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Sympathetic Nervous System Effects in the Hands Following a T4 Mobilisation Technique: A Randomised, Placebo-Controlled Trial

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Introduction

- T4 Syndrome has existed as a clinical concept for decades that has been identified as a source of hand symptoms (Evans 1997; Conroy & Schneiders 2005; Mellick & Mellick 2006)
- Joint mobilisation has been advocated as a treatment for T4 syndrome (Maitland 1986; Grieve 1991)
- Treatment effects have never been established at a higher scientific level than case studies (DeFranca & Levine 1995; Conroy & Schneiders 2005)
- The T1-T9 SNS outflow links the thoracic spine to the T4 syndrome referral pattern (Bogduk 2002)
- No controlled studies have evaluated the effects of T4 mobs

Aims

- To perform the first RCT into the effects of T4 mobs
- To establish if there is a change in SNS activity in the hands following T4 mobs
- To establish if any change is sympatho-excitatory or sympatho-inhibitory, unilateral or bilateral

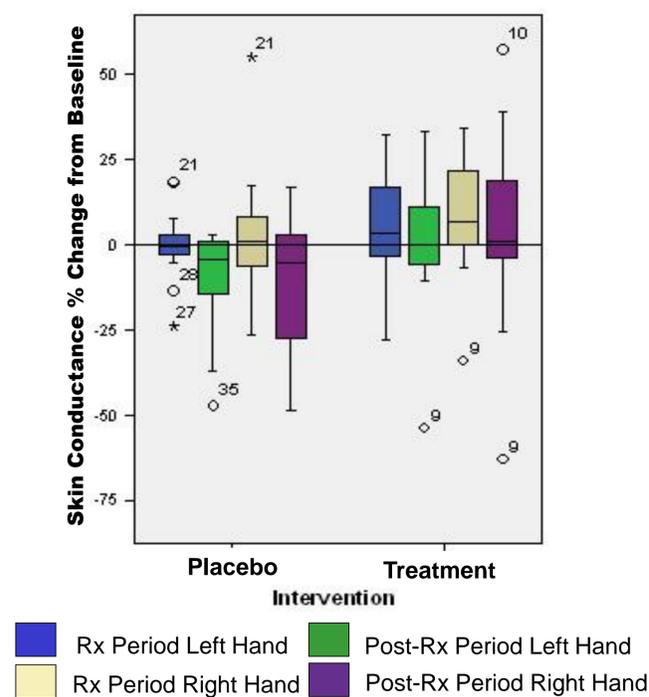
Methodology

- Double blind, independent groups
- Random allocation of 36 healthy subjects to either a *treatment* or *placebo* group. 80% power
- Equipment: BioPac® non-invasive neurophysiological measurements of skin conductance (SC) recordings of SNS activity in the hands (2nd & 3rd digits)
- SC recordings taken before, during & after the interventions
- Exit questionnaire to establish expectancy effects (Mann-Whitney U)
- Percentage change from baseline calculations compared between groups (1way-ANOVA) $p < 0.05$

Figure 1:
Treatment Technique
P-A Rotatory Mobilisation on T4
Grade III 1 min x 3



Figure 2:
Boxplot of SC Measures
During & After Intervention
for Both Groups



Pete Jowsey
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Results

DURING TREATMENT

- No significant differences in SNS activity between the treatment & placebo techniques in either hand

FOLLOWING TREATMENT

- 16.8% greater SNS activity in the right hand in the treatment group ($p=0.034$)
- 10.5% greater SNS activity in the left hand in the treatment group ($p=0.052$)

EXPECTANCY EFFECTS

- The placebo intervention was at least as credible as the treatment intervention ($p<0.05$)

Conclusions

- T4 mobs produced a side-specific sympatho-excitatory effect in the hand
- This was significantly greater than a validated placebo technique
- There was a trend towards a statistically significant bilateral effect which may be of clinical relevance
- The results support the findings of other studies that demonstrate that SMT applied to cervical & thoracic spine have sympatho-excitatory effects in the upper limbs

References

- Bogduk N (2002) Innervation and pain patterns of the thoracic spine. In: Grant R (ed) (2002) 3rd ed. *Physical therapy of the cervical and thoracic spine*. Edinburgh: Churchill Livingstone
- Conroy JL, Schneiders AG (2005) The T4 syndrome. *Manual Therapy* 10: 292-296
- DeFranca CG, Levine LJ (1995) The T4 syndrome. *Journal of Manual and Manipulative Physiological Therapeutics* 18 (1): 34-37
- Evans P (1997) The T4 syndrome: some basic science aspects. *Physiotherapy* 83 (4): 186-9
- Grieve GP (1991) 5th ed. *Mobilisation of the Spine: A primary handbook of clinical method*. London: Churchill Livingstone
- Maitland GD (1986) 5th ed. *Vertebral Manipulation*. London: Butterworth & Co Ltd
- Mellick GA, Mellick LB (2006) Clinical presentation, quantitative sensory testing, and therapy of 2 patients with fourth thoracic syndrome. *JMPT* 29(5): 403-408
- Pickar JG (2002) Neurophysiological effects of spinal manipulation. *Spine Journal* 2: 357-371
- Wright A (1995) Hypoalgesia post-manipulative therapy: a review of a potential neurophysiological mechanism. *Manual Therapy* 1:11-16
- Zusman M (2004) Mechanisms of musculoskeletal physiotherapy. *Physical Therapy Reviews* 9: 39-49