Avert

Non-invasive, posturographic discernment of injured vs non-injured states

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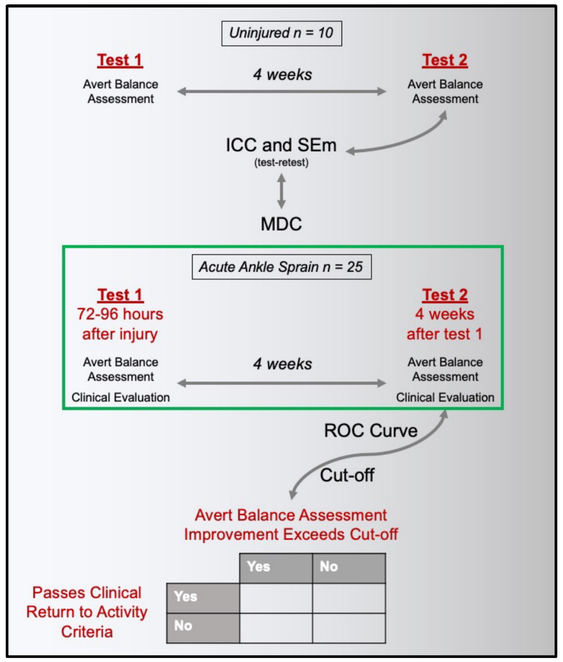
Background

Ankle sprains are the most common musculoskeletal injury and can lead to persistent, life-long symptoms in a high percentage of patients.[1,2] With an injury recurrence rate of around 40%, an initial ankle injury may decrease physical activity levels and promote the early onset of orthopedic disorders.[1,2] Measurement is important when treating any injury. A clinician must be able to evaluate patients' ability to safely meet the demands of their activity or sport. There are currently very few objective measures for measuring balance in the clinic. In this study, we propose a non-linear approach to measuring balance.

Figure 1. Study Flow Chart



Aims

1. To determine the clinical utility of existing, UNeMed-supported technology, Avert, to assess recovery from an ankle sprain.
2. To enhance the Avert software by expanding the advanced analysis of balance data

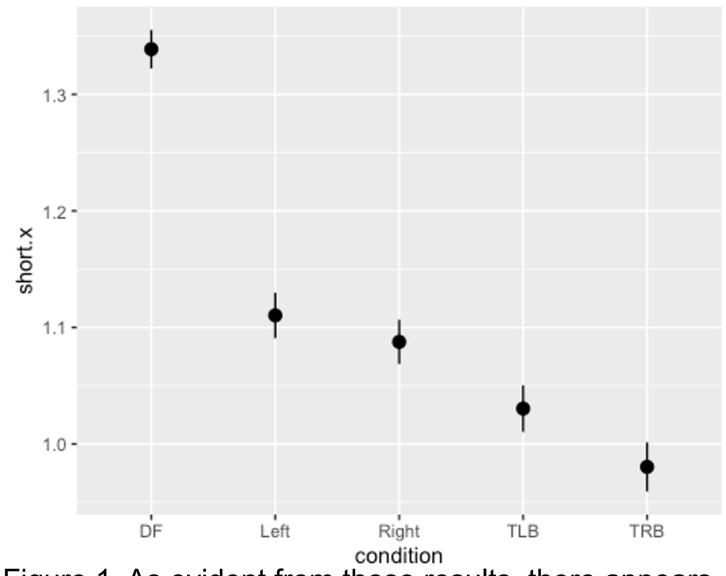


Figure 1. As evident from those results, there appears to be a relationship between standing condition and dynamics observed in COP velocity as captured by DFA. Similar results are observed for long term mediolateral scaling exponents.

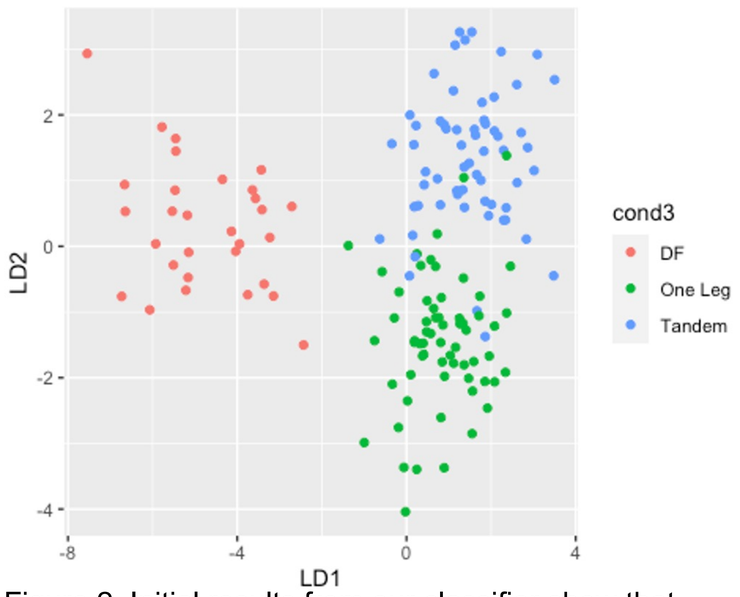


Figure 2. Initial results from our classifier show that balance conditions can be reliably detected using our custom-built algorithm.

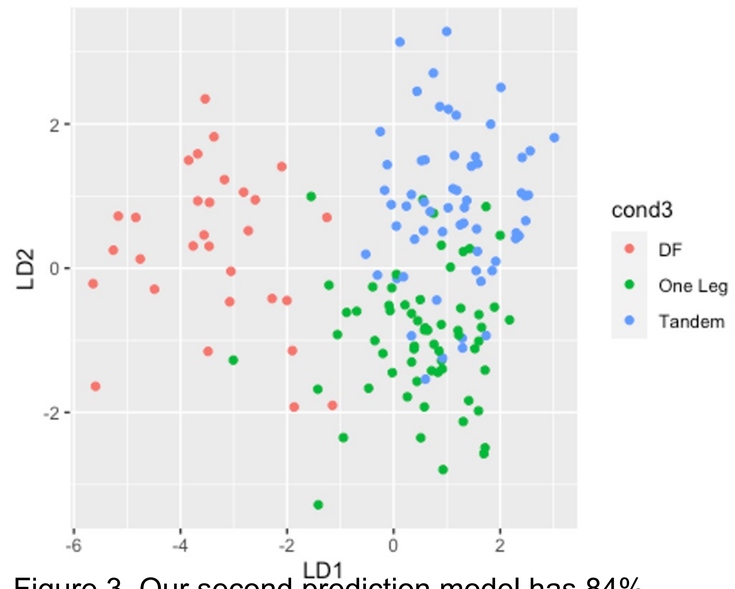


Figure 3. Our second prediction model has 84% accuracy at identifying varying balance difficulties.

Conclusions

- Our algorithm can reliably identify balance conditions within individuals that vary in difficulty.
- The next step is to validate the test-retest reliability of this algorithm using existing and new datasets.

REFERENCES

1. Kannus P, Renstrom P. Treatment for acute tears of the lateral ligaments of the ankle. Operation, cast, or early controlled mobilization. *J Bone Joint Surg.* 1991;73(2):305-312.
2. Hertel J, Corbett RO. An Updated Model of Chronic Ankle Instability. *J Athl Train.* 2019;54(6):572-588.

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