

# Volleyball injuries in KwaZulu-Natal — epidemiology

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## Abstract

**Objective.** This study explored the incidence, nature and causes of injury among club-level volleyball players in Kwa-Zulu-Natal.

**Design.** A descriptive survey was conducted. A random sample of 150 male and female club-level volleyball players ranging in age from 15 to 35 years from KwaZulu-Natal participated by informed voluntary consent. Data were gathered using a validated questionnaire.

**Setting.** Data were collected at the players' convenience at the respective clubs.

**Main outcome measures.** Incidence, nature and causes of volleyball injuries.

**Results.** Data were analysed using the Statistical Package for the Social Sciences (SPSS) for Windows and chi-square tests with a probability set at 0.05. The results show that the incidence of injuries in KwaZulu-Natal volleyball players was high (74%). Unlike the research findings in other parts of the world where overuse (chronic) injuries were significantly higher, overuse injuries in this study (48%) were not significantly different from acute injuries ( $p > 0.05$ ). Ankle sprains due to jumping and landing (40 of 279 injuries) were more common.

**Conclusion.** The results show that a high incidence of injuries, especially to the ankle joint, are sustained by KwaZulu-Natal volleyball players during jumping and landing activities. More in-depth research is needed into the predisposing factors for injury in this sport.

## Introduction

Volleyball is a popular recreational and professional sport code both locally and internationally. Information on the incidence,<sup>1-5</sup> causes<sup>6-12</sup> and types<sup>2,4,6-10,12-17</sup> of injury sustained in this sport has been reported. Research has shown that overuse (chronic) injuries make up 50 - 80% of all injuries,<sup>2,17,18</sup> with players aged between 25 and 29 years injured more often than younger players.<sup>12</sup> Male players sustained injuries one and a half times more often than their female counterparts.<sup>13</sup> Ankle injuries were the most common.<sup>1,2,17,18</sup> Predisposing factors to injuries included falls,<sup>12</sup> players' movements,<sup>2,18</sup> frequency of play<sup>2</sup> and duration of career.<sup>1</sup>

In South Africa, specifically KwaZulu-Natal, only one study investigating the incidence of volleyball injuries has been conducted, more than a decade ago.<sup>17</sup> To address this lack of research the present study looked at the incidence, nature and causes of injury among club-level volleyball players in KwaZulu-Natal.

## Methods

One hundred and fifty volleyball players from 18 KwaZulu-Natal clubs participated in this study by voluntary informed consent. Male and female players between the ages of 15 and 35 years were randomly selected from the pool of 250 players. Beach volleyball<sup>1</sup> players were excluded prior to determination of the population due to the possible effects of playing surface on the overall findings of the study. Information on participants' personal details, medical and sporting history, training history and epidemiology of volleyball-related injuries were obtained using a validated questionnaire.

The data were analysed descriptively and statistically using chi-square tests using the Statistical Package for Social Sciences (SPSS) version 6.0 for Windows. Probability was set at  $p < 0.05$ .

## Results and discussion

The response rate was 100%. Eighty per cent of the participants were male (Table I). This is proportional to the anecdotal information on gender participation in this sport in this province. The majority of the participants were of Indian origin (87%), 10% were black, 2% white and 1% coloured. The region under study has a majority of black residents, followed by Indians. Since black participation in various sport codes was only given priority since the national democratic elections in 1994, the number of players in the sample could reflect their proportional participation in this sport in this province. The majority of players (35%) were in the 20 - 24- year age range (Table I).

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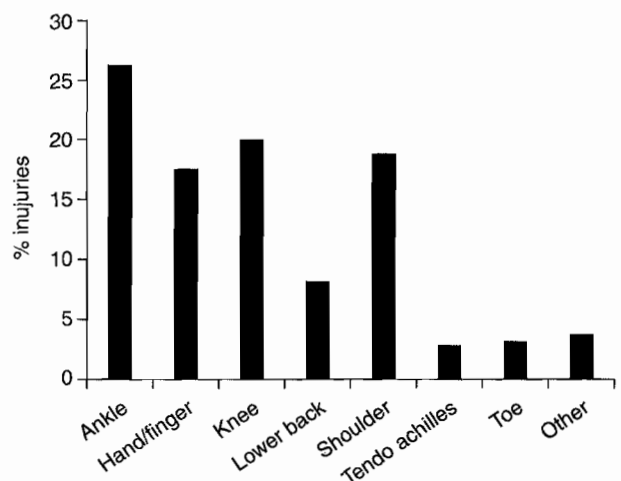
**TABLE I. Number, percentage and total injuries per age group stratum in male and female volley ball players**

Age (years)	15-19	20-24	25-29	30-35	Total
<b>Male</b>					
Total	36	45	23	17	121
No. injured	15	37	22	17	91
% injured	42	82	96	100	75
<b>Female</b>					
Total	15	8	3	3	29
No. injured	6	8	2	2	18
% injured	40	100	67	67	62
<b>Total</b>	<b>51</b>	<b>53</b>	<b>26</b>	<b>20</b>	<b>150</b>
No. injured	21	45	24	19	109
% injured	41	85	92	95	73

Seventy-three per cent of the participants (109 of 150) sustained injuries whilst playing volleyball (Table I). This finding cannot be compared directly with other reports<sup>3,12,13,18</sup> due to the differences in the nature of data collection and analysis.<sup>10</sup> Many of the players (45%) sustained more than one injury, resulting in a total of 279 injuries. This may be related to the fact that volleyball requires a variety of physical attributes including speed, power, flexibility, strength and balance and specific playing skills.<sup>9</sup> A higher level of conditioning may be required to satisfy the performance requirements of every position on the court. The contribution of optimal conditioning in reducing volleyball-related injuries has not been reported in the literature.

A large proportion of the males (75%) and females (62%) sustained injuries (Table I). Cassell<sup>8</sup> reported that males sustained injuries more frequently than females, in the ratio of 1.5:1. Aagaard *et al.*<sup>1</sup> found that male players were more at risk of injury because they spent more time in training and competition than female players. Male players in the 25 - 35-year age group and females in the 20 - 24-year age group sustained the most injuries, as shown in Table I. However, due to the small sample of female players, the comparison of injuries amongst different age strata in males and females will not be reliable. Kujala *et al.*<sup>12</sup> reported that young males in the 20 - 29-year age group were injured most often. More research is required to determine the injury rate between different age strata in male and female players.

Our results show that the difference in the frequency of acute injuries (53%) and overuse injuries (48%) was not significant ( $p > 0.05$ ). This finding is different from that reported in the literature where there were significantly more overuse injuries (50 - 80%).<sup>2,17,18</sup> Aagaard and Jorgensen<sup>2</sup> reported that during the period 1986 - 1996, the rate of overuse injuries increased from 16% to 47% in elite male volleyball players. They attribute this to a 50% increase in training activity. The majority of the acute injuries (26%) in this study involved the ankle (Fig. 1). This is similar to findings in international studies (15 - 60%)<sup>2,17,18</sup> and the previous local study<sup>17</sup> where the ankle was the most frequently (30%) acutely injured body part. The present study shows that sprains of the ankle were the most frequent type of injury, comprising 63% of all ankle injuries. Bahr *et al.*<sup>4</sup> showed that 78% of their sample suffered at least one previous injury of the affected ankle. Our study suggests that landing on another player's foot (43%) and incorrect land-



**Fig. 1. Per cent of injuries sustained during volleyball, involving specific anatomical areas of the body. 'Other' refers to neck, thigh, shins, hamstrings, quadriceps, calf.**

ing (47%) produced most of the ankle injuries, similar to the findings of Bahr *et al.*<sup>4</sup> Other investigators have shown that strains and sprains accounted for two-thirds or more of volleyball injuries regardless of age or playing level.<sup>3,12,13,18</sup> The increased rate of injuries to the ankle<sup>1,4</sup> has been attributed to blocking and spiking during which the volleyball player jumps and/or lands on another player's foot, falls and slips.<sup>8</sup>

On the other hand, some studies report that in the case of overuse injuries, the knee is more frequently injured (8 - 80%)<sup>9,10,12</sup> while others show that the shoulder is more frequently injured (8 - 20%).<sup>3,11,15</sup> Our results show that injuries to the knee, shoulder, and hand/finger occurred in 20%, 19% and 18% of cases respectively, as shown in Fig. 1. Blocking and spiking have been implicated in the frequency of knee, shoulder and hand/finger injuries.<sup>1,5,11,12</sup> In the present study the majority of hand injuries were produced by blocking (24%), setting (18%) and collisions (29%) with the ball. These findings are similar to those reported by Aagaard and Jorgensen<sup>2</sup> and Aagaard *et al.*<sup>1</sup> Frequency of tendinitis of the knee and shoulder, 64% and 55% respectively in this study, was also similar to that reported by others.<sup>6,10,14</sup>

The position played had a significant effect on the percentage of injuries reported ( $p < 0.05$ ). Among the 69 players who

played one position only, 93 injuries were reported, indicating a rate of 1.3 injuries per player. A breakdown of these injuries showed the following percentages of injury per type of position played: liberos 100%, outside hitters 73%, setters 76%, middle attackers 54% and utility players 63%. The 40 players who played more than one position reported a total of 93 injuries producing a rate of 2.3 injuries per player. These results show that players who are involved in more than one position sustain more injuries, similar to reports by Watkins and Green (1992)<sup>18</sup> and Aagaard and Jorgensen (1997).<sup>2</sup>

All players who trained less than 6 times per week sustained injuries more than 60% of the time. However the literature shows that an increase in the number of training sessions per week<sup>1,2</sup> and a history of injury<sup>3</sup> increase the risk of injury. Similar to other research,<sup>1</sup> we found that those who played for more than 2 years progressively sustained more injuries in proportion to the number of years played (Table II).

**TABLE II. Number and percentage of players injured in relation to years of play**

No. of years of play	Number of players	No of players injured (%)
< 2	23	3 (13)
2 - 5	42	27 (64)
6 - 10	47	44 (94)
> 10	38	35 (92)
Total	150	109 (73)

## Conclusion

The results of this study show that the incidence of injuries in KwaZulu-Natal volleyball players is significantly high. Unlike the finding in the rest of the world, overuse injuries were not predominant here. Ankle injuries were the most common injuries found. Older males were injured more often, showing that years of play could play a role in injury rate. In indoor volleyball most of the injuries occurred during blocking and spiking,<sup>1,2,4,16</sup> jumping and landing.<sup>9</sup> An increase in overuse injuries is attributed to increases in training activity.<sup>2</sup> Volleyball requires a variety of physical attributes (speed, power, flexibility,<sup>11</sup> strength<sup>9,11</sup> and balance) and specific playing skills.<sup>8</sup> Therefore training to meet a minimum set of physical, physiological and

psychological requirements is necessary to cope with the demands of play and to reduce the risk of injury.<sup>8</sup> This study shows the need for more research, specifically in biokinetic training and coaching, in South African volleyball.

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