

How does instrumented gait analysis help decision making in the Indian setting for Cerebral palsy treatment? - Experience from a tertiary referral centre

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Background:

- Instrumented Gait Analysis – increasingly being used for assessment in Cerebral Palsy

ADVANTAGES:

- ✓ Objective
- ✓ Dynamic Assessment
- ✓ Reproducible



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Objectives:

1. Is Instrumented Gait Analysis necessary for experienced clinicians in India to assist their decision making?
2. What are the pathologies where clinician gets additional inputs from Gait Analysis?

Materials & Methods

Study Design: Retrospective Case series

Study Period: June 2018 to February 2020

Place of Study: State-of-the-art Gait Facility at AIIMS, New Delhi with 8 force plates, 12 Infra-Red cameras and 2 video cameras (BTS, Italy). Helen Hayes protocol was employed in all patients.

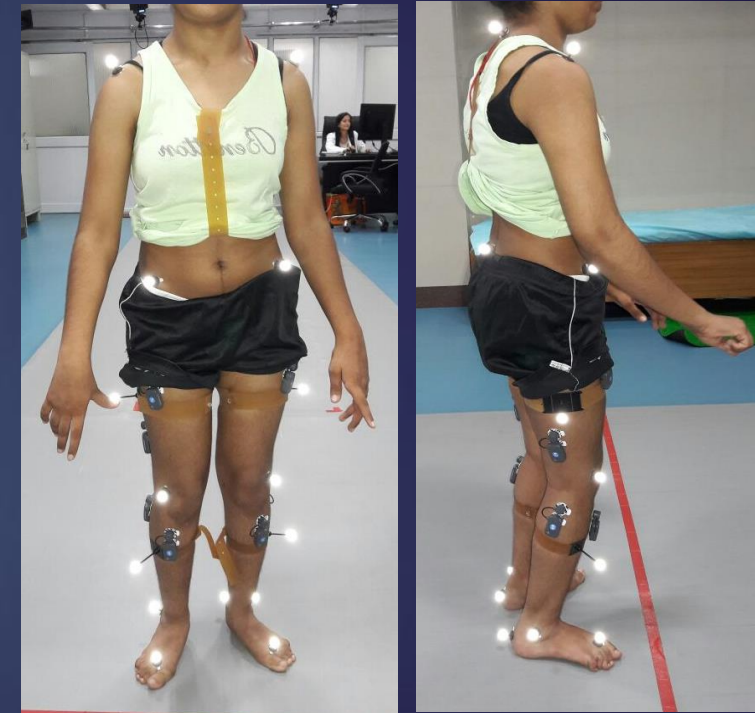


Figure 1: Demonstration of marker placement as per Helen Hayes Protocol

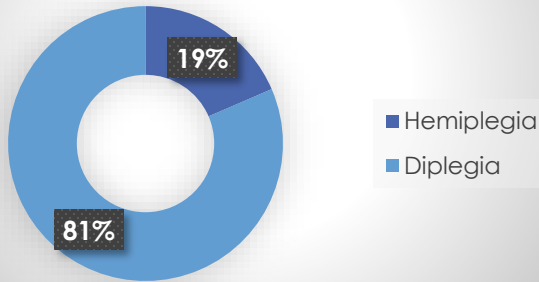
Results

Demographics:

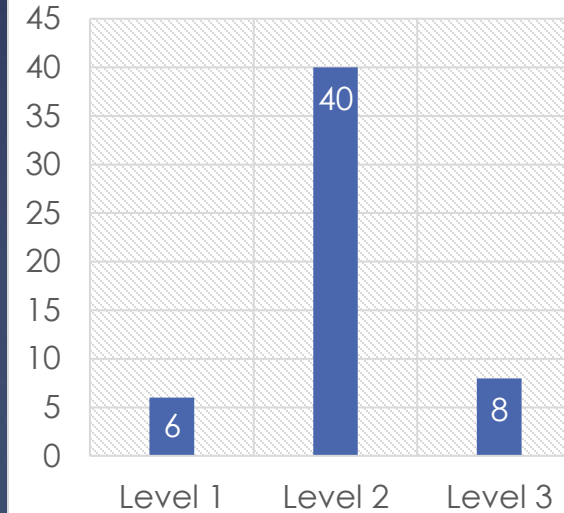
Mean Age- 12.2 years (Range 5 to 24 years)

Male: Female = 37 : 17 (Ratio= 2.18: 1)

Neurological Involvement

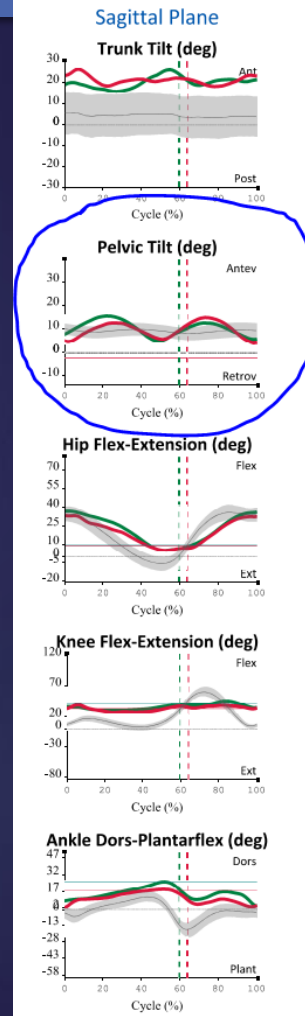


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Kinematic Analysis



- ✓ Six patients had their surgery deferred after Gait Analysis reports (all of them had Crouch gait and were planned for Hamstring release- on Gait analysis, patients found to have nearly full extension during stance)- managed with Orthotics
- ✓ Eight patients – Minimalised surgery after Gait Analysis report – Five Gastrocnemius release avoided for Apparent equinus, three Hamstring release avoided
- ✓ Six patients – Functional Psoas tightness demonstrated on Gait Analysis which was not evident on clinical examination (Thomas test) – Double Bubble in Pelvic Tilt (See Figure 2)

Gait Patterns

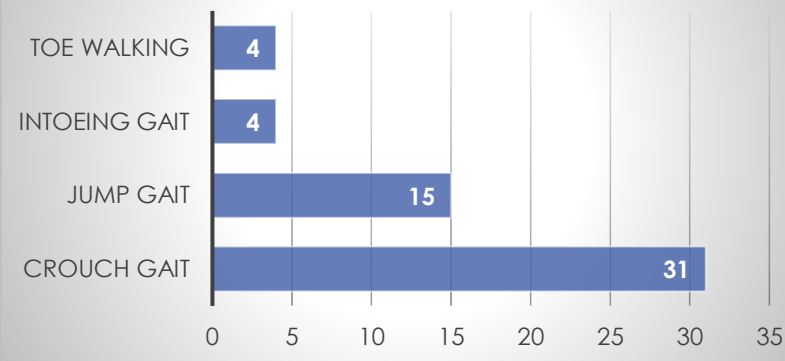


Figure 2

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CONCLUSION:

- ✓ Gait Analysis is quite useful whenever there is a disagreement between experienced clinicians
- ✓ Minimizes errors by avoiding excessive release (especially Gastrocnemius release)
- ✓ Additional findings are revealed (ex: functional Psoas tightness) which cannot be picked up on Static examination

References

1. Lofterød, Bjørn, et al. "Preoperative gait analysis has a substantial effect on orthopedic decision making in children with cerebral palsy: comparison between clinical evaluation and gait analysis in 60 patients." *Acta orthopaedica* 78.1 (2007): 74-80.
2. Gage, James R. "Gait analysis. An essential tool in the treatment of cerebral palsy." *Clinical orthopaedics and related research* 288 (1993): 126-134.
3. Khouri, N., and E. Desailly. "Contribution of clinical gait analysis to single-event multi-level surgery in children with cerebral palsy." *Orthopaedics & Traumatology: Surgery & Research* 103.1 (2017): S105-S111.
4. Narayanan, Unni G. "The role of gait analysis in the orthopaedic management of ambulatory cerebral palsy." *Current opinion in pediatrics* 19.1 (2007): 38-43.

