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The Development of a Musculoskeletal Profiling Tool to Guide Entry into Classical Ballet

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In classical ballet, musicality, expressiveness and technique show artistry but dancers are selected importantly, for their physical attributes. Young dancers are selected for their potential, into vocational schools based on their talent and physical characteristics (Walker, Nordin-Bates and Redding, 2010). They are selected by audition and according to the institution, with differing degrees of physical scrutiny. We know that dancers are selected into professional companies for many qualities – the technical standard they have achieved, dramatic talent and possibly their already established reputations as well as their particular physiques. They are the result of a relentless and highly selective process (Haight, 1998). Haight claims that while most athletes are selected for their genetically endowed tendency to perform well in a certain event or category, ballet dancers are selected overwhelmingly for aesthetic reasons. Physique appears to take precedence. We can also assume that dancers in professional companies set the trend for selection into vocational schools because there is nothing reported in the literature.

The subject of the first part of this study focussed on the physical attributes desired in the elite ballet dancer today, in spite of being only a part of what goes into being dancer. How vital a part the physique has played in the past and plays today, is important to determine from experts. Particular physical attributes are preferred, and this has implications for both the artistic team and the healthcare team in the selection of young dancers into the profession.

A three-round Delphi Survey was used to arrive at consensus as to the most selected physical attributes in professional ballet. The artistic panel members were international and consisted of Artistic Directors of professional companies and vocational schools, teachers, choreographers and principal dancers. The healthcare panel members were therapists, doctors and exercise specialists.

In the first round the artistic panel clearly prioritised the aesthetic attributes with physical proportions and flexibility of hip, foot and ankle taking precedence, often not considering the attributes required for robustness and resilience of the physique. The healthcare panel

favoured strength, control and stamina – the attributes that protect from injury and enhance performance. The prioritising of flexibility by both groups is what is seen on professional stages today, but otherwise the artistic members selected aesthetics twice as highly as the healthcare members who appeared to see the dancer through a different prism. This has highlighted the lack of understanding between these two groups who view the development of the dancer from separate standpoints.

The second part of the study, based on the consensus from the Delphi exercise, used the Nominal Group Technique to examine proposed tests chosen to contribute to a dancer profile, to be used at vocational school audition. A group of experts, already using audition screening, was consulted and a balanced selection of range of movement tests and functional movement control tests, was agreed upon.

In the third part of the study seven range of movement (ROM) and seven functional movement control (FMC) tests were trialled on eighteen pre-professional ballet students (16 – 17 years) from different schools, who had newly entered training. ROM tests were used because of the emphasis on flexibility in the Delphi Survey results – particularly hip external rotation, foot and ankle plantarflexion. FMC tests were chosen because of the stress on control in the survey and to support the ROM tests. Three experienced physiotherapists conducted a repeated assessment, and reliability studies were carried out. Intra- and inter-rater reliability was calculated. Tests which have been examined for reliability can be used with confidence, by the specialist clinician.

The ROM tests were analysed using Intraclass Correlation Coefficient (ICC), 95% Confidence Interval and Strength of Agreement – an analysis of continuous data. The Alpha Coefficient was also used on the data divided into categories - ordinal data, with Strength of Agreement. The intra-rater reliability for all tests was high and acceptable using both ICC and Alpha Coefficients. The inter-rater reliability was high using categories and the Alpha Coefficient, but using ICC highlighted those tests requiring further precision and trialling.

Although functional movement control tests are frequently used in assessing patients, it is difficult to achieve good reliability from visual information (Luomajoki et al., 2007; Krosshaug et al., 2007; Eastlac et al., 1991). The intra-rater reliability of the FMC tests in this study was substantial to excellent. However, the inter-rater reliability was low for the ballet technique

moves, indicating that including those in this specialised profile, requires better rater proficiency and a thorough understanding of basic biomechanics in ballet moves. This may highlight the fact that physiotherapists employed in dance require further training in order to understand the specific demands on dancers, technically and biomechanically. Sahrmann, (2014) emphasised that clinicians needed additional skills in the observation of movement to optimize and restore function. To be able to identify correct and flawed biomechanics is understood to be the physiotherapist's expertise in whichever specialty they work.

Standardised, reliable tests are recommended to capture each physique and its particular combination of attributes, including spine, hip, foot and ankle. In doing so, a comprehensive profile is developed for each audition participant to support the audition panel selection. Injury detracts from training time which is needed to build technique and performance necessary to compete in a crowded market, for few professional positions. Therefore, careful selection is required at audition before commitment (of young aspirants, parents, teachers, schools) to avoid attrition in ballet schools due to injury.

This is the first ballet-specific musculoskeletal profiling tool, tested for reliability, to be proposed for use at vocational school auditions for 16-year-olds. This musculoskeletal profile offers a brief global view of joint range and movement strategy. Any joint restriction or aberrant patterning may inform on potential injury risk considering the intensity of any pre-professional dance training programme.

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