

---

# Eyes-Closed Dance Training for Improving Balance of Dancers

Kimberly Hutt, M.Sc., B.Sc.(Hons), PGCHE, MSST, London Contemporary Dance School, London, UK

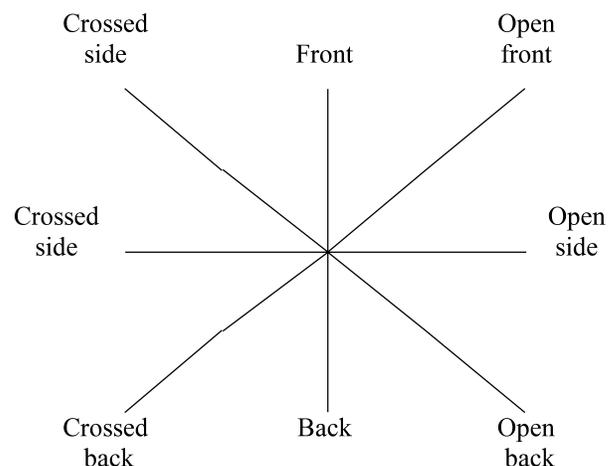
Research has shown that dancers rely heavily on visual cues to maintain balance.<sup>1</sup> Visual conditions in dance performance environments range from traditional lighted stages to open spaces and museums, typically very different from rehearsal and class environments where dancers can be dependent on mirrors for visual feedback. Consequently, when performing, a dancer's balance may suffer.

Balance requires three main mechanisms involving visual stimulus, mechanisms within the inner ear, and physical sensory awareness. This sensory awareness is known as proprioception. Dancers who rely more on proprioception than visual cues for balancing tend to be more stable. In addition, within dance and sport, it is widely accepted that proprioception reduces the risk of injury due to improved joint and postural stability. These points should further encourage dance educators to seek ways to enhance proprioception among dancers.

It is possible for dancers switch from one balance mechanism to another.<sup>2,3</sup> For example, they may rely predominantly on visual cues for balancing when their eyes are open, yet shift to proprioceptive strategies when they close their eyes. A similar shift might be required under stage lighting conditions, or other unfamiliar performance environments. Interestingly, a study on classical ballet dancers demonstrated that while dancers have excellent balance abilities, when they close their eyes and try to balance, they are no better than non-dancers.<sup>4</sup> This finding suggests that a dancer's ability to switch from using visual cues to proprioceptive strategies for balancing could be improved. It has also been noted that dance practice alone does not improve proprioceptive mechanisms for balancing, necessitating balance practice beyond the dance class.

The concept of specificity within sports training and testing has been acknowledged, and is growing within the dance field, for example, dance fitness testing<sup>5,6</sup> and balance testing.<sup>7</sup> Researchers have identified that in order for balance training to be successful, it must be trained using the same skills that are required during performance.<sup>8,9</sup> Therefore, when training dancers it seems appropriate to select a balance-training program with specificity to dance practice. Furthermore dance training programs often require long and exhausting hours of dance classes, therefore identifying means of integrating balance specific training within dance classes may reduce the necessity for additional practice and is likely to improve compliance.

In this study, a group of pre-professional dancers were given an eyes-closed, dance-specific training program to enhance their proprioceptive mechanisms for balancing and to seek improvements in dynamic balance. Eighteen elite pre-professional ballet dancers were randomly assigned to either a control (eyes-open) or experimental



**Figure 1** The eight spoke grid and directions used for all variations of the SEBT. NB: These directions are based on the subject facing the front spoke and using her right leg as the dominant “reaching” leg.

---

This article is adapted from: Hutt K, Redding E. The effect of an eyes-closed dance-specific training program on dynamic balance in elite pre-professional ballet dancers: a randomized controlled pilot study. *J Dance Med Sci.* 2014 Mar;18(1):3-11.

(eyes-closed) group for the intervention. The balance abilities of all dancers were tested before and after a four-week balance intervention. Balance was tested using previously researched modifications to the Star Excursion Balance Test (Figure 1) (mSEBT), designed to challenge a dancer's balance.<sup>7</sup> The mSEBT uses speed to complete the test, and assesses how far the dancers can reach their working leg before toppling as indirect measurements of dynamic balance.

### Balance Training

The intervention consisted of dance-specific, eyes-closed sequences integrated into the dancers' daily ballet class, and on a weekly basis were designed to progressively challenge the dancers' balance. During the intervention period the control group undertook the same program with their eyes open. The balance exercises formed the first center practice

exercise of the class and were performed five days per week for 4 weeks.

The results showed that balance among the dancers in the experimental (eyes-closed) group improved significantly when compared to the control (eyes-open) group across all balance tests. Improvements in time to complete the tests were up to 16%. During the variations of the test that measured reach distances, improvements were also greater among the experimental group, but the difference was less noticeable. Theorizing that the test variations collectively represent dynamic balance, overall, these results suggest that a four-week, eyes-closed, dance-specific training program can improve the dynamic balance ability of dance students.

The most notable improvements were elicited when time to complete the tests were measured. It is interesting that research has shown that when the speed of a moving limb increases, more equilibrium control is required to maintain

Week 1	Port de bras	Start in 5th position croisé. Arms, 1st, 2nd, extend and down (4 counts) 1st, 5th, open to 2nd (4 counts) Port de bras forward and back (8 counts) Chasse to 4th point foot derriere (4 counts) Transfer through 4th, plié to point devant (4 counts) Ronds de jambe en d'ehors with quarter turn to croisé (4 counts) Transfer through plié back to point devant croisé close 5th (4 counts) Repeat all other side Total 64 counts
Week 2	Battement tendu	Start in 5th position croisé Tendu devant, close 5th, tendu devant, close 5th (4 counts) Tendu à la seconde, lower heel, point foot close 5th derriere changing direction to croisé other side (4 counts) Repeat on other leg (8 counts) 4 x tendu à la seconde en arriere closing in 5th and changing feet each time (4 counts) 4 x tendu à la seconde en avant closing in 5th and changing feet each time (4 counts) Repeat all Total 64 counts
Week 3	Battement jeté	Start in 5th position croisé 2 x jeté devant, on 3rd jeté – 2 x piqué to 45° close 5th (4 counts) Repeat à la seconde, changing 5th each time finishing closing derriere to change croisé direction and leg (4 counts) Repeat with same leg derriere (4 counts) Jeté à la seconde with 2 x piqué close devant, mini developpe à la seconde, close derriere (4 counts) Start all on other side Total 32 counts
Week 4	Developpé and grande battement	Start in 5th position croisé Developpé devant, take to a tendu, close 5th (4 counts) Grande battement devant, grande battement à la seconde, close derriere (4 counts) Repeat on other side (8 counts) Balancé side using front leg, balancé side using other leg (4 counts) Soutenu towards front leg (4 counts) Repeat balancé and soutenu sequence (8 counts) Repeat all (64 counts)

balance.<sup>8</sup> This is particularly useful information for dancers and dance educators given the dynamic nature of dance, as it suggests that balance training not only improves dynamic balance, but may also improve speed.

The only version of the test that did not reveal noteworthy improvements involved randomizing the order of the direction in which the working leg was reached. This was an unexpected and interesting finding, however it could be explained by predictive balance control. Predictive balance relies on anticipatory postural adjustments, which can be accounted for by learned movements.<sup>9</sup> The dancers in this study were classical ballet students. It could be argued that sequences within a ballet class can be predictable; for example, if you were to ask a ballet dancer or teacher, “What comes next: coupé, chassé, pas de bourrée, glissade...?”, you would anticipate the answer to be “jeté.” The mSEBT followed a predictable en dehors (clockwise if using the right leg as the working leg) and en dedans (counter-clockwise) direction. When the direction of the working leg was randomized, all of the dances within the study struggled. This is useful information for dance educators as it could suggest that choreographing less predictable sequences within a dance class could further challenge balance mechanisms and ultimately improve dance performance.

In summary, the results from this study indicate that eyes-closed training can improve the balance abilities of elite female pre-professional ballet dancers. These results imply that closing the eyes during dance training is an effective way to stimulate a shift from visual to proprioceptive dependency for balance control, thereby improving balance regardless of visual conditions in the surrounding environment, and potentially reducing the risk of injury. It

is hoped that these findings may encourage dance educators and practitioners to incorporate eyes-closed training into dance practice.

## References

1. Golomer E, Crémieux J, Dupui P, Isableu B, Ohlmann T. Visual contribution to self-induced body sway frequencies and visual perception of male professional dancers. *Neurosci Lett.* 1999;267:189-92.
2. Golomer E, Dupui P. Spectral analysis of adult dancers' sways: sex and inter-action vision-proprioception. *Int J Neurosci.* 2000;105:15-26.
3. Simmons RW. Sensory organization determinants of postural stability in trained ballet dancers. *Int J Neurosci.* 2005;115:87-97.
4. Hugel F, Cadopi M, Kohler F, Perrin PH. Postural control of ballet dancers: A specific use of visual input for artistic purposes. *Int J Sports Med.* 1999;20:86-92.
5. Redding E, Weller P, Ehrenberg S, Irvine S, Quin E, Rafferty S, Wyon M, Cox C. The development of a high intensity dance performance fitness test. *J Dance Med Sci.* 2009;13(1):3-9.
6. Wyon M, Redding E, Abt G, Head A, Sharp NC. Development, reliability, and validity of a dance specific aerobic fitness test (DAFT). *J Dance Med Sci.* 2003;7(3):80-4.
7. Batson G. Validating a dance-specific screening test for balance: preliminary results from multisite testing. *Med Probl Perform Art.* 2010;25(3):110-15.
8. Huxham FE, Goldie PA, Patla AE. Theoretical considerations in balance assessment. *Aust J Physiother.* 2001;47:89-100.
9. Willardson JM. The effectiveness of resistance exercises performed on unstable equipment. *Strength Cond J.* 2004;26(5):70-4.