Journal of Foot and Ankle Research

BioMed Central

Oral presentation

Open Access

Use of the Oxford Foot Model in clinical practice

Jennifer McCahill*, Julie Stebbins and Tim Theologis

Address: Oxford Gait Laboratory, Nuffield Orthopaedic Centre, Oxford, UK

Email: Jennifer McCahill* - jennifer.mccahill@noc.anglox.nhs.uk

* Corresponding author

from 1st Congress of the International Foot & Ankle Biomechanics (i-FAB) community
Bologna, Italy. 4–6 September 2008

Published: 26 September 2008

Journal of Foot and Ankle Research 2008, **1**(Suppl 1):O28 doi:10.1186/1757-1146-1-S1-O28

This abstract is available from: http://www.jfootankleres.com/content/1/S1/O28

Introduction

The Oxford Foot Model (OFM) [1] has been used routinely in clinical practice to assess foot deformity during gait in our laboratory since 2004. Over this time, 163 patients with various pathologies have been assessed. The aim of this study was to determine the OFM's clinical relevance in defining dynamic foot deformity thereby assisting management decisions in two populations: idiopathic clubfoot and cerebral palsy/hemiplegia.

Methods

Idiopathic Clubfoot – 24 patients (7 female and 17 male, age range 6 to 24 years) have been seen – 12 bilateral, 7 right and 5 left clubfeet for a total of 36 feet. All patients were surgically treated to correct foot deformity at an early age with a posterior-medial release. Ankle range of motion and weight bearing foot posture were assessed in a standardised clinical examination (CE) and compared with foot model kinematics.

Cerebral Palsy – Hemiplegia – 70 patients (34 male and 36 female, age range 6 to 38 years) have been assessed. Six of these subjects were measured bilaterally.

Results

Idiopathic Clubfoot – The findings from the OFM were used to identify the level of foot deformity in order to specify the type of surgery required, justify the type of casting appropriate to correct foot deformity, clarify the source of foot rotation (ie tibial, hindfoot, forefoot), and

Table 1: Results of CE and OFM data

Hindfoot							
	↑ DF	↓ DF	↓ PF	Inversion	Eversion	IR	ER
CE	0	22	7	8	18	4	0
OFM	6	3	5	9	10	23	4
Forefoot							
	↓ DF	Supn (Tib)	Addn (HF)	Addn (Tib)	Abdn (HF)	Abdn (Tib)	
CE	0	6	0	25	0	0	
OFM	11	15	11	22	6	3	

Key: ↓df-inadequate dorsiflexion; ↑df-excessive dorsiflexion; ↓pf-restricted plantarflexion; IR-internal rotation; ER – external rotation; supn (Tib) – supination related to tibia; addn/abdn (HF)-adduction/abduction related to hindfoot; addn/abdn (Tib) – adduction/abduction related to tibia.

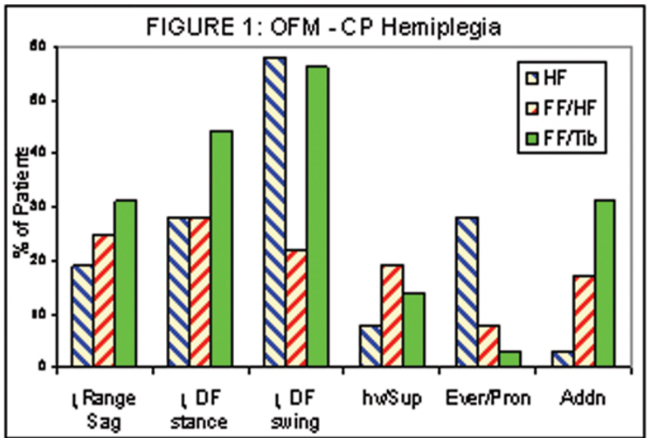

Figure 1
Oxford Foot Model Findings – CP hemiplegia. *Key*: ↓Range Sag = reduced range in sagittal plane, ↓ DF stance – reduced dorsiflexion in stance, ↓ DF swing = reduced dorsiflexion in swing, Inv/Sup = excessive inversion/supination, Ever/Pron = excessive eversion/pronation, Addn = excessive adduction. HF = hindfoot with respect to tibia, FF/HF = Forefoot with respect to hindfoot, FF/Tib = Forefoot with respect to tibia.

to corroborate clinical findings. The OFM influenced future management in 45% of the patients seen (Table 1).

The CE and OFM had best agreement in hindfoot plantarflexion and inversion, and forefoot adduction in relation to the tibia. Arch height was increased in 7 feet (cavus) and reduced in 8 feet (planus); clinically cavus was described in 16 feet and planus in 16 feet. Hindfoot internal rotation was present in 64% of feet post-surgically and was the sole cause of forefoot adduction in relation to the tibia in 33% of feet.

Cerebral Palsy – Hemiplegia

The OFM was used to assess dynamic foot motion to define indications and assess the outcome of surgical or orthotic management, Botulinum Toxin treatment and serial casting. The model was also used to monitor the progression of foot deformity, to clarify controversial findings from conventional lower limb kinematics, to determine the level of foot drop, and to corroborate clinical findings. The OFM directly influenced management in 71% of cases. Figure 1 summarises the findings of the foot model in this population.

Conclusion

Understanding the foot's dynamics during gait adds crucial information compared to the CE alone. The information gained from the OFM has become gradually more influential in the decision-making process. As with conventional gait analysis in its first steps, multi-segment foot kinematics is becoming increasingly important in clinical practice; in planning management and assessing results.

References

1. Stebbins , *et al.*: *Gait & Posture* 2006, **23(4):**401-10.