



Effects of muscle contraction with transcutaneous electrical nerve stimulation on nonspecific chronic low back pain

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Introduction

Nonspecific chronic low back pain (NCLBP) is pain that lasts at least 12 weeks and does not have a specific cause, it is one of the most common health problems in the world. Common exercise programs for this population include strengthening/stretching of the large back and abdominal muscles. Pain signals that flow along the peripheral nerves to the spinal cord encounter nerve gates that can inhibit or facilitate the incoming nerve impulses. The traditional use of the conventional high-frequency transcutaneous electrical nerve stimulation (TENS) was based on the gate control theory of pain, suggesting that counter-stimulation of the nervous system could modify perception of the pain.

Purpose

The purpose of this study was to examine the effects when adding voluntary contraction of the trunk/core muscles during the use of a transcutaneous electrical nerve stimulation unit for chronic nonspecific postural low back pain.

Methods

- Five participants (1 male & 4 females), from the UTA Kinesiology department and some personal contacts of the principle investigator qualified for this study.
- Participants first met at the UTA exercise science research lab and performed the sit-and-reach, the toe-touch and filled out a Modified Oswestry questionnaire and took home a pain sheet to fill out during the first week to obtain a baseline (B).

Table 1: Demographic Variables

Variable	Mean	SD
Age (years)	34.60	±12.90
Height (m)	1.67	±0.07
Weight (kg)	72.64	±18.48

Methods (cont'd)

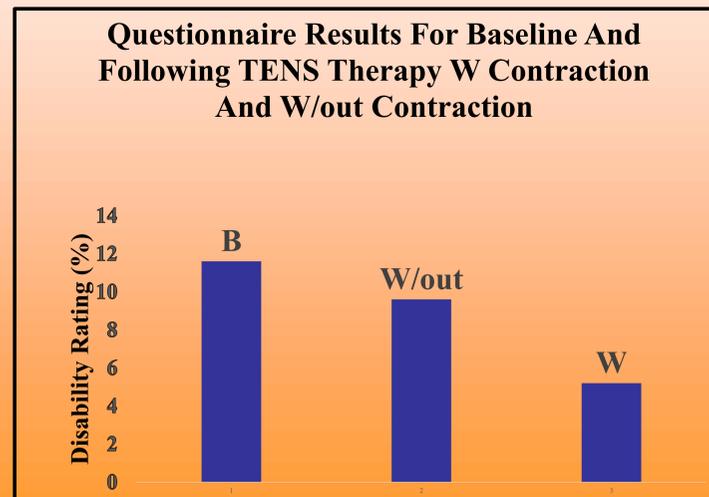
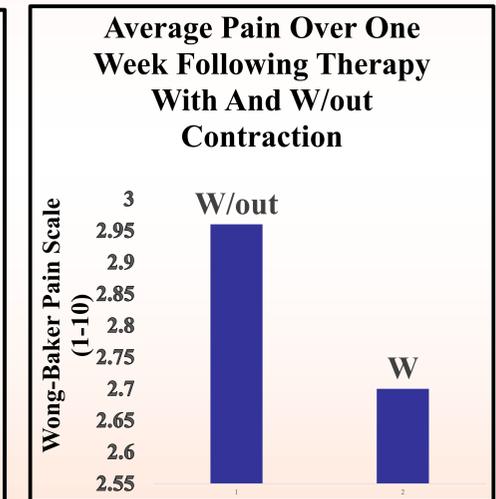
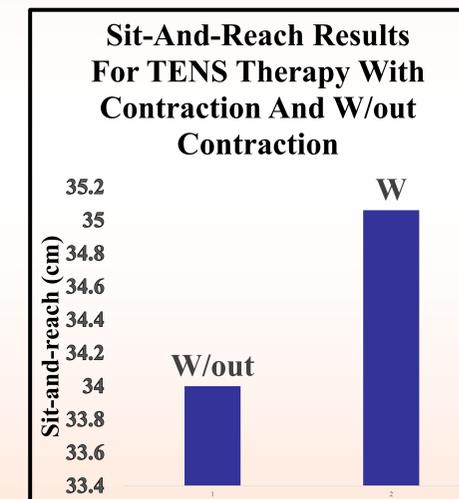
- The second week consisted of three sessions of the TENS therapy without contraction (W/out), followed by a week of filling out the pain sheet.
- Participants then came in and values were determined for all variables.
- The fourth week consisted of three sessions of the TENS therapy with contraction (W), followed by a week of filling out the pain sheet.
- Participants then came in and values were determined for all variables for the final time.

Results

- Results for toe-touch measurements showed no significant differences between the baseline, therapy with contraction, and therapy without contraction.
- Results for the Modified Oswestry questionnaire disability rating showed a significant difference ($p=0.03$) between the baseline and without contraction (B: $11.6\pm5.73\%$; W/out: $9.6\pm6.22\%$) and between the baseline and with contraction ($p=0.02$) (B: $11.6\pm5.73\%$; W: $5.2\pm5.93\%$).

Results (cont'd)

- Results for average pain over a one week period showed a significant difference ($p=0.04$) between the therapy with contraction and the therapy without contraction (W/out: 2.96 ± 1.62 ; W: 2.70 ± 1.56).
- Sit-and-reach results between the therapies with contraction and without contraction (W/out: 34.00 ± 12.90 cm; W: 35.06 ± 9.31 cm) showed a significant difference ($p=0.03$).



Conclusions

- Significant differences were found for the sit-and-reach (W & W/out), average pain over a one week period (W & W/out), and the questionnaire (B & W; B & W/out). This could have been affected by many factors outside of the study, such as an increase in exercise, the participants being more aware of posture, etc.
- This study had limitations including a small sample size, only one male participant, and a short period of time for therapy. More research should be done on adding muscle contraction to TENS therapy to aid in the pain relief of those with NCLBP.