



EFFECTIVE METHODS OF GRIP STRENGTH DEVELOPMENT

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Development of grip strength is often overlooked in traditional resistance training programs. This underdevelopment can manifest itself as a weak link in the kinetic chain involved in many field, combat, and rotational sports. Rightfully, a priority of any program's goals should be to maximize the strength and power within major motor patterns associated with the performance and needs analysis of the given sport (5,6). Those qualities have a greater impact on overall athletic ability and should be developed continually as part of a long-term athletic development plan. Additionally, making small alterations to traditional movements and supplementing a periodized resistance training program with grip-specific movements may benefit athletes in a variety of ways. Typically, grip-specific training can be performed directly using specialized equipment. While effective, these tools can be expensive for coaches at the high school and small college level, and be non-functional for group training environments. Instead, using training methods that can improve grip strength indirectly while facilitating the development of the program's primary goals may be most desirable.

Grip strengthening may be a secondary or tertiary goal in the annual development plan for athletes, but its training can be done with little expense or needs for special equipment. Small program adjustments that target grip strength and improve its function can be implemented without large sacrifices to time or resources. The

methods and protocols provided in this article will demonstrate low cost methods of improving grip strength for various sport performance needs.

GRIP STRENGTH AS A PERFORMANCE VARIABLE

Often seen in sports with a demand for rotational power (e.g., golf, baseball, and tennis), athletes use force generated from the lower body and transfer that force into the distal segments of the hand and fingers via what practitioners label as the "kinetic chain." Force is produced from the legs and hips into the ground, transferred through the torso, and makes its way into the hands and implement. Efficient sequencing of these movements leads to faster angular velocities of the distal segments, which is typically the hands. While the actual contribution of force from the muscles of the hands and forearms are negligible, the transfer of force is a valuable factor. The muscles of the forearms, hands, and fingers are tasked with the final transfer of power through the kinetic sequencing of rotational movements. Development of functional grip qualities may provide an advantage in various sports relying on the hands and forearms as the last link in the kinetic chain. This principle is demonstrated in implement-based sports, where an increase in grip firmness reduces impact recoil and improves the exit-velocity of the intended target (4). The stronger the grip on the implement, the less distraction occurs during contact with the intended target. Less distraction upon contact allows for greater energy conservation, which is of high value to athletes involved in

sports where imparting high exit-velocities on a target is beneficial. This is especially significant when it comes to off-center impacts where the distractive forces are often at their greatest.

Within combat and sports that intrinsically have high levels of physical contact, grip strength can be an important factor for subduing or controlling an opponent. Wrestlers, judokas, and grappling athletes have a specific need for high levels of both grip strength and endurance (1,7). Increasing the functional strength of the hands and forearms in specific positions is beneficial to improving an athlete's ability to manipulate their environment, objects, or opponents.

GRIP STRENGTH TRAINING CONSIDERATIONS

The muscles of the flexors in the hand and forearm create gripping force, while the extensors of the forearm stabilize the wrist (13). Exercises aimed at improving grip strength should stress the flexors to improve the amount of force produced in gripping actions, while the extensors of the forearm should also be trained to improve the endurance and stability of the hands and wrist against an external load. In grip training, there are three main grip holds: crushing (finger to palm), pinching (finger to thumb), and supporting (carrying a load for distance or time). Implementing movements that help stress each distinct variation promotes specific grip strength adaptations. Maximal strength or muscular endurance can be developed using these varied movements (12). Specific training implements can be costly, and are often designed for individual use rather than a team training environment. Therefore, the strength and conditioning professional should consider methods that are easy to use and can be modified for different training ages. One of the most efficient ways to enhance grip strength is through simple manipulation of pre-existing training implements like dumbbells, barbells, and pull-up bars.

METHODS TO DEVELOP CRUSHING GRIP

Gripping larger diameter objects with a crushing grip requires higher muscular force (compared to gripping smaller objects) (3). Wrapping a hand towel around a barbell or dumbbell increases the circumference of the gripping surface and alters the stability between the hand and the implement (Figures 1 – 6). Using towels allows athletes to train with movements they are accustomed to without making significant alterations to program design or purchasing expensive training tools.

An unstable load requires advanced levels of stabilizing strength from the hands as well as the forearms (12). This requires an athlete to apply greater than normal squeezing force with the hand and forearm to complete the desired action and recruits the forearm extensors to stabilize the wrist. Hanging a towel or pair of towels from a pull-up bar mimics normal pull-ups, but adds the challenge of an unstable gripping surface (Figures 7 – 10). Similar methods can be implemented to the bent-over row (Figures 5 and 6) and the inverted row (Figures 11 – 12). By resisting gravity and bodyweight, towel pull-ups stress the flexor muscles of the forearm, hand, and fingers while simultaneously stressing the stabilizing muscles of the wrist. Likewise, using a towel through

the handle of a kettlebell increases the diameter and instability of movements like the kettlebell swing (Figures 13 and 14). Figures 1 – 16 demonstrate different exercise modifications that can be made using a towel on a standard bar, dumbbell, kettlebell, and pull-up bar.

PLATE PINCHING AND PLATE FLIPS

Pinching strength is the application of force from the fingers to the thumb. The functional abilities of this hand position can be utilized in “precision-handling” tasks and should be considered in the strength programs for athletes who need to develop more finely-tuned grip strength qualities of the hands and fingers (e.g., baseball pitchers, cricket bowlers, rock climbers, etc.) (8). Forceful pinching involves greater stress on the tendons of the forearm than a crushing grip position (3). Weighted pinching is a simple and effective method of improving the strength of the fingers utilized in the pinching grip (Figures 17 – 20). Pinching two plates of equal weight together for an established amount of time is an exercise that can be easily implemented in most weight rooms. Pinches can be done with one or two hands. Isolating specific fingers or groupings of fingers can allow for more specificity within the resistance training program depending on the needs of the athlete or the demands of the sport.

Performing plate flips with bumper plates is a dynamic movement that is specific to pinching grip strength (Figure 21 – 23). Plate flips can be performed with two hands as well (Figures 24 – 26), which allows for variation while training for sport specificity. Adding more plates to pinching holds, using heavier plates for pinches and flips, or using more challenging grip positions are ways to develop pinch grip strength and endurance progressively. Figures 17 – 26 demonstrate different varieties of pinch holds that can be done using weighted plates.

WEIGHTED CARRIES

Holding heavy loads while moving is a way to develop strength for the supporting grip position. Additionally, weighted carries replicate real-life challenges involved in daily living, are a known training method used by strongperson athletes to develop grip strength and core strength, and have been used to measure anaerobic capacity (14,15,16). While often performed with special equipment, farmer's walks can be performed with common dumbbells (Figures 27 – 28). Depending on the needs of the sport, an athlete may require many different hand and wrist positions that should be specifically trained to have maximum transfer to their sport or activity (11). Carrying exercises that train isometric holding strength and endurance are specifically beneficial to combat sports, where grip may play a key role (1,7). Using a variety of implements for different weighted carries can keep athletes engaged in new challenges while promoting strength through different grips.

Grasping dumbbells from a single end can challenge the supporting and gripping strength of the entire hand (Figure 29). Although the brand and type of dumbbell available limit training adaptations, grasping a single end of one or two dumbbells and

EFFECTIVE METHODS OF GRIP STRENGTH DEVELOPMENT

walking for time or distance (in a similar manner as a farmer's walk) can improve grip strength. Using kettlebells is another method to increase variety, especially by implementing them with unilateral carries, bottoms-up carries, or using the lateral side of the kettlebell handle to increase the stability demand at the wrist (Figures 30 – 31). Using unilateral carries has the added benefit of challenging the stability of the spine and developing strength of the back or core (Figures 31 – 32) (9). Figures 27 – 32 demonstrate varieties of weighted carries using common implements.

PRACTICAL CONSIDERATIONS

Table 1 provides an example of grip strength training modifications that can be easily implemented into a training program. Supplementing a training program with grip-specific movements after the majority of strength training is completed can be useful to specifically improving grip strength, while having the added benefit of improving performance on other movements where grip strength is a limiting factor. Drop sets can be used to simultaneously train for strength and power and grip strength. This method allows for progressive overload, while benefitting grip strength. Adding two sets of a grip-specific exercise can keep the training program efficient and volume manageable.

Plate pinches, towel farmer's walks, towel dumbbell carries, and towel kettlebell swings are best suited for the latter parts of a training session. Targeting grip strength early in a training session fatigues the muscles of the forearms and hands, which can be detrimental to performance on greater priority lifts. Using these exercises as part of an anaerobic capacity circuit allows for variation of muscle use across a range of grips. This allows multiple training goals to be developed without spending an unnecessary amount of time performing isolated training of the wrist and forearm.

CONCLUSION

Improving grip strength is not a primary goal in many strength and conditioning programs, though its inclusion can improve athletic performance. For athletes participating in rotational power sports, increasing grip strength on an implement can improve energy transfer. Considerations for developing grip strength and endurance are especially important for combat sport athletes and can be implemented as a part of their metabolic conditioning with the use of weighted carries. In conjunction with a balanced strength and conditioning program, implementing specific grip-focused training exercises can have a positive impact on grip strength and endurance.

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TABLE 1. EXAMPLE GRIP STRENGTH TRAINING MODIFICATIONS

TRAINING SESSION	COMPOUND MOVEMENT FOR STRENGTH DEVELOPMENT (75 – 85% 1RM)	SETS X REPS	MODIFIED DROP SET FOR GRIP STRENGTH FOCUS (45 – 55% 1RM)	SETS X REPS
1	Barbell bent-over rows	3 x 5	Towel barbell bent-over rows	2 x 12
2	Pull-ups	3 x 10 – 12	Towel pull-ups	2 x 5
3	Single-arm dumbbell bent-over rows	3 x 5 each	Towel single-arm dumbbell bent-over rows	2 x 8 – 12 each

TABLE 2. EXAMPLE CIRCUIT

EXERCISE	TIME
Jump rope	60 s
Farmer's walks	30 s
Push-ups	60 s
Plate pinches	30 s
Towel kettlebell swings	60 s

EFFECTIVE METHODS OF GRIP STRENGTH DEVELOPMENT



FIGURE 1. TOWEL BARBELL BENT-OVER ROW



FIGURE 2. TOWEL BARBELL BENT-OVER ROW



FIGURE 3. TOWEL ON A DUMBBELL



FIGURE 4. TOWEL ON A DUMBBELL



FIGURE 5. TOWEL SINGLE-ARM BENT-OVER ROW



FIGURE 6. TOWEL SINGLE-ARM BENT-OVER ROW



FIGURE 7. TOWEL PULL-UP



FIGURE 8. TOWEL PULL-UP



FIGURE 9. TOWEL PULL-UP



FIGURE 10. TOWEL PULL-UP



FIGURE 11. TOWEL INVERTED ROW



FIGURE 12. TOWEL INVERTED ROW



FIGURE 13. TOWEL KETTLEBELL SWING



FIGURE 14. TOWEL KETTLEBELL SWING



FIGURE 15. TOWEL KETTLEBELL FRONT RAISE

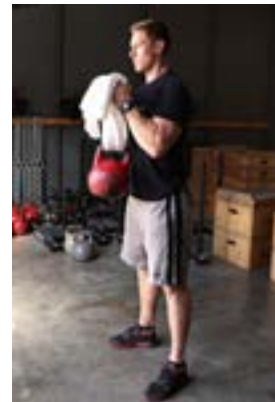


FIGURE 16. TOWEL KETTLEBELL FRONT RAISE



FIGURE 17. WEIGHTED PINCHING



FIGURE 18. WEIGHTED PINCHING



FIGURE 19. WEIGHTED PINCHING



FIGURE 20. WEIGHTED PINCHING - TWO HANDS



FIGURE 21. SINGLE-ARM PLATE FLIP



FIGURE 22. SINGLE-ARM PLATE FLIP



FIGURE 23. SINGLE-ARM PLATE FLIP



FIGURE 24. TWO-ARM PLATE FLIP



FIGURE 25. TWO-ARM PLATE FLIP



FIGURE 26. TWO-ARM PLATE FLIP



FIGURE 27. FARMER'S WALK



FIGURE 28. FARMER'S WALK



FIGURE 29. GRIP VARIATION



FIGURE 30. KETTLEBELL SINGLE-ARM FARMER'S WALK



FIGURE 31. KETTLEBELL SINGLE-ARM FARMER'S WALK



FIGURE 32. KETTLEBELL SINGLE-ARM UNILATERAL CARRY



FIGURE 32. KETTLEBELL SINGLE-ARM UNILATERAL CARRY