# Effect of cervical spine manipulation on muscle strength: A randomized clinical trial

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## Summary

This randomized clinical trial evaluated the immediate effect of cervical spine manipulation on the maximal isometric strength of shoulder abductors. A total of 26 subjects participated where 13 subjects were randomized into the intervention group (joint manipulation of the cervical spine), and 13 subjects to the placebo group (simulated manipulation of the cervical spine). The maximum isometric strength of shoulder abductors was evaluated pre and post intervention using a dynamometer (E-lastic). According to a paired t-test analysis, no significant change in muscle strength was found between pre and post intervention for both groups. This study demonstrated that a single cervical spine manipulation does not produce immediate effects on the maximal isometric strength of shoulder abductors.

## Introduction

In osteopathy, joint manipulation is used to restore the mobility of a segment and it is considered a treatment option for various dysfunctions [1,2]. Cervical joint manipulation can cause biomechanical alterations but it is yet poorly explained in the literature [3]. The purpose of this study was to evaluate the immediate effect of cervical spine manipulation on the maximal isometric strength of shoulder abductors.

## Methods

The study was a randomized clinical trial, triple-blind, with non-probabilistic sample, composed of 26 adults (11 male and 15 female, 22 ± 4 y.o.). Inclusion criteria was: no presence of neck pain or discomfort; have joint dysfunction in cervical spine. The subjects were randomized into two groups (13 in Intervention Group - IG and 13 in Placebo Group - PG). The study was conducted in 3 stages: pre-intervention evaluation, intervention and post-intervention evaluation.

For the pre and post-intervention evaluation stages, the Isometric Maximum Strength (IMS) for shoulder abduction was measured on both sides using a portable dynamometer (E-lastic). Measurement was taken with subject in the orthostatic position, with shoulder abducted at 45° (frontal plane) and abducted at 30° in the scapular plane, and with elbow, forearm and wrist in neutral position. Three measurements of 5 seconds each were performed for right and left sides with an interval of 15 seconds between measures.

For the intervention stage, a professional osteopath performed the intervention. The cervical spine was first evaluated through palpation techniques, and then the cervical spine manipulation to fix a joint dysfunction was performed. In the PG, a manipulation simulation was performed without any real modification in joint dysfunction.

A paired t-test was used to calculate differences between pre and post-intervention strength. SPSS 22.0 was used for the statistical analysis.

## Results and Discussion

Table 1 shows the mean and standard deviation (SD) of right and left IMS measurements for both groups. No significant change in muscle strength was found ($p>0.208$).

**Table 1** – Isometric maximum strength before and after intervention for both groups.

| Groups | Test | Mean | SD | P value |
|---|---|---|---|---|
| Intervention | Right pre | 10.4 | 4.3 | 0.655 |
| | Right post | 10.2 | 3.6 | |
| | Left pre | 9.7 | 4.0 | 0.208 |
| | Left post | 10.3 | 4.4 | |
| Placebo | Right pre | 10.1 | 3.8 | 0.417 |
| | Right post | 9.9 | 3.4 | |
| | Left pre | 9.7 | 3.1 | 0.786 |
| | Left post | 9.6 | 3.4 | |

The results of this study is in agreement with another study [4] where no significant change in strength was found. On the other hand, differences were found in hand grip strength in judo athletes after three interventions with cervical spine manipulation [3]. Future studies with a larger sample size and evaluating the long term effect of cervical spine manipulation on strength is recommended.

## Conclusions

This study demonstrated that a single cervical manipulation was not able to produce immediate effects on the maximal isometric strength of shoulder abductors.

## References

[1] Honore et al. (2018). *Quiropraxia e terapias manuais*, v. 26, n. **1**, p. 11.
[2] Schwerla et al. (2015). *J Am Osteopath Assoc*, **115**(7), 416-25.
[3] Botelho et al. (2012). *J Manipulative Physiol Ther*, **35**:38-44.
[4] Humphries et al. (2013). *J Chiropr Med*, **12**:153-9.