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Treatment of gait disorder in a child with mild cerebral palsy

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In this paper we present a procedure to correct the gait disorder in a 4 year old girl with mild CP and spastic double monoplegia. Time series for movement of the patient were produced in the gait lab of Wigmore clinic in Yerevan (Armenia) and the orthoses were designed based on numerical computation to optimise the movement of the patients.

Diagnosis: A comprehensive physical examination of the patient and observation of the gait were done by a team of paediatric orthopaedic surgeons, a paediatric rehabilitation physician, a rheumatologist, and a biomechanician. The cause of disorder in locomotion was diagnosed upper motor neuro disorder and CP. Distal movement of the patient is not possible and the treatment should be done by using orthosis device, by physiotherapy and stretching, (Fig. 1a), and by Tracking Gait Carpet (TGC) (Fig. 1b, 1c.)

Fig. 1. (a) Physical examination, (b) gait on tracking gait carpet (TGC) bare feet (c) with assistive devices

Gait analysis and design of orthosis devices: Analysis was done with a system consisted of 8 cameras and a force plate, 15 sensors were placed on patient's body, Stroboscopic photos during a gait with bare feet and with asistive devices from start, after 5 second and after 10 second, were taken (Fig. 2). Based on analysis of numerical results the Lower-limb orthoses designed, manufactured and used (Fig. 3).

Conclusions: The cause of locomotion disorder was diagnosed as spastic double monoplegia with mild CP. A system of orthosis together with 8 physiotherapy exercises and walking on a Tracking Gait Carpet (TGC) was used to treat locomotion disorder in a 4 year old girl suffering from mild CP. Walking disorder was corrected significantly.

The disorder in movement of hands disappeared after the patient gained stability and equilibrium of the gait.

Fig. 2. Stroboscopic photos during a gait with orthoses and shoes

Fig. 3. Photos taken during various stages of design and manufacturing of the orthoses

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