Cricket injuries: a longitudinal study of the nature of injuries to South African cricketers

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Objective: To determine the incidence and nature of injuries sustained by elite cricketers during a three season period in order to identify possible injury patterns.

Methods: Thirty six physiotherapists and 13 doctors working with 11 provincial and the South African national teams completed a questionnaire for each cricketer who presented with an injury during each season to determine anatomical site of injury, month of injury during the season, diagnosis, mechanism of injury, whether it was a recurrence of a previous injury, whether the injury had recurred again during the season, and biographical data.

Results: A total of 436 cricketers sustained 812 injuries. Bowling (41.3%), fielding and wicketkeeping (28.6%), and batting (17.1%) accounted for most of the injuries. The lower limbs (49.8%), upper limbs (23.3%), and back and trunk (22.8%) were most commonly injured. The injuries occurred primarily during first class matches (27%), limited overs matches (26.9%), and practices (26.8%) during the early part of the season. Acute injuries made up 64.8% of the injuries. The younger players (up to 24 years) sustained 57% of the first time injuries, and the players over 24 years of age sustained 58.7% of the injuries that recurred from a previous season. The injuries 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%).

Conclusion: The results indicate a pattern of cause of injury, with the young fast bowler most likely to sustain an acute injury to the soft tissues of the lower limb while participating in matches and practices during the early part of the season.
Although there have been a number of investigations into the incidence and nature of injuries sustained by cricketers, the literature reviewed shows that no long-term investigation has been carried out to determine if any injury patterns could be identified. Thus the aim of this study was to investigate the nature of injuries sustained by elite cricketers during a three season period (1998–1999 (S1), 1999–2000 (S2), and 2000–2001 (S3)).

**METHODS**

The doctors and physiotherapists working with the South African team and the 11 provincial teams were required to complete a questionnaire for all cricketers that presented with an injury. It was designed to obtain the following information: anatomical site of injury; month of injury during the season; the diagnosis; mechanism of injury; whether it was a recurrence of a previous injury; whether the injury had recurred again during the season; biographical data.

An injury was defined as any pain that prevented the player from completing that particular match, practice, or training session and caused the player to seek medical attention. Acute injuries were those of rapid onset, chronic injuries were of longer duration involving very slow changes, and acute on chronic injuries were of longer duration and involved gradual changes, but were brought about by movements causing rapid onset. The severity of the injury was related to the length of time the player was not able to participate in practice sessions or matches.

For the purpose of this survey the incidence of injury was expressed as a percentage of the total number of injuries recorded. Injuries were grouped according to anatomical region as follows: the head, neck, and face region; the upper limbs; the back and trunk; the lower limbs. Injuries were also classified according to whether they were sustained during batting, bowling, or fielding. To allow comparisons between phases of play, the number of injuries in each phase was expressed as a percentage of the total. The time in the season when the injury occurred was also recorded. The off season was defined as the period when no specific cricket practice or training was performed. The preseason was defined as the period when no specific cricket practice or training was performed. The season was defined as the period when specific cricket practice and training was undertaken. The season was when matches were played and included international tours.

The BMDP Statistical Software Package (BMDP, 1993; BMPD Statistical Software Inc, Los Angeles, California, USA) was used to compute univariate statistics.

**RESULTS**

During the period under review, the physiotherapists and doctors working with the 11 provincial teams and the national team recorded 812 injuries sustained by 436 cricketers, with 13 as a result of bowling. All 14 of the stress fractures sustained occurred to the younger (59.3%) and bowling (56.9%) injuries than the older players. Older players (up to 24 years) sustained more overuse (59.3%) and bowling (56.9%) injuries than the older players. All 14 of the stress fractures sustained occurred to the younger players, with 13 as a result of bowling.

The injuries occurred predominantly when practising or playing for provincial (36.7%), provincial B (24.1%), and international (16.0%) teams. When representing club and school teams, 9.1% and 7.2% of the injuries occurred respectively. Players attending the various provincial and national cricket academies suffered 6.8% of the total injuries.

The injuries occurred equally during first class (27.0%) and limited overs (26.9%) matches and during practices and training (26.8%). The gradual onset of the injury, caused as a result of a combination of training, practising, and playing matches, over a period of time, accounted for 19.3% of the injuries.

Table 3 gives the age and role of the injured players. The younger players (up to 24 years) sustained more overuse (59.3%) and bowling (56.9%) injuries than the older players.

Table 4 shows the chronicity and occurrence of injuries. The majority (64.5%) of the injuries were first time injuries, and the younger players (up to 24 years) sustained 57% of these injuries. Of the new or first time injuries, 123 (23.5%) occurred during fielding. Recurrent injuries from the previous season made up 22.8% of the injuries, and players over 24 years of age sustained 58.7% of these injuries. A similar injury rate for injuries sustained during the season and recurring during the
same season was found for the players up to 24 years (49.2%) and over 24 years (50.8%).

Table 5 presents the regional distribution of the injuries. Lower limb injuries accounted for nearly half of the injuries (49.8%), and injuries to the hamstrings (17.8%) and quadriceps (10.1%) muscles, patella and knee (18.5%), and ankle (10.6%) comprised the majority of the 405 lower limb injuries. The hamstring injuries were mainly muscle strains (49) and tears (16), and injuries to the quadriceps were primarily caused by bowling (hamstring, 21; quadriceps, 19) and fielding (hamstring, 9; quadriceps, 8).

The 189 upper limb injuries were predominantly to the phalanges (24.3%), glenohumeral joint (21.7%), and metacarpals (11.1%). Injuries to the phalanges and metacarpals were primarily caused by impact from the ball while batting (25) and fielding (32), mainly resulting in fractures (19) and joint (14) injuries. The glenohumeral injuries were predominantly muscle (14), tendon (10), and joint (10) injuries caused by fielding, including throwing (22), overuse (5), and bowling (4).

Injuries to the lumbar spine (47.6%), abdominal muscles (18.9%), and ribs (10.3%) made up the majority of the 185 back and trunk injuries. The 88 lumbar spine injuries were made up mainly of joint (40) and muscle (20) injuries, and stress fractures (13) and were caused by overuse (31), bowling (25), fielding (12), and batting (7).

Of the 33 injuries to the head, neck, and face, 21 (63.6%) were cervical spine injuries, with 13 being muscle spasms or muscle strains. Of these, nine were the result of batting for long periods at a time.

Bowling (41.3%) and fielding, including wicketkeeping (28.6%), accounted for most of the injuries, with batting accounting for 17.1% (table 6). Of the bowling injuries, 53.4% were lower limb injuries and 32.6% were back and trunk injuries. Of these, 58.0% were acute injuries, 16.6% chronic injuries, and 25.4% acute on chronic injuries. Batting injuries were primarily lower limb injuries (54.4%) and impact injuries to the upper limbs (23.5%). The fielding, including wicketkeeping, injuries were predominantly to the upper (40.6%) and lower (42.9%) limbs.

The injuries occurred during the preseason (9.4%) (September), the early part of the season (32.3%) (October and November), midseason (21.7%) (December and January), the latter part of the season (12.5%) (February and March), and the “off season” (24.2%) (April to August).

The severity of the injuries varied, with 36.4% of the injuries only preventing the player from completing the training or practice session or the match that they were involved in when the injury occurred. The more severe injuries resulted in 12.3%, 13.7%, and 11.5% of the players not being able to practice or play matches for one to three days, four to seven days, and 8–21 days respectively, with a further 26.1% of the injured players not being able to practise or play matches for more than 21 days.

The primary mechanism of injury was the delivery and follow through of the fast bowler (25.6%), overuse (18.3%), running, diving, catching, and throwing the ball when fielding (21.4%), and being struck while batting (7.0%). Of the 149 overuse injuries, 82 (55.0%) were first time injuries, and 41 (27.5%) and 26 (17.5%) were recurrent injuries from the previous or the same season respectively.

DISCUSSION

The results indicate a pattern of cause and risk of injury. The principal finding is that young fast bowlers are at the greatest risk of sustaining an acute injury to the soft tissues of the lower limb during matches and practices during the early part of the season.

As the nature of cricket has developed in recent times, the cricketer has become more at risk of injuries associated with field sports. The results show a slight variation in the mean seasonal risk of injury, with acute injuries being the most common. Acute injuries, particularly to the soft tissue of the lower limbs, were primarily sustained during bowling, running between the wickets while batting, and running to field the ball. More than half of the first time injuries were acute, with many sustained while fielding.

Fast bowlers are at the greatest risk of injury for a variety of reasons, including the demands that fast bowling places on the musculoskeletal system, incorrect technique, poor preparation and training, and overuse.1-4 Of greatest concern is the
Fast bowlers are the most likely to be injured, and there is evidence of an increase in overuse injuries. Players and coaches need to be aware of the increase in these injuries, which are often first time injuries, which are likely to recur if not fully rehabilitated.

South African studies coordinated by Richard Stretch have been the most published of the early cricket epidemiological studies, and this paper represents the largest of these series to date. The processes are now obviously in place for recording injuries to elite cricketers in South Africa. The next challenge for this study as it evolves is to define a specific cohort of players and exposure time in order to report actual incidence and prevalence of injury.

Australia now also has a system for monitoring injuries to elite cricketers. England apparently has a similar process underway. Although New Zealand does not yet have a specific elite cricket injury survey, they are perhaps the country best placed to monitor cricket injuries at the amateur level because of the existence of a specific body—the Accident Compensation Corporation (ACC)—which is responsible for all sports injuries in New Zealand.

This South African study and the recently published Australian study1 show very similar injury profiles, but no injury rates can be directly compared because of differing methodologies. This is a familiar tale to anyone who has tried to compare injury rates between football studies from different countries. Cricket authorities have an obligation to try to promote research into the causes of cricket injuries. The most coordinated approach would be for the International Cricket Council to fund a cricket injury surveillance project (with a universal injury definition) in all Test playing countries.

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Take home message
Fast bowlers are the most likely to be injured, and there is evidence of an increase in overuse injuries. Players and coaches need to be aware of the increase in these injuries, which are often first time injuries, which are likely to recur if not fully rehabilitated.

REFERENCES