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Effects of loaded Plyometrics on the performance of professional soccer players

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Abstract

Background: Physiotherapists form a large body of practitioners in professional soccer and have been the mainstay of soccer medical care within the game for the past 50 years. The role of physiotherapists extends beyond the clinical setting and many find themselves organising warm up sessions, assisting with training.

The proper development of speed related abilities has an important role in professional soccer game. In rapidly changing sports field players face the challenge of developing multiple physical and technical capacities in young soccer players for their existence in sports. More recently in professional team sports, a progressive and gradual increase in the demands of maximal sprints and explosive game actions has been observed during training and official competitions.

Objectives: The purpose of the study was to analyze the "Effects of loaded plyometrics on the performance of professional soccer players".

Design: Quasi experimental study design.

Methods: In this study, quasi experimental design was conducted to test the effectiveness of loaded plyometric training strategy on speed and power performance of professional soccer players. The study population included 30 patients fulfilling both inclusion and exclusion criteria informed consent was obtained from each subject prior to participation. A description about the procedures was given to the subjects before commencing study. A total of 30 subjects is selected by simple random sampling method. The exercise program was of 3 months duration there 4 session of training in each week for 24 loaded plyometric jumps where performed for 25 min. Prior to all testing sessions a general and specific warm up routine was performed involving light running(5 min at a self- selected pace) and submaximal attempts at each testing exercise.

Results: The study shows a significant improvement in speed and power and mean propulsive power. The 3 months loaded plyometric training is effective in improving the speed and power, mean propulsive power among soccer players.

Keywords: Loaded plyometrics, sprint speed tests, power, mean propulsive power

Introduction

Physiotherapists form a large body of practitioners in professional soccer and have been the mainstay of soccer medical care within the game for the past 50 years. The role of physiotherapists extends beyond the clinical setting and many find themselves organising warm up sessions, assisting with training. The proper development of speed related abilities has an important role in professional soccer game. In rapidly changing sports field players face the challenge of developing multiple physical and technical capacities in young soccer players for their existence in sports. More recently in professional team sports, a progressive and gradual increase in the demands of maximal sprints and explosive game actions has been observed during training and official competitions.

Plyometrics also known as jump training, plyometrics are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power. Plyometrics includes explosive powerful training exercises that are trained to activate the quick response and elastic properties of the major muscles in the body. The term plyometrics was coined by Fredwilt after watching soviet athletes prepare for their events in track and field in the 1970s, he begin a collaboration with soviet trainer Michael Yesis. Plyometric training seems to be a practical, safe, and efficient strategy for enhancing neuromuscular performance in young athletes.

Acute improvement in jumping performance when using external overloading during plyometric jumping performance. Which can be explained by the significant ground reaction force and impulse promoted by the use of additional loads.

The aim of this study is to find out the effectiveness of loaded plyometrics on performance of young soccer players. Different training strategies have been effectively implemented to improve jumping and sprinting abilities in soccer players from different age categories.

Materials and Method

1. Body weighted jacket 2. Weighing machine 3. Height measurement chart 4. Jump measurement chart 5. Chalk powder 6. Stop watch 7. Cones 8. Pen or pencil 9. Paper

3. Procedure

In this study, quasi experimental design was conducted to test the effectiveness of loaded plyometric training strategy on speed and power performance of professional soccer players. The study population included 30 patients fulfilling both inclusion and exclusion criteria informed consent was obtained from each subject prior to participation. A description about the procedures was given to the subjects before commencing the study. A total of 30 subjects were selected by simple random sampling method. The exercise program was of 3 months duration, there were 4 session of training in each week for 24 loaded plyometric jumps were performed for 25 minutes. Prior to all testing sessions a general and specific warm up routine was performed involving light running (5 min at a self -selected pace) and sub maximal attempts at each testing exercise The athletes involved in loaded vertical and horizontal jumps using a loaded weighted jacket with a load of 8% of the athletes' BM (McKenzie *et al.*, 2014) (LJ; n = 30). The study protocol took place prior to the competitive season, during the preseason training period. The participants and their legal guardians signed an informed consent form prior to research commencement.



Fig 2: Loaded Plyometric Training

Starting Position of the Subject with the Loaded Plyometric Position



Fig 3: Loded Plyometrics

The Subject Bending the Knees Prior To Jump With Loaded Jacket



Fig 1: Loaded Plyometric Training the Subject Wearing Weighted Jacket



Fig 4: Loaded Plyometric Training the Subject In The Loaded Position

Statistical analysis

Statistical tool

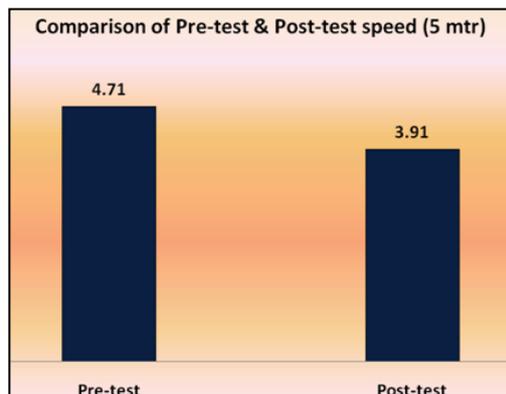
- The collected information will be summarised by using descriptive statistic such as frequency, percentage mean, and standard deviation.
- Mean is compared with paired 't' using pre and post measurements. If it is not following normal distribution. Wilcoxon sign rank will be used (interferential statistics)
- The p value less than 0.05 will be considered significant.

Result

Evaluation of the sprint speed test

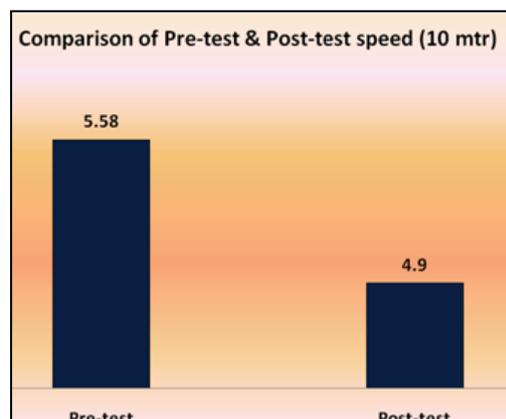
A. 5 meter sprint speed test

The mean column displays the mean pre-test and post-test time taken by the soccer players. SD is the standard deviations of the time in pre & post respectively. Mean change 0.8 is the difference between pre-test and post-test (4.71&3.91). Since the *t*-value, 121 is greater than the *table value* 2.76, $p < 0.01$, there is a significant difference existing between the pre-test and post-test time taken by the soccer players in 5 meter speed test. Hence time taken by the soccer players in post- test (5 meter) has significantly reduced. This proves the effect of loaded plyometrics on the performance of professional soccer players.



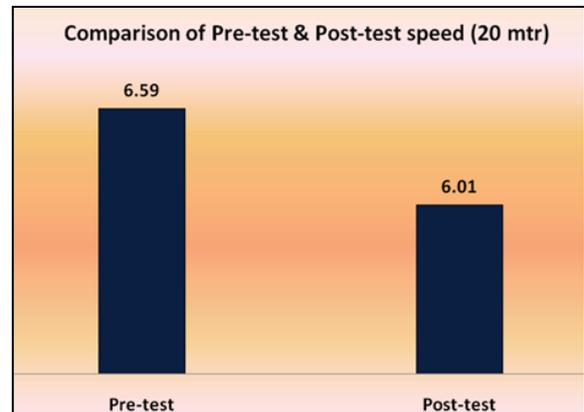
B.10 Meter Sprint Speed Test

The mean column displays the mean pre-test and post-test time taken by the soccer players. SD is the standard deviations of the time in pre & post respectively. Mean change 0.68 is the difference between pre-test and post-test (5.58&4.9). Since the *t*-value, 41 is greater than the *table value* 2.76, $p < 0.01$ there is a significant difference existing between pre-test and post-test time taken by the soccer players in 10 meter speed test. Hence time taken by the soccer players in post-test (10 meter) has significantly reduced. This proves the effect of loaded plyometrics on the performance of professional soccer players.



C. 20 Meter Sprint Speed Test

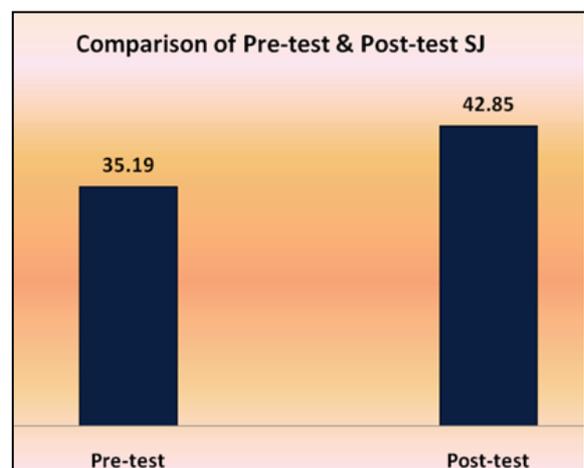
The mean column displays the mean pre-test and post-test time taken by the soccer players. SD is the standard deviations of the time in pre & post respectively. Mean change 0.58 is the difference between pre-test and post-test (6.59&6.01). Since the *t* value, 29 is greater than the *table value* 2.76, $p < 0.01$, there is a significant difference existing between the pre-test and post- test time taken by the soccer players in 20m



Evaluation of the vertical jump test

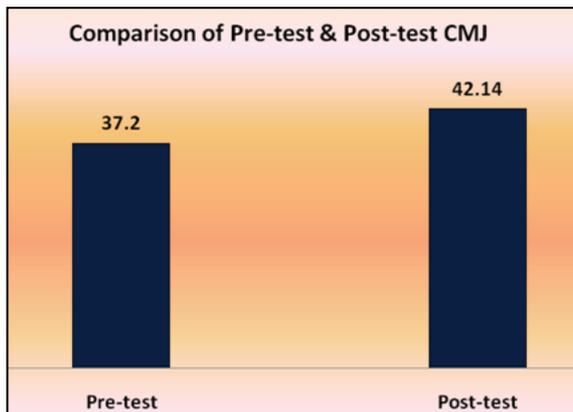
A. Squat jump test

The mean column displays the mean pre-test and post-test SJ. SD is the standard deviations in pre & post respectively. Mean change 7.66 is the difference between pre-test and post-test (35.19&42.85). Since the *t*-value, 11.49 is greater than the *table value* 2.76, $p < 0.01$, there is a significant difference existing between the pre-test and post-test SJ. Hence the SJ scores by the soccer players in post-test have significantly improved. This proves the effect of loaded plyometrics on the performance of professional soccer players on SJ



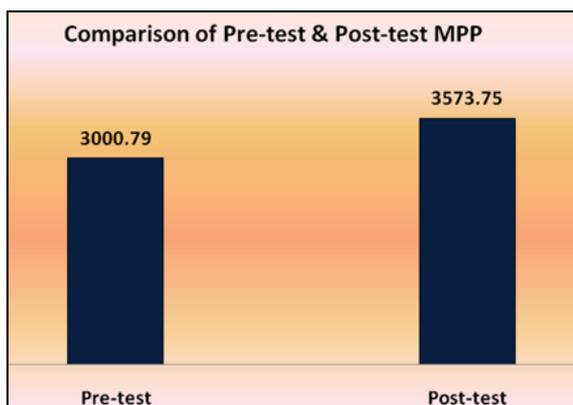
B. Counter Movement Test

The mean column displays the mean pre-test and post-test CMJ. SD is the standard deviations in pre & post respectively. Mean change 4.94 is the difference between pre-test and post-test (37.2& 42.14). Since the *t*-value, 74.0 is greater than the *table value* 2.76, $p < 0.01$, there is a significant difference existing between the pre-test and post-test CMJ. Hence the CMJ scores by the soccer players in post-test have significantly improved. This proves the effect of loaded plyometrics on the performance of professional soccer players on CMJ.



Evaluation of the Mean Propulsive Power Test Through Sayers Formula

The mean column displays the mean pre-test and post-test MPP. SD is the standard deviations in pre & post respectively. Mean change 572.96 is the difference between pre-test and post-test (3000.79&3573.75). Since the *t-value*, 13.1 is greater than the *table value* 2.76, $p < 0.01$, there is a significant difference existing between the pre-test and post-test MPP. Hence the MPP scores by the soccer players in post-test have significantly improved. This proves the effect of loaded plyometrics on the performance of professional soccer players on MPP.



Discussion

This study aimed to prove the effects of 3- months of loaded plyometric training on the performance of professional soccer players, a quasi experimental study design in Gokulamkerala fc soccer school Manjery, Malappuram district. This study shows significant improvement in speed and power performances in professional soccer players. This loaded plyometric training is practically safe and inexpensive powerful conditioning programme. The results of each outcomes like speed test and vertical jump test and mean propulsive power test shows their improvements.

Plyometric training has long been staple of athletes and exercise to work on their explosive strength plyometric also known as Jump training or Plyos are exercise in which muscle exert maximum force in short intervals of time with the goal of increasing power (speed strength). This training focuses on learning to move from a muscle extension to a contraction in a rapid or explosive manner, such as specialized repeated jumping.

The study aim to analyse the Effects of loaded plyometric on the performance of professional soccerplayer V'. In this study quasi experimental design was conducted to test the effectiveness of loaded plyometric training strategy on speed

and power performance of professional soccer players.

The loaded plyometric training shows significant improvement in the speed, power and mean propulsive power performance in professional soccer player. These are evident with the comparison of mean pre test and post test values of the outcomes like speed test, vertical jump test and mean propulsive power assessment through Sayers formula.

The mean column displays the mean pre test and post test taken by soccer players. SD is the standard deviation of the time in pre and post test respectively. Mean change 0.8 is the difference between pre and post test (4.71 and 3.91). Since the T-value 1 to 1 is greater than the table value

2.76. P less than 0.01 there is significant difference existing between the pre test and post test time taken by the soccer player in 5 meter pre test. Hence time taken by the soccer players in post test has significantly reduced. This proves the effect of loaded plyometric on the performance of professional soccer players.

An improvement in speed and power performance in professional soccer players was significantly better after the loaded plyometric programme. Post test mean value showed the time taken to complete the 5 meter, 10 meter and 20 meter. Speed test has lowered after plyometric training.

Overall the results of this study suggest that the training on loaded plyometric has significant effect on speed and power performance in soccer player.

Limitation of this study includes a small sample size which might affect the generalisation of results, short duration exercise programme, only male subjects were included and all measurements were taken manually and this introduced human error which could affect the reliability of the study.

Suggestion for future studies include: -larger duration exercise programme is recommend for more reliability and validity to establish greater efficacy of the treatment. The study should be done in large sample size, long term follow up is needed to evaluate whether there occurs any sustain or carry over effect after exercise programme.

Conclusion

To conclude, the professional soccer players could improve their performances after a 3 Months preseason training program using loaded and unloaded jumps. The observation supported by the statistical analysis. Based on the outcomes tools the loaded plyometric training meaningfully improved the speed and power, mean propulsive power among the soccer players.

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