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The Journal of Rheumatology is a monthly international serial edited by Earl D. Silverman featuring research articles on clinical subjects from scientists working in rheumatology and related fields.
Rheumatological Aspects of Dance

The care of dancers represents perhaps the greatest challenge in occupational medicine. Training and demands of the profession are intense, every bit as demanding as the professional athlete. The control and coordination of body parts required is almost as refined as that needed in the hand and arms in a professional musician. The choreographic instructions are likely to be as precise as a musical score. However, unlike athletes, dancers are denied the option of performing on their own terms at their own physiological and anatomical aptitude. Just as the instrumentalist is driven by the composition’s requirements, so the dancer is driven by the requirements of the choreographer and the speed at which the music is played, either in recording or by the conductor of the orchestra. In addition, dancers face problems of body build, contour, and weight, sometimes leading to anorexia, that are not normally seen in musicians.

This issue includes the publication of a major article in this “niche” area, almost 20 years since the last major publication, which was also in the pages of The Journal. The authors have studied joint laxity and the influence of joint hypermobility syndrome on both students and professional ballet dancers in the Royal Ballet Company and its associated schools, the principal and most respected ballet company in the United Kingdom. The report breaks new ground by comparing both male and female ballet dancers, at various levels of performance and training, using more sophisticated methodology in the assessment of joint hypermobility in this elite group of performers of international repute. The authors have excellent credentials for their work. One of the physicians is a co-author of the 1972 report that first discussed whether joint hypermobility might be an asset or liability in dancers. One of 2 physiotherapists involved, both active in the treatment of dance injury, was also herself a dancer and contributed to the seminal textbook Dance Technique and Injury Prevention.

The authors use the 1973 Beighton scoring system (adapted from the 1964 Carter and Wilkinson scoring system) and the more detailed Contompasis scoring system to compare students from the Royal Ballet School and professional dancers from the Royal Ballet Company with control groups of teenagers and adults from a local secondary school and the Royal Opera House, respectively, none of the controls ever having received ballet training in the past. Although this group of controls displayed a slightly higher degree of hypermobility than might have been expected from the literature on such a population, the dancers displayed more hypermobility at all levels, particularly the males (as might have been predicted). The more interesting feature was that hypermobility was found to decline, both from student to professional standard and also within the ballet company itself, the more accomplished principals displaying less hypermobility than the others. It was also noted that arthralgia was common, more so in males than females, but in the females the pain was most frequently reported by hypermobile dancers, unlike the males.

The study raises some interesting points about methodology. It was perhaps reasonable not to depend for analysis upon the Brighton revised diagnostic criteria for benign joint hypermobility syndrome since these include several clinical features as well as the range of movement of the joint, and may therefore not be the most suitable for epidemiological surveys. The Beighton criteria were preferred over the earlier Carter and Wilkinson system, even though this includes the ankle joint, a joint that might have been of particular interest in this group of performers. The Contompasis scoring system is the most comprehensive (although time-consuming) of all. Devices that are highly sensitive for the measurement of joint laxity at a single joint, for example the Leeds hyperextensometer, would have added little to this study, although it would have been of interest to additionally assess proprioception, which may be impaired in hypermobility, particularly among those that have experienced injuries.

The relative reduction in joint laxity associated with training at the highest level comes as a surprise. It is presumed that this is not artefactual. The range of movement of a dancer before and after “warm-up” can vary considerably. Some remain naturally supple in spite of warm-up;

See Joint laxity and the benign joint hypermobility syndrome in student and professional ballet dancers, page 173
others require a warm-up of up to one hour to gain their full flexibility. These differences are probably attributable to inherited collagen structure, with warm-up least required in those that have inherited the most supple collagen. Errors can be introduced if elite performers are measured “cold,” often the only time they are available, when junior performers are dragged out of a rehearsal class, as a result of which they are “warm.” Here these precautions were observed, allowing the authors to speculate either that the most hyper lax are lost through injury along the way or that the greater coordination of muscular control required at an elite level of performance reduces laxity. The undoubted reduction in laxity with aging (as crosslinks form between collagen strands) is unlikely to have influenced the results in these relatively young populations.

The possible association of hypermobility with injury has attracted authors for many years\textsuperscript{10}. This association is recognized in other areas of sports medicine; however, precise quantification remains difficult because the magnitude of the applied injuring force is every bit as important as the laxity of the joint in determining whether injury occurs or is prevented. The inherent joint laxity can also strongly influence the speed to recovery.

The novel comparison of the sexes in this issue’s article also poses as many questions as it answers. The hormonal balance and magnitude in any one individual is likely to be an important factor: androgens important in enhancing muscle growth and bulk, which will protect from excessive joint hypermobility, and progestogens important in relaxing collagen. The joints of female musicians often seem more prone to injury towards the end of the second half of the menstrual cycle when progestogens dominate, a feature that is not observed in males. The effect of pregnancy as well as the number of children is also of interest, since this has been shown to influence laxity\textsuperscript{11}.

Greater insight into the anatomy and physiology of dancers is likely to pay dividends in injury prevention. A study that assessed the true prevalence of dance related injuries in 188 professional ballet or modern dancers in the United Kingdom\textsuperscript{12} identified that 84% had experienced an injury that affected their dancing at some time on the basis of a circulated questionnaire. Dancers are invariably reliable witnesses, and among the factors they considered to place them at risk were tiredness, dancing on unsuitable floors, the angle or rake of the stage, the temperature of the theater, and the difficulty of the choreography. However, questionnaires only convey limited information and fail to address the individual physique of each dancer and the extent to which this might be protective or place them at risk.

The importance of individual variation becomes even greater in contemporary dance. Dancers recruited to ballet companies are invariably selected for size and shape, each company keeping the corps de ballet uniform in appearance. Contemporary dance allows much freer rein and is much more strongly influenced by ethnic dance styles, attracting exponents of varying size, shape, and race. The affiliation of the Northern School of Contemporary Dance with the University of Leeds some 10 years ago has provided our own performing arts clinic with valuable insights into this area. If ballet places strain on the extremities, particularly the feet and ankles, contemporary dance is based much more on spinal movement, where rotation predominates, a requirement not often seen in classical ballet, which relies more on flexion and extension of the spine. The contemporary training frequently unmasks small degrees of inherited scoliosis, a rotational twist causing particular problems of back pain unless remedied by careful attention to technique\textsuperscript{13}. It is also our impression that students who have trained extensively in ballet as children find it hard to cross the divide to contemporary dance with its many more varied demands.

Further study of such groups of dancers, always “body aware” and often having basic training in anatomy and physiology, as well as their experience, will continue to provide valuable insight into the many more mundane overuse rheumatological problems encountered in less exotic workplaces.

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