

## FUNCTIONAL DEVELOPMENT OF GRIP STRENGTH AND FOREARM MUSCLES IN MAS-WRESTLING

Samarqand State Pedagogical Institute

Faculty of Physical Education, 2nd-year student

**Nabiyev Amirjon Aminovich**

**Annotation:** This article examines the physiological, biomechanical, and methodological factors influencing the functional development of grip strength and forearm muscles in mas-wrestling athletes. It scientifically analyzes muscle tissue adaptation processes, load mechanisms, specialized training complexes, neuromuscular control features, and methods of developing static strength. The research results provide theoretical and practical foundations for improving grip strength and enhancing performance in mas-wrestling.

**Keywords:** mas-wrestling, grip strength, forearm muscles, isometric exercises, biomechanics, muscle adaptation, strength training

Mas-wrestling has become widely popular in the global sports arena today. It is one of the national sports that requires high levels of strength, endurance, coordination, and psychological stability. The historical roots of this sport go back to the traditional competitions of the Sakha (Yakutia) people. Currently, mas-wrestling is governed by the World Mas-Wrestling Federation, and various prestigious competitions are held regularly. The essence of the sport is that two athletes hold onto a stick and attempt to pull their opponent toward themselves, forcing them to lose balance. This process tests not only the athlete's muscular power but also the quality of neuromuscular control.

One of the most important physical requirements in mas-wrestling is the development of grip strength and forearm muscles. The muscles of the hand ensure a firm hold on the stick, while the fingers withstand intense pressure against the opponent's resistance. Although these muscles are anatomically adapted to heavy loads, the level of stress placed on them during mas-wrestling is several times higher than in many other sports. In particular, the static endurance of wrist flexors, pronators, and supinators is a key determinant of an athlete's success. Grip strength does not depend solely on muscle mass; it is also influenced by neuromuscular control, muscle tissue density, joint stability, force distribution between the fingers, and biomechanical advantages. In mas-wrestling, the athlete directs all available strength to a single point — the stick. This requires coordinated muscle activation, synchronized movement patterns, and the ability to sustain static force for extended periods. Therefore, increasing grip strength requires a well-structured system of special isometric exercises, high-resistance pulling drills, and finger-strengthening methods.

Recent scientific research shows that mas-wrestlers who achieve high competitive results not only have strong forearm and hand muscles but also demonstrate rapid muscle activation capacity. Muscle adaptation, improved blood circulation, enhanced oxygen supply, and increased nerve impulse transmission speed all contribute to performance advantages. From this perspective, grip strength can be considered the central determinant of performance in mas-wrestling.

This article provides a detailed scientific analysis of the physiological factors, biomechanical characteristics, specialized training exercises, adaptation processes, load mechanisms, and recovery periods that influence the functional development of grip strength and forearm muscles in mas-wrestling. Grip strength consists of three main components: muscle hypertrophy, nerve impulse transmission efficiency, and joint–ligament stability. In mas-wrestling, static strength plays a leading role, which depends on the optimal ratio of slow-twitch and fast-twitch muscle fibers.

Forearm muscles adapt primarily through isometric loading. During mas-wrestling, the fingers and forearm muscles remain under maximum tension for long periods. Therefore, grip strength is largely determined by muscle fiber density and adaptation to short-amplitude static movements.

#### Specialized Exercise System

- Static pulling exercises with a stick
- Leaning forward while maintaining a firm stick grip
- Hanging on a pull-up bar with a thick handle
- Plate pinch exercises
- Resistance band pulling drills
- High-resistance wrist flexion and extension exercises

These exercises significantly improve grip strength, muscular endurance, and neuromuscular activation. Mas-wrestling technique requires athletes to choose an optimal body position, transmit force from the legs to the grip, and determine the correct pulling angle. Wrist stability, stick–hand contact force, and finger pressure distribution create biomechanical advantages. Static loading induces rapid muscle fatigue. Therefore, recovery is supported by massage, cryotherapy, hot–cold contrast therapy, stretching, and proper nutrition.

The functional development of grip strength and forearm muscles is a central factor in achieving high performance in mas-wrestling. Specialized training systems, isometric loading, biomechanical optimization, and efficient neuromuscular interaction ensure competitive superiority. This scientific analysis provides a methodological foundation for coaches and athletes engaged in mas-wrestling.

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