EFFECT OF UPPER LIMB PROPRIOCEPTIVE TRAINING ON FIELD GOAL AMONG AMATEUR BASKETBALL PLAYERS:

AN EXPERIMENTAL STUDY

AUTHOR

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ABSTRACT

INTRODUCTION : The ability to detect knowledge of joint position is known as proprioception. Without having to actively consider your location in space or your surroundings, it enables you to move swiftly and freely. A continuous feedback loop in the neural system, proprioception informs your brain about your current location and the forces acting on your body at any given moment. The ability to detect knowledge of joint position is known as proprioception. Without having to actively consider your location in space or your surroundings, it enables you to move swiftly and freely. A continuous feedback loop in the neural system, proprioception informs your brain about your current location and the forces acting on your body at any given time.

METHOD : Number of three pointers made by players in basketball was considered in this study and pre and post number of scores was marked before and after the intervention for 6 weeks. The study outcome measure include effective field goal percentage by the means of substituent formula specifically to calculate 3 pointers made from the total ball successfully scored into the basket.

RESULT : Effective field goal (eFG) : Mean = 67.129 , SD = 8.5319

CONCLUSION : Upper limb proprioceptive training is effective in improving number of 3 pointers among college gong basketball players.

KEW WORDS : Proprioceptive training , 3 pointers , Effective field goal.

INTRODUCTION

Shooting a ball into a hoop to score points is the goal of the sport of basketball, in which two teams compete to score the most points. A rectangular court with a hoop at each end is used for the game. The player passes or bounces the ball as they run or walk up the court.If they shoot the ball into the hoop, they score two points; if they shoot it from behind the three-point line, they score three points.On a basketball floor, each team has five players at a time, with roughly seven bench substitutes per team [1].

PREVALENCE

Over the years, a team's three-point shooting percentage (3PA) has significantly increased. When the NBA introduced the three-point line in 1979, there were only 2.8 3PA on average each game. That figure rose to 32.0 during the 2018–2019 season, representing a 1000% increase. Following this, three-point field goal efficacy

(3P%) significantly improved, rising from a low 28% in the NBA's first season of the three-point shot to roughly 35–36% in the most recent seasons.[2]

PROPRIOCEPTION

The ability to detect knowledge of joint position is known as proprioception. Without having to actively consider your location in space or your surroundings, it enables you to move swiftly and freely. A continuous feedback loop in the neural system, proprioception informs your brain about your current position and the forces acting on your body at any given moment [3].

FIELD GOAL

A field goal In basketball, a field goal is a shot that is worth two points if it is made inside the line and three points if it is made outside. Each half-court cell's total number of field goal attempts and points scored is then recorded. Keep in mind that a player's or a team's shooting efficiency is measured by the field goals they attempt and make [4].

Effective field goal

It is number of goals made outside of the 3 point line.

INCLUSION CRITERIA

1. Playing basketball for 1-2 hours/day
2. Individual between age 18-25 years
3. Participants of both male and female gender will be included
4. Individuals who can understand Hindi ,English language

EXCLUSIONCRITERIA

1. Any injuries that might hamper players to play
2. Injuries to upper limb
3. Individuals who had gone for any upper limb and lower limb surgery in past 6months
4. Musculoskeletal conditions.

AIMS

Aim of the study is to evaluate the effect of upper limb proprioceptive training on effective field goal among college going basket ball players

OBJECTIVES

To determine effect of upper limb proprioceptive training on field goal among college going basket ball players.

MATERIAL AND METHODS

The ethical clearance was archived from the ethical committee at parul university institutional ethical committee for human research (PU-IECHR). An experimental study was performed among total 30 subjects. Prior to the commencement the procedure, informed consent was taken from the subjects. The 30 participants were selected for the study. The subjects were screened based on inclusion and exclusion criteria prior to enrollment in study.

Both male and female between age 18 -25 years. Subjects who play basketball for 1-2 hrs. per day. Subjects with any musculoskeletal injury or any past surgery in last 6 months is excluded, any upper limb injury. The pre and post values were statistically analyzed. Before participating each subject was given information about the study.

PROCEDURE

Parul University will be the source of research study .Participants will be screened using a total of n. Following screening, basketball players will be evaluated for inclusion and exclusion criteria. Participants who meet the requirements for inclusion will be requested to sign a written consent form. Following the signing of the written consent form, participants will be split into two groups after being evaluated for baseline criteria.

EXPERIMENTAL GROUP: Participants get information about upper limb proprioception. Before the intervention begins, each participant will have a pre-assessment for performance and outcome measures (field goal).

The amount of successful scores achieved by the individual is the field goal. The number of objectives set both before and after the intervention will be evaluated.

For six weeks in a row, the experimental group will receive inervention three days per week.

INTERVENTON

1)Wall ball circle- its an effective close chain exercise for improving scapular muscles and proprioception

- Patient is asked to stand facing a flat wall with feet shoulder wide apart , he/ she is instructed to extend one hand forward and press the ball against the wall with a flat palm about shoulder height off the ground - Patient is also instructed to not let the ball drop.
- Using palm alone the patient then rolls the ball around in small circles both clockwise and counter-clockwise direction.

2) **BOSU walkovers** - Individual is asked to get in plank position with both hand on BOSU and then step sideways with one hand followed by other. Number of repetition- 15,20 followed by 25

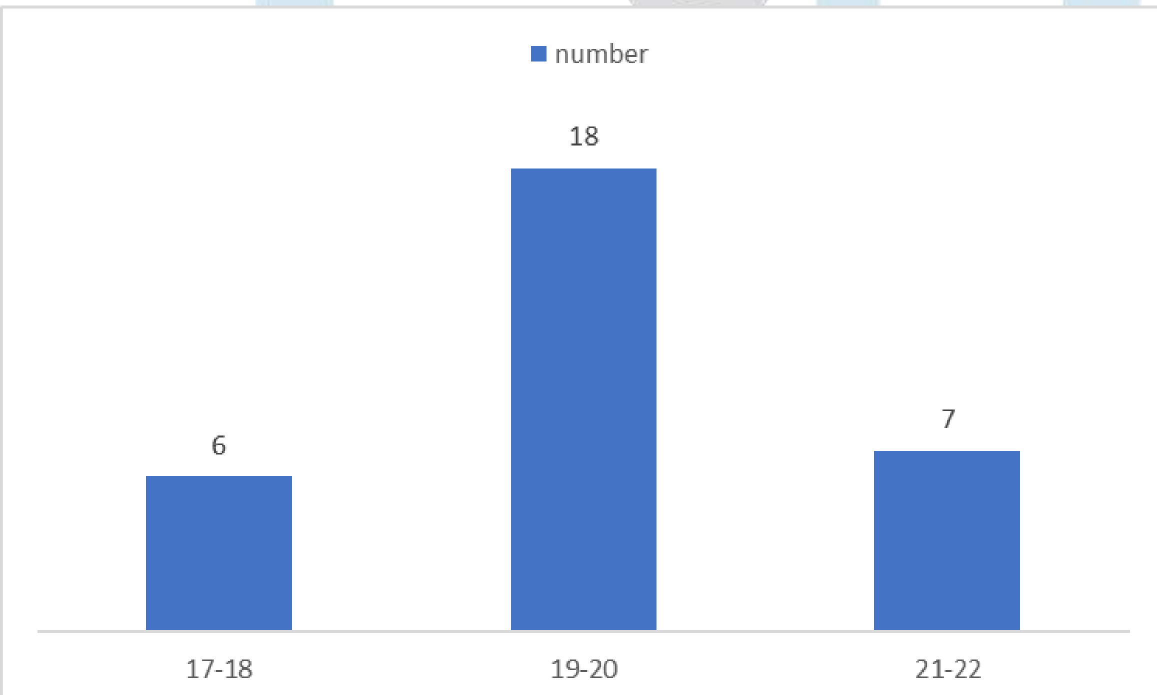
3) **Vestibular ball balancing** - Individual is asked to be in prone lying at the edge of the plinth till above the knee level. A vestibular ball is placed at the front of plinth and both hands on the ball followed by shoulder flexed and elbow extended . Hold the position for 30 sec (3 sets) with eyes open for next 3 consecutive days.

4) **Wobble board balancing** -individual is asked to do plank position ,placing both hands on wobble board and maintaing balance without the board touching the floor. Hold position for 30 sec (3 sets) with eyes open for initial 3 days and in progression for 60 sec (3 sets) with eyes open for next 3 consecutive days

Statistical analysis - Descriptive analysis , SPSS interpreted by using statistical software IBM SPSS -20. The descriptive statistics including means and standard deviations were obtained. P value less than 0.05 were considered to be significant.

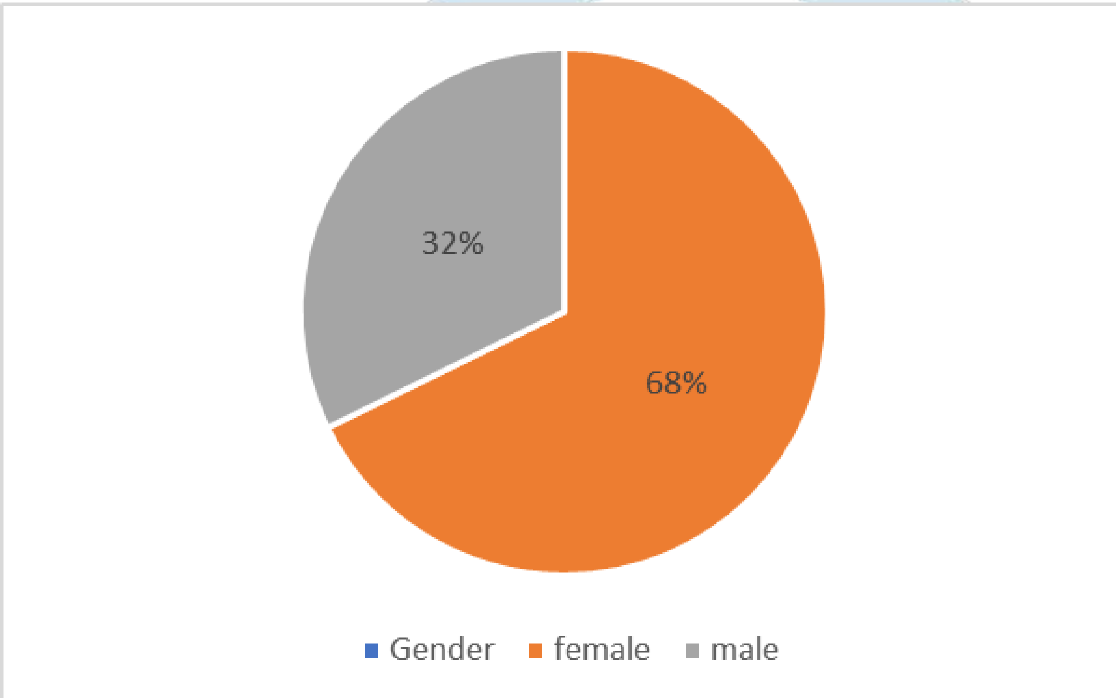
Age	number
17-18	6
19-20	18
21-22	7

Table 1 shows the age distribution



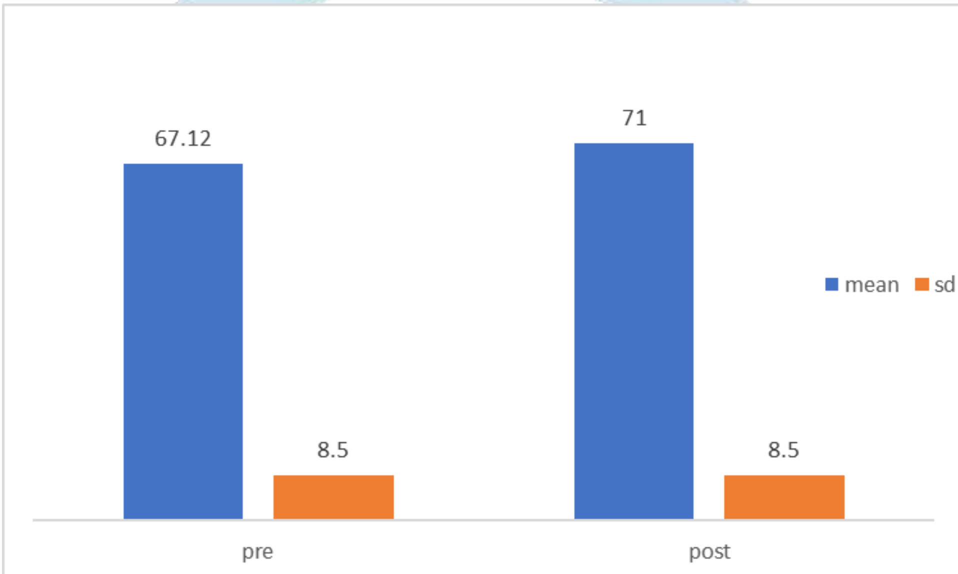
Graph 1 shows the age distribution

Gender	Number
female	21
male	10



Graph 2 . shows the gender distribution

	Mean	SD	Z value	P value
pre	67.129	8.53519	4.8	0.00
post	71	8.52056		



Graph 3 shows comparison of field goal pre and post mean and SD value

DISCUSSION

According to the current study, college basketball players' Effective Field Goal % (eFG) improved, demonstrating that upper limb proprioceptive training can greatly increase their 3-point shooting skill. The body's ability to perceive the position and movement of joints is known as proprioception, and it is essential for maximizing movement efficiency, especially in sports requiring coordination and precision. Using relevant studies to contextualize the findings, this discussion will interpret the findings in relation to proprioception and how it affects basketball shooting performance.

Athletes lacking proprioception can move without actively considering their body positioning. Basketball abilities like dribbling, passing, and most importantly, shooting, all need precise and coordinated motions. When performing high-skill tasks like making a 3-point shot, the feedback loop from proprioceptive receptors in muscles, tendons, and joints gives vital information for fine-tuning motions.

Proprioceptive training has been shown to increase shooting accuracy and performance in general. According to a study by [5], proprioceptive training enhanced basketball players' accuracy and coordination, especially while making shots under duress [5] In a similar vein, [6]emphasised that certain workouts that increase proprioceptive sensitivity can improve movement control and consistency. This is consistent with the current study's findings, which show that proprioceptive training significantly improves shooting performance.

The main outcome measure employed in this study to evaluate the impact of proprioceptive training on shooting accuracy was the effective field goal percentage (eFG). Since 3-pointers are worth more than 2-pointers, eFG is a more accurate measure of a player's actual shooting efficiency. With a mean eFG of 67.129 and a standard deviation of 8.5319, the study indicates a significant increase in shooting accuracy after the intervention

Athletes who have better proprioception are better able to regulate the fine motor movements required for shooting, such as shoulder and wrist alignment, which is essential for making accurate and reliable shots[7] proprioceptive training that focus on balance and upper limb coordination can greatly improve shooting mechanics and lower the variability of basketball players' shoots. Players can execute their shooting form more consistently and accurately by honing their sense of joint position and movement, which could account for the rise in eFG seen in this study.

Proprioceptive Training Mechanisms In basketball, upper limb proprioception is especially important since shooting requires intricate hand, shoulder, and arm motor patterns. [8] state that proprioceptive training can help with muscle coordination, joint stability, and general movement awareness. Under the pressure of a game, these adaptations enable athletes to execute exact movements with less conscious effort, resulting in more fluid and accurate actions. Proprioceptive training exercises, such those that use resistance bands or balancing boards, can improve shooting form by focusing on joint locations and muscle activation patterns [8]

The study's 6-week intervention period corresponds to the time frame during which proprioceptive adjustments usually start to manifest. Athletes who underwent six weeks of proprioceptive training shown notable gains in motor control and coordination, which improved their performance on sport-specific tasks like shooting, according to a research by Wilson [9]. This is in line with the study's findings, which indicated that proprioceptive training significantly increased players' 3-point shooting accuracy.

Practical Consequences for Athletes and Coaches According to the study's findings, proprioceptive training can be a useful supplement to basketball training plans. Proprioceptive exercises should be incorporated into practice sessions by coaches to help players shoot more accurately, especially when making 3-pointers. For enhancing upper limb proprioception, exercises including dynamic stability drills, balancing activities, and joint-position awareness training may be especially helpful. Proprioceptive training may also have wider uses, improving balance, coordination, and injury avoidance, among other areas of basketball performance [10].

Proprioceptive exercises are easy to integrate into warm-up routines or as supplemental training because of their relatively simple nature. Exercises that simulate shooting motions using resistance bands or a weighted ball, for instance, may give players a greater sense of control over their shooting technique.

Restrictions & Upcoming Studies Although the study's findings are encouraging, there are certain things to keep in mind. To make the results more broadly applicable, the number of participants in the sample could be expanded. Additionally, the study only looked at 3-point shooting performance; however, future research could look into whether proprioceptive training also enhances mid-range or free throw shooting. Proprioceptive training's long-term impact on shooting accuracy and general basketball performance should also be investigated. To find out which training strategy improves shooting performance the most, future studies could also compare proprioceptive training to other training techniques like strength training or technical shooting drills.

CONCLUSION

This study demonstrates how collegiate basketball players can increase their 3-point shooting efficiency by engaging in upper limb proprioceptive training. By enhancing players' control over their upper limb motions, proprioceptive training appears to improve shooting accuracy, as evidenced by the observed improvement in the effective field goal percentage. Incorporating proprioceptive exercises into training regimens may provide a straightforward yet efficient method to improve shooting efficiency as basketball players and coaches search for methods to maximize shooting performance.

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