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A Preliminary Investigation Into The Magnitude of Effect Of Two Commonly Used Lumbar Treatment Techniques On The Sympathetic Nervous System

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Background

- > 58.9% of UK Physiotherapists utilise spinal joint techniques or McKenzies's extension in Lying (EIL) as preferred treatments for LBP +/- leg pain (Foster et al, 1999)
- > However, there is no consensus regarding the efficacy of the choices of treatment.
- > Changes in SNS activity levels following spinal manual therapy have been linked to hypoalgesia & pain modulation in the cervical spine & upper limbs (Petersen et al, 1993; Vicenzino et al, 1994 & 1998; Slater et al, 1994; Sterling et al, 2001).
- > Preliminary work on the lumbar spine has indicated similar links (Perry & Green, 2009).

Methodology

- > A single-blinded, quasi-experimental, independent group's design.
- > Random allocation of 50 normal, healthy participants (25 per group) into either the lumbar manipulation or an EIL group.
- > Biopac® non-invasive neurophysiological measurements of skin conductance (SC) recorded proxy-measures of SNS activity in both lower limbs (2nd & 3rd toes).
- > Readings were taken before, during & after the administration of the techniques.
- > Results were calculated using Area Under the Curve & converted into percentage change for the intervention & the post-intervention periods.
- > Null hypotheses were tested using both within- & between-groups t-tests with the level of significance set at $p < 0.05$.

Figure 1:
Experimental Set-up



Figure 2:
Boxplot of SC measures for 3 periods of both groups

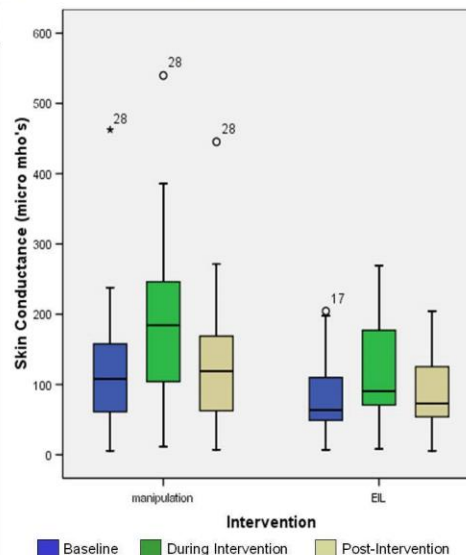
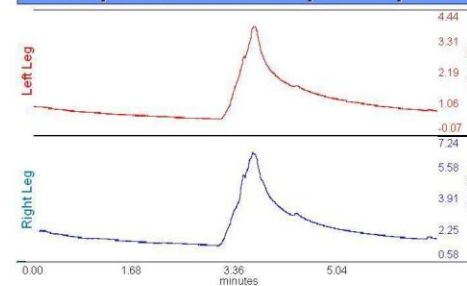


Figure 3:
Biopac readout of Manip technique



Results

- > See Figure 2 for details of effects
- > Both treatments increased SNS activity, from baseline levels, during the intervention period.
- > The EIL technique increased SNS activity by 42% from baseline levels ($p=0.0005$).
- > The manipulation technique increased SNS activity by 76% from baseline ($p=0.0005$).
- > The manipulative technique had a significantly greater effect than the EIL technique ($p=0.012$).
- > For both treatments, only the manipulation technique had an effect that lasted into the post-intervention period ($p=0.001$).
- > Further analysis of the manipulation group found no difference between the 'opening/gapping' side and the 'closing/compression' side of the technique ($p=0.76$).

Conclusions

- > Both treatment techniques resulted in significant neurophysiological responses.
- > The manipulation technique had a greater effect than the EIL technique.
- > The manipulation technique had an effect that was continued into the post-treatment period.
- > Despite popularly held beliefs regarding the nature of effect of the side being manipulated (opening or closing side) there was no evidence to support that one side was superior to another regarding magnitude of effect.
- > It is postulated that the sympatho-excitatory response was mediated through reflex pathway.
- > Results of this study are consistent with other studies on the cervical spine.

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