Evaluation of military boots effects on gait using symmetry coefficients.

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Summary: The majority of reported overuse injuries among military populations affect lower extremities. Even slight gait asymmetry might influence physical performance and contribute to injuries. Improving gait symmetry during military training can help to prevent injuries of the lower limbs. We have evaluated military boot effect on gait symmetry and compared three gait symmetry coefficients while walking barefoot and with military boots.

Methods: We carried out a case-control study among sixty-six active-duty infantry soldiers at the mean age of 29.7 years (range 22-40 years), at an average service time of 5.2 years (range 1-15 years). Cases were soldiers with prior lower leg overuse injury (plantar fasciitis, Achilles tendinopathy, stress fracture, medial tibial stress, patellofemoral syndrome) during the last 6 month period (cases) and controls were free of any lower extremity overuse injuries during the same period. Participants were walking on a 5-meter long walkway while 2 Quintic cameras were recording gait. Biomechanical gait analysis was performed using Quintic v31 Biomechanics software. For gait symmetry evaluation ratio index (RI), symmetry index (SI), and gait asymmetry (GA) coefficients were calculated for stride timings during barefoot and shod conditions.

Results: Gait asymmetry was observed in both groups, see Figure 1 for details. GA and SI show the least changes; the most significant symmetry change was observed in RI values, the difference between shod and barefoot conditions was statistically significant, indicating a positive footwear effect on gait symmetry (t=-3,20(65) p=0,002).

Conclusion:

Gait analysis is a practical tool to identify asymmetries and plan injury prevention programmes. This study results showed positive military footwear effects on gait symmetry using ratio index, symmetry index, and gait asymmetry coefficient, however, only ratio index showed statistically significant symmetry improvement while walking with shoes.