

## Original Research Article

# Prevalence of cricket-related musculoskeletal pain among Indian junior club cricketers

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## ABSTRACT

**Background:** Cricket is the most commonly played sport in India. The number of children playing cricket are increasing. There is growing evidence that injury rates in junior cricketers are higher than professional cricketers. In India at the community level, there are no standardized specific cricket injury prevention programmes (CIPP) which reduce injury risk. Minimal data is available from Asian countries, especially on junior cricketers. Our study is an attempt to focus on junior club cricketer injuries, plan safety precautions and emphasize role of CIPP.

**Methods:** It was an observational study conducted on male junior club cricketers in the age group of 8-16 years. Based on a self-reported questionnaire, player's physical status, training, injuries and their nature are assessed over a period of 12 months.

**Results:** Over the study period 36 of 50 cricketers were symptomatic. The lower limb is the most frequently injured. Most common etiology is overuse. We found that the players are not following pre-training warm-up and post-training cool-down.

**Conclusions:** CIPP should be implemented and strictly followed from the early stages of sports life. Pre-training warm-up and post-training cool-down should be included in their routine training. Overuse i.e. playing overtime and ignoring the pain during practice or match should be avoided. A supervised training and regular screening of players by orthopaedician or sports physician will keep them fit to play with full potential.

**Keywords:** CIPP, Cricket, Injury, Junior club, Overuse, Warm-up

## INTRODUCTION

Cricket is one of the most popular sports in the Indian subcontinent. Currently the men's Indian cricket team is ranked 1<sup>st</sup> in test cricket, 2<sup>nd</sup> in one-day international and 5<sup>th</sup> in T20 (as of 22/10/2019 - ICC rankings). The number of children playing cricket are increasing day by day, their injuries are also increasing. To possess such a strong national side, the building blocks and foundations need to be laid at junior club level to meet the required standards to develop and transcend to provincial and national levels.<sup>1</sup>

Despite being a noncontact sport, cricket injuries are commonly reported.<sup>2,3</sup> There is growing evidence that the injury rates in junior and amateur cricketers are higher than professional cricketers.<sup>4,5</sup>

Team sports like rugby, basketball and handball have all implemented injury prevention programmes (IPP) at the community level and many of these programmes have been successful in reducing injury rates. In India at the community level, there are no standardized specific cricket injury prevention programmes (CIPP). These programmes

reduce injury risk by improving neuromuscular strength, agility and limb coordination with a combination of strength, plyometric and balance exercises.<sup>6</sup>

Musculoskeletal pain can occur in various ways while playing cricket: a direct hit by a ball or bat, rapid rotational movements (twisting), fielding, sliding and diving and collisions with other players.<sup>1,7-9</sup> Apart from above, overuse can lead to musculoskeletal pain. It is necessary to make players understand the importance of fitness, diet and training to become successful sportsmen.

There is significant published work from developed countries, but minimal data is available from Asian cricket playing nations, especially on junior club cricketers. Our study is an attempt to focus on junior club cricketer injuries and plan safety precautions accordingly.

## METHODS

This was a retrospective study which documented cricket-related musculoskeletal pain over a 12 months period i.e. from June 1<sup>st</sup> 2017 to May 30<sup>th</sup> 2018.

Subjects are male junior club cricketers in the age group of 8-16 years from cricket coaching academies in Hyderabad, Telangana, India, who participated voluntarily after their parents gave informed consent. Approval from ethical committee and scientific research board of our institution (Sunshine Hospitals) was taken. The identity of all the subjects is kept anonymous and confidential.

The player type is defined and categorized into four groups.<sup>10</sup> Bowlers- fast and slow, batsmen, wicket-keepers - a specialized player position, and all-rounders players who put equal effort both in bowling and batting.

With the help of coaches, physiotherapists and trainers of the academy all the players are evaluated for musculoskeletal pain (injury) in the last 1yr based upon a questionnaire. To minimize the recall bias, we crosschecked the attendance sheets of the players and the reason for the days on leave are evaluated.

Musculoskeletal pain (Injury) is defined as 'A sensation of agony that inhibits the individual from participating in cricket or practice for a minimum of 24 hours'.<sup>11</sup> Injury incidence was defined as number of injuries occurring per 10,000 hours of play.<sup>10</sup>

Prevalence was calculated as by the following formula: missed player days  $\times$  number of injured players/numbers of play days  $\times$  total number of players.<sup>10</sup>

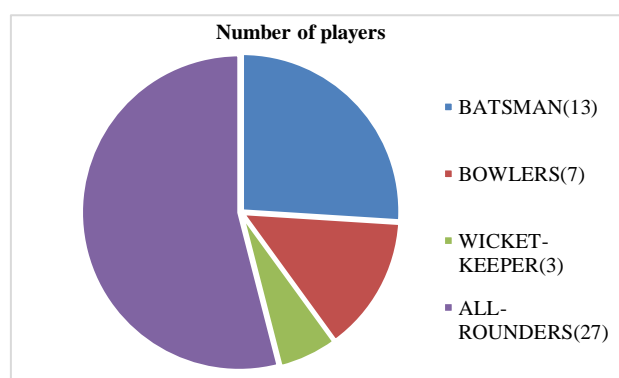
Descriptive statistical analysis is done. Results on continuous measurements are presented as mean, standard deviation and range. Significance is assessed at 5% level of significance.

## RESULTS

The study included 50 male players who fulfilled the inclusion criteria. The average age of the players is 13.84 years (9-16 years). Player's profile was detailed in Table 1. These cricketers have been playing professionally or semi-professionally for an average of 4.5 years (1-10 years). Players are categorized as shown in Figure 1.

**Table 1: Player profile.**

Player profile	Mean $\pm$ SD
Age (years)	13.84 $\pm$ 2.0
Body weight (kg)	58 $\pm$ 13.2
Height (m)	1.61 $\pm$ 0.12
Body mass index (kg/m <sup>2</sup> )	21.22 $\pm$ 3.5



**Figure 1: Player categorization.**

The player practice profile is as follows- apart from competitive matches, all players had daily practice for specific hours at the Academy ranging from 1-6 hours. Standard practice is 6 working days, with official day off on Sunday. However, we noticed that most of players played Local Street or club cricket on Sundays and so there was no actual 'day off' from the game. The number of hours of cricket practice per week and per year is detailed in (Table 2).

**Table 2: Practice profile.**

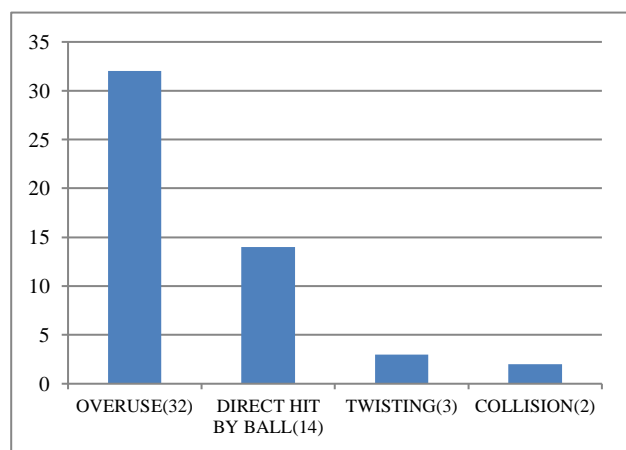
Practice profile	Mean $\pm$ SD
Average no. of hours of daily practice	4.5 $\pm$ 1.57
Average no. of days of practice in a year	284.24 $\pm$ 58.4
Average no. of hours of practice in a year	1090 $\pm$ 485.2

The mean warm-up before the practice session is 20 $\pm$ 5.5 minutes, which includes weight training, skills coordination and aerobic flexibility. We found that strict pre warm-up and post cool down are not being followed.

Over the study period 51 instances of musculoskeletal pain were documented among 36 cricketers, 14 cricketers had

no significant musculoskeletal pain. The anatomical sites were thigh (9), knee (5), calf (5), Toe, ankle (7), lower back and trunk (15), shoulder (5), wrist (1), hand (2) and neck (1).

The lower limb is the most frequently injured (27), followed by the back and trunk (15), the upper limb (8) and neck (1). No injury is documented in the head and face. Among 27 lower limb cases - 17 are due to overuse, 7 due to direct hit by ball and 3 by twisting. Among 15 back and trunk cases 11 occurred due to overuse, 2 due to direct hit by ball and 2 by collision with other player. Of the 8 upper limb cases, 5 are due to direct hit by ball and 3 due to overuse. Pain in neck is due to overuse. The overall causes of pain are as depicted in (Figure 2).



**Figure 2: Cause of pain.**

Injury incidence is calculated to be 0.94 per 10,000 hours of play. The average number of days a player missed practice/matches and was out of active cricket due to pain is 5.3 days (1-30 days per year). The injury prevalence in our study is noted to be 0.97%. There is no significant relationship found between the injury incidence rate and the demographic characteristics; age ( $p>0.05$ ), BMI ( $p>0.05$ ) and experiences ( $p>0.05$ ).

## DISCUSSION

Our study is focused on junior club cricketers (8-16 years). This is the age group where both parents and players focus on number of hours, they play cricket rather than their training efficiency. This amateur nature results in improper training and injuries that lead to low performance which eventually affects their career in cricket. Junior club cricketers are the building blocks of Nations cricket which is why we conducted the study in this age group.

In a study by Noorbhai et al, the age group was 14-17 years with a mean of  $15.6\pm1.1$ .<sup>11</sup> In the study by Das, Usman et al, the mean age of the players was  $17.1\pm1.6$  years.<sup>4</sup> The average age of the players in our study is 13.84 years (9-16 years) with 80% in the age group of 13-16 years. All

players were male as in study by Das, Usman et al and Noorbhai et al.<sup>4,11</sup>

The mean BMI of all players is 21.22 and of injured players are 22 which is statistically insignificant ( $p>0.05$ ). The build of player may not be the reason behind the injuries observed.

Mean warm-up is  $20\pm5.5$  minutes, which is adequate as per Soomro et al.<sup>6</sup> But we observed that the quality of training is not adequate and needs to be addressed. A post-training cool-down is not being followed properly in the academies we studied. Soomro et al says CIPP as pretraining warm-up and post-training cool-down will result in significant reductions in Injury rates compared to the control group.<sup>6</sup>

The average months of training in a year is  $10.9\pm1.2$  which is more than that observed in study by Noorbhai et al i.e.  $7.6\pm2.7$ .<sup>11</sup> It is observed in our study that players continued to play even in off seasons similar to the observation by Dhillon, Soni et al.<sup>10</sup> During this off season, they used to play in compromised environment like streets, smaller playground with inadequate facilities and without guidance and prior warm-up - which needs to be addressed in countries like India. We may not be able to improve the facilities instantly but we can train the players to do a good warm-up and strictly follow CIPP and avoid playing on day offs.

Of 36 injured players 7 (19.4%) are bowlers, 8 (22.2%) batsmen and 21 (58.3%) are all-rounders unlike in study by Noorbhai et al where batsmen and all-rounders had almost same number of injuries i.e. 30% and 28% respectively.<sup>11</sup> Our sample size is small but the time spent by all-rounder in the ground in the form of fielding, bowling and batting is definitely more than any other player which justifies our injury pattern.

Each player (batsman, bowler, all-rounder, wicket keeper) is subjected to different stress, for example wicketkeepers perform a minimum of 300 squats in an innings, fielding involves walking, shuffling, running, jumping, diving and fast bowlers experience force equivalent to 5-8 times their body weight on the knee during front-foot contact phase which makes them susceptible to back and lower limb injuries.<sup>12,13</sup> CIPP builds the training sessions in a way to address the group of muscles stressed most commonly i.e. player specific training.

Injury incidence was calculated to be 0.94 per 10,000 hours of play which is less than in study by Dhillon, Soni et al i.e. 3.27.<sup>10</sup> The injury prevalence in our study was noted to be 0.97% and that of Dhillon, Soni et al is 10.14%.<sup>10</sup> Larger sample size and injuries being noted over a single tournament may be the reason for the higher incidence and prevalence. The average number of days a player missed practice/matches and was out of active cricket due to pain was 5.3 (1-30 days).

In our study - the anatomical sites were lower back and trunk (29%), thigh (17%), knee (9.8%), calf (9.8%), phalanx (2%), ankle (13.7%), shoulder (9.8%), wrist (2%), hand (4%) and neck (2%). The anatomical sites of cricket-related musculoskeletal pain in study by Noorbhai et al were lower back (29%), thigh (11%), knee (30%), ankle (13%) and shoulder (17%).<sup>11</sup>

Lower limb is most commonly injured as in Noorbhai et al and Dhillon, Soni et al and Das, Usman et al.<sup>11,10,4</sup>

The most common etiology is overuse as in study by Das, Usman et al.<sup>4</sup> Considerable proportion of injuries are due to lack of awareness in judging severity of pain, playing in space and safety compromised grounds like streets and barren lands and playing without prior warm-up before the training session/match and continuing to play even after the injury. Exercise based intervention like CIPP improve strength, flexibility and training muscles in a fatigued state (cool down) improve resilience potentially reducing the risk of injuries. For example, repeated throwing by fielders lead to overuse injuries like rotator cuff (RC) tears in shoulder which can be prevented by strengthening RC muscles.

Clubs with low funds may not be able to implement training programs that require additional equipment. CIPP requires no additional equipment and breaks this socioeconomic barrier among cricket clubs.

Though our study is of small sample size (n=50), it highlights the current training condition, fitness level in academies and emphasizes mainly on overlooked injuries that eventually hinders a cricketer's overall performance.

## CONCLUSION

Junior club cricketers must have good physical training before practice/real matches, CIPP as a pre-training warm up and post training cool down can improve strength, fitness and reduce the injury rates. CIPP requires no additional equipment other than regular cricket which makes it easier to implement in every academy whether small or big. Physical strength and injuries must be evaluated at regular intervals by a physiotherapist and sports medicine doctor in order to address the issues at right time so that players can continue to play to their full potential and become successful.

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