



EFFECT OF ISOTONIC TRAINING AND ASANAS PRACTICES ON MUSCULAR STRENGTH AND MUSCLES MASS OF ADOLESCENT BOYS

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ABSTRACT

The purpose of the study was to find out the effect of isotonic training and asanas practices on muscular strength and muscle mass of adolescent boys. To achieve the purpose of the study thirty (30) adolescent boys in the age group of 15-17 years were selected from Zillaparishad high school, Jajapur, Mahaboobnagar district, Telangana state, India. Muscular strength and muscle mass were assessed by pull-ups and Body fat scale (Bioelectrical impedance analyser). The subjects (N=30) were randomly assigned to two equal groups of 15 subjects each. The groups were assigned as Isotonic training and Asanas practices group (ISNAPTG) and control group in an equivalent manner. The experimental group (ISNAPTG) participated in isotonic training and asanas practices for a period of 8 weeks. The control group did not participate in any specific activities and they followed their regular routine. The subjects of the two groups were tested on selected variables prior and immediately after the training period. The collected data were analyzed statistically through dependent 't' and 0.05 level of confidence was fixed to test the level of significance difference, if any between groups. The results of the study showed that there was significant level differences exist between isotonic training and asanas practices group (ISNAPTG) and control group on muscular strength and muscle mass.

KEYWORDS: Isotonic training, Asanas practices, Muscular Strength, Muscles Mass.

INTRODUCTION

Resistance training is proven to be safe and effective for adolescents when it is properly designed and supervised. The research studies recommend resistance training for young people to enhance muscular strength, prevent sport injuries, improve performance in sports and recreational activities, and affect health and lifestyle in a positive way (1, 2, 3). Resistance training, also known as strength or weight training, has become one of the most popular forms of exercise for enhancing as individual's physical fitness as well as for conditioning athletes. The terms strength training, weight training, and resistance training have all been used to describe a type of exercise that requires the body's musculature to move (or attempt to move) against an opposing force, usually presented by some type of equipment. The increasing number of health club, school, and college resistance training facilities attests to the popularity of this form of physical conditioning. Individuals who participate in a resistance training program expect the program to produce certain health and fitness benefits, such as increased strength, increased fat-free mass, decreased body fat, and improved physical performance in either a sporting activity or daily life activities (4). In addition to active games and aerobic exercise, regular participation in strength-building activities also should be incorporated into the weekly routine of school-aged youth (5).

ISOTONIC TRAINING

Isotonic is a muscular action in which muscle

exerts a constant tension. A better term for resistance training exercise in which the external resistance and weight does not change in both the lifting (concentric) and lowering (eccentric) phase is training. Dynamic constant external resistance (DCER) implied that the weight or resistance being lifted is constant and held constant and not that the force developed by a muscle(s) during the exercise is constant. When using free weights and many machines, the external resistance or weight lifted is held constant throughout the exercise movement (6) One of the main benefits of isotonic exercise is that it doesn't require extensive equipment. Portable items like dumbbells, kettlebells, medicine balls and other similar tools are all ways to fit isotonic exercise into any space or environment. More of the benefits of isotonic exercise are related to the use of resistance. The weight of the above fitness tools provides resistance that the body has to work against. This helps strengthen muscles in several ways. Those who have access to a range of free weights or fixed weights can pursue progressive resistance. This can provide assistance with a range of fitness goals. Working out with lighter weights through more isotonic repetitions will make muscles stronger and more able to handle challenges across their entire range of motion. When users work out with much heavier weights, it causes a specific increase in muscle size, because the high weight load leads to tiny tears in the muscle tissue. This causes enlarging of the muscle when they're repaired by the body. Isotonic strength was measured based on the 1RM test, which was begun at 50% of the subject's body weight, with increases of 30% and based

on the subject's perception until reaching the maximum load with which the subject could execute the movement without mechanical failure. No more than five attempts were permitted for the determination of maximum load; otherwise the test was considered invalid and the subject had to repeat the procedure another day (7)

ASANAS PRACTICES

Hatha yoga enhances the capacity of the physical body through the use of a series of body postures, movements (asanas), and breathing techniques (pranayama). Although numerous styles of Hatha yoga exist, the majority of studies included in this manuscript utilized the Iyengar style of yoga. The Iyengar method of Hatha yoga is based on the teachings of the yoga master B.K.S. Iyengar (8). The physical exercises (asanas) may increase flexibility, coordination, and strength, while the breathing practices and meditation may calm and focus the mind to develop greater awareness and diminish anxiety (9) and thus result in higher quality of life. Other beneficial effects might involve a reduction of distress, blood pressure, and improvements in resilience, mood, and metabolic regulation (10). In recent years, no study has examined the effects of isotonic training and asanas practices in adolescent boys. Therefore, the present study aim to investigate the effect of isotonic training and asanas practices on muscular strength and muscles mass of adolescent boys.

METHODS

To achieve the purpose of the study thirty (30)

adolescent boys in the age group of 15-17 years were selected from Zillaparishad high school, Jajapur, Mahaboobnagar district, Telangana state, India. The subjects (N=30) were randomly assigned to two equal groups of 15 subjects each. The groups were assigned as Isotonic training and Asanas practices group (ISNAPTG) and control group in an equivalent manner. The training program was administered for three alternate days (Monday, Wednesday and Friday) one week and 8 weeks in total. The subjects involved in isotonic training were about 60 minutes for morning and evening asana practices lasted 45 minutes. Intensity was set at 50% for the 1st four weeks and 60% for the 2nd four weeks.

TESTING PROCEDURES

The subjects of the three groups on selected variables i.e. muscular strength and muscle mass were assessed by pull-ups and Body fat scale (Bioelectrical impedance analyser) prior and immediately after the training period. A standardized 15 minute warm-up consisting of submaximal aerobic exercises and stretching exercises proceeded to conduct the pull-ups test.

TRAINING PROGRAM

Isotonic training and asanas practice for experimental group (ISNAPTG) was described in Table-1,2,3 and 4 as follows.

TABLE I.
FIRST FOUR WEEKS OF ISOTONIC TRAINING (MORNING SESSION)

S.No	Name of the exercise	Intensity	Repetition	Duration for 1 set	Rest between set	Total Sets	Total Duration
01	Warming up	50 %					10 minutes
02	Over head press	50 %	8	60 seconds	60 seconds	2	40 minutes
03	Lunges	50 %	8	60 seconds	60 seconds	2	
04	Bench press	50 %	8	60 seconds	60 seconds	2	
05	Squat	50 %	8	60 seconds	60 seconds	2	
06	Bent Over Rows	50 %	8	60 seconds	60 seconds	2	
07	Dead lift	50 %	8	60 seconds	60 seconds	2	
08	Dumbbell shrugs	50 %	8	60 seconds	60 seconds	2	
09	Standing Barbell Calf Raises	50 %	8	60 seconds	60 seconds	2	

10	Lying crunches	50 %	8	60 seconds	60 seconds	2	
11	Lying leg raise	50 %	8	60 seconds	60 seconds	2	
12	Cooling down						10 minutes
	Total duration						60 minutes

TABLE II
SECOND FOUR WEEKS OF ISOTONIC TRAINING (MORNING SESSION)

S.No	Name of the exercise	Intensity	Repetition	Duration for 1 set	Rest between set	Total Sets	Total Duration
01	Warming up						10 minutes
02	Over head press	60 %	10	55 seconds	45 seconds	2	40 minutes
03	Lunges	60 %	10	55 seconds	45 seconds	2	
04	Bench press	60 %	10	55 seconds	45 seconds	2	
05	Squat	60 %	10	55 seconds	45 seconds	2	
06	Bent Over Rows	60 %	10	55 seconds	45 seconds	2	
07	Dead lift	60 %	10	55 seconds	45 seconds	2	
08	Dumbbell shrugs	60 %	10	55 seconds	45 seconds	2	
09	Standing Barbell Calf Raises	60 %	10	55 seconds	45 seconds	2	
10	Reverse-Grip Barbell Curls	60 %	10	55 seconds	45 seconds	2	
11	Walking lunges	60 %	10	55 seconds	45 seconds	2	
12	Russian twist	60 %	10	55 seconds	45 seconds	2	
13	Bicycle crunches	60 %	10	55 seconds	45 seconds	2	
14	Cooling down						10 minutes
	Total duration						60 minutes

TABLE III
FIRST FOUR WEEKS OF ASANAS PRACTICES (EVENING SESSION)

S. No	Asanas	Duration	Duration for 1 repetition of asana	Rest between asana	Repetition	Total Duration
1	Prayer	2 minutes				
2	Warming up	6 minutes				8 minutes
Standing						
3	Tadasana		60 seconds	60 seconds	2	32 minutes
4	Pirayāsana		60 seconds	60 seconds	2	
Sitting						
5	Pāchīmothāsana		60 seconds	60 seconds	2	
6	Mātsyāsana		60 seconds	60 seconds	2	
Supine lying						
7	Sarvangāsana		60 seconds	60 seconds	2	
8	Uttanpadasana		60 seconds	60 seconds	2	
Prone lying						
9	Arthasālabāsana		60 seconds	60 seconds	2	
10	Bujangāsana		60 seconds	60 seconds	2	
Relaxation						
11	Savāsana	5 Minutes				5 Minutes
(60 seconds + 60 seconds = 120 seconds x 8 asanas x 2 repetitions = 32 minutes)						45 minutes

TABLE IV
SECOND FOUR WEEKS OF ASANAS PRACTICES (EVENING SESSION)

S. No	Asanas	Duration	Duration for 1 repetition of asana	Rest between asana	Repetition	Total Duration
1	Prayer	2 minutes				
2	Warming up	4 minutes				6 minutes
Standing						
4	Tadasana		60 seconds	30 seconds	2	36 minutes
5	Pirayāsana		60 seconds	30 seconds	2	
6	Trikonāsana		60 seconds	30 seconds	2	
Sitting						

7	Patchimothasana		60 seconds	30 seconds	2	
8	Matsyasana		60 seconds	30 seconds	2	
9	Vajrasana		60 seconds	30 seconds	2	
Supine lying						
10	Sarvangasana		60 seconds	30 seconds	2	
11	Uttanpadasana		60 seconds	30 seconds	2	
12	Chakkrasana		60 seconds	30 seconds	2	
Prone lying						
13	Bujangasana		60 seconds	30 seconds	2	
14	ArthaSalabasana		60 seconds	30 seconds	2	
15	Salabasana		60 seconds	30 seconds	2	
Relaxation						
16	Savasana	3 minutes				3 minutes
60 seconds (duration for 1 repetition of asana) + 30 seconds (rest between asana) = 90 seconds x 12 asanas x 2 repetitions = 36 minutes						45 minutes

STATISTICAL ANALYSES

The collected data were analyzed statistically through dependent 't' test. The 0.05 level of confidence

was fixed to test the level of significance difference, if any between groups.

RESULTS

TABLE V

SIGNIFICANCE OF MEAN GAINS & LOSSES BETWEEN PRE AND POST TEST SCORES ON MUSCULAR STRENGTH AND MUSCLE MASS OF ISOTONIC TRAINING AND ASANAS PRACTICES GROUP (ISNAPTG)

S.No	Variables	Pre-Test Mean	Post-Test Mean	Mean difference	Std. Dev (±)	σ DM	't' Ratio
1	Muscular strength	5.53	6.40	0.87	0.87	0.226	3.82*
2	Muscle mass	36.93	39.26	2.33	0.816	0.210	11.06*

An examination of table-5 indicates that the obtained 't' ratios are: 3.82 and 11.06 muscular strength and muscle mass respectively. The obtained 't' ratios on the selected variables are found to be greater than the required table value of 2.14 at 0.05 level of significance for 14 degrees

of freedom. So it is significant. The results of this study are statistically significant and explained its effects positively. And also the results show that the muscular strength and muscle mass were increased at 15.73% and 6.03%.

DISCUSSION

Isotonic exercises are auxotonic contractions in which, despite changes in muscle length, tension in the muscles remains constant and improves muscle strength. In the present study have total-body strength and conditioning program in place with proper training protocols maximizes the results. Besides the asanas practices designed in the present training programme was targeted a lot of strength to hold the body in a balanced pose and suitable practice strengthen the muscles of arms, back, legs, and core.

The results conformity with other studies research conducted by Prof. Ramanand N Gaikwad and Dr. Neetu Joshi (2010) investigated the effect of isotonic exercises for the promotion of motor fitness component and serving ability in volleyball. The findings concluded that six weeks Isotonic Exercise Training Program intervention has potential benefits to improve muscular strength, cardiovascular endurance, agility, speed and serving ability of the students. Marios Christou et. al., (2006) examined the effects of a progressive resistance training program in addition to soccer training on the physical capacities of male adolescents. The combination of soccer and resistance training could be used for an overall development of the physical capacities (maximal strength of the upper and the lower body, vertical jump height, and 30-m speed) of young boys. Avery D Faigenbaum et. al. (2002) compared the effects of 1 and 2 days per week of strength training on upper body strength, lower body strength, and motor performance ability in children. These findings support the concept that muscular strength can be improved during the childhood years and favor a training frequency of twice per week for children participating in an introductory strength training program. Clare C.W. Yu et. al. (2005) studied the effects of strength training on body composition and bone mineral content in children who are obese. They concluded that in diet-controlled prepubertal obese/overweight children, participation in an exercise program with emphasis on strength training resulted in improved lean mass and bone mineral accrual. A D Faigenbaum et. al (2001) studied the effects of 4 different resistance training protocols on upper-body strength and local muscle endurance development in children. They concluded that, in terms of enhancing the upper-body strength and local muscle endurance of untrained children, these findings favor the prescription of higher-repetition training protocols during the initial adaptation period. Clare C.W. Yu et. al. (2005) studied the effects of strength training on body composition and bone mineral content in children who are obese. They concluded that in diet-controlled prepubertal obese/overweight children, participation in an exercise program with emphasis on strength training resulted in improved lean mass and bone mineral accrual. Ting-Lan Chen et. al. (2009) investigated the effect of yoga exercise on the health-related physical fitness of school-age children with asthma. After 2 weeks of self-practice at home, yoga exercise continued to improve BMI,

flexibility, muscular strength, and cardiopulmonary fitness. Mark D. Tran et. al. (2001) studied the effects of hatha yoga practice on the health-related aspects of physical fitness (muscular strength and endurance, flexibility, cardiorespiratory fitness, body composition, and pulmonary function). Ten healthy, untrained volunteers (nine females and one male), ranging in age from 18-27, were the subjects. These findings indicate that regular hatha yoga practice can elicit improvements in the health-related aspects of physical fitness. Madhavi S (1985) studied the effect of yogic exercises on lean body mass. Fifty-nine normal healthy volunteers (36 males, 23 females) ranging from 18-54 years were studied for a period of three months. The present study there has been a steady decrease in the fat fold thickness resulting in an increase in lean body mass during the three months yoga-training programme. There was no change in the weight.

CONCLUSION

Based on the results of the present study it is concluded that the isotonic training and asanas practices significantly improved the muscular strength and muscle mass of adolescent boys.

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