



Disparities in Gait between Adolescent Idiopathic Scoliosis Patients and Matched Controls

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Background

Inconsistent results have been reported regarding changes in gait pattern for patients with adolescent idiopathic scoliosis (AIS) as compared to matched controls¹. The computer-assisted rehabilitation environment (CAREN; Motekforce Link, Amsterdam, the Netherlands) is an advanced treadmill-based motion capture system that in combination with Statistical Parametric Mapping (SPM) analysis allows for prolonged evaluation of the gait cycle. This study aimed to compare spatiotemporal parameters and joint angles in AIS patients with regards to matched controls.

Methods

Gait of 19 AIS patients indicated for brace treatment and 19 age and gender matched controls was measured at the CAREN system. Baseline measurements occurred after brace fitting but prior to brace treatment. Subjects walked at comfortable walking speed without wearing a brace. After a six-minute familiarization period, 250 steps were recorded. Spatiotemporal parameters, 3D pelvis angles and sagittal hip, knee and ankle angles were calculated using custom made algorithms programmed in Matlab (Mathworks V2016). Joint angles were normalized for time (gait cycle 0-100%) and SPM analysis was used to compare the groups. Results are presented as median [IQR].

Results

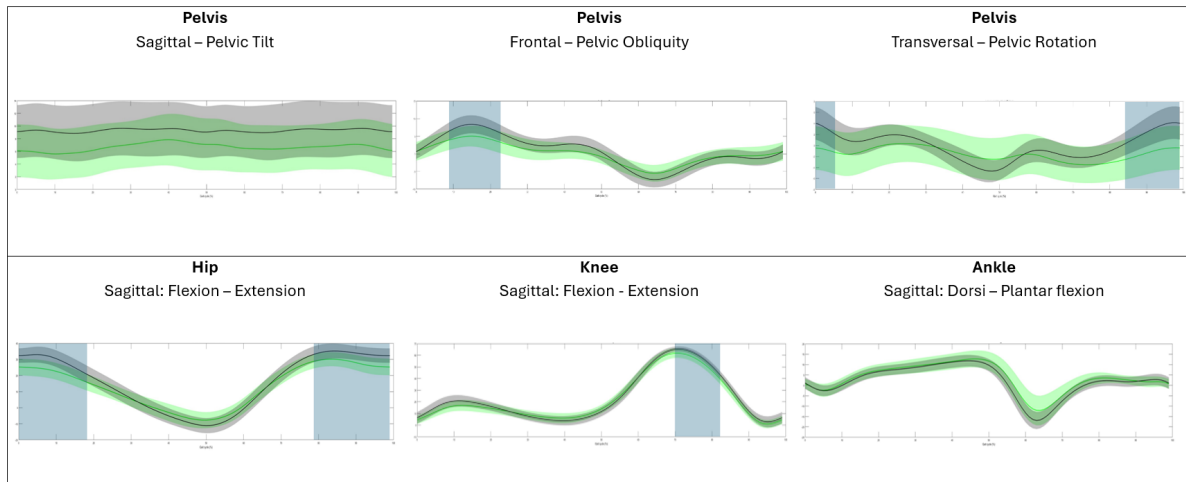
74% of the AIS patients and controls were female, having an age of respectively 15 [1.5] and 15 [7] years and a similar height of 1.70m [0.1]. AIS patients walked significantly slower (1.0m/s [0.3];1.4m/s [0.2]), with smaller stride (1.2m [0.2];1.4m [0.2]) and lower cadence (109.2 [8.7];117.4 [12.9]) compared to controls. Furthermore, hip flexion was significantly reduced in AIS patients with reduced maximal knee flexion, limited pelvic obliquity and rotation (Figure 1).

Conclusion

AIS patients prior to brace treatment walk significantly slower and with reduced range of motion suggesting a stiffer gait pattern potentially due to pain. However, differences are small ($<5^\circ$) requiring further investigation to determine clinical relevance.

Disclosures: The authors have nothing to disclose.

Figure 1: Joint angles during complete gait cycle (0-100%)



Joint angles presented as mean (SD), AIS patients (green) and matched controls (grey). Blue shaded area indicates the part of the gait cycle (%) where the joint angles significantly differ between groups.

1. Daryabor A, Arazpour M, Sharifi G, Bani MA, Aboutorabi A, Golchin N. Gait and energy consumption in adolescent idiopathic scoliosis: A literature review. *Annals of physical and rehabilitation medicine*. 2017;60(2):107-16.