

NEUROMUSCULAR BANDAGE AND WALKING SPEED INFLUENCE ON THE BIOMECHANICS OF THE HUMAN GAIT

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INTRODUCTION

Neuromuscular bandage is a novel, thin, and elastic tape which allows for more than 120% elongation of its original length, thereby leading to less mechanic constrains (Fu et al., 2008). Neuromuscular bandage has been appointed to positively influence sport performance and rehabilitation by improving proprioception and the muscular, lymphatic and articular systems (Kase, Wallis & Kase, 2003). However, even though neuromuscular bandage is widely used to treat lower limb injuries, research addressing its influence on human gait is scarce. Therefore the aim of this study was to analyse the plantar pressure pattern, contact time, stride rate and impact acceleration in the shank during walking with and without neuromuscular bandage placed on two muscle groups: Peroneus and Triceps surae.

METHOD

29 subjects (12 men, 17 women) participated in the study. Neuromuscular bandage was placed on the triceps surae and peroneus, and participants walked at two different speeds (V1: 0.73 m/s; V2:1.30 m/s) with and without neuromuscular bandage. The pedobarographic system Biofoot IBV® 6.0 was used to analyse plantar pressure in both feet (mean peak pressure [kPa]) in 5 foot areas (rearfoot, midfoot, forefoot, medial foot and lateral foot) and the kinematic variables of the study (contact time [s]; stride rate [steps/min]). A uni-axial accelerometer (Sportmetrics®) was taped to the anteromedial aspect of the tibia of each leg to measure the impact acceleration (G's).

RESULTS

No significant difference was observed on plantar pressure ($p>0.05$), and kinematics variables ($p>0.05$) with and without neuromuscular bandage. However, results revealed a relationship of dependence between speed and plantar pressure and kinematics parameters, especially under the rearfoot and

the medial part of the foot ($p < 0.005$). Regarding the impact acceleration, no difference was observed when walking with and without neuromuscular bandage, although the increase in speed did lead to significantly greater impact acceleration values ($p < 0.005$).

DISCUSSION

Most of the studies to date have focused on the influence of non-elastic tapes on the human gait. The main difference between these types and the neuromuscular bandage is that non-elastic tapes seem to influence the plantar pressure and gait kinematics (Vicenzino & McPoil, 2007). In this sense, the results observed in the present study suggest that application of a neuromuscular bandage on peroneus and triceps surae does not have a direct effect on the plantar pressure and impact acceleration measured at the shank of healthy individuals during walking, although both plantar pressure and acceleration were confirmed to be dependent on the speed of motion. As a result, and taking into account the findings of previous studies, one individual could benefit at a proprioceptive, lymphatic, muscular and articular level without experiencing any modification in their individual plantar pressure and impact acceleration gait pattern.

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