

Gait And Body Motion Capture Analysis In Adolescent Idiopathic Scoliosis-Pilot Study

Shaqirin S, Azmi B, Mohd Hisam MA, Rasidah I

Orthopaedics and Traumatology Department, Medical Faculty, Universiti Kebangsaan Malaysia, Kuala Lumpur.

INTRODUCTION:

Adolescent idiopathic scoliosis (AIS) is a prevalent spinal condition that occurs in children aged 10 until skeletal maturity. Gait analysis plays a pivotal role in orthopedic, serving as a vital tool for diagnosing and managing musculoskeletal disorders. Therefore, by conducting a comparative gait analysis between AIS patients and healthy individual, researchers can advance their understanding of AIS and refine treatment approaches.

MATERIALS AND METHOD:

Prospective cross-sectional study conducted from June 2022 to December 2023 at HCTM, gait and body motion deviations were compared between AIS patients and healthy individuals of the same age, gender, height, and body weight. The study population included AIS patients aged 10 to 18 years and healthy individuals without gait abnormalities or lower limb deformities. The sample size of 18 participants (9 in each group). Clinical examinations and gait analysis were conducted using the Xsens MVN system, with data analyzed using IBM SPSS Statistics.

RESULTS:

AIS patients have significantly lower speed compared to healthy individuals (0.96 ± 0.159 VS 1.06 ± 0.12 , $p = 0.05$) and significantly wider step width than healthy individuals (17.51 ± 1.578 vs 11.33 ± 1.767 , $p < 0.05$) in spatial parameters. There is significant difference between min and max hip and knee flexion of AIS patients and healthy individuals. Additionally, AIS patients have more backwards tilt and internal rotation, longer swing phase duration (s), longer gait cycle (%), and longer step duration (s) than healthy individuals.



Figure 1: Showing sensor placement

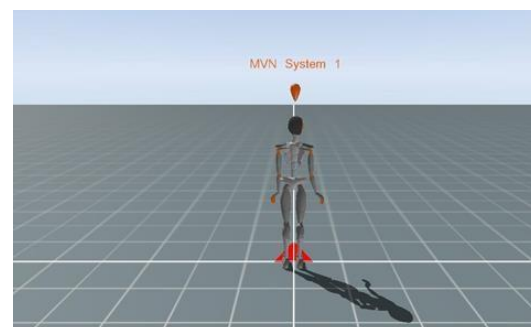


Figure 2: In Xsens MVN system

DISCUSSION:

The study examines gait characteristics in AIS patients compared to healthy individuals. AIS patients typically exhibit lower gait speed, increased step width, reduced hip and knee flexion, and altered temporal gait parameters. These differences are attributed to spinal deformity, muscle imbalances, and joint kinematic alterations.

CONCLUSION:

There are significant differences were observed in body motion between AIS patients and healthy adolescents. All these findings highlight the distinct gait patterns present in AIS patients, underscoring the importance of understanding these differences for effective diagnosis and treatment.

REFERENCES:

1. Addai, D., Zarkos, J. & Bowey, A. J. 2020. Current concepts in the diagnosis and management of adolescent idiopathic scoliosis. *Child's Nervous System*. doi:10.1007/s00381-020-04608-4