

Original Research Article

Prevalence of posterior ankle impingement syndrome after ankle sprain in fast bowlers

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ABSTRACT

Background: Cricket is a competitive, physically challenging game requiring a wide range of attribute including explosive power strength agility speed and physical and mental toughness. The study aimed to determine the prevalence of posterior ankle impingement syndrome in fast bowlers after ankle sprain.

Methods: In this study club level fast bowlers age group ranging from 18-25 years were considered. Selection of the subjects were done as per the inclusion and exclusion criteria. Sample size for study was 152. Purpose and procedure of the study was explained to the subjects. Clinical test such as anterior drawer test and Talar tilt test were performed to diagnosed ankle instability after ankle sprain. Subjects having atleast one test positive was further consider and hyper plantarflexion test were performed to confirmed posterior ankle impingement syndrome.

Results: The 68% of players are having posterior ankle impingement syndrome after ankle sprain.

Conclusions: The study concludes that there is high prevalence of posterior ankle impingement syndrome in fast bowlers after ankle sprain in players ranging from 18-25 years and involved in cricket for more than 3 years.

Keywords: Ankle injuries, Ankle sprain, Cricketers, Fast bowlers, Posterior ankle impingement

INTRODUCTION

Ankle joint is a synovial joint of hinge variety. The upper articular surface is formed by the lower end of tibia including medial malleolus, lateral malleolus of fibula and inferior transverse tibiofibular ligament. These structure form a deep socket. The inferior articular surface is formed by articular areas on upper, medial and lateral aspect of the talus. Structurally the joint is very strong due to close inter locking pattern and strong collateral ligament. ligament such as fibrous capsule, deltoid and lateral provide support to the joint.¹

Cricket is a competitive, physically challenging game requiring a wide range of attribute including explosive power strength agility speed and physical and mental toughness .Musculoskeletal pain can occur in various

ways while playing cricket occurs due to struck by the ball, rapid rotational movement, sliding, diving, overuse, ankle sprain. Intrinsic risk factor for musculoskeletal pain are the joint flexibility, ligament laxity, muscle tightness, functional instability, previous injuries and inadequate rehabilitation. Extrinsic risk factor include the amount of the training and number of games played, climatic factor, pitch surface, playing field.²

In cricket, the majority of injuries are of a noncontact nature and have traditionally been thought of as "overuse" injuries. There is emerging evidence that rapid change in workload is a greater risk factor for many injuries than absolute workload although the relative contributions between change of workload and absolute workload vary according to injury type.³ The injuries seen in fast bowlers were mainly soft tissue injuries

predominantly to muscle (41.0%), joint (22.2%), tendon (13.2%), and ligament (6.2%). The primary mechanism of injury was the delivery and follow through of the fast bowler (25.6%), overuse (18.3%), and fielding (21.4%).⁴

Incidence of ankle sprain in fast bowler is 26%.^(2,5) Lateral ankle sprains occur because the rear foot undergoes excessive supination on an externally rotated lower leg⁶. If trauma is repetitive, the ankle structures have potential to experience secondary injury and dysfunction. These dysfunction included both anterior and posterior ankle impingement syndromes where disruption of the bony structures, joint capsule, ligaments, and tendons typically occurs due to over stretching.⁷ During fast bowling action there is the change in the pace that put stress on the soft tissue and muscles as they try to adapt the changes.⁷ Biomechanically fore foot is more prone to acute injury whereas the hindfoot may be more susceptible to overuse injuries such as lateral ankle instability.⁷

Acute or repetitive compression of posterior structure of ankle may lead to the posterior ankle impingement syndrome. Posterior lateral impingement is caused by an accessory ligament, posterior infermalleolar ligament, which spans the posterior ankle between the posterior tibiofibular and posterior talofibular ligament.⁸ During the plantar flexion the back of ankle is compressed. It occurs as the bone or soft tissue in the back of ankle are pinched excessively during plantar flexion caused by the pain and inflammation. The most common structure involved are the joint capsule, flexor hallucis longus tendon or the OS trigonum.^{7,9} Fast bowlers plantarflex their forefoot and are prone to posterior impingement and may develop bony spur formation due to repeated loading which will affect the speed and efficiency of bowling and as it usually remains undiagnosed after ankle sprain. So there is a need to find out prevalence to plan the further treatment or precautionary measure to prevent posterior ankle impingement syndrome.

METHODS

Study area

A cross-sectional observational study conducted in the Straight drive academy, Dombivli, Mumbai from.

Study period

Study was conducted for the period of 19 months i.e. 4th October 2021 to 10th April 2023 and club level fast bowlers were included in the study.

In this study club level fast bowlers age group ranging from 18-25 years were considered. Selection of the subjects was done as per the inclusion and exclusion criteria. Purpose and procedure of the study was explained to the subjects. Data was collected after the approval and permission of the subjects. Clinical test such

as anterior drawer test and talar tilt test were performed to diagnose ankle instability after ankle sprain. Subjects having at least one test positive were further considered and hyper plantar flexion test was performed to confirm posterior ankle impingement syndrome.

Inclusion criteria

Players between the age group 18-25 years, player having experience of minimum 3 years, only male players, regular practice at club level player and history of previous ankle sprain were included.

Exclusion criteria

Patients with recent injury, open wound, and recent history of ankle sprain (period: 1 week) were excluded.

Data analysis

Collected data was checked for completeness and constituency. Descriptive statistics were used and results were expressed in frequencies and percentages by using pie diagrams and charts. The values were documented in Microsoft excel 2013.

RESULTS

So out of 152 population 93 subjects were ranging from 18-22 years and 59 subjects were ranging from 22-25 years (Figure 1).

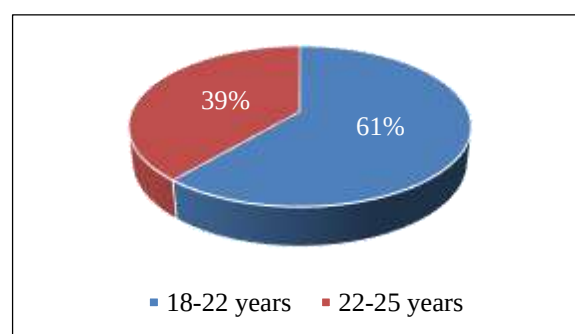


Figure 1: Age distribution.

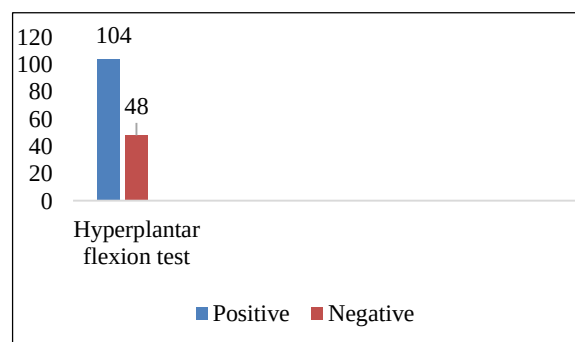


Figure 2: Prevalence of posterior ankle impingement syndrome.

Represents the prevalence of players having posterior ankle impingement syndrome after ankle sprain. Out of Total 152 subjects 68% subjects were positive for hyper plantar flexion test while and 32 % subject were negative (Figure 2).

DISCUSSION

Cricket is a competitive, physically challenging game requiring a wide range of attribute including explosive power strength agility speed and physical and mental toughness. Intrinsic risk factor for musculoskeletal pain are the joint flexibility, ligament laxity, muscle tightness, functional instability, previous injuries and inadequate rehabilitation. Extrinsic risk factor include the amount of the training and number of games played, climatic factor, pitch surface, playing field

In cricket fast bowlers are more affected than batsmen and spin bowlers. Intrinsic and extrinsic factors play an important role in injuries of fast bowlers. In cricket, the majority of injuries are of a noncontact nature and have traditionally been thought of as “overuse” injuries. There is emerging evidence that rapid change in workload is a greater risk factor for many injuries than absolute workload although the relative contributions between change of workload and absolute workload vary according to injury type. In this study, anterior drawer test, Talar tilt test was performed to check ankle instability cause after ankle sprain. Subjects positive for any one of the test were considered to be having mechanical ankle instability after that Hyperplantar flexion test was used to find out posterior ankle impingement.

The ankle joint complex bears a force of approximately five times body weight during stance in normal walking, and up to thirteen times body weight during activities such as running. The ankle moment obtained from gait analysis demonstrates a dorsiflexion moment at heel strike as the dorsiflexors eccentrically contract to control the rotation of the foot onto the ground and prevent the foot from slapping the ground. During the second phase, there is a plantarflexor moment as the ankle dorsiflexors contract eccentrically to allow forward progression of the shank over the foot. During the third phase, the plantar flexion moment continues with the plantar flexors contracting concentrically towards toe-off. As walking speed increases, ankle kinetic patterns remain similar in profile but with greater magnitudes.

This study assessed the occurrence of posterior ankle impingement in fast bowlers after ankle sprain. Fast bowlers have to perform repetitive action, after ankle sprain ligament become weak this lead to the ankle instability. Due to the ankle sprain mechanical instability occur because of improper remodelling of the ligament. After ankle sprain both mechanical and functional stability of ankle are affected. Fast bowlers increases the stress as well as cause improper weight distribution.

During rapid weight shifting centre of mass is more on weight bearing foot or landing foot. Injuries can be caused by going into wrong action and twisting causing more force on the ankle. Due to poor neuro-muscular control bowlers unable to land properly through their action. Impingement result from the compression of the ligaments or soft tissue. In posterior ankle impingement syndrome posterior intermalleolar ligament, posterior talofibular ligament, calcaneofibular ligament, posterior tibiofibular ligament may get compress. It may also caused by multiple osseous and soft tissue etiologies in isolation or in combination.

Mostly pathology is associated with the lateral process of posterior talus which cause posterior ankle impingement syndrome. This can become chronic injury due to repetitive microtrauma. Pain is less specific due to the achilles tendon. Symptoms get worsened by plantarflexion. After compression of ligaments it affects the bowling action of bowlers which lead to decrease in the efficacy of the bowler. It may cause pain while running or landing the foot.

This study was done on sample size of 152 male club level players between age group of 18-25 years. After that subjects were examined through the anterior drawer test and talar tilt test to determine ankle instability. If any one test comes positive then that subject was consider for hyperplantar flexion test. The data states that 62% i.e. 104 out of 152 from sample size were having posterior ankle impingement.

The study has assessed the prevalence of posterior ankle impingement syndrome in fast bowlers after ankle sprain and will help to plan preventive strategies as well as intervention for the same.

Limitation of study was conducted in a metropolitan city. Female players were not included, particular age group players were selected.

CONCLUSION

The study concludes that there is high prevalence (i.e. 68%) of posterior ankle impingement syndrome in fast bowlers after ankle sprain in players ranging from 18-25 years and involved in cricket for more than 3 years.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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