

## EFFECT OF CERVICAL SPINE MANIPULATIVE THERAPY ON JUDO ATHLETES' GRIP STRENGTH

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### ABSTRACT

**Objective:** The objective of this study was to perform an investigation evaluating if cervical spinal manipulative therapy (SMT) can increase grip strength on judo athletes in a top 10 national-ranked team.

**Methods:** A single-blinded, prospective, comparative, pilot, randomized, clinical trial was performed with 18 athletes of both sexes from a judo team currently competing on a national level. The athletes were randomly assigned to 2 groups: chiropractic SMT and sham. Three interventions were performed on each of the athletes at different time points. Force measurements were obtained by a hydraulic dynamometer immediately before and after each intervention at the same period before training up to 3 weeks with at least 36 hours between interventions.

**Results:** Analysis of grip strength data revealed a statistically significant increase in strength within the treatment group after the first intervention (6.95% right, 12.61% left) as compared with the second (11.53% right, 17.02% left) and the third interventions (10.53% right, 16.81% left). No statistically significant differences were found in grip strength comparison within the sham group. Overall differences in strength were consistently significant between the study groups ( $P = .0025$ ).

**Conclusion:** The present study suggests that the grip strength of national level judo athletes receiving chiropractic SMT improved compared to those receiving sham. (*J Manipulative Physiol Ther* 2012;35:38-44)

**Key Indexing Terms:** *Martial Arts; Manipulation, Spinal; Chiropractic; Athletic Performance*

The competitive and dynamic atmosphere of professional sports generates a wide field in which new therapeutic techniques have a great potential for growth and development once their efficacy is showed to optimize sports performance.<sup>1</sup> Complementary/alternative and traditional medicine (CAM/TM) usage among athletes has been poorly studied, and recent investigations have been focused on the prevalence of their use and other descriptive approaches.<sup>1-3</sup> In a Hawaiian university, 56% of athletes had reported the use of 1 or more types of CAM/TM. The 2 major types of CAM/TM used in this setting seem to be massage (prevalence of 38%) and chiropractic (prevalence of 29%).<sup>2</sup>

When wide-ranging populations are considered, the usage of CAM/TM has increased in the last decade in various countries.<sup>4</sup> The chiropractic profession is considered as one of the most important CAM/TM professions, with use rates in the general population ranging from 6% to 12%, with spinal manipulative therapy (SMT) as its most commonly used therapeutic approach.<sup>5,6</sup> Spinal manipulative therapy is considered an effective and safe therapy for musculoskeletal disorders<sup>7</sup> with significant results in both short and long term.<sup>8-14</sup> It is consisted of a specific high-velocity, low-amplitude application of force beyond the end of passive range of motion and inside the zone known as parapsychological space.<sup>5</sup> Several studies have evaluated adverse effects and potential severe outcomes from SMT, and the results indicate that SMT is comparatively a safe procedure when performed with patients without contraindications.<sup>4,15-19</sup>

Spinal manipulative therapy generates neuromuscular reflex responses in a surface electromyography in patients with low back pain,<sup>22</sup> increases quadriceps' strength after manipulation of the ipsilateral sacroiliac joint,<sup>23</sup> and causes temporary excitatory inhibition of lumbar and cervical motoneurons.<sup>26</sup> Spinal manipulative therapy has influenced a significant reduction of tumor necrosis factor  $\alpha$  and

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interleukin  $1\beta$  (proinflammatory cytokines) production when compared with placebo and other control groups<sup>24</sup> and has also induced a significant reduction of pain and hyperalgesia in an experimental study with SMT instrument-assisted (Activator Methods International, Ltd, Phoenix, Arizona) performed in rats.<sup>25</sup> In the current study, the hypothesis that cervical SMT would increase grip strength when performed in national level judo athletes was tested.

The United States has officially used chiropractic care in the Olympic Games since 1980.<sup>1</sup> The Brazilian Olympic Committee has been using sports chiropractic care since 2000 in their major competitions such as the Olympics and Pan American Games. During the 2007 Pan American Games in Rio de Janeiro, 209 chiropractic-based treatments were performed for 95 athletes within a total of 660 Brazilian competitors (14.40%). At the 1995 All African Games, 1135 athletes were treated by doctors of chiropractic within 6000 athletes, with a total of 1957 chiropractic treatments being performed. Most of the treatments were performed on track and field athletes (38%) followed by fighting sports (14.7%).<sup>20</sup> Another study revealed that 77% of the coaches from the American National Football League refer athletes to chiropractic care, and 31% of the teams officially have a chiropractor as part of their medical team.<sup>1</sup> Thus, there is a precedence for inclusion of chiropractic care for high-performance athletes.

Judo is an intense martial art sport that can potentially cause injuries that may result in loss of strength, which is detrimental to sports performance. A recent study analyzing 3 consecutive judo championships revealed an increase of 13.5% in the incidence of injuries, with no differences between sex or weight categories of the athletes. The most common location in men were at the fingers, whereas the shoulders were more commonly associated with injury among women.<sup>21</sup> These findings suggest that judo may be a sport in which the impact of chiropractic therapies on the athletic performance can be tested.

Spinal manipulative therapy is growing in sports treatment, and when performed by a highly trained professional,<sup>4</sup> it can serve as a useful therapeutic option for the treatment of joint biomechanical dysfunctions, especially of the spine.<sup>22-25</sup> However, this technique has primarily been used with therapeutic aims, and little is known if it can be used as a potential sports performance enhancer.

Therefore, this study evaluated the effects of chiropractic cervical SMT<sup>4,5</sup> on grip force among Brazilian judo athletes who were competing on a national level.

## METHODS

### Trial Design

A pilot clinical trial, with balanced randomization (1:1), single blind, and placebo controlled, was performed to test

the influence of SMT on grip strength of judo athletes of a top 10 national-ranked judo team.

### Subjects

Brazilian athletes from a national competing level judo team volunteered to the study. This group includes athletes from both sexes with a 5-day training program per week. The group was approached, and the athletes were interviewed to verify inclusion and exclusion criteria. Eighteen individuals were recruited (72% of the total invited). The participants were randomly assigned into 2 groups of 9 subjects each, with group 1 receiving SMT and with group 2 getting sham procedures. The study was registered under the International Standard Randomised Controlled Trials Number (ISRCTN) 38228413. The study was approved by the ethics committee of the Faculdade de Tecnologia e Ciências, Salvador, Brazil (register no. 904). All participants or their legal guardians signed informed consent before enrollment in the study.

### Inclusion and Exclusion Criteria

The inclusion criteria were age ranging from 15 to 30 years, regular attendance to training and competing sessions for at least 4 days a week, never receiving chiropractic care, possessing no prior knowledge of chiropractic procedures, and no change of medical or physical routine because of the addition of the new procedures.

The exclusion criteria were spine anomalies, such as hypoplasia or instability of the odontoid process; acute fracture or infections; cancer; local hematoma; signs of progressive neurologic deficit; Arnold-Chiari malformation; vertebral dislocation; signs of meningeal irritation; and signs of joint instability.<sup>4,15,16</sup>

### Study Design and Setting

The study took place at the team training facilities in Salvador, BA/Brazil in June 2009. All athletes answered a survey before the randomization and then were randomly assigned following simple randomization procedures (flip of a coin) to 2 groups. The subjects allocated in the group 1 ( $n = 9$ ) were treated with standard chiropractic cervical diversified technique SMT, and group 2 ( $n = 9$ ) had received a standardized sham intervention.

Spinal manipulative therapy intervention consisted of static and motion cervical joints analysis, with the patient lying supine, and areas of motion restriction received specific contact high-velocity, low-amplitude manipulation consisting of standard chiropractic diversified techniques to the cervical spine.

Sham intervention was performed using the head piece drop mechanism of a Thuli Table (Thuli Tables Inc, Dodgeville, WI). This procedure consisted of having the patient lying prone, and the drop mechanism was performed 3 to 5 consecutive times, having the contact force of the

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