

## Comparison of Gait Variability in Individuals with Trans-Tibial and Trans-Femoral Lower Limb Loss: A Pilot Study

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**Abstract :** Objectives and Goals: The stride-to-stride fluctuations in gait is a determinant of qualified locomotion as known as gait variability. Gait variability is an important predictive factor of fall risk and useful for monitoring the effects of therapeutic interventions and rehabilitation. Comparison of gait variability in individuals with trans-tibial lower limb loss and trans femoral lower limb loss was the aim of the study. Methods: Ten individuals with traumatic unilateral trans femoral limb loss(TF), 12 individuals with traumatic transtibial lower limb loss(TT) and 12 healthy individuals(HI) were the participants of the study. All participants were evaluated with treadmill. Gait characteristics including mean step length, step length variability, ambulation index, time on each foot of participants were evaluated with treadmill. Participants were walked at their preferred speed for six minutes. Data from 4th minutes to 6th minutes were selected for statistical analyses to eliminate learning effect. Results: There were differences between the groups in intact limb step length variation, time on each foot, ambulation index and mean age ( $p < .05$ ) according to the Kruskal Wallis Test. Pairwise analyses showed that there were differences between the TT and TF in residual limb variation ( $p=.041$ ), time on intact foot ( $p=.024$ ), time on prosthetic foot( $p=.024$ ), ambulation index( $p = .003$ ) in favor of TT group. There were differences between the TT and HI group in intact limb variation ( $p = .002$ ), time on intact foot ( $p<.001$ ), time on prosthetic foot ( $p < .001$ ), ambulation index result ( $p < .001$ ) in favor of HI group. There were differences between the TF and HI group in intact limb variation ( $p = .001$ ), time on intact foot ( $p=.01$ ) ambulation index result ( $p < .001$ ) in favor of HI group. There was difference between the groups in mean age result from HI group were younger ( $p < .05$ ). There were similarity between the groups in step lengths ( $p>.05$ ) and time of prosthesis using in individuals with lower limb loss ( $p > .05$ ). Conclusions: The pilot study provided basic data about gait stability in individuals with traumatic lower limb loss. Results of the study showed that to evaluate the gait differences between in different amputation level, long-range gait analyses methods may be useful to get more valuable information. On the other hand, similarity in step length may be resulted from effective prosthetic using or effective gait rehabilitation, in conclusion, all participants with lower limb loss were already trained. The differences between the TT and HI; TF and HI may be resulted from the age related features, therefore, age matched population in HI were recommended future studies. Increasing the number of participants and comparison of age-matched groups also recommended to generalize these result.

**Keywords :** lower limb loss, amputee, gait variability, gait analyses

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