by the area under the distance curves normalised to the duration of flight. The maximum standard deviation was used as a measure of performance variability.

Results: The pelvis did not move at the beginning (about 0.5 s) of all trajectories examined, followed by a reduction of the distance to the target. At low velocities the distance reduced rapidly before it levelled out on hitting the target, as opposed to a more gradual reduction of distance at high velocities. This was quantified by the normalised areas under these curves, which increased as carpet velocity increased. Variability (SD) was initially low and constant leading to the point of maximum variability which occurred immediately after the pelvis began to move. Variability increased as the subject moved towards the target, and then decreased close to collision. A one-way repeated measures ANOVA test of the area under the curves (F1.705, 5.114 = 7.991, P < 0.05), and variability (F1.556, 4.667 = 12.164, P < 0.05) for all subjects showed significant differences. Post-hoc analysis showed that most normalised areas under the curve and variability values were greater as velocity increased.

Discussion: There is no movement towards the target during the initial “decision making” phase while the subject decides how to move the pelvis in order to drive the magic carpet towards each balloon. Variability of pelvic movement was largest during the “initial adjustments” phase. The final “minor corrections” phase was present at low velocities to allow the subject to compensate for any overcorrection. At higher velocities there was no time for minor corrections placing the emphasis on the initial adjustments phase which determines the success of the task.

References

P036
Influence of inverse dynamics on diabetic neuropathies joint kinetics estimation
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Summary: Diabetic neuropathies (DN) gait disorders are often attributed either to muscles interfering with locomotor function or to muscles being prevented from performing their proper actions. Many options are available in order to perform an analysis of gait dynamics. This study investigates the influence of the method applied to joint kinetics calculation on describing the effect of peripheral neuropathy (PN) on gait in diabetic patients.

Conclusions: The comparison among the three methods showed importance of adopting inverse dynamics in joint moment (JM) calculation. The methods presented in [1] and [2] was able to better highlight JM alterations due to PN.

Introduction: Understanding the effect of PN on DN gait plays an important role in diabetic foot prevention. Identification of the root causes of gait abnormalities is important and implies correct estimation of joint dynamics.

Patients/Materials and Methods: Kinematics, kinetics and surface EMG data of twenty subjects (10 normal and 10 DN) have been collected by means of 6 cameras BTS Sr.l. motion capture system (60–120 Hz) and surface EMG (PocketEMG, 16 channels) synchronized with 2 Bertec force plates (FP4060–10). A fullbody marker set [3] was used to collect kinematics data. JM were calculated as the vector product of the position vector of the joint centre and the collected ground reaction force, and by means of two inverse dynamics approach. In both cases [1,2] Newton-Euler formulation was applied from the feet segments to the last segment of the kinematic chain (eight rigid segments: pelvis considered separated from the trunk and L5 as a ball-and-socket, thigh, Shank, foot right and left).

Results: JM normative bands (NB) have been created (ICC > 0.75) to include a subject’s joint moment in the nb) using the data of the control group, and DN jm compared with them. Each term of the equation (1) contribution in the jm calculation was evaluated and the inertial parameters showed to play the major role. The latter showed also the larger variability among the DN subjects (Figure 1). Results on DN were discussed taking into account gait alteration evidenced by EMG.

Figure 1. DN subjects inertial moments.

Discussion: Clinical gait analysis provides a great deal of information that can aid in the selection of an appropriate treatment, but it requires appropriate calculation of joint kinetics.

References

P037
Strength outcome and progression over time following multilevel orthopaedic surgery in children with cerebral palsy
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Summary: This study investigated the interrater reliability and concurrent validity of a hand-held dynamometer in children with cerebral palsy. This assessment protocol was used to evaluate strength outcome and progression over time after multilevel orthopaedic surgery (MLS) of the lower limbs.