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Effects of Stretching Exercises on Cricket Wicket Keeper Performance and Reduction of Injury Rate

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ABSTRACT

Aim of the Study: The basic aim of this study is to check the effects of flexibility exercises (Dynamic, Static & Proprioceptive Neuromuscular Exercises) on wicketkeeper (Cricket) performance.

Methodology: This experimental study included a total of 27 cricket players (wicketkeepers) were selected for this purposive study with a targeted sampling method utilized. A control group consisting of 10 players was also selected for further comparison. Anthropometric measurement, along with Sit and Reach test has been utilized before and after the training program execution. A self-made 15 questionnaires for health history and consent form has also collected from 27 subjects (wicketkeepers) to get feedback and check screening.

Findings: The values tested at 10% and the outcome observed found significant at ($p<0.001$) in flexibility as compared by pre and post-test values through paired sample t-test protocols. The reliability was checked through Cronh's Bach Alpha (0.71) and validity was checked by a pilot study with the help of the Statistical Package of Social Science (SPSS-26).

Conclusion: The result concluded that flexibility exercises (Dynamic, Static & Proprioceptive Neuromuscular Exercises (PNF) impacts on wicketkeeper (Cricket) performance as it utilized on regular basis. Furthermore, the recurrence has been checked after 3 months and concluded that the control group has a value of 20% as compared with the experimental group (12%) respectively.

Keywords: Proprioceptive Neromuscular Facilitation (PNF)**,** Flexibility Range of Motion (ROM).

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Introduction

Cricket is one of the second most popular sports all over the world and leading sports in continent Asia. Cricket needs different physical components to perform at elite competition. Out of all flexibility is one of the key of performance in current era. Flexibility, in simple words explains as a range of motion/movement (ROM) at a particular joint/set of joints. Similarly, how far we can reach, bend or extend. When improving flexibility is the goal, the muscle and their fascia (sheath) should be the major focus of flexibility training. As Behm et al. (2023) suggested that flexibility increases through different or

alternative training, while soft tissues contribute to overall performance. An individual's performance depends upon a number of components, and flexibility is only one of these. Although flexibility is a vital part of performance it is important to see it as only one spoke in the performance wheel. Flexibility varies between individuals, particularly in terms of differences in muscle length of multi-joint muscles (Bradley, Olsen, & Portas, 2007). In stretching placing particular parts of the body in certain positions, as it increases the length of the muscles and associated soft tissues, resulting in a reduction in general muscle tension and an achieved range of motion is increased. By increasing the range of motion extend limbs' motion not to enhance range to the muscles but also to the tandems and ligament efficiently. Therefore, the more flexible and pliable those muscles are, to perform in high-intensity activities. The most important function of increased flexibility is to get rid of injuries to some extent, improve comfort, move freely and reduction in the lessening of the susceptibility to soft tissue injuries like muscle, tendon, ligaments, sprain, and strains (Armstrong, & Smedley, 2003; Shrier, 2005; Bradley and Portas, 2007). Even though similar sports demands different levels of ROM it is essential to plan regular stretching exercise protocols in the warm-up and warm-down sessions to achieve high-performance goals and long lasting performances, as gained through millimeter by millimeter and increase day by day on a continuous basis. Cricketer has special requirements when it comes to flexibility and refers to your ability to maximize the ROM of your relative joints, tendons, and muscles, etc. ROM improvement resulted in improved athletes' speed, agility, and other essential fitness components as required in wicketkeeper performance. Flexibility can be improved with stretching exercises (Chaabene *et al.,* 2019), it increases millimeter by millimeter day by day in progression process and also related with tissues (Gill, Noor & Eqra, 2019). On the basis of regular stretching, a well developed stretching plan manipulated changes in the range of motion in particular within the muscles themselves, include the soft tissue like fascia, tendons, skin, and scar tissue (Micheo, Baerga, & Miranda, 2012). The output product of stretching is confidence in tissue control, lengthening, and ROM respectively. Stretching is not only helpful in rehabilitation programs (Page, 2012; Gill et al., 2021; Gill et al., 2022), as it is used therapeutically to alleviate cramps in its most basic form. Stretching is a natural and instinctive activity both in male and female athletes (Page, 2012; Tallet, Gill & Zain, 2018; Gill, Noor & Eqra, 2019; Gill et al., 2021). One school of thought is that stretching habitually occurs naturally after waking from sleep (cold muscle stretch) or a long periods of immobility and exiting confined spaces and areas (active stretching). Increasing flexibility through stretching is one of the basic tenets of physical fitness, it a rare for athletes to stretch before for warming up and at the end of exercise (Gill, Noor & Eqra, 2019) to reduce the risk of injury and increase performance (Andersen, 2005). There are various methods that will exploit the benefits of flexibility which lead to reduce the risk of injury. Joints, muscles tendons and ligaments flexibility require less energy to move through a greater ROM. Similarly, university athletes used supplements and other muscles relaxant to make it more convenient for Male & Female athletes (Gill et al., 2022). Different exercise expert's uses a different mode of stretching to perform better and enhance self fitness along with reduction of injuries: one is hydrotherapy exercise as it produces less impact on joint tendons and joints as well (Gill et al., 2019). The other way is to perform on the ground. The stretched muscles not only gain strength & flexibility but also helped to support other body muscles as assisted or worked as stabilizers, assistant and prime mover muscles (Rubini Costa & Gomes, 2007; Chaabene, 2019). Stretching can be dangerous when it performed inaccurately, it can be done through a variety of methods depending on tissue, their origin and insertion as well. A few techniques may be ineffective or detrimental, even to the point of causing hypermobility, instability, or permanent damage to the tendons, ligaments, and muscle fiber. The physiological nature of stretching and theories about the effect of various techniques are therefore subject to heavy inquiry (Page, 2012). The physical fitness varies from person to person, gender, and individual depending on the sports demand as it is a vital part of fitness wheel. It can be enhanced and improved by working on regular basis added with skill drills. The flexibility training could escort to injury which lead to poor performance. Although, strength, power and range of motion (ROM) are of prime importance to a athletes, but a periodic training program would also improve strength, pace and stamina (Micheo, Baerga, & Miranda, 2012). A dangerous stretching myth is that by increasing range of motion one should lose strength, power, speed joint stability which resulted in

deficit in performance (Armstrong, & Smedley, 2003). In other words, an increase in potential of muscles power and therefore increases athletic ability, improve dynamic balance, or the ability to control the muscles (Armstrong, & Smedley, 2003). Most athletes have experienced the resistance training resulted muscles showed tightness, soreness and it seemed hard to walk. A non systematic training along with not properly warm down resulted in delayed onset muscle soreness DOMS (Herbert and Gabriel, 2002; Shrier, 2005). The soreness resulted to the byproduct of waste material which accumulate in the form of lactic acid, if appropriate warm down in not done performance graph come down gradually. (Armstrong & Smedley, 2003; Shrier, 2005). Flexibility is a vital component of physical fitness and has many positive effects on the body. Once you increase your flexibility, allowed increased ROM in your body resulted improved performance. The flexibility training are categories on the bases of the activity. However, it is important to note that although there are many dissimilar ways to stretch, no one way, or no one type of stretching is better than another. Each type has its own advantages and disadvantages, and the key to getting the most out of stretching lies in being able to match the right type of stretching to achieve the maximum flexibility. Proprioceptive Neuromuscular Facilitation, PNF (Ferber Gravelle and Osternig, 2002; Taylor Sheppard Lee & Plummer, 2009) is a stretching technique utilized to improve muscle elasticity and has been shown to have a positive effect on active and passive range of motions (Funk *et al.*, 2003; Behm, Aragao-Santos, Korooshfard, and Anvar, 2023).

Significance of the Study

This study not only helpful to wicketkeepers at domestic, club, university, domestic and novice but it also helpful for professional athletes to look up their performance not only for cricketers but other athletes as well. Coaches, trainers, physiotherapists, doctors & professionals will get assistance by this study to overcome injuries and prevention of athletes to get rid off from sports for longer epoch of time. . In Pakistan, people are crazy about cricket. In Lahore the major city of the Punjab have 164 cricket clubs, 132 are registered to the Pakistan Cricket Board organization and rest of the clubs are still under registration proves. The study is all about these registers clubs.

Objectives

- To identify the impact of flexibility exercises on wicket keeper's performance and to make some recommendation to manage the impact of flexibility exercises on a wicket keeper's performance.
- To check the perception of wicket keeper about range of motion in performance.

Research Questions

RQ 1: What are the impacts and effects of flexibility exercises on a wicket keeper's flexibility?

RQ 2: Is flexibility essential part of wicket keeper for rehabilitation and or helpful in reduction of injury rate?

De-limitation

- The study was delimited to the National Cricket Academy, Domestic cricket, Lahore city cricket clubs and Punjab University athletes.
- The study was limited to the Male population for experimental research & for survey it is applicable for both male and female athletes.

Research Methodology

The present study is about checking the effects of flexibility on wicketkeeping position. With the high demand for cricket, wicket-keeper flexibility plays a key role in performance. It was an experimental study in which a targeted sampling method was utilized. The independent variable was flexibility and the dependent variable was performance. Pre-test values have been taken to get baseline data and implemented 8 weeks flexibility program. The study consisted of 27 male Club level wicketkeepers of

which 5 subjects left the study due to personal reasons and the remaining were N=25. All subjects were between the ages of 15 and 28 years and had not sustained a lower extremity injury within the past six months. The testing instruments that were used in this study were Sit and Reach Test for flexibility measurement. The athletes performed this test on a flat surface with shorts, and shoes off. An Electronic Weight Machine was used to measure the weight of the subjects. Age and height were asked by the subjects. A box with height, length, and width was 30cm (12 inches) and the top of the board with 22.86 cm (9 inches) longed towards the feet place, and a meter rule was used for the flexibility measurements. The flexibility was measured in centimeters. This test was done on the Grounds of the University of Punjab, the gymnasium, and the Department of Sports Science & Physical Education, University of the Punjab Lahore. A control group of 10 normal wicket keepers was taken to help in further comparison. The following figure 1 shows the flow chart of the research:-

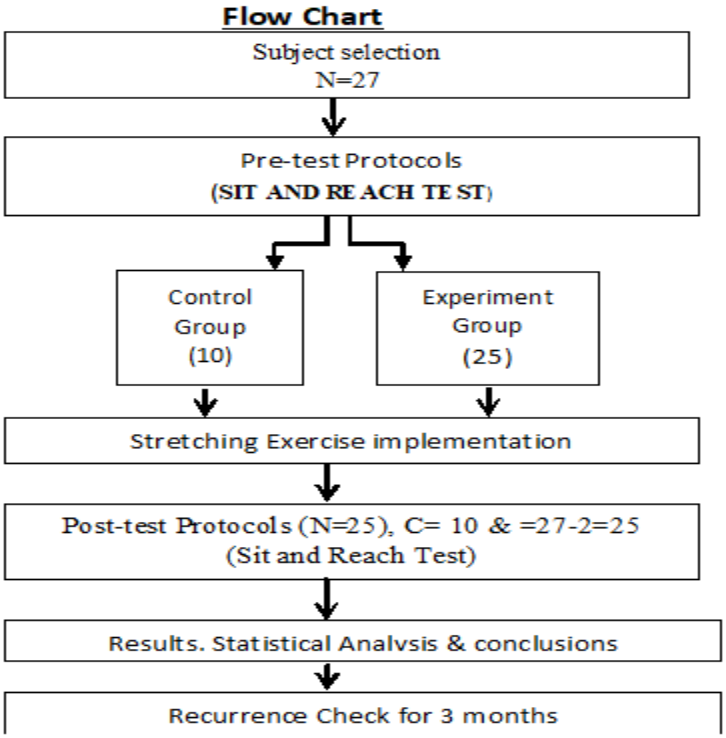

Figure 1

Post-test values have been taken after 8 weeks flexibility training. The value has been analyzed under SPSS-26 and paired sample technique utilized for further comparison. The recurrence rate has also been checked after 3 months and it was concluded that experimental group has 12% recurrence rate which was less control group 20%, which is 8% more than experimental group.

Statistical Analyses

All data was analyzed using SPSS version 26.0 SPSS statistics of International Business Machine (IBM). The scores for each group pre and post test value were analyzed, paired sample t-test utilized (Steel and Torrie, 1980). The following Table 1 and Figure 2 showed the demographic variable distribution of study of participants.

Table 1: *Showed demographic variables of selected subjects (Wicket Keepers)*

Variable	Frequency	Percentage
Male	25	100%
Female	----------	----------
Age years		
15-20	19	76%
21-30	6	24%
Height (cm)		
160 -170	18	72%
170 -180	5	20%
180 -190	2	8%
Weight (Kg)		
50-60	11	44%
61-70	9	36%
71-80	6	24%

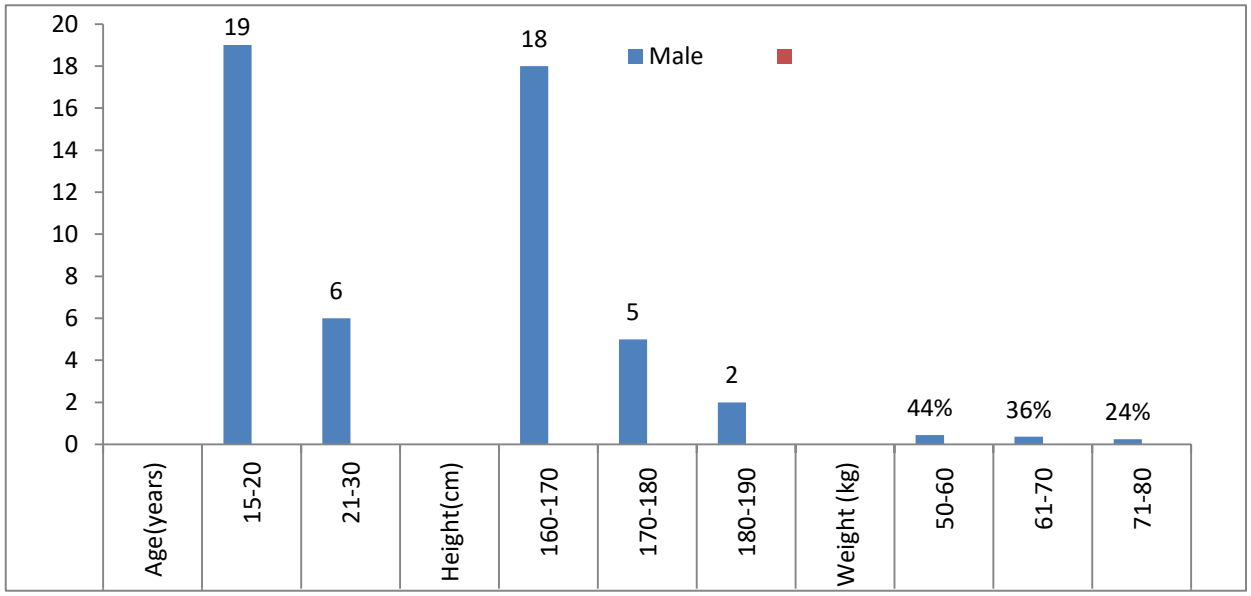

Figure 2

The study utilized 8 weeks training program which help the subjects to come over their deficit of range of motion.

Table 2: Showed the 8 weeks training session of the flexibility plan for wicket keepers

Weeks	1	2	3	4	5	6	7	8
Days/ Session	2/3days	3/4days	4/5days	4/5days	3/4days	4/5days	5/6days	4/5days

Table 3: *Showed the statistical data of pre and post test results Sit and Reach Test Results (wicketkeeper flexibility).*

Test	Mean ± S.D (cm)	Diff	%	t-value	p -value
Pre-test	30.40 ± 5.19	2.16	7.12	6.35	.000
Post-test	32.56 ± 4.77				

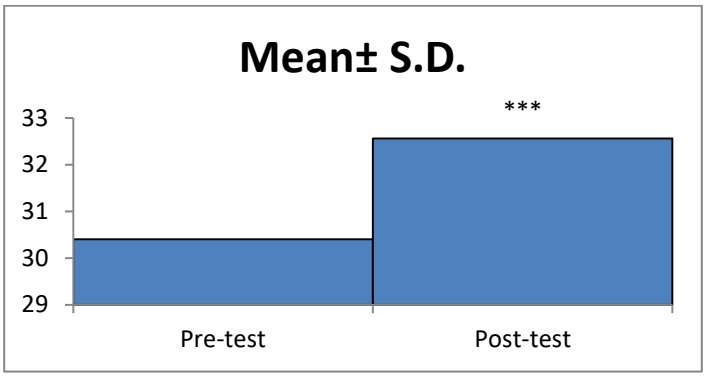

Figure 3

Above table 3 and Figure 3 showed the pair sample t test scores of the pre and post-test results. The mean flexibility of pre-test was 30.40cm and the mean flexibility of post-test was 32.56cm. Above table also shows that the Standard deviation in centimeters of pre and post flexibility test, the pre-test S.D. was 5.19cm and post-test S.D. was 4.77cm respectively. The t-score value 6.35 shows that, there is highly impact of flexibility sessions on player performance. The difference between mans value of pre and post data was 2.16 and its percentage was 7.12with sig value 0 .000 respectively shows that the highly significance in post-test after the different health related training sessions.

Recurrence

The recurrence rate of 35 subjects has been checked and subjects were followed for 3 months. It has been observed that 20% subjects of control group were injured after executed the flexibility plan and 12% were from experimental group as shown in table 1 and figure 2 respectively.

Table 4: *Showed the recurrence rate of 8 week stretching plan of wicket keeper*

Time Weeks	Control Group (N=10)	Experimental Group N=25
1-2	1	1
3-4	1	1
5-6	---	---
7-8	---	1
9-10	---	---
11-12	---	---
Total	2	---
Recurrence %	20%	12%

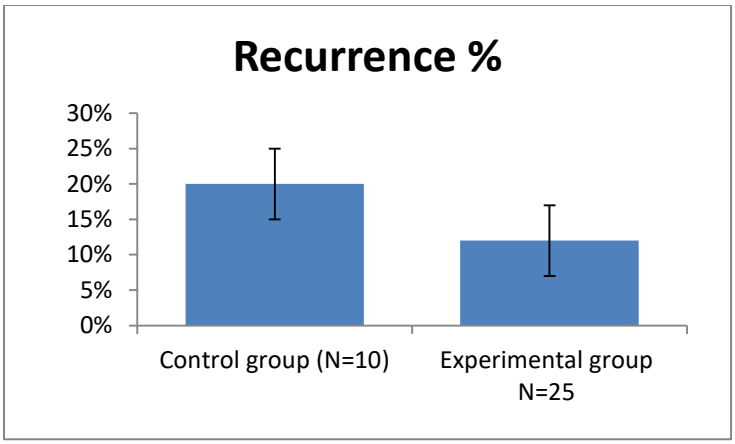

Figure 4

Table 2 and figure 2 Showed recurrence rates which have been checked after 3 month implemented of flexibility program. The control group showed 20 % and experimental group indicated 12% recurrence respectively.

Discussion

The research indentified that after implemented the stretching sessions for 8 weeks, it was observed that the range of motion (ROM) increased and the players performance enhances as it performed better than before. Furthermore, the wicket keeper injury rate was improved as it was compared with control group. Different researchers utilizes stretching techniques and different results attain (Micheo, Baerga, & Miranda, 2012; Page, 2012; similarly our results also familiar with the results of different researchers as flexibility not only improve range of motion, performance and reduction of injuries but also motivate the athletes for performing better in future. It also increases self confidence in cricketers by performing in all three formats. Different researchers have a point of view that stretching looses power and speed our results are not familiar with their theory as performance enhances after implemented the stretching program for 8 weeks and resulted significant ($p<0.001$). Alternate training can also increase flexibility as it was recommended by Behm, Aragao-Santos Korooshfard and Anvar (2023) our results overlaps with this concept but it will increase the risk of injury in in-season training as body is not used to it for wicket keeper. It might be fruitful in off season and pre season as well.

Conclusion

The result concluded that flexibility exercises (Dynamic, Static & Proprioceptive Neuromuscular Exercises (PNF)) on wicketkeeper (Cricket) performance as it is worked on regular basis. Moreover, the outcome indicated that flexibility not only improves range of motion (ROM) but also played a major role in restricting injuries.

Recommendation

- Wicket keeper should perform flexibility sessions on exercise on regular basis.
- After every aerobic and strength training exercise wicket keeper should utilized static techniques of flexibility exercises for the enhancement of the performance and fast recovery..
- Coaches should educate & improve the ROM (range of motion) as essential aspect wicket keepers.
- Wicket keepers should also know the different techniques of stretching especially Proprioceptive Neuromuscular Facilitation (PNF) that will help them for better flexibility and better performance.

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Conflict of Interest

Authors declared no conflict of interest.

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