

Is visual feedback pertinent for gait rehabilitation? Preliminary study of plantar pressure control with visual feedback in healthy people

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Objective We present a preliminary study of plantar pressure control with visual feedback in healthy volunteers by using internal or external focus attentional focalization. The objectives are to decrease the pressure under the right heel of 70%.

Material/patients and methods Twenty healthy volunteers were randomized into 2 groups using either internal or external focus. Plantar pressures were recorded using 3 captors under each heel, on the heads of 1st and 5th metatarsals as well as under the calcanean tuberosity (Winshoe device, Medicapteurs C). Simultaneous visual feedback consisted of a graduated color scale through which each zone produced a color objective for requested alleviation. The order was different for each group, leading either to an external focus ("deforming the ground") or internal focus ("press on the heel"). Measurements of walking speed as well as the number of steps were taken using photoelectric cells. Subjects were tested in 3 steps: (i) over 20 m of normal walking, (ii) tested after an order of internal or external focus, associated to a simultaneous visual feedback, and (iii) after 3 minutes of a single order.

Results The subjects were able in every case to decrease the pressure on the heel; however, the goal of decreasing it by $70 \pm 7\%$ was achieved in only 10% to 20% of cases. There were no statistical differences across the 2 groups. We observed a retention/learning situation after the second step being able to decreased pressure even without feedback. The walking speed decreased in every case. Subjects were able to decrease pressure on the heel but the more refined objective to control this pressure was not achieved.

Discussion-conclusion We discuss the relevance of the notice order and the type of visual feedback, which might have been too complex. The absence of difference between internal focus and external focus is difficult to interpret in this setting. The next step would be to test a higher number of human volunteers, and use hearing feedback.

Keywords Plantar pressure control; Visual feedback; Attentional focalization

Disclosure of interest The authors declare that they have no competing interest.