CAN GAIT DEVIATION INDEX BE USED EFFECTIVELY FOR THE EVALUATION OF GAIT PATHOLOGY IN TOTAL HIP ARTHROPLASTY? AN EXPLORATIVE RANDOMIZED TRIAL

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Introduction: Three-dimensional (3D) produces a large volume of data, and simplifying such complex data into a single measure of patients overall gait ‘quality’ would be valuable in clinical practice. The Gait Deviation Index (GDI) has been proposed as such a measure1. The experience with GDI in osteoarthritis (OA) patients following total hip arthroplasty (THA) is unknown. The aim of our study was to use the GDI to evaluate post-operative gait quality changes in patients with two types of THA.

Methods: A total of 38 patients (11 females and 27 males, age 56 ± 5.6, BMI 27.8 ± 3.6) with unilateral end-stage primary hip OA were evaluated pre-operatively, two- and six-months after THA, using 3D gait analysis while walking at self-selected speed. Upon completion of the pre-operative assessment, the patients were randomly assigned to either resurfacing hip arthroplasty (RHA) or conventional total hip arthroplasty (THA). From the entire variability in kinematic variables across a gait cycle, rather than a small number of discrete parameters, the GDI was calculated for each limb (n=76 limbs). Data from age-matched controls (n=20) were used as reference. A multilevel regression model was employed.

Results: No interaction was observed between treatment and time (p = 0.33) or limb and time (p = 0.53). The pre-operative GDI mean value was 83.4 ± 10.9, showing patients had a moderate deviation from normative gait before surgery. After surgery, the GDI score improved by 4.9 [95CI: 2.1 to 7.9] equal to a 0.8 average increase in GDI per month of follow-up. There was no difference in GDI scores between the two groups; 1.8 [95CI: -2.8 to 6.4]. However, the GDI score for the non-operated limb was higher than the GDI score for the non-operated limb; 2.5 [95CI: 0.1 to 4.8].

Conclusions: Our results show that, THA and RHA patients recovered equally well from the respective treatments. The GDI increased significantly after THA surgery, which indicates an overall improvement in gait quality for both treatment groups. The difference between the operated and the non-operated limb showed that asymmetrical gait pattern do not disappear following THA. Further research is required to establish the clinical relevant difference for the GDI score, and to determine the association with pain and OA severity.