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A study on effect of resistance training and plyometric on arm and leg explosive strength in Kabaddi players of Karnataka

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Abstract

The purpose of the present study was to observe the effects of a specific combined training programme (Resistance Training and Plyometric training) on leg and Arm explosive strength development in Kabaddi players. For the purpose of the study 60 Kabaddi players (Junior players=30, Senior players=30) aged from 17 to 18 years, and all of them volunteered for the study, the experimental group was treated with resistance training programme followed by Plyometric training programme, 4 days a week for 12 weeks. A Pre test was conducted before, and followed by a post test after 12 weeks of training for the subjects, for upper and lower extremity explosive strength. The results of the study stated that the complex training to improve the upper and lower body explosive strength level in Kabaddi players gave a positive effect by improving their performance.

Keywords: Resistance training, plyometric training, Kabaddi players

Introduction

Kabaddi is well-known to everyone as the game of entertaining masses, the popularity; simple and basic nature of play has attracted people to the core. As the game does not need any high cost equipments as well as a technically complicated instrument to use in its conduct. Though it is basically an outdoor sport played on clay court, now a days the game is being played on synthetic surface, with players playing with shoes, the game taken a different dimension in itself, and had attained a great success. Kabaddi is a unique body contact game with the basic idea of the game is to score points by raiding into the opponent's court and touching as many defense players as possible without getting caught on a single breath. During play, the players on the defensive side are called "Antis" while the player of the offense is called the "Raider" the game of Kabaddi perhaps the only combative sport in which attack is an individual attempt while defense is a group effort. The Kabaddi perhaps is one of the few sports to combine yogic characteristics with physical activity.

The game of Kabaddi contains physical qualities such as Agility, good lung capacity, Muscular co-ordination, presence of mind and quick responses. For a single player to take on seven opponents is no mean task, requires courage as well as an ability to concentrate and anticipate the opponent's strategies. The sport has a long history dating back to pre-historic times. It was probably invented to ward off group attack by individuals and vice-versa. The game is very popular in the southern part of Asia in its different forms.

Strength is the maximal force that an individual can apply against a pre-determined load. Wherein Neuro-muscular system work against the resistance. Strength in an individual depends on many issues, age, gender, hormones, body growth; scientifically designed systematically executed plans are among them.

Strength is one of the main fitness components, important for success in many sports. Certain sports, such as weight lifting, wrestling and weight throwing, it is the most important physical attribute. In many other sports, including team sports like Football and Basketball, good strength is very important as part of the overall fitness profile. So having Resistance training as part of main training regime will enhance one's performance.

Strength training may be related to sports performance by incorporating and activating specific muscle groups in addition to relevant movement required by a sport.

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A plan that is put into place to increase the demand placed on muscles through strength training will then in turn increase lean muscle and its performance efficiently and effectively. Strength training does help sports performance, but it is important to remember it is only one component of an integrated program. Every sport demands a certain level of strength, power, endurance, speed, and more from athletes. Explosive strength is defined as the maximum amount of strength and speed needed for a specific sport or task. Additional force without a motive can in fact lead to injury by decreasing flexibility and mobility. Determining what kind of strength and from what starting positions are needed is the first step in building out a resistance training program. Once the athlete and coach understand the specific tasks of the sport they can plan out a strategy to incorporate strength training in the program at just the right amount and type needed. An attempt is done through this study to incorporate different training sessions and performance. Plyometric training involves the usage of jumps, hops, bounds, and/or skips; this form of training is governed by the stretch-shortening cycle, otherwise known as the reversible action of muscles. Plyometric activities can be separated into two categories depending upon the duration of the ground contact time: 1) fast plyometric movements (≤ 250 ms); and 2) slow plyometric activities (≥ 251 ms). This training modality appears to be very effective for improving athleticism in both youth and adult populations. Moreover, both land- and aquatic-based plyometric training appears to be a potent stimulus for improving athletic qualities. As plyometric activities are highly-coordinated and skilful movements, they should be coached with full care and attention by qualified personnel. Though training volume is relatively easy to measure, training intensity is far more complex due to the individual variability of each athlete.

Purpose of the study

The purpose of the present study was to examine the influence of resistance training and plyometric training, on lower extremities explosive strength and to examine the influence of resistance training and plyometric training, on upper extremities explosive strength

Material & Methods

The study was designed to assess the effects of a complex training programme on the explosive strength development of Kabaddi players. For the study 30 junior and 30 senior Kabaddi players aged from 17 to 18 years were selected as subjects for the study. A Pre test was conducted followed by a post test after 12 weeks of training for the subjects, for upper and lower extremity explosive strength. Before each training session, all the subjects performed 10 minutes of low to moderate warming up exercise and stretching. Investigator demonstrated the correct method of performing each plyometric and resistance exercises for the better understanding of the subjects. The complete training protocol is illustrated as below.

Selection of variables

All the subjects were Kabaddi players who were selected to represent Karnataka state. An informed consent was taken from all the subjects and their parents informing them the outcomes of the study. The junior group was control group and the senior group was experimental group. The experimental group was treated with resistance training programme followed by Plyometric training programme, 4 days a week for 12 weeks.

Workout Schedule

Table 1: Week 1-6 Endurance and Hypertrophy

Day	Name of the exercise	Set	Reps- 1 st to 6 th week	Reps- 7 th to 12 th week	Rest
Day -1	Dumbbell bench press	5	6-12	12-20	60sec
	Incline smith machine bench press	4	6-12	12-20	60sec
	Bench dip	4	6-12	12-20	60sec
	One-arm triceps pushdown	4	6-12	12-20	60sec
Day-2	Single-arm cable chest fly	3	6-12	12-20	60sec
	Leg press	5	6-12	12-20	60sec
	Hack squat to calf raise	5	6-12	12-20	60sec
	Leg curl	4	6-12	12-20	60sec
Day-3	Single-leg step-up	3	6-12	12-20	60sec
	Bulgarian split squat	3	6-12	12-20	60sec
	Standing calf raise	4	15-20	25-30	60sec
Day-3 Rest day					
Day-4	General pull-up	10	6-12	12-20	60sec
	Weighted decline sit-up	10	6-12	12-20	60sec
	Lat pull down	5	6-12	12-20	60sec
	Underhand-grip lat pull down	5	6-12	12-20	60sec
	Russian twist	5	6-12	12-20	60sec
	Seated cable row	3	6-12	12-20	60sec
	General plank	3	max time	max time	60sec
Day	Name of the exercise	Set	Reps- 1 st to 6 th week	Reps- 7 th to 12 th week	Rest
Day -4	Incline reverse dumbbell fly	4	6-12	12-20	60sec
	One-arm concentration curls	4	6-12	12-20	60sec
Day-5 Rest day					
Day -6	Single-arm dumbbell shoulder press	5	6-12	12-20	60sec
	Walking lunge to dumbbell press	4	6-12	12-20	60sec
	Cable lateral raise	4	6-12	12-20	60sec
	Cable front raise	4	6-12	12-20	60sec
	Dumbbell shoulder press	4	6-12	12-20	60sec
Day-7 Rest day					
	Standing calf raise	5	15-20	25-30	60sec

Table 2: Workouts for improving leg and Arm Explosive strength

Day	Name of the exercise	Set	Reps- 1 st to 6 th week	Reps- 7 th to 12 th week	Rest
1, 2. 4. 6	Single arm Dumbbell Snatch	3	6-12	12-20	3min
	Plyometric Push Up	2	6-12	12-20	3min
	44 inch Box jump	3	6-12	12-20	3min
	Drop jumps	3	6-12	12-20	3min

Tests for measuring arm and leg explosive strength**Overhead medicine ball throw (Forward)**

Medicine ball throw tests are used for assessing power. The Overhead throw for distance is a test of upper body strength and explosive power.

Aim: This test measures upper body strength and explosive power.

Equipment required: 2-5 kg medicine ball depending on the age group being tested, tape measure

Procedure: The subject stands at a line with the feet side by side and slightly apart, and facing the direction to which the ball is to be thrown. The ball is held with the hands on the side and slightly behind the center. The throwing action is similar to that used for a soccer/football sideline throw-in. The ball is brought back behind the head, then thrown vigorously forward as far as possible. The subject is permitted to step forward over the line after the ball is released, and is in fact encouraged to do so in maximizing the distance of the throw. Three attempts are allowed.

Scoring: The distance from the starting position to where the ball lands is recorded. The measurement is recorded to the nearest 0.5 foot or 10 cm. The best result of three throws is used.

Vertical jump Test: The vertical jump test is a test of lower body power. The test was first described nearly 100 years ago (Sargent, 1921)

Purpose: to measure the leg muscle power

Equipment required: measuring tape or marked wall, chalk for marking wall (or Vertec or jump mat).

Procedure: the athlete stands side on to a wall and reaches up with the hand closest to the wall. Keeping the feet flat on the ground, the point of the fingertips is marked or recorded. This is called the standing reach height. The athlete then stands away from the wall, and leaps vertically as high as possible using both arms and legs to assist in projecting the body upwards. The jumping technique can or cannot use a countermovement (see vertical jump technique). Attempt to touch the wall at the highest point of the jump. The difference in distance between the standing reach height and the jump height is the score. The best of three attempts is recorded.

Scoring: The jump height is usually recorded as a distance score. See the vertical jump norm table to rate scores. For more information, see a selection of vertical jump test results. It is also possible to convert jump height into a power or work score.

Statistical Procedure

The results of the pre and post intervention was subjected to paired t test, mean (SD) of pre-value, mean (SD) of post-value Mean of score difference and P value. A Significant +ve P value (<0.05) = significant improvement after intervention, as shown by mean of score difference.

Results

The Results of the study stated, the pre and post-test for explosive strength scores, in the groups, at base lines and after the training programme, are presented in the table.

Table 3: The pre and post-test for explosive strength scores, in the groups, at base lines and after the training programme

Test name	Groups	Pre	post	p-value
overhead Medicine ball Throw (Forward)	Exp. Group	3.35±0.29	3.84±0.29	9.69*
	Con. Group	3.28±0.34	3.28±0.27	0.0053
Vertical jump test	Exp. Group	24.33±2.23	29.3±1.98	2.055**
	Con. Group	25.03±2.43	25.4±1.86	0.163

Discussion of Findings

The groups were similar on pre-test, but significant differences were observed post test for experimental group, in both the variables.

The main findings of the study stated that, the Markable increase in the height of the vertical jump and the distance of the medicine ball throw was observed, which proved the effectiveness of Resistance training and plyometric training, the experimental group improved in both the measured variables, from pre to post testing. The control group also improved in vertical jump and increase in medicine ball put but not to markable level. In the present study, the training programme was designed to improve muscular power levels, focusing on vertical jump and medicine ball throw.

Conclusion

Finally it was concluded from the present study, that the combined training programme (selected resistance training

and Plyometric training) increases arm and leg explosive strength among junior and senior Kabaddi players of Karnataka state. A selective model of training schedule is very much needed to be executed in systematic and scientific way for better results

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