

# Evaluation of Lower Extremity Kinematics During Gait in Children with Hypermobility Ehlers-Danlos Syndrome

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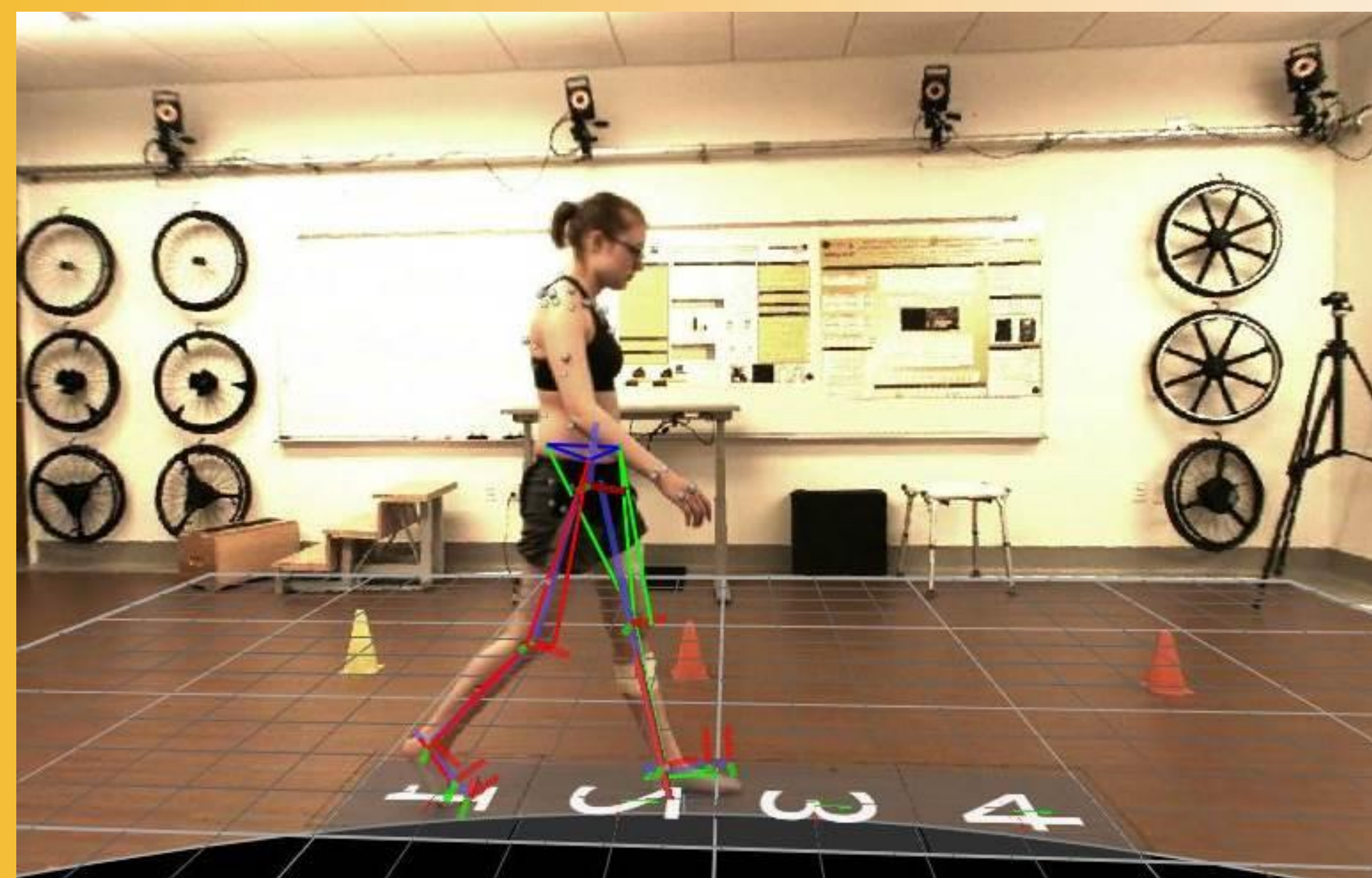
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## INTRODUCTION

- Ehlers-Danlos syndrome is a disorder that affects connective tissues [1]
  - Hypermobile Ehlers-Danlos Syndrome is one of thirteen subtypes that primarily affects skin, joints and blood vessel walls [2]
- 1 in 5000 individuals have hEDS [3]
- Symptoms include overly flexible joints that can dislocate
  - Creating joint instability leading to early-onset osteoarthritis [4]
- Gait has been researched in adults with hEDS [5]
  - Results cannot be applied to children
  - Size difference and musculoskeletal system not fully developed

**Goal: To evaluate the gait kinematics in children with hEDS**



**Figure 1:** Subject performing gait trial with Vicon lower extremity plug-in gait model [6]

## METHODS

### Data Collection (Fig. 1)

- 15 camera Vicon TS system: 120 Hz
- Task: Self-selected gait at comfortable pace

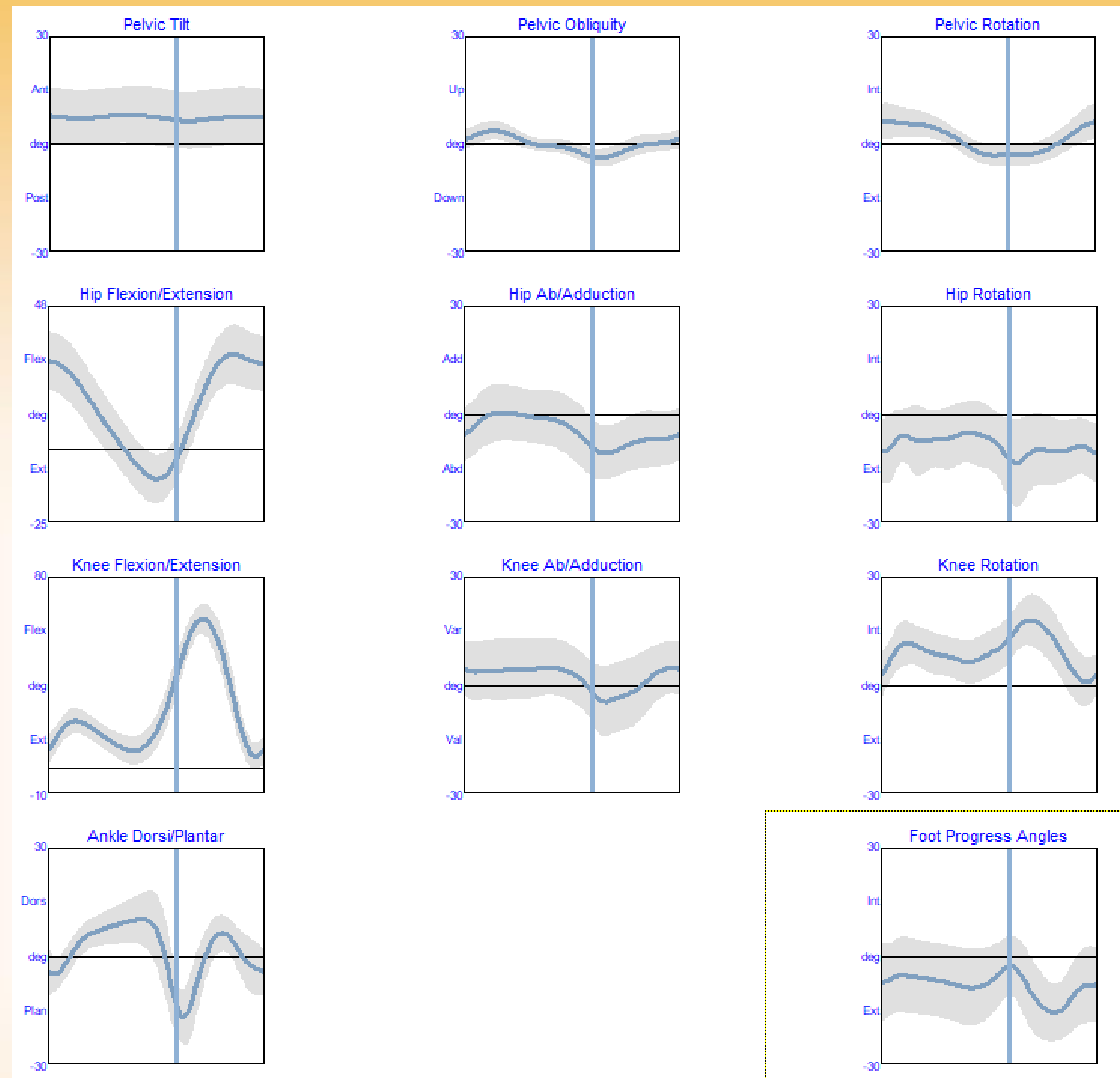
### Data Processing

- 8-11 gait cycles per subject analyzed
- Gait cycle divisions identified by:
  - Heel strike (HS) and toe off (TO)

## SUBJECT DEMOGRAPHICS

- Seven (7) children ages 9-17 with hEDS
- Mean age of 14 (2.9) years old
- Three males and four females
- Mean height 152 (17.3) cm
- Mean weight 54 (15.6) kg

## RESULTS



**Figure 3:** Average (stdev) of five trials for seven subjects of self-selected gait kinematics

## DISCUSSION

- When compared to healthy gait the group averages of children with hEDS fell within typical ranges [7,8]
- Inspection of individual subjects shows variance from typically developing children
- Investigation in a larger population is ongoing to characterize the phenotype in children with hEDS

## REFERENCES

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## CONCLUSIONS

- Children with hEDS have similar range of motion to typically developing children
- Identification of differences between those with hEDS and healthy individuals may provide insight to the development of pain and injury increase over time.
- With this knowledge physical therapists may be able to work with hEDS patients to effectively decrease their risk of early-onset osteoarthritis.

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