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# Lateral Bias in Dance Training

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In the current focus on dance wellness a serious effort is being made to provide the kind of safe and effective training that produces a healthy, physically and psychologically “balanced” dancer. The degree of structural and functional asymmetry of the dancer, the lateral preferences of the dancer in performing certain dance skills, and the possibility of laterally biased dance experiences all need to be taken into consideration as part of the total picture of dance wellness and proper training.

Some of the major technical requirements for a dancer are: static and dynamic stability, most often on only one leg; a good range of motion in specific joints to create an aesthetic line in the gesturing leg and in the upper body; leg strength for take off and landing; and the ability to turn efficiently. In an ideal world, dancers would be totally balanced in their physical and technical training on both sides of their body. They would be able to perform any of these dance tasks equally on either leg and to either side, and thus provide a “perfect,” symmetrically balanced instrument for the choreographer. Realistically, it is more likely that a trained dancer has an asymmetrical body structure, a preference for learning and performing specific skills on one leg or one side, and a dance technique that is functionally asymmetrical—that is, dance skills are performed more proficiently on one leg or side than the other. Assuming that a more symmetrical dancer is desirable, this topic of enquiry is surely of much interest to the dance educator, as is the extent to which asymmetry may be preventable.

It is difficult to determine whether preference results from pre-existing structural asymmetries on the one hand, or causes structural asymmetries or performance differences due to unbalanced usage on the other. This is ultimately a “chicken and egg” question that is explored in more depth in the article from which this one is taken.\* In this article a more limited set of questions is examined; Do dancers arrive at a dance class already biased? Do dancers learn faster on one side than the other? How automatic, or how difficult, is transferring the skills learned

on one leg/side to the other? Does the typical dance class increase or balance out that bias? Finally, what role can dance educators, therapists, and the dancers themselves play in identifying these biases, thereby helping to develop a healthy balanced body?

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## Lateral Preferences

As a population, we have an eye and ear dominance and a preference for which hand and foot we use in fundamental motor skills, with about 90% of the population being right handed and about 80% right footed. An initial innate bias for one side or the other is reinforced by practice, and so it is not surprising that these biases are also reflected in skill levels in a variety of hand skills, foot skills, and fundamental motor skills. At the time of school entry a preference for handwriting, throwing, hopping and ball kicking has been established in most children.<sup>1,2</sup> Children live in a right-biased world, where play, sport, and activities of daily living tend to be spatially orientated to a cultural right preference. Therefore, many motor skills are practiced more on one side than the other, and it is not surprising that this promotes more proficiency on one side; that is, there is a functional asymmetry in many motor skills. We can assume that dancers would follow the population norm, and thus have lateral biases for performing dance skills and show performance differences. Consensus in the literature suggests that the mobilizing limb—i.e., the limb used to manipulate an object, as in kicking a ball or starting up stairs (or in dance terms, the gesture leg)—is considered the dominant or preferred leg, and the posture stabilizing leg is the non-dominant.<sup>1,3</sup> The degree of difference between the two sides, however, is dependent on the motor task being done, and the choice of which foot to prefer in a particular task is influenced by the complexity of the task and the interrelationship of the stabilizing and mobilizing leg.<sup>1,3</sup> For example, if we are only performing a unilateral skill such as standing on one leg we tend to use the preferred leg; however, if we perform a bilateral skill, such as kicking or some other

difficult action with our free gesturing leg, we tend to switch the support leg so our preferred leg can attempt the more difficult action.

This collaboration of the balancing and gesturing legs in many dance skills makes identifying a dancer's "preferred" or "dominant" leg or side somewhat difficult. Which leg do we label as "preferred," the support leg (thereby focusing on strength/balance) or the gesture leg (range of motion)? Two studies<sup>4,5</sup> with university dance students explored lateral preference. Students were asked to identify right, left, or no preference for performing a number of fundamental motor and ballet skills. In the first study right preference for specific skills ranged from 90% to 45%, and in the second study, using slightly different skills, 95% to 18%. These percentage ranges are based on how challenging the balance, propulsion, or shock absorption function of the supporting leg, or the flexibility and range of motion of the gesturing leg, are. Although there were large individual variations between dancers, some overall patterns emerged. Strong right turning preferences were identified in both studies,<sup>4,5</sup> but this right bias did not necessarily carry over to other skills, which varied between right and left. A right preference for balance was evident when balance was challenged (as in piqué).<sup>5</sup> When range of motion (ROM) was the issue, however (in battement à la seconde and ronde de jambe),<sup>5</sup> the balance preference switched to the left leg. Range of motion, therefore, apparently overrides balance demands. It is likely, however, that each dancer has to negotiate her own trade-off between balance, strength, and flexibility, depending on body structure, past training, and injury history.

The results of both studies suggest that identifying a dancer's lateral bias is a complex matter, and the choice of dance skills used in evaluation becomes critical. It is also important to match the choice of skill to the dancer's ability level. To get a complete picture one must evaluate a number of components, such as: spatial direction of turning, both on the spot and traveling; take off and landing legs in jumps; range of motion and flexibility of the gesturing leg; and strength of the supporting leg when a balance task is difficult or the gesturing leg has to be held in the air for a long time.

Why assess a dancer's lateral preferences? Preferences can potentially affect the learning of new skills and how much skills are practiced on the non-preferred side. These in turn will affect how well the skills are performed on either side, and how the muscles and joints respond to a potential imbalance or overload. The bias may be compounded by a laterally-biased class.

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### Learning and Transfer

Given a population preference for performing hand and foot skills on the right, it is not yet known whether one also learns better on the right side. To explore that question researchers have typically presented a novel hand skill to be learned first on one side and then transferred

to the other. Magill has identified some of the arguments proposed for either side.<sup>6</sup> For teaching right-transfer-left, it could be argued that it is easier to learn a new skill with one's well skilled, highly refined side. One should learn faster on the right, and the motor program would more easily be transferred to the left side. The counter argument, however, is that while it may initially be more difficult to perform a novel skill on the non-dominant side it is processed at a deeper level, and therefore when the newly learned skill is transferred to the right, the more "competent" side will achieve a higher transfer performance. The results of numerous hand transfer studies were inconclusive.<sup>6</sup> There was no consistent right or left hand learning preference. Results depended on the type of task studied.

It is not surprising that some dance instructors and researchers have been intrigued by the transfer question, as learning and then transferring skills and combinations from one side of the body to the other is such an integral part of the dance class. There is unfortunately sparse information to settle this question for the dance class. Initially learning and then becoming competent in a novel, physically difficult skill, such as a new turn or jump or balance skill, involves learning the actions involved, but the actual level of skill attained is also dependent on the existing strength, balance, range of motion and control of one limb compared to the other. Any difference found would not necessarily be due to one side "learning" the skill better. This fact has made studying right/left learning in dance difficult and inconclusive.

Differences in "learning" can perhaps be demonstrated more clearly by presenting a novel sequence that does not include any physically demanding skills. A recent study<sup>7</sup> was undertaken to evaluate the effect of lateral presentation and dance experience on the learning and transfer of dance sequences. Forty females, 20 novice and 20 experienced dancers, were videotaped attempting to learn two dance sequences, presented either to their right or their left side and then transferred to the opposite side. There were no differences between the right and left learning groups for the initial, practice, and transfer trials for either novices or experienced dancers, although the left learning groups took more time to learn the sequences.

The lack of difference for left side learning for both beginning and experienced dancers is noteworthy, considering the general right preference for performing many dance skills and the typical right biased dance class. It is important to point out that in this study the demands were largely cognitive. What was measured was learning, not performance. Participants were scored on being able to move continuously through the sequence with the correct steps in the right order, following the demonstrated directional pattern. They were not scored on technical form; rather, learning in this instance represented a memory challenge. This study does suggest that learning capability may not be detrimentally affected by sometimes starting the class on the left. Whether the skill level eventually

reached will be balanced on both sides is an open question, and will be influenced by how much practice is provided for either side.

### Teaching Biases

A quick glance at a sample of the traditional dance texts on any reader's shelves will likely show a model performing a dance skill while gesturing with the right leg—in *batterie*, *développé*, or *arabesque*—with the accompanying description of the steps starting with the right foot or the right side. One can assume that dance teachers would also be influenced by a bias, and may tend to favor the right side. This might include demonstrating and initiating practice on the right, giving more practice to the right, and presenting combinations on the right and then expecting them to be transferred to the other side with little extra instruction or marking. Two studies of dance classes demonstrated that this right bias is common.<sup>8,9</sup> In the first study students were asked about their expectations for a teacher starting various sections of class on the right or left side/foot. Results were 66% right for the barre part of the class, 85% for the center work, and 85% for the adagio. Seventy-six percent expected that the adagio would be repeated on the other side, but only 12% expected it to be re-demonstrated.

In the second study, observing ballet classes, the number of repetitions favored the right, with up to a 26% higher prevalence of right over left.<sup>9</sup> The right bias increased with advancement in class level. Although anecdotal reports from teachers suggest that some are experimenting with starting on the left or alternating sides from day to day, there is also reluctance to deviate from students' expectation of starting on their comfortable and preferred right side.<sup>8</sup> A self-evaluation format might be useful for instructors to quantify their own bias, and as a tool in pedagogy courses to generate more data on class bias in different dance forms and different class levels.

The proposition has to be entertained that dance training can either exaggerate an already existing bias or help reduce it. Dancers' preferences and the amount they practice will interact with their ability to learn lateralized skills. How might biased practice influence learning? The performance of most skills is dependent on neuromuscular control, not simply on physical parameters. The height of a leg in a *la seconde*, or the balance on *relevé*, is certainly dependent on more than muscular strength or range of motion. The degree of motor control we have in either limb would certainly be affected by how often we practiced skills on one side or the other. Learning is no doubt also affected by our perceived competence at performing skills on one side or the other. Anecdotal reports in the transfer experiment mentioned previously suggested that many students exhibited or reported some lack of confidence in their ability to learn the sequence when it was presented to the left side, as well as surprise at how effectively they were eventually able to learn it.<sup>7</sup> This issue of perceived competence on one leg or the other may also be a developmental issue. If extra effort were made to offer more laterally balanced

experiences to young dancers would a more balanced older dancer emerge?

### Choreography

A final question to be explored, but not by the movement scientists, is the role that preference and asymmetry play artistically. There are many historical examples of great dancers and major pieces of choreography that were laterally biased in, for example, lengthy turning sequences. On the other hand, a member of the *corps de ballet* can't say to the choreographer "I don't like doing my turns from that side of the stage." Although there are exceptions, in the world of sports one does not ask a high jumper or a pitcher or tennis player to perfect his skill on either leg or both arms. However, the demands of dance are aesthetic, and surely a balanced instrument is a necessity. Is lateral bias and functional asymmetry an advantage or disadvantage in a performer's life, or is choreography also biased in order to adapt to this reality? That last question is one only the artistic dance community can answer.

### Conclusion

The novice dancer likely brings to his/her first dance class some structural asymmetries and differential proficiency in lateralized motor skills, along with a distinct preference for learning and performing skills on one side. The dancer may then be exposed to teachers who also have asymmetries and preferences, and to class content and traditional teaching methods that potentially provide further laterally biased learning experiences. In the worst-case scenario this could produce a strongly biased, potentially injury-prone dancer, who is laterally limited as a performer. Dance educators and therapists can play an important role in identifying biases and asymmetries. The ideal outcome of a well considered training program that attempts to balance any asymmetries would be a functionally balanced, healthy, and choreographically versatile dancer.

\*This article is adapted from: Kimmerle M. Lateral bias, functional asymmetry, dance training and dance injuries. *J Dance Med Sci.* 2010;14(2):58-66.

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