

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

**Jowsey, P. and Perry, J.**

Deposited in [Curve](#) January 2016

**Original citation:**

Jowsey, P. and Perry, J. (2013) 'Sympathetic Nervous System Effects in the Hands Following a T4 Mobilisation Technique: A Randomised, Placebo-Controlled Trial' , 'CSP International Conference.'. Held October 2013 at Birmingham.

**Copyright © and Moral Rights are retained by the author(s) and/ or other copyright owners. A copy can be downloaded for personal non-commercial research or study, without prior permission or charge. This item cannot be reproduced or quoted extensively from without first obtaining permission in writing from the copyright holder(s). The content must not be changed in any way or sold commercially in any format or medium without the formal permission of the copyright holders.**

**CURVE is the Institutional Repository for Coventry University**

<http://curve.coventry.ac.uk/open>

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

Pete Jowsey<sup>1</sup>, Jo Perry<sup>2</sup>

<sup>1</sup>Pete Jowsey Physiotherapy & Acupuncture / Department of MSK Physiotherapy, Bristol Community Health CIC

<sup>2</sup>Department of Physiotherapy, Faculty of Health and Life Sciences, Coventry University

## 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

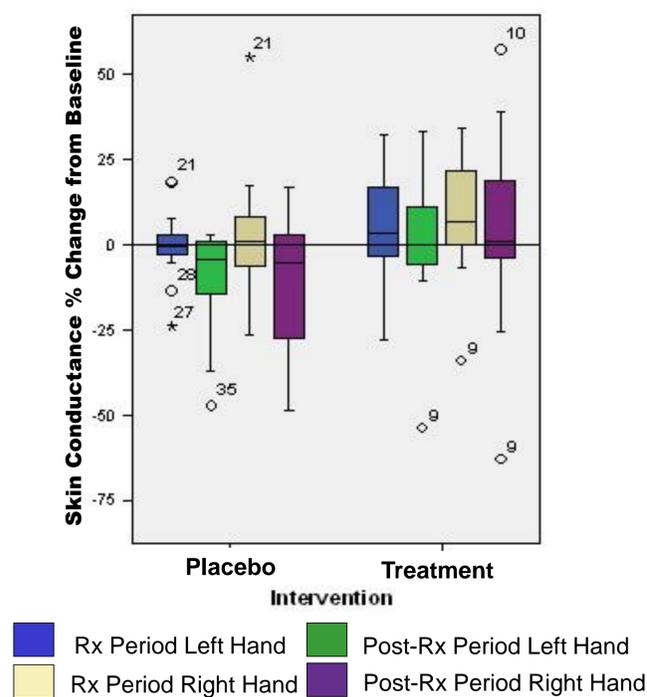
## Methodology

- 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 (2<sup>nd</sup> & 3<sup>rd</sup> 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



## 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) 3<sup>rd</sup> 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) 5<sup>th</sup> ed. *Mobilisation of the Spine: A primary handbook of clinical method*. London: Churchill Livingstone
- Maitland GD (1986) 5<sup>th</sup> 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