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Research Article

Analysis Of Injury Incidence Among Basketball And Handball Players By Special Designed Exercise Protocol

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Abstract

Purpose: The purpose of the study is to assess the analysis of injury incidence among basketball and handball players by special designed exercise protocol. **Method:** Forty (N = 40; 20 Basketball + 20 Handball) subjects were selected randomly as subjects and divided into two groups: experimental group (EXP = 20; 10 Basketball + 10 Handball) and Control Group (CON = 20; 10 Basketball + 10 Handball). EXP Group underwent special exercise training protocol and CON Group acted as control group. The experimental group was subjected to the training for three days in a week which is progressively increased to five sessions as the training progresses for the period of 8 weeks. The factors namely explosive strength and injury prevalence were measured by sargent jump test and injury rate assessment. The data were collected and tested from each subject before and after the training period and statistically analyzed by using analysis of covariance (ANCOVA). **Results:** The results of the study indicate that there was no significant change in explosive strength (F = 0.28) among experimental group when compared with the control group and there were significant changes in injury prevalence (F = 5.53) of basketball and handball players which shows significant difference among the groups. After training intervention showed 20.76% improvement in explosive strength and 60% reduction in injury prevalence were noticed in experimental groups after eight weeks of exercise designed protocol. **Conclusion:** We conclude that there was a significant improvement in experiment groups on selected factors namely explosive strength and injury prevalence of college level men basketball and handball players.

Keywords: exercise training protocol, explosive strength, injury prevalence, basketball, handball

INTRODUCTION

Explosive strength is nearly the most vital basic feature behind the performance in all sports. A basketball and handball player should achieve a high essential strength level since it has a many advantageous impacts to moving in the court through from speed, explosive strength, and circumstance power. One additionally requires strength to hold one's body or body parts in a specific position, move rapidly or to back off the movement. A strong core strength is vital in basketball and handball for winning defensive and offensive duels (Barth and Bosing 2010). The strength of the upper body part is critical in setting screens (Rose, 2013); attaching a bounce back (Manfredi, 2016;

PowerCranks.com, 2013); posting-up (playing with your back to the basket attacking for position to score); and looking after position (PowerCranks.com, 2013). Basketball and handball players require the strength of the upper body part because of the games high power (Drinkwater, Payne and McKenna, 2008 and Marzilli, 2008) contends that upper area strength particular to the skills required in basketball should be created and trained for. Lower body quality additionally shoots long-run shots creating power from the legs (Haefner, 2014). The advantages of lower body strength will decidedly influence sporting profession to be longer and furthermore to withstand the high force of the game. Moreover, the strength of the lower appendages would be advantageous with the end goal to infiltrate among defenders and shoot the ball, while holding one's stability. Jumping height in basketball and handball is of specific significance as the higher the player can jump, the less demanding it is scoring nearer to the ring. Fitting strength of the lower appendages may reduce injuries, for example, to the anterior cruciate ligament (ACL) (Arendt, Agel, and Dick, 1999; Kraemer and Fleck, 2004; Willson, Ireland, and Davis, 2006). This study attempts to find the analysis of injury incidence among basketball and handball players by special designed exercise protocol.

MATERIAL & METHODS

Subjects

Forty (N = 40; 20 Basketball + 20 Handball) college level basketball and handball players were selected from the Department of Physical Education, Annamalai University, Tamil Nadu, India. The selected basketball and handball players age 21.31 ± 2.34 years; height 174.65 ± 4.79 cm and weight 65.12 ± 4.84 kg. These players have minimum of 3 years of playing experience and gave willingness to take part in the study. The general characteristics of the participants in experiment group and control group are shown in Table I. A written explanation of the experimental procedure and potential risk factors were given to each player and their informed consent was obtained.

Table I. General characteristics (mean ± standard deviation) of experimental group and control group.

		EXP Group (n=20)	**CON Group (n=20)**
Mean (±) SD	Age (years)	21.28 ± 2.13	21.34 ± 2.55
	Height(cm)	175.22 ± 5.34	174.08 ± 4.24
	Weight(kg)	64.99 ± 3.64	65.25 ± 6.03

Study Design

The subjects were randomly assigned to two groups. Group 1 (EXP = 20; 10 Basketball + 10 Handball) performed special exercise training while Group 2 (CON = 20; 10 Basketball + 10 Handball) served as control group. Testing of each group was performed on two occasions first before administration of training as pre-test and after twelve weeks of training as post-test.

Methods of Assessment

Table II: Methods of Assessment.

S. No.	Variables	Method of Assessment

1	Explosive Strength	Sargent Jump Test
2	Injury Prevalence	Questionnaire

Explosive Strength

Sargent Jump Test was used to evaluate the subject's explosive strength as showed in table II. The test was administered for three trails with rest in between. The jump height is usually recorded as a distance score and best out of three were recorded to the nearest centimeters.

Injury prevalence

Injury prevalence was assessed by a questionnaire as showed in table II which aimed at gathering information on the type, number of occurrence, circumstances of occurrences (match/training) before and after the training durations for both the groups.

Exercise training protocol

Both the experiment and control group underwent a common fitness training for 20 min per season 3 to 5 seasons in a week for 8 weeks with a gradual increase in number of seasons as the training program. The experiment underwent a special deigned exercise training protocol which include components for the development of systematic warmup and warm down, reaction time, flexibility, mobility, balance, explosive strength and vo2 max. The training counted of agility drills, balancing exercises, static and ballistic stretching, multidirectional movement drills and quickness training.

Statistical Analyses

The data were collected from each subject before and after the training period and Analysis of Covariance (ANCOVA) was used to find out the significant difference between the experimental and control groups on each variables separately. All the statistical tests were calculated using the statistical package for the social science (SPSS) for MacBook Air (Version 23). The level of statistical significance was set at $p < 0.05$ as the number of subjects was limited and also as the selected variables might fluctuate due to various extraneous factors.

Results and Discussion

The effects of independent selected factors were determined through the collected data by using appropriate statistical techniques and the results are presented below. The analysis of co-variance (ANCOVA) test on the data obtained for explosive strength and injury prevalence of the pre-test, post-test and adjusted post-test means of experimental group and control groups have been analysed and presented in table III. The percentage of gain in explosive strength and injury prevalence before training and after eight weeks of training among EXP group and CON group is presented in table IV.

Table III: Analysis of covariance (ANCOVA) on explosive strength and injury prevalence of experimental groups and control group

VARIABLE	TEST	CON	EXP	F-Ratio
EXPLOSIVE STRENGTH	Pre Test Mean (±) SD	36.56 ± 2.61	36.56 ± 3.28	0.00
	Post Test Mean (±) SD	44.00 ± 2.68	44.15 ± 3.47	0.23
	Adjusted Post-test Mean	44.00	44.15	0.28
INJURY PREVALENCE	Pre Test Mean (±) SD	0.65 ± 0.59	0.75 ± 0.55	0.31
	Post Test Mean (±) SD	0.70 ± 0.57	0.30 ± 0.47	5.85*
	Adjusted Post-test Mean	0.70	0.30	5.53*

**Significant at .05 level of confidence*.

Table IV: The Pre and Post Test Means of Experimental (EXP) and Control (CON) Groups with Percentage of Gain

VARIABLES	GROUP	PRE TEST	POST TEST	Gain	%Gain
EXPLOSIVE STRENGTH	Experimental	36.56 ± 3.28	44.15 ± 3.47	7.59 ↑	20.76% ↑
	Control	36.56 ± 2.61	44.00 ± 2.68	7.44 ↑	20.35% ↑
INJURY PREVALENCE	Experimental	0.75 ± 0.55	0.30 ± 0.47	0.45 ↑	60% ↑
	Control	0.65 ± 0.59	0.70 ± 0.57	0.05 ↓	7.69% ↓

Explosive Strength

The pre-test means (F = 0.00) of experimental and control group doesn't shows a significant difference (P < 0.05), whereas the post-test and adjusted post-test means (F = 0.23 and 0.28) was also not showing significant difference (P < 0.05) showed in table-III. This indicates that there was no significant change in explosive strength among experimental group when compared with the control group (Figure I). Therefore, eight weeks of exercise training protocol showed greater improvement in explosive strength.

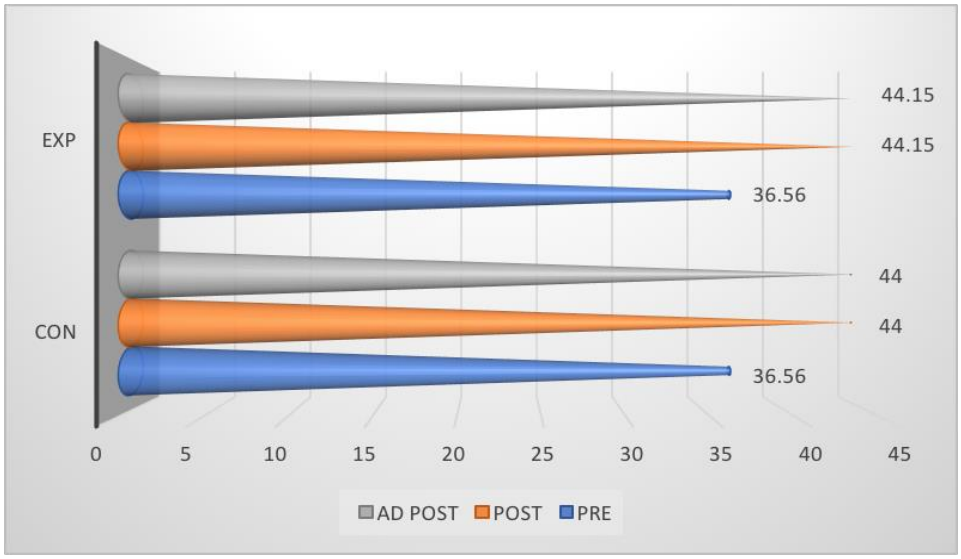

Fig I: Bar Diagram showing the pre, post and adjusted post test mean values of experimental groups and control group on explosive strength.

The finding of this study showed an improvement of 20.76% on explosive strength in experimental group after the eight-week exercise training protocol while the control group also shown a significant improvement (20.35%) on explosive strength as shown in table-IV. The result of the study found significant improvement in explosive strength after the experimental period for both the groups. As both the groups are undergoing game related drills and active game practice, both the groups show an identical improvement (20.76% vs 20.35%) in explosive strength. So that may be the reason for no significant difference among the groups in explosive strength.

Injury Prevalence

The pre-test means ($F = 0.31$) of experimental and control group doesn't shows a significant difference ($P < 0.05$), whereas the post-test and adjusted post-test means ($F = 5.83$ and 5.53) shows a significant difference ($P > 0.05$) showed in table-III. This indicates that there is a significant change in injury prevalence among experimental group when compared with the control group (Figure II). Therefore, eight weeks of exercise training protocol showed less injury rate in experiment group then control group on injury prevalence.

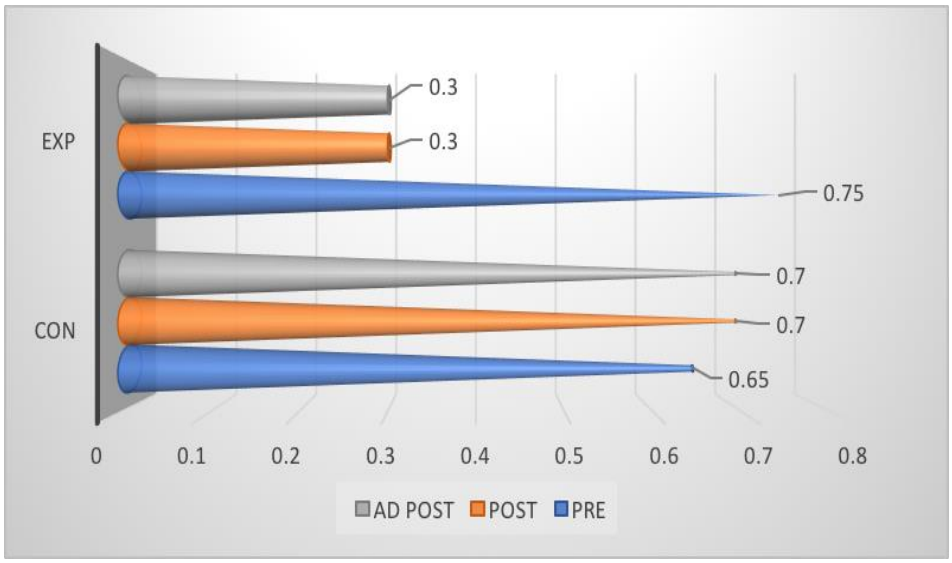

Fig II: Bar Diagram showing the pre, post and adjusted post test mean values of experimental groups and control group on injury prevalence.

The finding of this study showed that there was a significant difference in injury prevalence in experimental group due to eight weeks of exercise training protocol. This training design showed that the risk of injury reduced in injury prevalence by 60% (0.75 ± 0.55 vs 0.30 ± 0.47) in the experimental group showed in table-IV. The above finding and observation made by the following studies showed by Garrick et al., (2005), who found the rate of acute knee & ankle injuries and all injuries reduced in young handball players; Olsen et al., (2005), who found the effect of a structured warm- up programme designed to reduce ankle and knee injuries incidence; Hubschar et al., (2010), who found that reducing the incidence of sports injuries among adolescent and young adult athletes due to the effectiveness of proprioceptive/neuromuscular training; Nicola et al., (2017), who found the injury risk profiles and burden of injury between the intervention and control groups and Emery et al., (2007), also found that reduction of all, lower-extremity and ankle sprain injury with respect to clinically relevant trend. In this study there is a positive improvement in explosive strength and resulted in the decrease in injury prevention.

CONCLUSION

The result of the study revealed that the training group has significant improvement in explosive strength and injury prevalence and this is seen after giving 8 weeks of special designed exercise protocol reducing the rate of injury and improving the performance of college level men basketball and handball players. It is recommended that a special designed exercise protocol for basketball and handball players at all skill levels and age be implemented to prevent injury.

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