RESEARCH REVIEW JOURNALS
Volume-04
Issue-03
March -2019

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com [UGC Listed Journal]

Effect of Short-Term Unilateral and Bilateral Legs

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ARTICLE DETAILS

Article History
Published Online: 13 March 2019

Keywords
unilateral vertical jump, bilateral vertical jump, unilateral squat, bilateral squat, training groups, strength and power, men and women

ABSTRACT

Effect on strength and power measurements from short-term unilateral and bilateral less resistance exercise. This study was designed to compare the effect on several tests of unilateral and bilateral lower corporeal strength and power of both men and women on the effects of short unilateral resistance (UL) and bilateral Resistance Training (BL) with free weights. A study was completed with thirty-eight males and females (mean body weight 78.3 6 21.47 kg; age 20.74 6 2.6 years). The group practiced with plyometric drills 2 days a week for 8 weeks with free weights and 2 days a week. The resistance training program consisted of a progression from three sets of 15 repetitions to a maximum of 1 repetition (1RM) predicted by 50% of the subject, to 6 sets of five repetitions to a maximum of 87%. For each group, the amount and intensity of training were equal. The free squat was used for unilateral and bilateral strength measurement. Power was measured with a unilateral and bilateral vertical jump test and the Magaria-Kalamen stair-climb test. Covariance analysis was used to analyze gender and group interaction discrepancies between men and women. As a covariate, Pretest values were used. In the unilateral vertical jump height and relative power the UL group improved more than the BL Group. After adjustment to preliminary differences, the better scores were similar between men and women in all tests, with the exception of the unilateral squat. For men or women comparisons between training groups no significant interactions were found on all tests. These results show that UL and BL are equally efficient in improving unilateral and bilateral legal strength and power in men and women without training early.

1. Introduction

In resistance training programs, one-sided or partially unilateral exercises, such as lungen, step-ups and unilateral squats are implemented as aid exercises and receive less emphasis than core exercises. Although USE is typically integrated into most training courses, its focus on the use varies, in part, due to the lack of scientific information on the potential to improve strength and strength of these exercises. The exercises are typically used as a variation in BSE, such as bilateral squats. At the beginning of the resistance training programme, the bilateral squat is typically used to develop a strength base for untrained subjects before using USE. But many competencies which are based on fundamental lower-body movement (running, throwing, hitting , kicking, vertical and horizontal leaps and changing course) are exerted in a unilateral weight-bearing phase in whole or in majority. Resistance exercises must be similar to the mechanics and forces required to obtain the requisite skills in a specific sport to most efficiently improve the results. Research data are needed to determine whether USE could be integrated into a strength and explosive power system in an early stages. During the bilateral supported exercises, the effects of lower body training on strength and power have been extensively investigated. Staron et al . examined muscle adaptation times in the early phase and found similar improvements in muscle cross-sectional area and relative maximum strength in squat and leg press for men and women during the two weeks of 16 sessions of resistence training. Small research data currently reveal the effects of USE in men and women on enhanced strength and power. Negrete and Brophy found a significant correlation between the one-legged squat strength isokinetic in 76 cm•s21 in a weight-bearing position and the vertical one-leg jump in a cross-sectional design for men and women. The isokinetic system Linea used in this study measured force in a standing position during a concentrated phase. During the single leg position, this measurement system provided an outside balance support which could demand different muscle recruitment when the strength is measured in an autonomous position. Several researchers found that the hip abductors were recruited for frontal airplane stabilization using an electromyogram analysis in a single leg position (no external equilibrium support). Cordova et al. found no significant relation between isotonic or isokinetic single-leg pressure with rotary movement at 608•s21 and vertical single-leg reaction force after 5 weeks' training in a group of women at university. After a non-weight, closed-kinetic chain training, the improvement of strength was suggested not correlated with a change of force in a closed-kinetic movement. The impact of free-weight USE on unilateral and bilateral weight-beating strength and strength in men and women is yet to be examined. The purpose of this study was therefore to compare the effect on several unilateral, bilateral strength and power measures in untrained men and women of short-term training with BSE and USE.

2. Flywheel resistance exercise training

Six weeks of training was conducted on a flywheel inert equipment (ExxentrickBox, Exxentrix AB, Stockholm, Sweden) based on a bilateral squat (BG). The two sessions per week were conducted in the same conditions with a minimum of 48 hours of resting between sessions. The sessions were organized into a brief standard warm-up (like previously used in the strength test) as well as 4 sets of seven repetitions of squat

in BG and one unilateral squat (0.05 kg / m2 moment inertia), each leg in UG. In each of the sessions is uniform. A time of 3 minutes between sets was permitted.

3. Unilateral or Bilateral Training to Improve Female Players'

Many sports are performed by unilateral movements, such as running , walking (with some exceptions), play handball and basketball. However, bilateral exercises, including strength elevation, weightlifting, breast swimming and the swimming of butterfly, are also performed. Scientific understanding of the physiological demands of sport is one of the most popular disciplines for men and women worldwide. A handball game consists of a half-time break (15min) of 2 periods (30 min each). Up to 70 per cent of the game is played by handball players on foot or on foot. Since it would be a very slow and calm sport, where not much happens, you 'd quickly rethink your previous assumption once you watched a game. Handball is complex and one of the most rapid team sports worldwide due to the number of repetitive sprints, leaps, contact with the body, duels, spatial changes and specific patterns of physical movement in response to the dynamic tactical situation of the game. Handball is a sport that demands highly on legs and arms, depending on the aerobic ability of the athletes to recover between the anaerobic inputs. Póvoas et al .(2014) indicates that all handball positions have situations and activities of greater or lesser intensity. These situations and actions require the physical condition of the players to meet the intensive requirements. This is done through the implementation of a training system to suit the position of the player. In other words, players performing several explosive jumps and movements in different directions and so on should train so that their bodies have become competent in these neurological requirements.

4. Adaptation and how it Works

In order for trainers to improve some physiological aspects in their athletes, certain training stimuli must be achieved in order to adapt to the desired physiology. This is because adaptation is very specific to the type of training undertaken; it is necessary to establish training programs on energy systems which dominate sport as well as the sport's motor skills and skills. The unilateral or bilateral exercises with similar neurological and physiological demands as sports, which include athletes preparing for sports consisting of unilaterally or bilaterally running, should be carried out in their preparing regimens. To enhance the performance of athletes, the coach must subject the athlete to a systematic and incremental increase of training stimuli designed to increase the physiological performance potential of the athlete. The trainer should therefore design trainings that will systemically challenge the adaptation of the main functions of the body, including the neuromuscular function, our metabolism and the cardiorespiratory system. It is extremely important to ensure this process.

5. Speed and Acceleration

Handball comprises numerous high intense situations, consisting of repeated sprints, jumps, contact with the body, duels and directional changes. In order to perform these movements efficiently and the players must improve their ability to accelerate to high speeds and effectively change direction in the game situation. They need to be able to perform these movements effectively. Speed helps you to quickly cover a distance. The ability to travel quickly in a straight line is a crucial factor of performance in a wide variety of sports. Acceleration is the ability to increase motion speed as quickly as possible. Sprinting performance over short distances (e.g. 5-10 m) is determined by acceleration. It is commonly measured as velocity. The ability to accelerate can determine successful sport performance in team sport as in football and handball. Team sprints are often launched while athletes move at slower speeds or when athletes are willing to break away or start an action. Therefore, it is essential for an effective game for athletes to progress rapidly in the first few moves.

6. Improving Acceleration and COD Performance

Significant association between lower bodily power, measured against back squat exercise, sprint efficiency, and plyometric workouts including counter-motion jump (CMj) and depth jump (DJ) is recorded in a significant number of literature. Handball coaches can use plyometric exercises and strength exercises to increase the acceleration of their athletes' sprint and DCC skills so as to impair and improve their hometasis in these areas. The combination of plyometric and strength training, though, has proven to be more important in increasing the height of the vertical jump and leg strength. The improvement of the players' ability in the game to jump higher and more and generally produce more power with the leg was recommended for a faster 10-metre-long sprint time.

7. Unilateral and Bilateral Contractions

In many ways you can practice unilateral and bilateral training, such as plyometrics, strength training and stretching. As previously not mentioned, both the one-sided and the two-sided are unilateral and bilateral. A unilateral contraction occurs when one extremity contracts at a time, and the two extremities contract at a time. When a bilateral contraction takes place, the term BFD is used to describe the performances decrease in bilateral contractions compared to two unilateral contractions. The term BFD is called the Bilateral Force Déficit (BFD). It is when the resulting force is less than the combined force of individual limb contractions by the bilateral homonymous contraction. In other words, it is most likely that the sum of two unilateral maximum contractions is greater than one bilateral maximum contraction. A small number of studies have shown that unilateral training can be successful in raising intensity rather than bilateral training. This is due to the fact that unilateral strength training allows for higher intensity and muscle stimulation. On the other hand, a significant number of studies show that bilateral exercises are effective in enhancing sprint acceleration and COD ability.

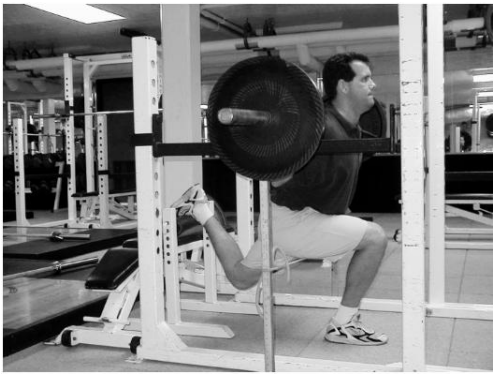
8. Unilateral and Bilateral Training as Sports Specific Training

Studies have demonstrated that unilateral upper limb training improves skills for handball players. While Zbigniew et al .(2013) says that sprinting training is sport specific, for young footballers it is unnecessary. Bompa&Haff (2009) says that excessive sports training can make athletes overtrained or

worse. Bompa&Haff (2009) argues that training for sport is a must to maximize competitive success. Specific training has also shown, in combination with this statement, the use of both single and bilateral rehabilitation exercises and pre-rehabilitation exercises for M muscular breaks. Semitendinosus, Semimembranosus and Semitendinosus. Femora's Biceps. In conclusion, sports training does not only improve the success of sportsmen, but it may also help to reduce the incidence of sports injuries.

9. Training Protocol

After two weeks of training and two weeks of testing, the two groups followed the training-resistance programs for 8 weeks 2 days a week. As key exercises to optimize strength and power development both BSE and Usage were introduced. The core of the BSE was bilateral front squats and squats, and unilateral squat, lung and step-up were the core of the USE. Each session of the UL Group was unilateral, with lungs or step-ups, alternating with each workout.



For both classes, amounts and intensities of training were similar based on sets, reps, and percentage of each RM expected. The two programs excluded upper-body exercises to prevent the potential improvement in strength or power of the upper corpus from altering the outcomes. The two groups rose from three sets of fifteen repeats to 50% of every 1RM predicted to six, with five replicates 87% over a period of eight weeks. The UL Group performed unilaterally two days a week, 3–8 weeks, while before the resistance training the BL group performed bilateral plyometric. Each group of sessions completed pogo jumps and vertical counter-movement springs with 3 5 to 3 sets of 15 sets between week 3 and week 8. each session. The pogo jump was performed with minimal hip and knee flexion at landing before the vertical jump was rebounded for the maximum height and the vertical jump was completed on a half to three-fourths squat counter movement. The post-testing was done with the same protocols as described previously for baseline testing after the eight-week training period.

10. Handball Specific COD-Test

The COD capacity assessor for Spasics (2015) has been modified to suit the available technology. The distinction between the modified and the original versions was that cones were removed, which were randomly lit, to eliminate the freedom of choice among subjects. Instead, the cones attached originally to the Ivar network of Spasics were hypothetically removed and replaced by a spot marked with a tape on the floor which didn't light up. The starting location of the tests is the same as the initial test, with a range of three meters to the X-marked point. Instead of 1.5 metres, the Ivar Run system was placed on the start line. Things ran in a right direction towards the X-marked place, laterally to the left cone, then to the X-marked sport on the side and continued to run laterally towards the right cone, and again laterally back to theX-marked place.

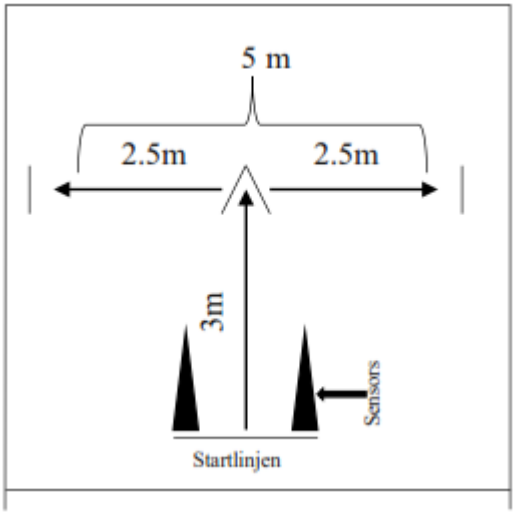


Figure 1. Handball specific COD ability assessor based from Spasics

11. Exercise Standardizations

The subjects were instructed to conduct a total of 27 different training exercises during the six weeks of the training. 24 plyometric exercises and 3 strength exercises. The difference between plyometric and strength is that plyometric consists of movements that are bodyweight only for the subjects. Meanwhile, external weights (e.g., beakers, dumbbells, medicine balls etc.) are exercised for strength. The weight was calculated by individuals and told them to find a weight that suited their strengths and was only necessary to accommodate the required number of repetitions. Both squat motions had to be carried out at a knee angle of 90 degrees. This exercises were back squat, front squat with medicine ball, and single legged squat, see figure 2, 3, and 5.

Figure 2, demonstrates a bilateral back squat, as well as the desired knee angle. The weight of the barbell was decided by the subjects and what they thought they could handle

Figure 3, demonstrates a bilateral front squat with medicine ball, as well as the desired knee angle. The weight of the medicine ball was 10kg, heavier weights were not used due to lack of equipment

Figure 4, demonstrates a unilateral exercise called single legged squat, along with the desired knee angle.

Along with the different squat exercises, the two groups were instructed to perform bilateral and unilateral Hip Extensions and Lunges, see figure 5, 6 and 7.

Figure 5, a bilateral hip extension performed with desired execution.

Figure 6, a unilateral hip extension performed with the desired execution.

Figure 7, a demonstration of the unilateral exercise lunge being performed with the desired angles.

All strength exercises were demonstrated with a certain tempo, the tempo which the strength exercises were to performed at was “@30X0”. Meaning the first number equals a threesecond eccentric phase, the second digit equals a zero second paus at the bottom of the movement, the letter X represents an explosive concentric phase and the fourth and final number represents a zero second paus at the peak of the concentric movement.

12. Conclusion

The improved bilateral power and strength measures in men and women after UL and BL were not considerably different from these studies. The improvement in all unilateral and bilateral tests among men and women was similar, excluding the unilateral squat. The small effect size of the unilateral squat difference indicates that further research is warranted before it suggests that men improve more than women. Data in this study also show that USE could improve vertical jumping performance more efficiently than BSE. The USE and BSE training protocols were equally effective in increasing MK performance in both men and women at an early stage. Since untrained individuals participated in this study, we anticipated improved strength and strength on tests similar to training. Training subjects with USE could increase bilateral strength and power in the early training period, in line with topics which had been trained with BSE, when incorporated into the education program and treated as core exercises. The bilateral squat is the training in untrained topics that is typically included in the early stage of the training programme, in order to quickly build strength in order to incorporate aid practices, like the USE. Including only USE in the training program at an early stage does not reduce the maximum bilateral strength and strength of unskilled men and women in the short term, according to our data. The data also show that in the early stage of a resistance training program designed to improve vertical jumping unilateral performance in untrained men and women, the USE should be given priorities. Future studies should include athletes trained to resist and extended training to determine whether similar results can be found. With a longer training period, difference in strength and power may appear, as potential improvements in hypertrophy and neurological adjustments to the performance of these tests contribute. The effect of USE on other sport-specific skills should also be determined through future trials. In order to

improve their strength and functionality, strength and conditioning experts need more information to determine the importance of USE being put into the training programs of their subjects.

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