FITNESS is linked to artistry in dance

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Company: Springs Dance Company
Work: *The Selfish Giant*
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Over the last 25 years exercise science has been studying dance from biological, psychological and sociological perspectives rather than a primarily artistic one. The early studies by Cohen et al [1-3] and Schantz and Astrand [4] noted that ballet had a greater emphasis on anaerobic fitness and that the dancers' aerobic fitness levels were similar to sedentary or moderately trained individuals. Later research on contemporary dance appeared to tell a similar story though contemporary dancers had slightly greater aerobic fitness [5-8]. The two *Fit to Dance* reports[9, 10] also noted that dancers perceived fatigue as one of the main causes of injury. These findings should not be a surprise as the previously mentioned research all showed dancers performing at or near their maximum physical abilities. Dance is a high skill exercise form (as opposed to low skill like running for example) that requires a very high level of co-ordination and precision which is not really seen in sport when exercising at these relative intensities. Generally, as the physical intensity increases so the intricacies of movements decrease, though dancers appeared able to rock this trend.

The next step seemed to require a closer examination of the link between physical fitness and dance artistry. Researchers at the University of Wolverhampton thought it would be interesting to see whether increased physical fitness capacities of dancers caused a similar improvement in the artistic components of dance performance. The basis of this research has been shown in a number of sports, where winners have been able to perform at a lower relative workload than their rivals[11-13] i.e. they are able to achieve similar or better results with less stress experienced by their bodies. The Arts and Humanities Research Council kindly funded the research project that focused on classical ballet and contemporary dance genres. We were very lucky to be able to use vocational dance schools and professional dance companies for this research. Research carried out on non-elite populations cannot always be generalised to elite populations as the underlying characteristics (fitness and anthropometric) may vary hugely (this is why it is very important to always examine who the participants in research projects are, as sedentary populations adapt differently to trained populations when interventions are imposed upon them).

The first study examined the physical demands of dance performance by video analysis (see also Dance UK News issue 71). Video analysis provides a gross exploration of the underlying demands of dance performance using the basic categories of exercise intensity, discrete skills, and changes in direction. The exercise intensity category ranges between 'rest' and 'very hard' (participant is undergoing very hard work e.g. run pace, static holds above shoulder height, multiple high jumps landing on one leg), whilst discrete skills includes activities such as lifts and jumps and the latter category, changes in direction, focuses on acute changes in direction and movement to and from the floor. The data from 48 ballet and 45 contemporary performances indicated that the two genres are as significantly different in the underlying physical demands placed on their performers as the artistic aspects of the choreography.[14, 15] Ballet was characterised by longer periods at 'rest' and at 'high' to 'very high' exercise intensities, whilst contemporary dance featured more continuous moderate exercise intensities. These differences have implications on the energy systems utilised during performance with ballet potentially stressing the anaerobic system more than contemporary dance. Ballet also noted higher rates in discrete skills for jumps (5 jumps.min-1) and lifts (2 lifts.min-1) than contemporary dance.

The next study examined the relationship between a wide range of physical fitness parameters and artistic ability (see also Dance UK News issue 72). To assess the latter, each participant had to dance a set solo (ballet or contemporary) which was then marked by two experienced dance examiners for each genre. The participants then underwent a battery of fitness tests including anthropometric measurements, aerobic fitness, power, muscular endurance and flexibility, following the guidelines set out by the British Association of Sport and Exercise Science.[16] We developed a new ballet specific aerobic test that complemented an already developed contemporary specific aerobic test (DAFT). Within the limitations of the chosen solos, the physical fitness attributes that best predicted artistic competency in contemporary dance were upper body muscular endurance and lower body power (jumps)[17]; whilst in ballet, jump height and active range of movement (développé) were the best indicators of artistic competence. The limitation of the study was that the relationship between the fitness attributes and dance was specific to these two dance pieces and can't truly be generalised to other choreography.

The final study used professional dancers and final year vocational school performance group dancers. Again each group (ballet and contemporary) performed a solo-piece this time before and after a six week training period and carried out the same fitness test battery as before. Half of each cohort, the intervention group, were given the fitness training intervention and the rest acted as controls and carried out their usual daily routine. The intervention consisted of circuit and vibration training that emphasized power (upper and lower body) and flexibility as well as emphasising the aerobic system for contemporary dancers and both the anaerobic and aerobic for ballet. The intervention was just one one-hour session per week. This limited intervention was chosen as the participants were already doing on average 5-7 hours dancing a day and we speculated that more sessions were more likely to cause overtraining and also interfere with their present schedules too much. The participants' two dance solos (pre and post intervention) were randomised prior to the dance experts marking them. Results showed that all dancers who were part of the intervention group improved their artistic marks significantly more than the control groups'.[18]

So the suppositions[5, 9, 10, 19-26] that had been made of a link between dance artistry and physical fitness seem to have foundation. The information gleaned from the video analysis will allow performance and role specific interventions to be designed. The project has also shown that as long as supplemental training is focused, benefits can be achieved in a short period of time which is vital within the training and rehearsal schedules of today's dancers. ■

The project has been summarised in a two volume series
Twitchett E. *Do Increases in Physical Fitness Affect Dance Aesthetics Volume 1: Classical Ballet.* Saarbrucken, Germany: VDM Verlag Dr Muller 2010.
Angioi M. *Do Increases in Physical Fitness Affect Aesthetic Components in Dance: Volume 2: Contemporary dance.* Saarbrucken, Germany: VDM Verlag Dr. Müller 2010

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The University of Wolverhampton runs a MSc in Dance Science as well as doctoral research in dance medicine and science:

www.wlv.ac.uk

References can be found at

alturl.com/2hb24