Gait Analysis Using a Foot-Scan in Unilateral Osteoarthritis of the Hip

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Abstract: Gait posture and rhythm are affected by varied factors including leg length discrepancy, alignment of the lower limb, joint deformity and pain. In hip osteoarthritis patients manifesting these factors, we performed a gait analysis procedure, utilizing a foot scan. The analytical parameters were the gait cycle, the weight-bearing curve of the foot sole, the trace of the center of pressure; and whether or not the outcomes of the procedure correlate with an evaluation of the hip joint function and also the leg length discrepancy was examined. There was a significant difference between the normal and hip osteoarthritis subjects in six variables analyzed in relation to the gait cycle: they were the double support time, the stance phase, the swing phase, the single support phase, double support phase, and ratio of single support time (p<0.05). Furthermore, in the hip osteoarthritis group, the values of the peak point immediately after heel strike decreased significantly on the affected side as well as on the opposite side, In comparison to the normal group, but the extent of the decrease on the latter side was milder than the former. Compared with the normal group, the starting point of the track that the load center follows shifted anteriorly but not medially. The load center later moved medially at the center of the longitudinal diameter of the sole. These findings are unrelated to the results of an evaluation of the hip joint functions. Among the patients with coxarthrosis, in comparison to those with no leg length discrepancy, those with a discrepancy of 2 cm or more showed a longer time of standing on one foot and a reduction in the ratio of this one-foot standing tendency.

Key words: Osteoarthritis of the hip, Gait analysis, Foot-scan, Evaluation of the hip joint function, Leg length discrepancy