DIFFERENCES IN DAY-TO-DAY AND SIDE-TO-SIDE STRETCH REFLEX MAGNITUDE IN PATIENTS WITH BRAIN INJURY

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INTRODUCTION

- Due to its frequent use in research and increasing use clinically (1), the test-retest reliability of the short latency stretch reflex (SSR) of the soleus muscle (SOL) in healthy subjects and patient populations is important.
- In stroke patients in the acute/sub-acute (SA) phase, the magnitude of cortical responses are not related to the clinical status of the patients and are fluctuating from day-to-day. The responses stabilize as the patients become chronic (2).
- It is possible that the difference in magnitude between days is due to a fluctuating nervous system in the early stages following a lesion.
- Although day-to-day differences in magnitude have been assessed in the cortical responses of sub-acute patients they have not been investigated at the spinal level.

AIM

- To investigate the day-to-day and side-to-side characteristics of the SOL SSR magnitude in patients with acquired brain injury

MATERIALS AND METHODS

- Thirty one SA patients and 34 healthy controls participated in the study.
- Patients suffered stroke (71%), traumatic brain injury (19%), encephalitis (7%) and ateriovenous malformation (3%).
- Testing occurred on two sessions, 24 hours apart with subjects tested in the same position.
- Dominant and non-dominant/affected and less affected sides were tested. In healthy controls and patients, respectively
- While the subject was seated, the EMG activity of the SSR of the SOL was recorded following thirty 8°, 160°/s dorsiflexion stretches administered every 4–12s while the patient contracted the SOL to 5–15% of the MVC of the dominant/affected SOL.
- The magnitude of the SSR was defined as the area under the curve in the 20ms following the onset of the SSR and expressed as a proportion of baseline.
- The SSR magnitude was variance heterogeneous and best approximated by log-normal distribution. Therefore, the LogG analysis was applied.
- The magnitude of the response was modelled as a ratio between day 1/day 2, dominant/non-dominant and affected/less affected and compared.

RESULTS

- 9% of healthy controls and 13% of patients had different SOL SSR response magnitudes between day and 35% of healthy controls and 29% of patients had differences between side
- 2 patients had extreme differences (5 and 10 times the response magnitude) between the affected leg vs. less-affected leg.
- These extreme differences were not seen in the healthy controls or other patients
- The extreme patients were TACI stroke patients, performed worst in the 10MWT and had an Ashworth score of 3.

![Figure showing the magnitude ratios (and 95% confidence intervals) for day and side for each patient (1–31). Notice the logarithmic vertical scale. The unfilled circles with solid lines represent the magnitude of the response on a log scale for day 1/magnitude of the response on a log scale for day 2 and the filled circles with dashed lines represent the magnitude of response on a log scale for the more-affected limb/magnitude of the response on a log scale for the less-affected limb. The horizontal line represents a magnitude ratio of 1, indicating no difference in the magnitude between day and/or side. Subjects with 95% confidence intervals bisecting the horizontal line had no significant difference between side and/or day](image)

CONCLUSIONS

- A similar percentage of SA patients and healthy controls had differences in magnitude between days and side. Therefore, in general SA patients were not more unstable than healthy controls.
- This contradicts previous reports on cortical responses showing SA patients with variable response magnitudes (2).
- Despite this, two SA patients had extreme ratio differences. Although these patients were the exception, they are seen commonly enough that they should be acknowledged.
- Due to the low number of patients with extreme differences definite conclusions with regard to the type of patient that express large differences between side should be cautioned.