between those two factors can be used to set the early therapeutic programme, making rehabilitation more effective.

Table 1. The relationship between CT scan and gait classification

<table>
<thead>
<tr>
<th>Observed</th>
<th>Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forefoot</td>
<td>Flat foot</td>
</tr>
<tr>
<td>Forefoot</td>
<td>22</td>
</tr>
<tr>
<td>Flat foot</td>
<td>5</td>
</tr>
<tr>
<td>Heel</td>
<td>2</td>
</tr>
</tbody>
</table>

References


P090

Surface EMG as a diagnostic tool in diabetic neuropathy gait analysis

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Summary: The present work aimed at investigating the influence of diabetic neuropathy (DN) on electromyography (EMG) of the thigh and calf, and the correlation between EMG alteration and respectively ground reaction forces, plantar pressure and kinematics.

Conclusions: Early detection of DN may reduce the risk of ulcerations on diabetic foot patients, and help in planning prevention treatment in order to reduce ulcer formation and therefore the number of amputation.

Introduction: DN leads to nerve degeneration and reduced muscle innervations. Together with vasculopathy develops into a foot disease which may lead to callosity and ulcers.

Patients/Materials and Methods: Gait and EMG analysis were performed with a 3D fullbody and foot marker set [1] on 27 subjects [2 normal, 4 diabetics (D), 21 neuropathics (DN)]. BTS motion capture system (6 cameras, 60–120 Hz) and surface EMG (POCKETEMG, 16 channels) synchronized with 2 Bertec force plates (FP4060–10), and integrated with 2 Imago S.n.c plantar pressure systems (0.64 cm² resolution, 150 Hz) were used. Surface EMG were applied on the following muscles: peroneus longus (PL), tibialis anterior (TA), gastrocnemius (G), rectus femoris (RF) and gluteus medius (GM). From EMG has been obtained: time of muscle activation relative to gait cycle phase, delays or not activation, electrical signal intensity generated, stiffness, rms value, mean frequency. From kinetics, plantar pressure and kinematics were obtained: 3D foot subsegments forces, plantar pressure, contact surface and joint rotation angles.

Results: Major alterations were found at PL, TA, and G muscles: delay in term of activation (Figures 1, 2) or not activation, with no prevalence of side according to the prevalence of distal DN evidenced at qualitative diagnostic EMG analysis; stiffness was also observed on the above mentioned muscles. Alteration in RF and GM was found in 30% of DN patients. Delay in term of activation was observed in TA of D subjects. Whenever EMG of PL, TA and G presented delay or not activation in the proper gait cycle phase together with hyperactivation in other period of the gait cycle baropodometric analysis revealed predominant displacement of center of pressure in the medio-lateral axis both for D and DN, and hyper pressure in the metatarsal area during walking. Relatively to the same EMG anomalies, gait analysis revealed presence of supinated foot, lower flex-extension range of motion and moments at ankle joint.

Discussion: Surface EMG can be a useful tool in gait analysis of DN if associated with kinematics, kinetics and plantar pressure analysis.

References


P091

Effect of lateral wedges on lower leg muscle length and potential for exacerbating spasticity

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Summary: The effect of lateral wedges on eight lower leg muscles’ lengthening characteristics was studied in healthy subjects. The results showed a trend for most lengthening variables to increase when wearing lateral wedges.