



The Immediate Effects of Manual Massage of Forearm on Power-Grip Strength and Endurance in Healthy Young Men



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Abstract

Objective: The purpose of this study was to examine the immediate effects of a single massage session on hand grip strength and endurance after isometric exercise in healthy young men under controlled conditions.

Methods: A total of 44 healthy young men from a university population participated in the study. They were randomized to receive either massage or passive movement intervention. Hand grip endurance and hand grip strength in both groups were recorded using a Jamar hand grip dynamometer and a digital chronometer before and after the intervention. Statistical analysis was performed using the Wilcoxon, Mann-Whitney, and paired *t* test as well as independent *t* test.

Results: Pre- and postmean hand grip endurance times for the massage group were 38.4 ± 12 and 46.5 ± 13 seconds ($P < .001$), and hand grip strength values were 43 ± 5.6 and 45.7 ± 5.3 kg ($P = .077$). Pre- and postmean hand grip endurance times for the passive movement group were 33 ± 12.3 and 31.9 ± 10.7 seconds ($P = .513$), and hand grip strength values were 42.8 ± 6 and 42.9 ± 5.6 kg ($P = .854$).

Conclusion: Immediately after 1 session of massage to the forearm and hand, the grip endurance improved in a group of healthy young men. However, passive movement of the upper limb for 1 session did not enhance grip performance.

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Introduction

In many activities and sports, hand grip is important. Also, many jobs are greatly dependent on grip strength. Grip performance is necessary in activities such as carrying a suitcase, turning a doorknob, and many other tasks. Grip performance is also important in sports like tennis, basketball, and mountain climbing. In addition, researches in the field of rehabilitation, sports, and ergonomics often use hand grip evaluation.

Regarding the massage, it should be mentioned that, for thousands of years, massage has been in use; however, more recently, it has been used in rehabilitation.¹ Some literatures support a positive trend for massage to benefit athletic recovery and performance.² It has been reported that massage improved grip strength in the carpal tunnel syndrome.³ The symptoms of carpal tunnel syndrome were also relieved by massage.⁴ Another study showed that petrissage improved cycle ergometer pedaling performance.⁵ Equally, several studies reported that massage decreased delay muscle soreness after vigorous exercise. Muscle soreness can negatively interfere with the activities of daily living as well as sports performance.⁶⁻⁸ It has also been reported that the use of massage in women collegiate athletes decreased soreness and improved vertical jump.⁹ Massage has been shown to be helpful in reducing pain and joint stiffness and improving function in patients with osteoarthritis of the knee over a period of 8 weeks.¹⁰ In addition, a pain reduction in hand arthritis following massage was noticed.^{11,12} Also, beneficial effects of massage to soothe anxiety¹³ and boost immunity¹⁴ have been reported. It is generally accepted that massage can provide benefits to the body such as reducing muscle pain; a 2011 study published in the *Annals of Internal Medicine* found that massage therapy is as effective as other methods of treatment for chronic back pain.¹⁵

Although in studies about the effect of massage on performance outcome variables such as grip performance,¹⁶ sit and reach test,¹⁷ lactate removal,¹⁸ blood flow,¹⁹ and electromyography^{20,21} are usually investigated, the effect of massage on grip performance was examined in the present study. Besides the importance of grip in activities of daily living, jobs, and sports, some authors believe that grip may reflect the patient's general health and physical activity.²² In some studies, impaired grip strength was considered as an indicator of increased postoperative complications, decreased physical status, and upper extremity trauma outcomes.^{22,23} *Grip strength* is a general term used to describe the amount of power a person can generate with his or her hands.²⁴ However, in most activities, repeated

or sustained grip is used rather than a single short grip. Most activities require repeated forceful dynamic grasping or prolonged static holding rather than exerting maximum force during a single repetition. This sustained muscle contraction is referred to as *endurance*. *Muscular endurance* is the ability of a muscle or group of muscles to sustain an isometric contraction or continue repeated contractions against a resistance for an extended period of time.²⁵ *Massage* is the manipulation of the superficial and deeper layers of the muscle and connective tissue using various techniques to enhance function, decrease muscle reflex activity, aid in the healing process, and inhibit motor-neuron excitability.²⁶ Although it is generally accepted that massage can provide benefits to the body, other studies have reported that massage has no positive effect on performance.²⁷⁻³⁰ Therefore, more studies are needed to clarify the effects of massage on performance.³¹ The objective of this study was to determine if 1 session of hand and forearm massage could improve hand grip strength and endurance in healthy young men.

Methods

Subjects

After a public announcement through posters on campus, healthy young men from a university population entered the study. In the present study based on history and individual's self-assessment, the participant was considered as healthy or unhealthy. The following items were considered as inclusion and exclusion criteria: healthy male subjects (age, 18-25 years; body mass index [BMI], 22-25 kg/m²) with no history of upper extremity injury, trauma, or dysfunction for the past year. None of the subjects was an athlete (exercise was performed not more than once a week), and none had received massage for the past month. However, if the participants had a limited range of motion or were not interested in completing the test procedure, they were excluded. Every subject with a BMI between 22 and 25 kg/m² was registered. Afterward, the individual was randomly allocated to either the massage (n = 22) or passive movement (n = 22) group (based on simple random allocation using the biased coin suggested by Fleiss³²).

In total, 53 subjects were enrolled for the test. Four subjects were omitted because they were athletes, and 2 subjects were omitted because their BMI was not in the desirable range. Three subjects were also omitted as a result of sustaining upper limb injury in the past year.

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