

## Correlation of Patient Wearable Outcomes to Self-Reported Patient Outcome Measures

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**Introduction/Purpose:** Patient reported outcome measures (PROMs), especially computerized adaptive testing (CAT), are the gold standard for outcome reporting in the field of orthopaedic surgery. Wearable technology (fitbit, apple watch, etc) and other health monitoring capabilities available on smart phones applications (i.e. apple health) are rapidly evolving and being considered as alternative methods of measuring outcomes in orthopaedics. This patient wearable outcome (PWO) method has yet to be directly compared to PROMs, nor evaluated as a viable option for outcome measurement in orthopaedics. The purpose of this study is to directly compare PWOs to PROMs and determine the advantages and disadvantages of using the health monitoring capabilities of smart phones as outcome measuring tools in orthopaedics.

**Methods:** This study is designed as a nonrandomized prospective cohort focused on a small subset of subjects within the field of orthopaedics. Subjects were recruited from an orthopaedic foot and ankle clinic with diagnoses of ankle sprain, plantar fasciitis, and achilles tendonitis. These conditions were chosen as these would generally represent nonoperative conditions at presentation. Subjects under 16 years of age and surgical candidates were ineligible. Standard PROM surveys, all of which have been previously validated by the AOFAS for outcome measurement were administered at enrollment and then electronically delivered at 3 and 7 weeks. Surveys utilized were the Foot and Ankle Ability Measure (FAAM), Visual Analog Scale (VAS), and PROMIS physical function, mobility and pain interference scores. An application (ActiveTrack) is installed on the subjects' smartphones to pull all past and future health data including step counts, distance traveled, etc. Statistical analysis was then performed to correlate PWO's with PROMs.

**Results:** 28 subjects consented and enrolled in the study. This has provided strong encouragement for the goals of the study. 21 patients were observed at 3 weeks with a Pearson correlation of step count of 0.6975 (95% CI: 0.3804-0.8679). 7 subjects were observed at 7 weeks with a Pearson correlation of step count of 0.8387 (95% CI: 0.2325-0.9756). We found that step counts and FAAM scores generally increased after treatment, and that the correlation between the changes was positive. The strongest signal was obtained from the FAAM ADL subscale.

**Conclusion:** This study shows that there is a correlation between a patient's self-reported function (PROMs) and their activity (PWOs). PWO data may represent a more accurate measurement of a patient's activity and therefore may be a great tool in assessing functionality before and after an intervention (be it surgical or nonoperative treatments). Further analysis of the data obtained from this prospective study over time may help establish a new standard of care for measuring patients' response to orthopaedic treatment.

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