

# Does a commercial step counter provide useful feedback during a spinal cord stimulation trial?

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## Introduction

Anecdotal patient feedback and/or a patient diary are commonly used in the assessment of patients undergoing trial of spinal cord stimulation. An objective measure that allowed assessment of the benefit of the spinal cord stimulator trial would be a valuable addition to the clinical assessment. We undertook a pilot study using a commercially available step counter, and compared this to a 6 minute walk test (6MWT)<sup>1</sup> and a timed up and go (TUG)<sup>2</sup>.

## Methods

25 consecutive patients scheduled to undergo spinal cord stimulator trial were enrolled. Patients were assessed with a 6MWT and TUG, and then fitted with a Vivofit (Garmin) step counter one week prior to the neurostimulator trial. The step counter was to be used continuously for one week prior to the trial and through to the end of the trial. The 6MWT and TUG were re-assessed at the end of the stimulator trial period.

Data was analysed using Microsoft Excel 2016

## Results

23 of 25 patients were clinically deemed to have had a positive trial and proceeded to implant.

The step count showed no useful correlation in the pre and post-trial measures. Average daily steps pretrial were 4700 and at end of trial 4200 (p=0.19, t-test). No data was obtained from 5 patients – 3 patients using walking frames did not have a gait that was monitored by the device; 1 patient lost the device; 1 patient forgot to wear it.

The 6MWT also showed no useful correlation in the pre and post-trial measures. Pretrial average distance was 340 meters versus an end of trial distance of 370 meters (p=0.25 t-test).

The TUG showed a consistent change between pre and post trial measures. The TUG pre trial average time was 17seconds and the end of trial time was 14 seconds. (p<0.01, t-test).

## Results

### TUG 22 data sets

TUG	Pre	Post
Mean (seconds)	17.47909	14.735
Observations	22	22
Pearson Correlation	0.927104	
Hypothesized Mean Difference	0	
df	21	
P(T<=t) two-tail	0.000557	

### 6MWT 18 data sets

6MWT	Pre	Post
Mean (metres)	340	370.8333
Observations	18	18
Pearson Correlation	0.540819	
Hypothesized Mean Difference	0	
df	17	
P(T<=t) two-tail	0.253693	

### STEP COUNT 20 data sets

STEP COUNT	Pre	Post
Mean (number of steps)	4723.734	4241.178
Observations	20	20
Pearson Correlation	0.84325	
Hypothesized Mean Difference	0	
df	19	
P(T<=t) two-tail	0.188244	

## Discussion

An objective measure to guide decision making about the utility of spinal cord stimulation in an individual patient would be of great value to patients, clinicians and payors. Subjective and anecdotal evaluation can at times be tricky.

Both step count and 6MWT measurements are, in part, measures of endurance, and this may not be the best guide to effectiveness of analgesia in a deconditioned pain population during a short spinal cord stimulator trial.

The TUG, however, provided useful information, which may be a useful addition to the decision making process. There was a consistent and significant improvement in TUG times pre versus end of trial.

The TUG is more a measure of agility. Agility can be severely affected by pain, but is less dependent on endurance and fitness. The TUG may be worth further investigation as an assessment tool during spinal cord stimulator trials.

## Conclusions

Commercial step counters didn't help with the assessment of stimulator trials. It is likely this is related to the complexities of movement of many of these patients, and to the fact that step count measures endurance in a deconditioned group of patients.

The TUG appears worthy of further research as a measure of pain treatment outcomes.

## References

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