



Association between hamstring flexibility, lower back flexibility, and sprint speed in Cricket players: A narrative

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Abstract

Aim: This narrative review explores the relationship between hamstring flexibility, lower back flexibility, and sprint speed in cricket players, with a focus on how hamstring tightness impacts musculoskeletal injuries and performance.

Methodology: A comprehensive review of relevant studies was conducted, examining flexibility interventions like dynamic soft tissue mobilization and conventional therapy.

Result: The findings indicate that hamstring flexibility significantly influences range of motion and injury risk, with tightness potentially contributing to knee and low back pain. Fast bowlers were found to exhibit greater flexibility, strength, and sprint speed compared to batsmen.

Conclusion: Overall, the review concludes that improved hamstring flexibility plays a crucial role in reducing injury risk and enhancing sprint performance. Female cricketers demonstrated greater hamstring flexibility than male players, and while hamstring tightness was not directly linked to lower extremity injuries, it contributed to pain in the knee and lower back. Flexibility training, particularly for the hamstrings, is essential for optimizing performance and minimizing injuries in cricket players.

Keywords: Hamstring flexibility, lower back flexibility, sprint performance, Cricket players, musculoskeletal injury prevention

Introduction

Cricket is a global sport traditionally popular in the commonwealth nations but now being played in 105-member countries of the International Cricket Council. Cricket is the world's second-most popular spectator sport after football and has captivated people of every age, sex, background, and ability for more than 400 years. A Bat and Ball game with complex rules, cricket involves physical fitness, skill and strategy^[1].

Hamstring strain has emerged from being one of many common injuries a decade ago to being the most common injury in the sport at the elite level. These strains have a seasonal incidence of 8.7 injuries per 100 players per season, with most strains being grade 1 or 2^[2].

Players with shortened hamstring muscles present gait restrictions, increased risk of falls, and are more prone to musculoskeletal injuries. Hamstring muscle tightness leads to decreased range of motion of lumbar flexion and pelvic tilt. This can alter the biomechanics of lumbar spine and may led to back pain. Hamstrings are active throughout the gait cycle with peak activation during the terminal swing and initial stance of sprinting cycle. During the terminal swing phase, the hamstrings are required to contract forcefully and lengthen to decelerate the extension of knee and flexion hip^[3].

The biarticular hamstrings are active and undergo a stretch-shortening cycle during the second half of the swing phase of sprinting. Flexibility in sports allows players to perform certain skills more efficiently, but it is also important in other sports to aid performance and decrease the risk of injury. Flexibility is affected by various factors such as age, gender, activity, heredity, injury and pain. The relationship of flexibility to athletic performance is likely to be sport dependent. Decreased flexibility has been associated with increased in-line running and walking economy. Increased

stiffness may be associated with increase isometrics and concentric force generation, and muscle energy storage may be best manifested by closely matching muscle stiffness to the frequency of movement in stretch-shorten type contractions^[4].

Flexibility is a component of performance and fitness. The more flexible player the chances of injury is less. Flexibility and speed also play an important role in physical fitness of cricketer because they have to dive in the field for the catch, to stop the ball, the player has to run fast, to stop the ball, to take a run. If the player is not flexible the chance of injury is more. It has been 2 presumed that probability of getting injured decreases when the athletes are stronger and flexible.^[6] In relations to sports, speed is a determiner of performance and explosive strength. Muscle strength and speed are directly proportional to sports performance. Muscle activities result into increase speed performance^[7]. Sports personnel are the most afflicted towards various musculoskeletal disorders. Low back pain is the most common musculoskeletal complains experienced by 60% to 85% of athletic population at least once in a life time. Flexibility is the movement available at our joints, usually controlled by the length of our muscles. This is often thought to be less important than strength, or cardiovascular fitness. The predisposing factor includes muscle imbalances, inflexibility, structural differences of spine and improper training. Alteration in the surrounding muscles or ligaments tends to cause imbalances in the muscle group and decrease flexibility. Sports which involve hyperextension, flexion and rotation exhibits high amount of low back pain complains^[13].

So, the aim of this review is to explored the relationship between hamstring flexibility, lower back flexibility, and sprint speed in cricket players, with a focus on how hamstring tightness impacts musculoskeletal injuries and performance.

Authors, Journal, Year	Objectives	Design	Characteristics of participants sample size	Material and method	Outcome measures	Results
Pawar <i>et al.</i> 2023 ^[14]	To find the effect of dynamic soft tissue mobilization on cricket players on improving hamstring flexibility	Comparative study	30 cricket players selected by random sampling method	On the basis of selection criteria, players divided into two groups A & B. Dynamic soft tissue manipulation and passive stretch performed by the therapist. This stretch force was applied for 30 sec time period sets of 3 cycle for 4 weeks.	ROM	There was significant increase in active range of motion in both the group's subjects after the protocol. The range of motion gain in group A is higher than group B. Group A received dynamic soft tissue mobilization along with conventional therapy and group B which received conventional flexibility program.
Mahato <i>et al.</i> 2015 ^[4]	To compare three major joints flexibility of cricket, basket and football players.	Comparative study	30 Male players 10 Cricket players 10 Football players 10 Basket players. Age 20-28-year University level players.	Lower back flexibility test to measure lower back flexibility. Shoulder flexibility test to measure shoulder flexibility. Ankle flexibility test to measure ankle flexibility.	Flexibility	No significance difference was observed In lower back and shoulder flexibility among Players of different sports, cricket
Sulaiman <i>et al.</i> 2022 ^[12]	To compare the hamstring	Comparative study	50 cricketers among age group of 19- 25 years	2 groups group A include 25 males	AKET active knee extension	There is significant difference in
	Muscle length of male and female cricket players associated with low back ache			players and group B includes 25 females' players. Hamstring flexibility is measured using active knee extension test in supine position	test	hamstring flexibility between male and female cricketers.
Ratnesh <i>et al.</i> 2016	To find out difference between batsman and fast bowlers in relation to grip strength, back strength, leg strength and flexibility.	Comparative study	20 Cricketer 10 Fast bowler. 10 batsmen. Age (18- 28) years	20 Cricketer 10 Fast bowler 10 batsmen Variables Grip strength measured by hand grip dynamometer Back strength and Leg strength measured by dynamometer Flexibility was measured by the sit and reach scale in cm.	Hand grip dynamometer Leg and back strength dynamometer Sit and reach scale for flexibility measurement.	Fast bowlers have Greater grip strength, leg strength, back strength and flexibility comparison to batsman.
Rafia Imtiaz <i>et al.</i> 2023 ^[14]	To find the association of hamstring tightness with lower extremity injuries in athletes.	Cross – sectional study	141 Athletes 61 Cricketers 80 Footballers Only male participants Age 14 – 38 years.	141 Athletes 61 Cricketers 80 Footballers Nordic questionnaire was use to determine the lower extremities injuries. Active knee extension test use to measure hamstring tightness in athletes.	Nordic questionnaire Active knee extension test	Hamstring is not found to be associated with lower Extremities Injuries. While hamstring tightness could cause knee pain and low back pain in athletes.
Dahikar <i>et. al.</i>	Relationship between hamstring and lower back muscles flexibility and sprint speed in under -19 young male cricket players	Comparative study	100 Male crickets' players Age 16 – 19-year age	In this study 100 young crickets were included all of whom were between 16– 19 year of age. The participants went through a 30m sprint test for sprint speed and V sit and reach test for lower back and hamstring muscles Flexibility after a short warm up.	Speed sprint test. V sit and reach test. Anthropometric measurement. Stadiometer for height measurement, weighing machine for weight measurement.	In this study we observed a significant correlation between the sprint speed and flexibility of hamstring muscle and lower back muscles.

Discussion

The main objective of this review is to find out the association between hamstrings flexibility, lower back flexibility, and speed test. Hamstring strain has emerged from being one of many common injuries. Players with shortened hamstring muscles present gait restrictions, increased risk of falls, and are more prone to musculoskeletal injuries. Hamstring muscle tightness leads to decreased range of motion of lumbar flexion and pelvic tilt. This can alter the biomechanics of lumbar spine and may lead to back pain. Hamstrings are active throughout the gait cycle with peak activation during the terminal swing and initial stance of sprinting cycle. During the terminal swing phase, the hamstrings are required to contract forcefully and lengthen to decelerate the extension of knee and flexion hip. The relationship of flexibility to athletic performance is likely to be sport dependent. Decreased flexibility has been associated with increased in-line running and walking economy. Increased stiffness may be associated with increase isometrics and concentric force generation. Flexibility is a component of performance and fitness. The more flexible player the chances of injury is less. It has been presumed that probability of getting injured decreases when the athletes are stronger and flexible.^[6] In relations to sports, speed is a determiner of performance and explosive strength. Muscle strength and speed are directly proportional to sports performance. Muscle activities result into increase speed performance. A study by Pawar *et al.* proven that there was significant increase in active range of motion in both the group's subjects after the protocol (group A received dynamic soft tissue mobilization along with conventional therapy and group B received conventional flexibility program). The range of motion gain in group A is higher than group B. A study by Imtiaz *et al.* proven that hamstring tightness is not found to be associated with lower extremity injuries, while hamstring tightness could cause knee pain and lower back pain in athletes. A study by Shakira proven that there is no significant difference in hamstring flexibility between male and female cricketers with low back pain. A study by Aditya Mahato and Avijeet Rana proven that no significant difference observed in lower back and shoulder flexibility but in this two component cricket players are better than basketball player and football players are better than cricket and basketball players. In case of ankle flexibility significant difference was observed among cricket football and basketball players. In this football players are better than basketball players and cricket players are better than basketball and football players.

Conclusion

The study concludes that there is significant difference in hamstring flexibility between male and female cricketers with low back pain. The female cricketers have greater hamstring flexibility as compare to male cricketers with low back pain. Hamstring tightness is not found to be associated with lower extremity injuries. Hamstring tightness could cause knee pain and low back pain in athletes. Fast bowlers have greater grip strength comparison to batsman. Fast bowlers have greater back strength comparison to batsman. Fast bowlers have greater flexibility comparison to batsman.

Fast bowlers have greater leg strength comparison to batsman. No significant difference was observed in lower back and shoulder flexibility but in this two component cricket players are better than basketball player and football players are better than cricket and basketball players. In case of ankle flexibility, significant difference was observed among cricket football and basketball players.

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