

## The Gap Between Research and Pedagogy: Continuing the Discussion

In June 2013, Dr. Ralph Manchester wrote an editorial for *Medical Problems of Performing Artists* examining the following question presented to him in a letter to the editor: Why haven't we used the scientific method to determine optimal piano technique? The article in this month's issue entitled "Exploring active and passive contributors to turnout in dancers and non-dancers" by Sutton-Traina et al. examines various possible contributors to turnout in dancers, and which factors may be the greatest predictors of the dancer's standing turnout. What stands out within the reported data is the recognition that professional dancers as a whole do not approach the 180° of turnout that continues to be the icon of the ideal classical dancer. And so I pose the question: Why haven't we used the scientific method to determine optimal dance technique?

As Manchester noted about classical music, the tradition of teaching concert (or theatrical) dance is far older than the research and medical treatment of dancers. Early ballet dates back to the 1600s, whereas dance science and dance medicine have only been relying on scientific information about dancers since the 1960s and 70s. Thus, the pedagogical methods in training dancers are deeply entrenched in tradition, and creating shifts in set protocols is never simple. However, other complexities exist to this question, and to examine some of the more subtle factors, a definition of technique must first be discussed.

*Technique* is defined in the Merriam-Webster Dictionary as "the manner in which technical details are treated (as by a writer) or basic physi-

cal movements are used (as by a dancer); *also*: ability to treat such details or use such movements <good piano *technique*>." Other definitions for dance technique include the idea of the ability to execute the movements and vocabulary of various dance forms effectively and in what would be considered an aesthetically pleasing manner, and medical practitioners and some dance educators would claim that a component of good technique is that it prevents injury. At the heart of these definitions lies perhaps one of the profound contradictions that dance educators must face, and medical practitioners need to understand, in order to deal successfully with dancers. What happens when efficiency and injury prevention collide with aesthetics?

While several aesthetic components of dance might actually contribute to injury, or at least to more difficulty in achieving the necessary skill levels (hypermobility and the desire for extreme thinness are two examples), the focus of this editorial is on the issue of turnout. There are literally hundreds of dance articles and books that focus on turnout. Some discuss how to measure it, others consider how to train and develop it, and still others focus on the injuries caused by improper use of turnout. The central idea in looking at improper use of turnout is called "forcing turnout," i.e., arriving at a position of the feet that surpasses what can be achieved through hip external rotation and the anatomical contributions at the knee and foot/ankle complex. In stance that uses these components safely, the line of gravity falls through a vertical plumbline in the spine, through the

center of the knee joint whether parallel or turned out, and the weight is distributed evenly through the foot. In forced turnout, the pelvis is often in anterior pelvic tilt, the knee is torqued so that there are twisting forces on the internal knee ligaments, and the feet are often pronated so that the weight falls to the medial edge of the foot. Many of the articles examining improper use of turnout and injury incidence in dancers universally agree that forced turnout contributes to injury.<sup>1-8</sup>

Since the desire for 180° of turnout has been prevalent for so long, one of the overriding questions for dance educators has been whether or not turnout can be altered at the structural level (bone and ligament) and at what age. For a long time, it was believed that the anatomical/structural components of turnout could be increased before puberty through a variety of mechanisms, usually involving aggressive stretching techniques. However, Garrick and Requa<sup>4</sup> discussed the issue of forcing turnout and its relationship to injury, with a particular focus on the young dancer. They were two of the earliest doctors to suggest that the basic anatomical limits to turnout (ligament and bone) cannot be significantly altered at any age, even pre-puberty. Any development of turnout must come from changes in strength and flexibility to muscle tissue and enhanced motor control. This question of the degree to which one's structural limits to turnout can be altered is still an unresolved issue of debate.

Both forced turnout and poor technical control of turnout in dynamic movement seem to be contributing factors to injury. Negus et

al.<sup>1</sup> found that the number and severity of nontraumatic injuries were not associated with the amount of passive range of motion (ROM) in external rotation at the hip, but were associated with reduced functional or dynamic turnout (i.e., turnout that can be achieved muscularly during movement or activity). Coplan<sup>2</sup> used self-reporting of injury in ballet dancers and found a correlation between rate of injury and forced turnout. This issue is not limited to ballet dancers. Cimelli and Curran<sup>3</sup> found excessive foot pronation related to turnout in contemporary dancers. Scioscia et al.<sup>5</sup> stated that the compensations involved in forced turnout, which they call “screwing the knees,” put torque on the knees and thereby increase the risk of injuries such as medial meniscal ligament damage and patellofemoral injuries. In perhaps one of the largest studies, Steinberg et al.<sup>6</sup> examined 1,359 female dancers and concluded that years of stretching in an attempt to increase ROM for turnout can lead to a wide range of lower extremity injuries due to the resulting ligamentous laxity and instability of the joint. Teitz<sup>7</sup> described some of the compensations used by dancers to achieve turnout at the feet that exceeds hip rotation, and claimed that they can result in patellofemoral pain syndrome due to excessive compression forces at the knee. And as far back as 1989, Watkins et al.<sup>8</sup> were describing the forcing mechanisms at the foot/ankle complex in dancers, especially the youngest (<13 years).

It is understandable, given the nature of youth and its optimism, that dancers would tend to minimize warnings of injury in relation to their habitual patterns. What is perhaps a more intriguing question is why dancers will continue to use forced turnout when they realize that forcing turnout and poor use of turnout also negatively affect skill levels. Balancing becomes more difficult, jumping can be negatively affected, and fatigue can set in more quickly due to the excessive muscle tension used to support forced turnout. And yet the practice continues. I cannot recall ever hearing a basketball player state that he would sacrifice making baskets as long as he looked beautiful in mid-air. And therein lies the heart of the matter: many dancers think of perfect 5th position, or 180° of turnout, as the ultimate in beauty, and a failure to achieve this goal is simply less attractive.

It should be noted at this point that changes have occurred at all levels of dance training with respect to turnout and the practice of encouraging and allowing forcing compensations. From the local studios, to the colleges and universities, to the professional training institutions, attitudes and teaching methodologies have begun to shift their focus towards efficiency and health, and away from absolute standards of acceptable “technique” that encourage forcing the body into unrealistic positions, regardless of the consequences. I certainly hope to see this trend continue and encourage the researchers and medical practitioners

to continue providing support through evidence of the benefits of sound practice.

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### A.B.M. (BONI) RIETVELD APPOINTED OFFICER IN THE ORDER OF ORANGE-NASSAU

On Saturday, March 28, 2015, during the recent NVDMG symposium in Rotterdam, Dr. Boni Rietveld, founder of the Medical Centre for Dancers and Musicians at the MCH and President of the NVDMG, received the royal honor of Officer in the Order of Orange-Nassau, as presented by Mayor Emmens-Knol. The Order of Orange-Nassau is a Dutch chivalric order, established by the Queen regent Emma of the Netherlands in 1892, and open to “everyone who has earned special merits for society.”

