

Power training for judo: Plyometric training with medicine balls

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Since its inception as an Olympic event in 1964, judo has developed immensely, both as an art and sport. Like most sports today, judo training has become more sophisticated in recent years and many good technical books have been published as a result (1, 8). The bulk of literature, however, has focused primarily on judo techniques in contrast to the training of judoka for competition. Although judo is highly technical in nature, it is commonly accepted that when all considerations are equal or nearly equal, victory will fall to the stronger opponent.

The Need for Strength in Judo

In a combative sport such as judo, overall body strength and the ability to attack quickly are distinct advantages. Competitors are matched by weight, so high strength per unit of body mass is preferred. The short, explosive bursts of activity associated with attack and defense require an emphasis on strength and power.

The effectiveness and role of strength in judo has been recognized for some time. A comprehensive view of strength training has been documented (5). A systematic weight-training program

was reported to have been instrumental in Anton Geesink's Olympic victory in 1964 (1). More recently, it was stated that the serious judoka needs a program that encompasses many types of training, including total body strength, power, aerobic and anaerobic capacity, muscular endurance, flexibility and judo skills (4).

The need for total body conditioning reflects the nature of the activity encountered in the sport. Judo involves gripping, standing movements, throwing, ground fighting and other situations often found in one-on-one combative activity. A major attraction in judo is the ippon throw, which ends the match like the knock-out punch in boxing. The attack must be executed with precision and confidence. Many of the movements in standing judo, particularly throwing techniques, require the ability to twist the body and generate power from a certain position. Emphasis should be placed on developing the torso, hip and stomach areas to facilitate these movements.

A plyometric strength training program with medicine balls in various drills can be used by athletes and coaches to improve their training methods, which may ultimately

improve performance results.

Explosive Power Training

One way to develop explosive power is to use plyometric training principles. Plyometrics are drills or exercises aimed at linking sheer strength and speed of movement to produce an explosive-reactive movement often referred to as power (3). The principle behind plyometrics is the pre-loading or stretching of the muscles, enabling a reflex contraction that is more forceful and powerful.

Although plyometrics have been credited with exceptional performance in the past, such as sprinter Valeri Borzov's 100-meter win in 1972 and high jumper Dwight Stone's success, the use of plyometrics in training programs has been somewhat limited over the years, partly due to its recent application to Western sport, and also because it is not yet fully understood (7).

Plyometric training is relevant to any sport that requires power. For example, consider the wrestler initiating a double-leg takedown, the volleyball player jumping to block the ball at the net, or the hockey player winding up before a slap shot. Plyometric training is also

Table 1. Medicine Ball Exercises for Judo

Exercise	Body Part/Muscle Group	Application to Judo
Back throw Straight over To one side	Legs, hips, arms, shoulders, quadriceps, lower back, trapezius, hip flexors	Lifts, back-bending throws (e.g., "ura nage")
Chest pass Seated Kneeling Standing	Chest, arms, shoulders, wrists, pectorals, lats, deltoids, trapezius	Ground work, gripping, arm control while standing
Sit-up	Stomach, arms, shoulders, abdominals, lats, pectorals, deltoids	Ground defense from back position, overall body strength, general body strength in stance
Torso throw To front To side	Upper torso, arms, shoulders, obliques, deltoids, trapezius	Preparatory pulling (e.g., "kuzushi"); front-bending throws (e.g., "seoi nage")
Trunk pass Back to back Side throw	Mid-torso, lower back, hips, abdominals, obliques, lats, biceps, pectorals	Development of power for twisting movements for throw entries

applicable to judo, particularly because match activity is characterized by quick, explosive attacks occurring over a five-minute match period.

Training with Medicine Balls

Medicine balls have been widely used in various athletic and recreational activities, yet they are often overlooked in combative training

programs. Medicine balls have been used in some sports, such as track and field, where plyometrics have been devised primarily for throwing and sprinting events.

Plyometric training with medicine balls is well suited to judo for a variety of reasons. The medicine ball "is weighted and serves as a way of eccentrically loading the musculature of the

upper body as well as implementing sport-specific exercise routines" (3). Medicine ball drills can be implemented directly in the "dojo," or training room, allowing for a convenient method of monitoring training. Drills can simulate specific actions not normally reproduced by standard weight-training equipment. One can move the balls freely as a result, and they are par-



Figure 1. Starting position: back throw



Figure 2. Back throw action sequence



Figures 3 and 4. Back throw - to one side

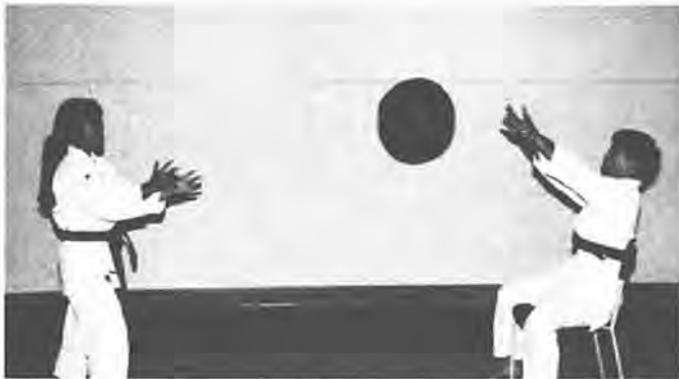


Figure 5. Chest pass - seated



Figure 6. Chest pass - kneeling



Figure 7. Chest pass - kneeling



Figure 8. Chest pass - standing

ticularly useful in the twisting movements involved in judo throwing techniques. Medicine balls also keep the athlete aware of his or her center of gravity (6) and hence, improve balance.

Exercises with Medicine Balls

The following exercises can be easily incorporated into a regular training session for judo. Each exercise involves muscular actions used in judo, focusing on major muscle groups. **Table 1** shows the name of each exercise, the major muscle groups used and their application to judo.

Back throw straight over. Start in a semi-squat position (**Figure 1**), holding the medicine ball off the

ground and keeping the arms straight, back straight and head forward. The action sequence (**Figure 2**) involves extending out of the squat position and thrusting the medicine ball over the head behind to a gym wall or partner. The action is done as forcefully and quickly as possible, concentrating on leg and hip extension and throwing the arms back, maintaining full extension.

Back throws to open side. Start in a semi-squat position similar to that of the straight-over back throw. The action involves throwing the ball over one shoulder using a twisting action in the torso (**Figures 3 and 4**). Alternate sides after one side has been completed.

Seated chest pass. Start seated

in a chair with both feet flat on the mat. Tie a belt around the chest to the back of the chair to prevent excessive movement. The medicine ball is held on either side and away from the chest. The athlete brings the ball toward the chest and quickly throws it away, similar to a basketball chest pass (**Figure 5**). The arms are extended in the follow-through.

Standing chest pass. Start standing, with one partner designated as the passer and the other as the catcher. The catcher catches the pass and throws the ball back to the passer, so that he or she can perform the passes as quickly as possible (**Figure 8**). The passer steps forward with the left and right foot alternatively when passing.

Table 2. 12-week Training Program

Exercise	Preparatory Phase				Competitive Phase	
	Weeks 1-2	Weeks 3-4	Weeks 5-6	Weeks 7-8	Weeks 9-10	Weeks 11-12
Sit-up	1 x 10-15	2 x 10-15	3 x 15-20	3 x 15-20	2 x 15-20	1 x 10-15
Chest pass (seated, kneeling or standing)	1 x 15-20	2 x 15-20	3 x 20-25	3 x 20-25	2 x 20-25	1 x 15-20
Trunk pass (back to back or side)	1 x 15-20	2 x 15-20	3 x 20-30	3 x 20-30	2 x 20-30	1 x 15-20
Back throw (straight over or to side)	1 x 10-15	2 x 10-15	3 x 10-20	3 x 10-20	2 x 10-20	1 x 10-15
Torso throw (to front or to side)	1 x 10-15	2 x 10-15	3 x 10-20	3 x 10-20	2 x 10-20	1 x 10-15
Frequency (per week)	1	2	2	2	1	1
Extra sets	Testing	+1 option	+ 2 options Testing	+ 2 options	+ 1 option Testing	

Decrease the time between the pass and catch.

Sit-ups. Start in the upright position, with feet interlocked with a partner. One partner starts with the ball over the head and arms extended (**Figure 9**). The receiving partner catches the ball and falls backward due to its momentum. This works the abdominal muscles. Both partners should keep their arms extended and throw the ball in a large arc to create as much momentum with the ball as possible.

Torso throws to front. Start by holding the medicine ball in front, with the top hand slightly behind the ball and the bottom hand supporting the weight of the ball (**Figure 10**). With the left hand on the bottom, swing the ball to the left side and quickly throw it to the front, pushing with the right hand placed behind the ball (**Figure 11**). The pushing action of the arm behind the ball is emphasized with the trunk rotation to develop kuzushi, or arm strength, for breaking an opponent's balance upon entering throws. Alternate sides after one side has been completed.

Torso throws to side. The action is similar to the throw to the front torso twist, with the difference in the follow-through and change of

direction of the pass. Throwing the ball to the side allows for more torque in the trunk (**Figure 12**).

Trunk back pass. Start with both partners standing back to back. The aim is to receive and pass the ball around from side to side as quickly as possible. To facilitate passing, one partner grips the ball on the top and bottom, and the other on each side (**Figure 13**). When twisting, try to keep the hips facing forward to avoid turning the entire body. Change directions and alternate grips accordingly (**Figures 14 and 15**).

Trunk pass side throw. Start with a wide stance and a partner to one side. Initiate the pass by twisting the torso slightly in the opposite direction and then quickly and forcefully passing the ball to the partner (**Figures 16 and 17**). A full body twist with arms, hips and torso should be used. Change direction of the pass when one side has been completed.

General Training Program

The following information will provide a starting guideline for supplementary strength/power training for judo. **Table 2** shows a 12-week training program that uses the exercises described above. The pro-

gram is divided into bi-weekly cycles, allowing for progressive loading and adaptation of the exercises. The general structure of the program accounts for the build-up of volume between the fifth and eighth weeks, followed by a decrease in conjunction with the competitive schedule.

Individual differences must be taken into account when establishing the optimal number of repetitions and sets for each exercise. Frequency of training should not exceed three times per week. Other considerations and points of information are:

- A sound strength base should be developed before starting a plyometric strength program.
- It is important to learn the proper technique of the exercises before attempting to stress or overload the muscle groups.
- Warm-up adequately before starting plyometric exercises. A proper cool-down is also required.
- Intensity is a key in plyometric training. Perform the exercises as quickly and forcefully as possible. This will ensure a maximal reflex response in the muscular contraction.
- Take adequate rests between



Figure 9. Sit-ups



Figure 10 and 11. Torso throw



Figure 12. Torso throw, side to side



Figure 13, 14 and 15. Trunk passes, back to back



Figure 16 and 17. Trunk passes - side throwing

sets (usually three to four minutes).

- Do not overload the resistance medicine ball weight) so that it negates the effectiveness of the exercise.
- Training sessions can be scheduled after a technique session or incorporated as part of a workout. Avoid plyometric training after heavy training sessions, because fatigue may affect the quality of training.
- During the competitive season, training can be decreased to one session per week.

Testing

Two simple testing procedures can be periodically incorporated during a training program.

Medicine ball pass. This test measures upper body strength. Use the seated medicine ball exercise described earlier (Figure 5). The distance from the chair to the point of contact is used as the measure for determining performance. Any distance under 10 feet indicates the need for a lighter ball.

Vertical jump. This test measures lower body strength. The athlete jumps from a flat-footed standing position and reaches as high as possible along a wall or pole. The fingers are dusted with chalk so that the reach is easily marked. The distance between the jumped mark and the standing reaching distance is the athlete's jump reach height. The best jump of three trials is used, with approximately one minute of rest between jumps to ensure adequate recovery of the muscle systems.

Testing establishes the athlete's baseline strengths and weaknesses and provides data for an individualized training program. Tests also provide information on the effectiveness of the program. Testing can motivate the athletes and facilitate monitoring of training and improvements.

Summary

The introduction of judo in the 1964 Olympic games elevated the competitiveness of the judoka, whereby training has become more sophisticated. Strength has been identified as an important component of judo, and strength-training methods have been incorporated into the programs of serious judokas. A form of strength training is plyometrics, which is based on the stretch-reflex contraction of the muscle, increasing power in the muscle groups used. The application of plyometrics to judo is warranted given the short, explosive burst of activity encountered in attack and defense during a match. The use of medicine balls in a plyometric program can be implemented easily during a judo practice session. Medicine ball exercises also provide a closer simulation of actions used in judo, and a greater awareness of an external mass along with balance and center of gravity. ●

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