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INCIDENCE AND NATURE OF EPIDEMIOLOGICAL INJURIES TO ELITE SOUTH AFRICAN CRICKET PLAYERS

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Objectives. The study investigated the incidence and nature of injuries sustained by elite cricketers during a season and the possible risk factors associated with these injuries.

Methods. Fourteen physiotherapists and three doctors recorded 163 injuries sustained by 88 cricketers.

Results. Bowling accounted for 40.5% of the injuries, while fielding and batting accounted for 25.6% and 21.5% of the injuries, respectively. The injuries occurred while practising for or playing in club (3.7%), provincial 'B' (8.0%), provincial (51.5%) and international (36.8%) matches and occurred primarily during 4- and 5-day (33.1%) and 1-day (27.0%) matches. First-time injuries made up 63.6% of the injuries, recurrent injuries from previous seasons made up 28.4% and 8.0% of the injuries recurred again at a later stage during the season. Of the injuries 62.6% were acute, 14.7% chronic and 22.7% were acute injuries on existing chronic injuries. The majority of the injuries were muscle (37.4%), joint (20.9%) and tendon (15.3%) injuries. The primary mechanisms of injury were as a result of overuse (30.7%); running to catch or field (15.3%); during the bowling delivery or follow-through (12.3%); and being struck by the ball while batting (11.0%).

Conclusions. Coaches, players and the medical support team need to be aware of the incidence, nature and cause of injuries, so that the risk of injury can be further reduced.

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Cricket has traditionally been regarded as a sport that is relatively injury-free, although it has been classified as a sport with a 'moderate' injury risk.¹ In the past the major areas of concern have been impact injuries to the head, face and fingers, and injuries to the back. However, in addition to spending more time developing technical skill, the modern cricketer needs to possess a high level of fitness, making him susceptible to over-use injuries as a result of repetitive training for a sport that is placing greater physical demands on the cricketer. Furthermore, a far higher level of skill is expected from the players than in the past.

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Case reports and studies done in South Africa on the incidence of injuries in adult cricketers indicate that injuries in cricket players are increasing rapidly.^{2,6} One hundred and ninety-three serious cricket injuries were sustained at some time during the cricket-playing career of 92 provincial cricketers.⁷ Of the serious injuries, 20% were to the head, 32% to the upper limbs, 18% to the back and trunk and 30% to the lower limbs. Eighty-one per cent of the head injuries were as a result of being struck by the ball while attempting to hook, the ball deflecting off the top edge of the bat onto the head while playing a horizontal bat stroke, or being struck by the ball rearing off the pitch. The phalanges, metacarpal and lower-arm injuries made up 81% of the upper-limb injuries, with 60% of these caused while batting and 38% sustained while catching or fielding the ball. Seventy-one per cent of the back and trunk injuries were to the lower and middle back, with 66% sustained while bowling or as a result of the repetitive movements of bowling many overs. Thirty-three per cent of the lower-limb injuries either resulted from continuous bowling, or were caused by bowlers tramping in the rough footmarks on the pitch in their delivery stride and follow-through. Seventeen per cent of the lower-limb injuries were muscle and ligament injuries caused while batsmen were running between the wickets. Of these injuries 74% occurred during matches, 21% during practices and 5% during both matches and practices. Of the serious injuries, 42% occurred while batting, 33% while bowling, 19% while fielding and 5% while either warming up or training.

On two international tours, an 8-day tour³ and a 2-month tour,⁴ 14 and 71 injuries were sustained, respectively. On the shorter tour 8 players sustained injuries; the injuries were to the head and neck (14%), upper limbs (14%), trunk and back (7%) and lower limbs (64%). The bone and joint structures of the lower limb accounted for 50% of the injuries sustained on the tour. On the longer tour all 16 players received treatment for at least 2 injuries each, with 1 player receiving treatment for 6 different injuries and 4 players receiving treatment for 5 injuries. The injuries were to the head and neck (7.0%), upper limbs (26.8%), trunk and back (19.7%) and lower limbs (46.5%).

Two separate studies carried out showed similar patterns for club and provincial cricketers⁵ and schoolboy cricketers.⁶ Both studies showed a high overall seasonal incidence of injuries (club and provincial 48.1%, schoolboy 49.0%), with the incidence in the club cricketers (28.4%) being lower than that of the provincial cricketers (71.6%). The most common sites of injury in schoolboy cricketers were the back and trunk (33.3%), upper limbs (24.6%) and lower limbs (22.8%), and in club and provincial cricketers, the fingers (20.5%). More injuries occurred to bowlers (club and provincial 42.0%, schoolboy 47.4%) than to the batsmen (club and provincial 17.1%, schoolboy 29.8%) and fielders (club and provincial 40.9%, schoolboy 22%). The injuries occurred equally during matches (club and provincial 69.3%, schoolboy 45.6%) and practices

(club and provincial 26.0%, schoolboy 47.4%), particularly during the early and later parts of the season. The recurrent injuries from the previous season were 23.9% and 29.8% in club and provincial players and schoolboy players, respectively. Of the total injuries sustained, 22.7% of the injuries to club and provincial cricketers and 36.8% of the injuries to schoolboy cricketers recurred during the season.

South African provincial and international cricketers are exposed to long and demanding seasons, with an increasing amount of time spent training, practising, travelling and playing cricket. With growing regularity coaches, cricket players and the medical support personnel are confronted with the dilemma of injuries at vital stages of the season. The aim of this study was, therefore, to investigate the seasonal incidence and nature of common injuries sustained by South African provincial and international cricketers during a season. This would be the first stage in the establishment of a database of injuries maintained over a number of seasons for provincial and national cricketers in order to identify whether injury patterns are occurring, as well as any possible factors associated with these injuries.

METHODS

The doctors and physiotherapists working with the South African team and the 11 provincial teams were required to complete a questionnaire for each provincial cricketer who presented with an injury. The questionnaire was designed to obtain the following information: (i) anatomical site of injury; (ii) month of injury during the season; (iii) mechanism and diagnosis of injury; (iv) whether it was a recurrence of a previous injury; (v) whether the injury had recurred during the season; and (vi) biographical data.

An injury, which could be an acute or an overuse injury, was defined as any physical damage that occurred during a match, practice or training session and which prevented the player from completing that particular match, practice or training session. For the purpose of this survey the incidence of injury was expressed as a percentage of the total number of injuries recorded. The injuries were grouped according to the anatomical region that was injured, as follows: (i) the head, neck and face region; (ii) the upper limbs; (iii) the back and trunk; and (iv) the lower limbs. These injuries were classified according to whether they were sustained during batting, bowling or fielding. To allow for comparisons between the phases of play during which the injuries were sustained, the number in each phase was then expressed as a percentage of the total number of injuries. The time of the season when the injury occurred was recorded. The off-season was defined as that part of the season when no specific cricket practice or training was performed. The pre-season, a 2-month period, was the part of the season when specific cricket practice and training were undertaken before the commencement of



matches. The season was defined as the part of the season when matches were played, and included the periods during the international tours.

No medical records or record of the other sports played were obtained from the injured players. The BMDP Statistical Software Package (BMDP, Los Angeles, BMDP Statistical Software Inc., 1993) was used to compute univariate statistics.

RESULTS

During the period under review, 14 physiotherapists and 3 doctors working with 7 of the 11 provincial teams and the national team, recorded 163 injuries sustained by 88 cricketers, with an average of 1.91 ± 1.61 injuries per player (Table I).

Table I. Number of injuries sustained by players during a season

Number of injuries	Number of players	Total number of injuries
1	56	56
2	14	28
3	8	24
4	4	16
5	1	5
6	3	18
7	1	7
8	-	-
9	1	9
Total	88	163

The regional distribution of the injuries was to the head, neck and face (4.3%), upper limbs (21.5%), back and trunk (24.5%) and lower limbs (49.7%) (Fig. 1).

Bowling (40.5%) and fielding, including wicket-keeping (30.0%), accounted for the majority of the injuries, with batting accounting for 21.5% of the injuries. Eight per cent of the injuries occurred while warming up for practices and matches and while travelling, with playing soccer resulting in 2% of these injuries. Of the 66 bowling injuries, 23 (34.8%) were to the back and trunk and 37 (56.1%) were lower-limb injuries, with 12 (34.3%) and 17 (48.6%) of the batting injuries to the upper and lower limbs, respectively. Fielding, including wicket-

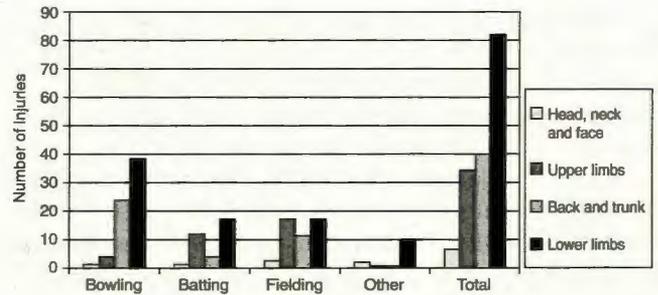


Fig. 1. Anatomical site and phase of play when injuries (N = 166) occurred.

keeping, resulted in 48 injuries, with 17 (35.4%) injuries to each of the upper and the lower limb regions.

The injuries were mainly soft-tissue injuries, predominantly muscle (37.4%), joint (20.4%) and tendon (15.3%) injuries (Fig. 2). Of the 61 muscle injuries, 30 (49.2%) were to the bowlers and 15 (24.6%) to the batsmen. Sixteen (47.1%) of the 34 joint injuries were sustained by the fielders.

The injuries occurred predominantly during first-class (33.1%), limited-overs (27.0%) matches and practices and training (19.7%); 18.4% of the injuries were of gradual onset (Table II).

The injuries occurred during the pre-season (11.8%), the early part of the season (33.5%), mid-season (9.9%) and in the later part of the season (23.0%), with 21.8% of these injuries

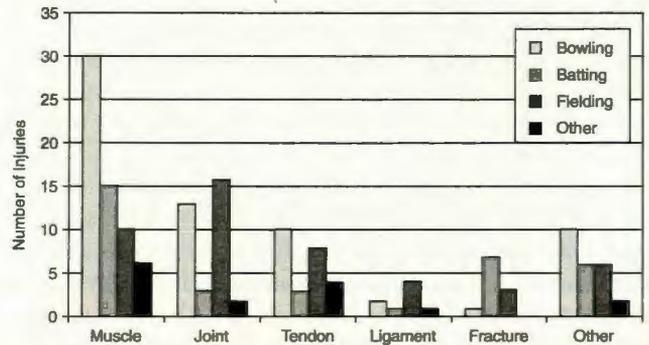


Fig. 2. Nature of injury and phase of play when injuries (N = 166) occurred.

Table II. Phase of play when injuries were sustained

	Match				Practice and training		Gradual onset		Other	
	1-day		3-5-day		N	%	N	%	N	%
	N	%	N	%						
Head, neck and face	1	2.3	3	5.6	-	-	2	6.7	1	33.3
Upper limbs	10	22.7	12	22.2	8	25.0	5	16.7	-	-
Back and trunk	12	27.3	18	33.3	3	9.4	7	23.3	-	-
Lower limbs	21	47.7	21	38.9	21	65.6	16	53.3	2	66.7
Total	44	100	54	100	32	100	30	100	3	100
% of total		27.0		33.1		19.7		18.4		1.8



sustained while the players were on international tours to the Commonwealth Games and the tour to England.

The injuries occurred predominantly during provincial (59.5%) and international matches (36.8%), with 3.7% of the injuries occurring when the players played matches for their club teams. Acute injuries made up 62.6% of the injuries, with acute-on-chronic and chronic injuries accounting for 22.7% and 14.7%, respectively. The majority of the injuries were first-time injuries (63.6%), with 28.4% recurrent injuries from the previous season and 8.0% of the injuries sustained during the season recurring again during the same season.

The primary mechanism of injury was overuse (30.9%), with running and diving for the ball or falling when catching or fielding accounting for 15.3% of the injuries. The delivery and follow-through of the fast bowlers accounted for 14.8% of the injuries. The batting injuries were primarily as a result of being hit by the ball (11.1%), running between the wickets (7.4%) and batting for long periods on end (3.1%). Catching and throwing accounted for 5.6% and 1.8% of the injuries, respectively. The mechanism of the other injuries varied from warming up incorrectly, colliding with another fielder, and being spiked by boot studs, to injuries sustained during sprint and weight training.

DISCUSSION AND CONCLUSION

The incidence and nature of injuries sustained by provincial and international cricketers are presented, with the principal finding indicating that cricket injuries are common in provincial and international cricketers.

The seasonal incidence of injuries to the cricketers in this study is lower than that found in the previous studies done on club and provincial cricketers⁵ and schoolboy cricketers.⁶ However, the increase in the number of players suffering multiple injuries during the season is of great concern. This would appear to be the result of a number of factors, particularly overuse in fast bowlers, as indicated by the larger number of bowling injuries to the back and trunk. Fast bowlers are at risk in a sport requiring repetitive movements that generate a vertical force of 4.1 body weights and a horizontal deceleration force of 1.6 body weights at front-foot impact.⁷ These forces compound with the high volume of bowling done during practices and matches, as well as the stress placed on the spine when bowling with a 'mixed-action'. The 'front-on mixed-action' with the lower body in a front-on position and the upper body in a side-on position, and the 'side-on mixed-action' with the lower body in a side-on position and the upper body in a front-on position, are more likely to predispose the player to injury due to the increased load on the spine as the body is in a twisted position during the delivery phase.^{8,9}

The increase in fielding injuries, particularly shoulder and neck injuries as a result of diving to field, is the product of the

modern game. Coaches and fitness trainers need to be aware of the cause of the increase in injuries in these areas, and should include the necessary preventive training in their programmes.

In summary, it would appear that fast bowlers are at the greatest risk of injury. This study showed that the injuries occurred equally in limited-overs and first-class matches, with an increase during the parts of the season when there was a concentration of cricket. Cricketers are most likely to suffer from acute and acute-on-chronic injuries, particularly muscle, joint and tendon injuries of the lower limbs. The most common mechanism of injury was overuse, with injuries while running and diving when fielding showing a large increase compared with previous studies. Although cricket injuries have not reached serious proportions, cognisance needs to be taken of these patterns, particularly with regard to overuse injuries, so that the risks of injury can be further reduced.

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