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.



Figure 6: Undercurve

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.



Figure 7: Overcurve

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau.

6. Now turn over and lie prone with the forehead lying on top of stacked hands. The lumbar multifidi are easier to recruit in spine extension or even slight hyperextension. Begin first by engaging the pelvic floor. Many teachers describe this activity as the action we do when attempting to stop urination. Consider adding to this idea the image of a flow of energy being drawn up into the center of the body from the pelvic floor. Add to this drawing up the narrowing and hollowing experienced in the previous exercise so that there is a magnet or vacuum in the center of the pelvis drawing the waist in, the front of the pelvis toward the spine, and the pelvic floor in and upward toward the center as well. Some dancers will experience a sensation of connection or closing of the space on either side of the lumbar vertebrae and this is the multifidi activating. Not all dancers will be able to feel this muscle action, however, and this is not crucial.

While the above series deals with the deeper muscles important for core support, there are three other abdominal muscles that need adequate levels of strength and flexibility to allow for good pelvic alignment in stance and traveling work, as well as appropriate recruitment and release. The oblique abdominals and rectus abdominis can be strengthened using variations on curls, and curls with twists, while lying supine with flexed (bent) knees. (It is highly recommended that the hollowing and narrowing be done simultaneously with these exercises, to continue to reinforce that core support work with spine action, and there should also be attention to continuous breathing.) Wide elastic bands or cords can be used to increase loading. See figures 8-10 below:



Figure 8: Curls

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau



Figure 9: Curls with a twist

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau



Figure 10: Advanced version

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

7. Tie the elastic band to the barre and lie on the back with the head toward the barre, legs parallel, and the knees flexed. Hold the end of the elastic band and do the curl, using the pull of the band to increase the resistance. This exercise should not be attempted unless there is already adequate strength to maintain a rounded spine and the activity of hollowing during the curl, and should not be done with straight legs, as it can place too much stress on the spine. In fact, for dancers who are unable to maintain the rounded spine and the hollowing activity during a curl, they can turn around and face the barre, and use the elastic band to assist them in curling up until they have gained sufficient strength to do a correct curl on their own.
8. Physioballs can be used to add challenges to balance and enhance proprioception. It is not recommended that the curling action come all the way to vertical sitting, as this moves the activity to the hip flexors, and the focus should remain the abdominals. With very advanced dancers who already have good abdominal strength and alignment, curls can be done on the ball starting in a full arch of the spine and curling to flexion, going through full range of the muscle action.
9. The dancer needs adequate length in the hip flexors to achieve neutral pelvic alignment. Hip flexor stretching can be done in a long low lunge, with the front leg parallel and the back knee resting on a mat, not the hard floor. Straightening the back leg engages the rectus femoris, which would compromise the effectiveness of this stretch. The pelvis should be maintained as neutral as possible and the image of

the plumb line floating upward can help to keep the spine long. This area of the hip can also be stretched lying supine on a bench or table with the edge of the table or bench bisecting the two hip joints. Hold one leg at the chest to stabilize the pelvis and allow the other leg to hang off the end of the table, imagining the hanging leg heavy and released, the hip flexors melting and lengthening. Hip flexor stretching is vitally important to dancers in order to achieve neutral pelvis and to be able to use turnout effectively. See figures 11-12.



Figure 11: Hip flexor lunge

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau



Figure 12: Advanced variation

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

10. If the dancer has tilted the pelvis as described above to try to increase turnout incorrectly, the low back (the lumbar extensor muscles) might also become tight. Lumbar stretching can be done sitting on the floor, hanging forward, or lying on the back hugging the knees to the chest. For a more intense stretch, one can sit in a chair and hang forward with the legs separated, but this should not be done if there is low back pain. Lumbar stretching can also be done standing in parallel position in plié, holding onto the barre, or kneeling over a physioball. If there is excessive tension, the dancer can lie on small balls, placing them in areas of greatest tension, and then breathe and release the weight into the balls. Sometimes by doing the hip flexor stretches and allowing the pelvis to drop to neutral, the lumbar extensors will begin to release tension without doing stretches for this area.

It is important to remember that even after the muscles have been sufficiently strengthened and stretched to allow for good alignment, the neural patterning must still be addressed. There is literally an infinite supply of images and the key is to individualize the image for the dancer. Some dancers work better with images that focus on the diamond formed by the tailbone, pubic bone, and “sitz” bones, visualizing this diamond remaining parallel to the floor during movement. Another image using bony landmarks is for the ASIS (anterior superior iliac spines, or the two bones that protrude on the front of the pelvis) to line up vertically over the pubic bone. Other dancers relate more easily to images of the pelvis as a bowl of water, and not spilling water in any direction. Still others can use the image of the elastic bands from the pubic bone to the low back and adjust the length of those elastic bands to arrive at neutral. Dancers carrying tension in the lumbar extensors or hip flexors can benefit from images of water pouring down the low back or the front of the hips softening and opening like taffy. Teachers should provide a variety of images so dancers can choose the one(s) that work best for them. Often the best images are the ones the dancers create themselves.

3. ADDRESSING MUSCULAR AND NEUROMOTOR COMPONENTS OF THE HIP JOINT

The most obvious muscles of the hip are located in the buttocks. The large gluteal muscles act as hip extensors (taking the leg to the back) and external rotators. In contrast, the muscles that are more important for turnout, the deep lateral rotators, are small and are buried under the gluteals. These six lateral rotator muscles are attached to different parts of the pelvis. They all then run laterally, spanning the back of the hip joint capsule and the ischiofemoral ligament. Finally, they all attach behind the greater trochanter of the femur.

The function of the six deep rotator muscles is to laterally rotate or turn out the leg, relative to the pelvis. They achieve this goal by pulling the greater trochanter of the femur backwards, toward the back of the pelvis. It is often difficult for dancers to isolate contraction of this muscle group. It is not necessary to tighten or “clench” the gluteals to activate the deep lateral rotators group. The following series of exercises allows for recruiting and experiencing the external rotation at the hip first without weight bearing, and in conjunction with a variety of hip movements, including flexion, extension, abduction, and adduction.

1. Begin lying on the back (supine) in hook lying position, that is, with the knees flexed, legs parallel, and the feet on the floor. Open the knees fully, and flex the feet, placing the heels together and just off the floor so that the body is lying in what would be a grand plié when standing. Imagine that there are two magnets on the inner thighs that are drawn together and roll toward the ceiling as the legs slowly extend along the floor, pelvis staying neutral. Image that the legs are being pulled by a partner and

that the outer thighs are soft and silky and long as the feet move further out in space. At the end of the extension, imagine that the heels are glued together, and slowly flex the feet. This is now standing first position, turned out.

2. Return to the starting position (hook lying) and staying parallel, slide one leg out along the floor. Maintaining neutral pelvis, keep that leg straight and flex the hip to approximately 45°, so that the knees are at the same level. In this position, rotate the hip fully out and in (beyond parallel), exploring the full range of movement of hip joint rotation. It is important to maintain a quiet pelvis and not allow any accommodating movement in the pelvis. Images of weight and of the sacrum attached to the floor can assist this stabilization. Now bring that same extended leg to a higher position, flexing the knee and hip so that the leg is now in front attitude, and repeat the rotation out and in. In addition to stabilizing the pelvis, it is important to focus the effort on the rotary action of the hip joint. With the knee flexed, the ligaments will allow for additional rotation at the knee, but this exercise is designed to pattern hip external rotation for standing demi pli . Encouraging knee and foot compensations will not be useful. There are two advantages to exploring hip rotation in full flexion lying on the back: the deep rotators have a greater chance of being effectively recruited and there is the opportunity to receive visual feedback about hip versus knee and foot action, and to make appropriate changes in habitual behaviour. See figure 13 below:



Figure 13

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

3. Now roll up onto the side of the body. Fold both knees so that the feet are directly under the pelvis, and the knees are in front of the body, the same position as hook lying used earlier, but now lying on the side of the body. Check that the alignment of the pelvis and spine are neutral and create a small space under the waist. Maintaining neutral pelvis, rotate the top leg fully out (by lifting the knee toward the

vertical, keeping the feet together, like the action of a clam opening) and back down. To increase the difficulty and demand, do the same exercise with the bottom leg extended along the floor and turned out. This increases the balance and torso stabilization challenge. See figures below:

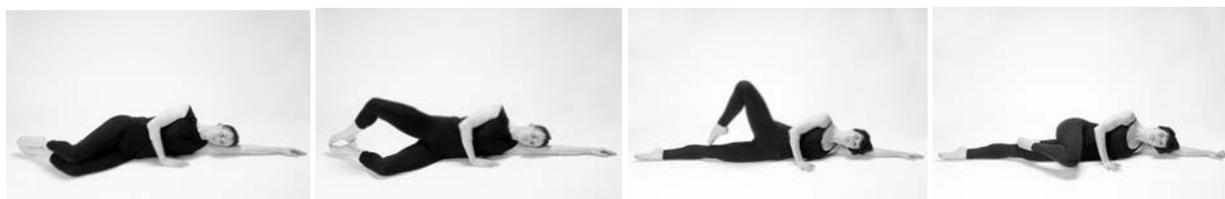


Figure 14

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

4. Roll onto the front of the body, hands under the forehead. Begin with the legs parallel. Lift one leg at a time, imagining that the leg elongates along the floor before it lifts, and that the front of pelvis is glued to the floor. Next, lift one leg parallel, rotate it out fully, rotate back to parallel, and place it down. You should alternate the legs, maintaining neutral pelvis. Embellishments can be added, such as flexing the feet, bending and extending the knee, and finally, allowing the gesture hip to come off the floor, but keeping the ribcage facing the floor, and the standing hip connected to the floor. This use of turnout in full hip extension requires body awareness and organization. The adductors must be involved to keep the leg directly behind the hip. The pelvis will rotate to allow a greater range of motion, so the upper torso will need to rotate in opposition. The extensors on the “standing” side will need to activate to maintain that hip placement on the floor. The full core support group needs to be recruited by the dancer to encourage stability and prevent lumbar injuries. And even the muscles that encourage alignment in the scapulae and upper limbs participate in this full body organization. See figure 15 below:

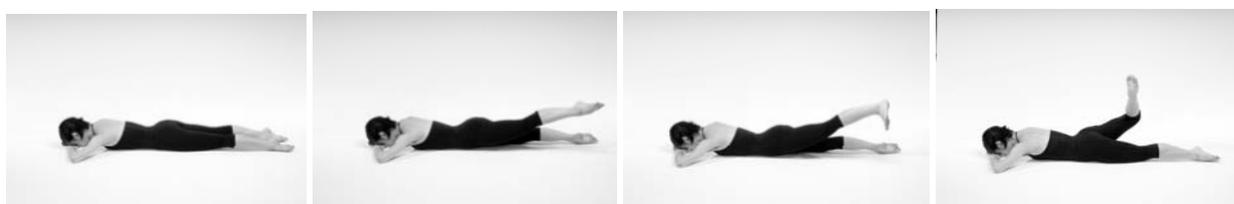


Figure 15

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

5. Both the external rotators and the internal rotators (gluteus medius and minimus) need to be stretched by dancers. The external rotators can get tight from overuse

and can be stretched lying on the back, bending one knee and drawing that parallel leg across the body, keeping the pelvis on the floor. For some people, however, this stretch is irritating or ineffective, and a version of the yoga “pretzel” can be used instead. Sit with one leg folded on the floor, and cross the opposite leg over, placing that foot on the floor. Turn the body to face the knee that is off the floor, and using the opposite arm, draw the knee toward the shoulder trying to maintain both “sitz” bones on the floor. See figure 16 below:



Figure 16

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

6. The internal rotators, if tight, can limit range of motion in external rotation. Since they are also hip abductors, an effective way to release them is to place the hip in an adducted, externally rotated position, which can be achieved lying on the back. Bring one leg up toward the chest with the knee bent, turn out, and slowly draw it across the body, maintaining the turnout and keeping the pelvis on the floor. It is important to stabilize the pelvis and to remain externally rotated or the stretch will not be effective for the target muscles (gluteus medius and minimus). Another useful stretch can be done in hip extension, which adds the tensor fascia latae. Start in the hip flexor lunge stretch described previously. Slightly turn out the front leg and rotate the pelvis to face that leg, placing the opposite hand (as front leg) on the floor for support. Lower the pelvis toward the floor, bending the body sideways in the opposite direction. You might need to move around in this position slightly until the stretch in the target area is experienced. See figure 17 below:



Figure 17

Photography by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau

7. Come to standing in first position, turned out. Take some time to experience the alignment of the pelvis and the organization of the legs in relation to the spine. Move into a demi plié imagining a huge diamond widening the knees out over the feet. Without thinking about straightening the legs, imagine that the pelvis is floating upward as the waist narrows and hollows, and that the magnets on the inner thighs are being drawn together and forward. Imagine the thighs sliding down the front of the leg and the buttocks sliding down the back of the leg as the inner thighs gather under the rising pelvic floor.

4. ALIGNING THE LOWER LIMBS AND STANDING WORK

While the focus of alignment discussions is often the pelvis and spine, the organization of the lower extremities is also important for dancers. The foundation supports of the body, the lower limbs, need to be aligned so that the weight of the body is supported evenly throughout the foot, not rolled to the inner or outer border. The following exercises address muscular recruitment and awareness of the lower limbs, and considerations in transferring this work to standing and traveling.

1. Begin lying on the back (supine) in hook lying position. Maintaining neutral pelvis, bring one leg to parallel attitude, heel above the sitz bone. Observing that the lower leg and foot have the potential to rotate when the knees are bent, draw an imaginary line from inside the ASIS down through the center of the hip joint, through the mid patella-mid ankle joint and continuing out between their 2nd and 3rd toes. Perform a series of points and flexes, using full ankle range of motion. Commonly, you will see that the feet turnout, and do not stay in line with the mid-knee and hip, so continue this exercise slowly until the correct alignment can be maintained. Repeat on the second side. After it is clear how to point and flex in good lower leg alignment with legs parallel, turnout at the hip, keeping this imaginary line constant through the leg and foot. Repeat the points and flexes, maintaining this line from the center of the hip joint, through the mid patella-mid ankle joints, and continuing out between the 2nd and 3rd toes.
2. Once it is clear that turnout comes from the hip joints as much as possible, stand and integrate all of the above images and experiences. First, review the neutral pelvic alignment in standing, including the motor control of the abdominals. Then, starting in a parallel position, begin to turnout. The upper thighs should move before the feet. Good alignment in stance is important to protect the health of the joints of the spine and hips. It is usually easier to begin in 2nd position as the anterior hip muscles are slightly slackened and the hip joint is freer to rotate externally. For an additional challenge, elevate the arms into 5th position, repeating the process of going from

parallel to turnout. Does this change the alignment? It is more difficult to maintain a neutral pelvis with the arms elevated as it naturally extends the spine slightly.

3. Now assume an open 4th position parallel. Turn out both legs, keeping the pelvis neutral. Note that the leg in the back is harder to turnout due to the extension at the hip joint as compared to the front leg. Repeat on the other side to assess if one hip is easier to turnout than the other. Note the importance of both internal and external rotation at the hip joint for healthy hips.

Turnout can be perceived as a static position, while dancing is motion. Therefore, what we want to see is that the dancer can use their turnout while moving, which often requires the hip to both internally and externally rotate. The lower leg contributes to the look of the turnout by adding five or more degrees to the ROM from the hips. However, turnout from the lower leg should not be encouraged through the practice of taking the weight off the leg, bending the knee, rotating the lower leg as much as possible, and then placing it on the floor. The attempt to straighten the legs after this process puts tremendous strain on the ligaments of the knees.

If the dancer plié in parallel and then turns out, there should be a few more degrees of external rotation at the hip joint from slackening the muscles and ligaments that cross the hip. However, the abdominal support of the pelvis must remain vigilant so that the dancer does not attempt to increase the motion by anteriorly tilting the pelvis. In relevé, it can be even more difficult to maintain turnout and pelvic alignment. Recalling the placement of bony landmarks and other images to encourage use of core support and abdominal muscles can be effective.

Once the dancer moves from a two-foot support to one, it becomes more difficult to maintain a level pelvis due to the forces of gravity on the body in the direction of pronation or “rolling in” at the foot. The effect of this at the hip joint is slight internal rotation. However, if a neutral pelvis is maintained by the active control of the abdominals from above and the hip external rotators, adductors and deep fibers of the gluteus maximus from below, it can be nullified.

For readers interested in learning more about the underlying principles of physical conditioning, such as duration, intensity, and overload, there are excellent publications that can be consulted. There is also literature, particularly in the somatic practices, supporting approaches using awareness, whole body integration and connectedness, and imagery to assist in the neuromuscular aspects of conditioning. There are many excellent sources in the literature that can provide resources for supplementary exercises for dancers, including C-I Training™, Pilates, Ruth Solomon’s work, the Gyrotonic Expansion System®, Zena Rommett Floor-Barre™, and many more. All contain safe and thorough ways to condition and realign the body for improved technique. It is then the goal of the dancer and dance

educator to transfer the newly acquired skills and improved facility from conditioning work to dance practice.

5. APPENDIX OF TERMINOLOGY

Anterior superior iliac spines (ASIS): The two bones that protrude on the front of the pelvis

Gluteus medius and minimus: Muscles on the side of the pelvis that internally rotate the femur; note that when the hip is flexed to 90 degrees or more, the gluteus medius will contribute to external rotation

Hamstrings: Muscles down the back of the thigh that extend the hip joint and bend the knee

Hip adductors: Inner thigh muscles

Lumbar multifidi: Small muscles close to the spine in the low back area

Neuromotor or neuromuscular: the effects of nerve impulses on muscles, that is, how the muscles receive messages from the brain and the central nervous system; in the context of this paper, “neural patterning” refers to the learned, habitual patterns that underlie our motor behavior and organize groups of muscles to act together

Oblique abdominals: Muscles on the side of the trunk responsible for rotation and curving of the spine
Psoas: A deep muscle connecting the lumbar spine to the inner leg, important in alignment of the pelvis
Rectus abdominis: Large muscle down the front of the trunk that curves the spine

Rectus femoris: The muscle on the front of the thigh that crosses the hip and the knee

Sitz bones: Also called “sit bones,” these are bones at the bottom of the pelvis, the ischial tuberosities

Tensor fascia latae: The muscle that is on the diagonal aspect of the hip joint and helps to hold the leg up in à la seconde

Transverse abdominis: The deepest abdominal muscle, located on both sides of the lumbar spine

6. ILLUSTRATION CREDITS

All photos by Gary Ray Rush, from *Conditioning with Imagery for Dancers*, by Donna Krasnow and Jordana Deveau, used courtesy of Thompson Educational Publishing, Inc.

Thank you to the dancers: Chad Clark, Jordana Deveau, Ellis Martin-Wylie, Belinda McGuire, Natasha Poon Woo, and Meredith Thompson.

7. RECOMMENDED READING

Alexander FM. *The Use of the Self*. Long Beach, CA: Centerline Press, 1985.

Alter MJ. *Science of Stretching*. Champaign, IL: Human Kinetics Publishers, Inc., 1988.

Bartenieff I, Lewis D. *Body Movement: Coping with the Environment*. New York: Gordon and Breach, Science Publishers, 1980.

Calais-Germain B. *Anatomy of Movement*. Seattle: Eastland Press, Inc., 1993.

Clarkson PM, Skrinar M. *Science of Dance Training*. Champaign, IL: Human Kinetics Publishers, Inc., 1988.

Dowd I. *Taking Root to Fly* (2nd ed). North Hampton, MA: Contact Collaborations, 1996.

Feldenkrais M. *Awareness Through Movement*. New York: Harper and Row, 1972.

Grossman G, Krasnow D, Welsh TM. Effective use of turnout: biomechanical, neuromuscular, and behavioral considerations. *J Dance Educ*. 2005;5(1): 15-27.

Krasnow DH. C-I Training: The merger of conditioning and imagery as an alternative training methodology for dance. *Med Probl Perform Art*. 1997; 12:3-8.

Krasnow D. *C-I Training (Conditioning-with-Imagery)* [Video/DVD recording]. Toronto, Canada: Donna Krasnow, 1998.

Krasnow D, Deveau J. *Conditioning with Imagery for Dancers*. Toronto, ON: Thompson Educational Publishers, 2010.

Krasnow DH, Chatfield SJ, Barr S, et al. Imagery and conditioning practices for dancers. *Dance Res J*. 1997;29(1):43-64.

Rommett Z. The Rommett Floor Barre Technique [Video recording]. New York: Zena Rommett Dance Association, 1991.

Solomon R. Anatomy as a Master Image in Training Dancers [Video/DVD recording]. Santa Cruz, CA: Ruth Solomon, 1988.

Solomon R. In search of more efficient dance training. In Solomon R, Minton S, Solomon J (eds): Preventing Dance Injuries: An Interdisciplinary Perspective. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance, 1990, pp. 191-222.

Stephens RE. The neuroanatomical and biomechanical basis of flexibility exercises in dance. In Solomon R, Minton S, Solomon J (eds): Preventing Dance Injuries: An Interdisciplinary Perspective. Reston, VA: American Alliance for Health, Physical Education, Recreation, and Dance, 1990, pp. 271-292.

Sweigard LE. Human Movement Potential: Its Ideokinetic Facilitation. Lanham, MD: University Press of America, 1974.

Todd ME. The Thinking Body: A Study of Balancing Forces of Dynamic Man. New York: Paul B. Hoeber, Medical Book Department of Harper & Brothers, 1937.

Watkins A, Clarkson PM. Dancing Longer: Dancing Stronger. Pennington, NJ: Princeton Book Company, 1990.

8. THE AUTHORS

Donna Krasnow is at York University, Toronto, Ontario, Canada and California State University, Northridge, California, USA.

Virginia Wilmerding is at the University of New Mexico, Albuquerque, New Mexico, USA.

This paper may be reproduced in its entirety for educational purposes, provided acknowledgement is given to the "International Association for Dance Medicine and Science."

©2011 IADMS, Donna Krasnow, M.S., and Virginia Wilmerding, Ph.D.