The use of wearable electronic step counters to objectively measure ambulation in patients undergoing spine surgery

A pilot study

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Introduction

- New innovations in wearable step counting devices have allowed physicians and researchers to assess and encourage patient ambulation.

- While ambulation is associated with patient weight and functional performance, no studies to date have examined the feasibility of wearable step counting devices in the neurosurgical population.

- In this pilot study we examined the feasibility of employing this technology, the natural history of patients undergoing decompressive lumbar spine surgery for claudication in terms of ambulation, and determine if ambulation as measured objectively correlates with validated outcome measures.
Methods

- Between 9/1/2016 and 4/1/2017, 25 adult patients who underwent elective lumbar decompression surgery for neurogenic claudication were prospectively enrolled in this study.

- Patients were given an activity-tracking wearable device at their pre-operative baseline visit.

- Average step count was measured in the pre-operative period, and at 1, 2, and 3 months post operatively.

- Patients were functionally assessed using the EQ-5D and Zurich Claudication Questionnaire at all visits.
Results

- Average patient follow-up was 83.5 days post-operatively.

- Patient ambulation as assessed by stepcounts decreased at 1 month postoperatively by 33.6% (N=17), increased at 2 months postoperatively by 16.6% (N=16), and increased at 3 months postoperatively by 12.0% (N=12) each compared to baseline.

- EQ5-D and Zurich instrument scores at 3 months following surgery improved in 94.1% (Mean 13.3 vs. 6.4, p<0.001, N=17) and 88.2% (Mean 33.7 vs. 13.9, p<0.0002, N=17), respectively.

- Change in EQ-5D and Zurich scores, assessed at last follow-up, did not correlate with changes in stepcounts.
Conclusion

- Our study demonstrates that wearable step count devices can be integrated into the neurosurgical spine population to assess patient ambulation in the perioperative setting.

- This can be used as an objective measure of ambulation to reduce survey related bias in research and clinical setting.

- Furthermore, we showed that patient ambulation does increase after 1 month post operatively.