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Comparison of Hip Range of Motion and Arch Height Index of Collegiate Female Dancers and Collegiate Females

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Background

Dance requires athleticism and an optimal degree of stiffness and compliance to maximize performance and aesthetics. There is little research published on the utility of hip range of motion (ROM) and arch height index measures (AHI) in the female dance population

Purpose

The purpose of this study was to examine the difference of objective findings on hip ROM and AHI in the female dance population compared to non-dancing females

Hypothesis

We hypothesized that the female dance population will have significantly different hip ROM and AHI than non-dancing females

Subjects

37 female college students were divided into 16 dance (height = 1.68m +/- .054 weight = 63.57kg +/- 9.16, BMI = 23.3 +/- 2.00) and 21 non-dance (height = 1.63m +/- .076 weight = 60.52kg +/- 7.69, BMI = 22.9 +/- 1.89) subgroups

Inclusion criteria: Females between the ages of 18-25 enrolled at the University of Dayton who were members of the Dance Ensemble, as well as females without formal dance training. Participants were excluded if they were medically diagnosed with a lower quarter injury within the past month

Methods

Participants were selected by convenience. Internal and external rotation (IR, ER) hip ROM was taken via digital inclinometry, and AHI measures were collected by the same evaluator



Figure 1: AHI measuring tool for analyzing AHI in sagittal plane with seated and standing position

Table 1: Hip ROM and AHI values (mean (SD))

Variable	Control	Dance	p-value
Left Hip ER	34.6 (7.1)	26.0 (5.2)	0.000
Right Hip ER	28.9 (7.6)	25.6 (6.3)	0.159
Left Hip IR	38.1 (10.6)	39.2 (6.8)	0.734
Right Hip IR	36.6 (10.9)	36.9 (8.6)	0.950
Left AHI Stiffness	0.026 (0.0090)	0.037 (0.0101)	0.002
Right AHI Stiffness	0.027 (0.0117)	0.027 (0.0169)	0.965

Figure 2: Digital inclinometry for measuring hip IR/ER ROM in prone position



Results

Data from an Independent T-test demonstrated there were no significant findings for any of the Dominant LE (DLE) values, however, Non-Dominant LE (NDLE) hip ER was found to be significantly less than the controlled population (p-value 0.000). It was also found that the NDLE foot AHI was more stiff (p-value 0.002), and rigid (p-value 0.002) in the dancers

Discussion

The results indicate that there are significant objective differences in collegiate dancers compared to the general population with left hip ER ROM and AHI. However, this data would be stronger with a larger sample population

Conclusion

This study demonstrated decreased hip ER ROM and a more rigid arch in the NDLE of collegiate female dancers compared to the general population

Clinical Relevance

Similar to professional athletes, these results indicate that there are significant physical differences in collegiate dancers compared to the general population. Stiffness and compliance characteristics in dancers may influence athletic performance and/or aesthetics. Further research is required to understand the cause and implications of these findings

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