Detecting Minimal Detectable Change For Deep Neck Flexor Endurance Test

Adkins, Whitley F.; Hill, Summer L.; Hicks, Kelsie L.; Mehta, Saurabh P.; Profitt, Brad L.

[1]School of Physical Therapy, Marshall University, Huntington, WV 25702

Background/ Introduction

- Poor deep neck flexor endurance (DNFE) is associated with chronicity of neck pain.

- Literature supports the reliability and validity of DNFE, there has been no evidence of Minimal Detectable Change (MDC) for the DNFE to facilitate interpretation of true change in neck muscle functions.

Study Objective

This study was designed to assess MDC of DNFE at 90% and 95% confidence intervals (CI) and also examine the intra- and interrater reliability of the DNFE to provide further support to its measurement properties.
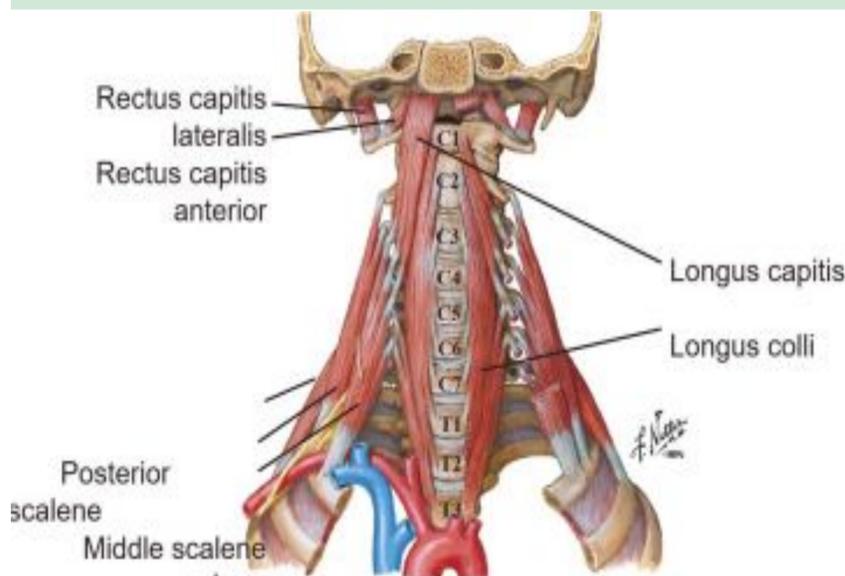
Methods

- Inclusion criteria: no history of neck pain within the past 6-months, current neck pain/discomfort of <3/10 on numeric pain rating scale, and score of ≤5/50 (10% of total possible score) on Neck Disability Index
- 50 healthy individuals
- Exclusion criteria: patients who are non English speaking, score of >5 on NDI, and score of >3 on numeric pain rating scale
- Patient reported their neck pain intensity on the numeric pain rating scale and Neck Disability Index (NDI).
- Two student raters collected data for DNFE testing time and one student rater timed and recorded data collected.
- Participants, in supine, lifted and held their neck up with chin in retraction until they could no longer hold the neck up.
- Each participant had three separate readings for DNFE test, and for each reading an average score was obtained.
- The first two readings were obtained by the same SPT (SPT1), whereas the third reading was obtained by a different SPT (SPT2) to facilitate the assessment of intrarater (between two recordings of SPT1) and interrater (between the first reading of SPT1 and the reading of SPT2) reliabilities.
- The reliability was determined by calculating the Intraclass Correlation Coefficient (ICC), where ICC values between 0.75 and 0.90 were good reliability.
- The MDC at 90% and 95% were calculated using formula $MDC_{90}=1.65*\sqrt{2}*SEM$ and $MDC_{95}=1.96*\sqrt{2}*SEM$ respectively, where SEM is the standard error of measurement for the DNFE test scores.

Results

- DNFE had good intrarater reliability
  - [ICC=0.88 (0.79-0.93, 95% CI)]
- DNFE had good interrater reliability
- [ICC=0.86 (0.75-0.92, 95% CI)]

- The calculated MDC_{90} for the DNFE was 25.97

- The calculated MDC_{95} for the DNFE was 30.85 seconds.

Discussion/Conclusion

- To our knowledge, this is one of the first reports that has provided the MDC values for the DNFE test albeit in healthy volunteers.
- This study also extends further support to the intra- and interrater reliabilities for the DNFE test.
- Future research can further validate the MDC values in individuals with neck pain and strive to obtain the minimal clinically important difference in these patients.
- This can assist clinicians in determining the effect of their exercise interventions aimed to increase DNFE.