Lower Extremity Joint Stiffness During Running in Adolescents with Autism Spectrum Disorder

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Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by a variety of physiological and behavioral characteristics. ASD affects 1 in 44 children in the United States. Running is the most common form of physical activity for girls and the second most common form for boys aged 12 to 15 years. This is consistent for autistic adolescents, who enjoy solitary activities, such as running, more than team-based sports. Autistic adolescents have reported elevated levels of fear for sustaining injury, being bullied, and fear of exclusion within their physical education classes compared to their non-autistic peers. Late adolescents undergo rapid skeletal growth leaving individuals more vulnerable to injury risk. Inadequate joint stiffness is one of several factors that may increase injury risk.

The purpose of this study was to examine ankle and knee joint stiffnesses of autistic adolescents and non-autistic matched controls at self-selected and matched running speeds.

### Results

- There were no significant interactions between groups and speeds (p=0.05) for any variable.
- Autistic adolescents had reduced knee and ankle joint stiffness (all p<0.020; Table 1).
- Running at the 3.0m/s standardized speed resulted in increased knee joint stiffness compared to self-selected (p=0.010).
- Autistic adolescents had reduced changes in knee and ankle moments (p<0.003; Table 1).
- Running at the 3.0m/s standardized speed increased knee moments over self-selected speed (p=0.004).

### Discussion

- Autistic adolescents typically display increased joint stiffness compared to controls. However, our expectation of a similar increase in joint stiffness during running was incorrect.
- Joint stiffness during running has typically been viewed as greater stiffness indicates an increase in injury risk; thus, reduced stiffness could be beneficial.
- However, decreased joint stiffness could be indicative of a less efficient running style whereby the elastic recoil is not being optimally utilized by the knee and ankle musculature.
- We cannot ignore the implications of prior training on running mechanics. We did not ascertain participants’ physical activity; however, we previously tracked physical activity engagement, finding no differences between groups in low and moderate to vigorous physical activity.

### References

1. Maenner, et al., 2021. Surveillance Summaries, 70(11); 1-16
2. Fakhouri et al., 2014. NCHS Data Brief. 141; 1-8
3. Healy et al., 2017. Autism Research. 47; 49-57
4. Stanish et al., 2015. 32(4); 302-317
5. Haegele et al., 2022. Autism. 26(1); 51-61
7. Brazier et al., 2014. Strength and Cond. 36(5); 103-122