EFFECTS OF MULLIGAN MOBILISATION TECHNIQUE "SNAG" ON THE LUMBAR SPINE IN THE SYMPATHETIC NERVOUS SYSTEM OF LOWER LIMBS

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Introduction

One of the most recent and popular manual therapy techniques for the treatment of low back pain of mechanical origin is the Mulligan's "SNAGs" mobilisation techniques (Mulligan, 1999, Foster et al, 1999). "SNAG" is the acronym of "Sustained Natural Apophyseal Glide" which is combined with and active or passive movement at the end of range (Mulligan, 1999, Exelby, 2001). These techniques are applied in "the most symptomatic" spinal levels following manual examination in order to decrease pain and improve range of movement (Konstantinou et al, 2002, Exelby, 2002). Despite their extensive clinical use, the mechanism of action of the technique in the lumbar spine has not sufficiently been understood.

Purpose

Relevant studies investigating SNS effects during other (than Mulligan's) mobilisation techniques have consistently found a sympathoexcitatory response, reflected by increase in skin conductance (SC) (an outcome measure of peripheral sudomotor activity) in asymptomatic participants (Simon et al, 1997, Sterling et al, 2001, Paungmali et al 2003, Perry & Green, 2008). Research on spinal MWM's is limited to the study by Moulson & Watson, (2006) who observed an increase on upper limb SNS activity during and shortly after treatment. Aim of this research study is to investigate the effects of a lumbar "SNAG" in lower limb SC of an asymptomatic population.

Participants

45 asymptomatic volunteers (12males, 33females) participated in the study. Their age ranged between 18 and 48 years (mean 28,2 years

Methods

This study is a single-blind randomised, parallel group design, which included treatment (SNAG), placebo and control groups. Ethical Approval was obtained by the Coventry University Research Ethics Committee, UK.

- Application of the SNAG technique

For the SNAG group, the Mulligan's "SNAG" was applied on L4/5 lumbar motion segment by an experienced manual therapist. SNAGs were performed from a comfortable sitting position in a plinth, while participants performed an active flexion 6 times (Fig.1). A belt was used, as advised by Mulligan (1999). Following palpation of the spinous process (to be mobilised), the force was applied in a parallel direction to the lumbar facet joints, via the ulnar styloid process of the therapist to the skin over the relevant spinal level. A total of 3 sets of mobilisation, in accordance with Mulligan's rule of three was administered with an one min break between sets.

- Application of the placebo technique

The placebo technique appeared very similar to the "SNAG"; however, the application of the optimum direction or the appropriate amount of force was absent (much less force in various directions was applied). These two factors are believed to play vital role in the success of the technique

- Application of control

For the control intervention, the participant was seated comfortably with the therapist standing behind them without manual contact.

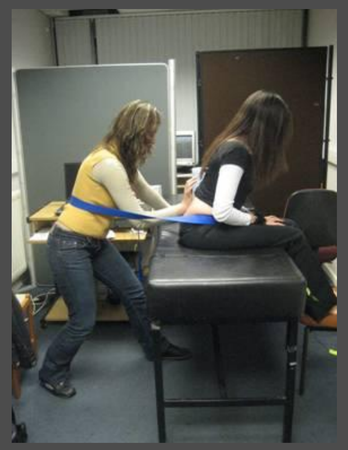

Fig 1

Measurement of skin conductance

SC was recorded using Biopac MP30 data acquisition unit with a data rate of 20samples/sec, connected with specialised software (Biopac Student Lab pro 3,7BSL) (Fig 2).

Measurements were recorded using SSL3A galvanic skin response transducers consisting of two Ag/AgCl electrodes attached to the skin with Velcro and filled with unibase gel as recommended (Fowles et al, 1981). After an 8min stabilisation period for SC recordings (Nance & Hoy, 1996), a 3minbaseline measurement was taken (baseline period). Then the researcher synchronized the beginning of the intervention with the data acquisition unit and administered each group's intervention for a total of 3min in each participant. (intervention period) Finally the participant remained in his position for another 3min while SC measurements were concluded (final rest period).

Fig.2

Results

The SNAG group presented with an increase in SC of 10.60+/-7.5% and an 11.19+/-7.85% for the right and left limb respectively, whereas the placebo with 6.64+/-12.04%and 7.44+/-13.27%. The control group presented with minimal change (2.54+/-2.69% and-0.86+/-1.63%).In the intervention period there was a statistically significant percentage change (from baseline) in SC amongst groups for both limbs (F=3.254, p=0.049 and F=6.161, p=0.005). (Fig 3) Statistical significance was evident only between SNAG and control group for both right and left lower limb (p=0.044 and p=0.004 respectively.)

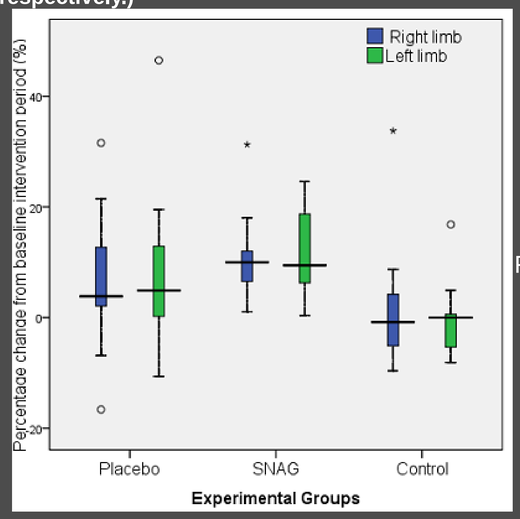

Fig 3

Discussion & Conclusions

Results of the study suggest that lumbar SNAGs performed on L4/5 intervertebral joint with active flexion on the experimental group elicited a sympatho-excitatory effect in the L4 dermatome in both lower limbs during intervention. Although no statistically significant differences were found between SNAG and placebo groups, the percentage change in SC was almost double in the SNAG group compared to placebo group. These findings are in accordance with the existing literature consistently demonstrating concurrent hypoalgesia, SNS excitation and motor function changes thus, implying a potential inter-play between local segmental receptors and supra-spinal neural pathways. Based on our findings, it can be postulated that the SNAG stimulated local sympathetic trunk fibres at L4/5 motion segment and potentially activated supra-spinal centres, eliciting the sympathoexcitatory effect detected. A limitation of this research is the use of asymptomatic population. Although SC is an outcome measure extensively used in relevant research, it is susceptible to psycho-emotional factors such as stress and personality traits.

Recommendations

This study contributes to the understanding of the complex mechanism of action of spinal manipulative techniques by providing evidence to the clinicians on the effect of the popular lumbar SNAG technique on SNS activity. A challenge for future studies would be to explore multi-system responses of the "SNAG" on LBP patients.

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