CERVICAL INJURY IN RUGBY FOOTBALL – A NEW ZEALAND SURVEY

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ABSTRACT

In a study of cervical injury in New Zealand rugby football in the years 1973 to 1978 inclusive, 54 cases of injury were identified of which five were fatal. There is no evidence that the incidence of these injuries is increasing. Incomplete figures for the season of 1979/80 include two deaths and 14 cases of permanent cord compression or temporary quadriplegia. The scrum is confirmed as a danger area but the danger occurring during the formation of the scrum is seen to be greater than was previously thought. Young players appear to be particularly vulnerable in scrums. The ruck and maul are danger areas. One-third of the accidents occurred during training or social games. It is concluded that the incidence of injury could be reduced by appropriate player selection, better coaching and amendment of the laws. Since only one player was aware of his danger at the time of his accident, it would seem that coaching with an emphasis on awareness and precautionary measures would be effective in prevention of cervical injury.

INTRODUCTION

The 1978 rugby season in New Zealand was marred by an epidemic of fatal cervical cord injuries. A very full coverage of these distressing accidents by the media led to great public concern being expressed, and the New Zealand Rugby Football Union, at the request of their Medical Advisory Committee, promoted an enquiry into the circumstances relating to this type of injury in rugby. This paper reports a number of the interesting facts that emerged.

METHOD

A survey of the years 1973 to 1978 inclusive was undertaken. The criteria for inclusion were permanent or temporary cord compression syndromes with or without fractures and/or dislocations of the cervical spine. Since no provincial or national rugby organisation kept records of these injuries, the enquiry was directed towards the Medical Officers of the Unions, hospitals, spinal injury units, and the Records Department of the Accidents Compensation Commission; also included were Health Department statistics and coroners' reports. Some sixty items of information were requested in the proforma, including: player characteristics such as age, physique, training methods, experience in the game, position on the field at time of injury and experience in that position; the nature and phase of the game; mechanism of injury; the nature of the injury; and treatment,

both first aid and definitive. From the analysis of this information it was hoped to: quantify the size of the problem; identify players at risk; identify phases of play carrying undue and unacceptable hazard; and identify aspects of prevention including the possibility of changes in the laws of the game.

RESULTS

54 cases were identified, and of these, 45 (83%) could be studied in depth either by personal interview or, in the case of the fatalities, by perusal of the coroners' reports (Table I). It will be noted that the totals from year to year showed a great variation. For example, there was an escalation from one case in 1976 to 17 cases in 1978, but the total of 27 for these three years is matched by a total of 27 cases in the three years 1973 to 1975. When the totals and averages per year are compared with statistics obtained for 1965 and 1967 it will be seen that over a decade the averages per year have stayed at a comparable level. Claims from various sources that the game has become more violent, and that this has led to an increased chance of serious injury, appear on this basis to be groundless.

An estimate of the magnitude of the risk of serious cervical injury can be obtained by consideration of the total number of times a player is exposed to this possible outcome each season. It is estimated that approximately

TABLE I

Incidence of spinal injury

	1973	1974	1975	1976	1977	1978	Yearly Average	1965	1967
Fatalities	—	—	—	—	—	5	0.8	—	—
Permanent serious disability	2	2	4	1	2	—	1.8	—	1
Temporary serious disability	—	2	1	—	3	3	1.5	?	?
Other	6	2	8	—	4	9	4.8	?	?
Total	8	6	13	1	9	17	9	7	9

200,000 players are involved in rugby in New Zealand and that, on average, they play 15 games each season, a total of 3,000,000 exposures. As on average nine injuries occur each season, the risk is of the order of 1 in 333,000.

Nevertheless, this survey uncovered five deaths due to rugby, eleven permanent severe spinal injuries, nine temporary quadriplegias and twenty-nine minor to moderate injuries. Of the study group, 66% are known to have recovered virtually completely.

TABLE II

Risk compared with other activities

Serious cervical injury in NZ (1975), compared with all spinal injuries in other activities (including readmissions)

Rugby	—	13	
			Motor vehicle — 332
			Diving — 29
Other	—	586	Other sport — 25
			Other — 200

Analysis of the type of game (Table III) reveals that while two-thirds of injuries occurred during club or school competitive games, the remainder occurred during social games, training sessions and trial matches, suggesting that less organised and formalised body contact may carry a greater risk. The influence of age is not completely clarified but there was some evidence to suggest that injuries occurring in younger persons were more likely to have a serious outcome. One-third of the accidents occurred in players below the age of 21, but one-half of the serious accidents (those causing death or permanent quadriplegia) involved players less than 21, and one-quarter of players were aged less than 17 at the time of the accident.

TABLE III

Type of game

Club competition	22	42.4%
School	6	14.3%
Training and Trials	6	14.3%
Social games	8	19%

The time of season, playing surface and period of the game did not appear to be important. On the other hand, the playing position on the field was certainly of importance (Table IV) as more than twice as many injuries were sustained by forwards as by backs. The difference between forwards and backs is explained by the high incidence of injuries occurring in scrums; outside the scrum the incidence of injuries to forwards and backs was the same. Hookers were clearly more vulnerable than other players were. Prop forwards also sustained a high number of injuries, both in scrums and in general play, suggesting that props, for one reason or another, may be accident prone. Since these forwards tend to have a markedly mesomorphic build it might seem that physique is not as crucial as could have been supposed. The figures may, however, have been biased by the fact that six of the thirteen injuries to prop forwards were sustained by players under 20 years of age. It could be that physical immaturity and lack of strength and experience are important determinants, especially when one considers that in a senior match a total force of 1 to 1.5 tonnes may be applied to the front row of the scrum.

The state of play also effects the incidence of injuries. Ten injuries were associated with collapse of the scrum, a well publicised source of danger, and a further six occurred while the scrum was forming. Efforts have already been made to minimise the number of scrum collapses in a game, but to date the difficulty of forming

TABLE IV

Influence of playing position

Forwards	In scrums	Other	Backs	
Prop	6	7	Scrum 1/2	2
Hooker	9	2	5/8	4
Lock	—	2	3/4	1
Back row	1	4	Wing	4
Total	16	15	Fullback	3
All	31		Total	14

the scrum has not been highlighted as a source of danger. It would seem that if the two front rows were to engage with correct binding and positioning, and the other five players were then to join the stable structure so formed, a better and safer scrum might result.

Both the tackler and the ball carrier were at risk in tackles, the ball carrier often being injured, however, in the maul or ruck that followed the tackle. A total of 15 players were injured in rucks and mauls and this aspect of the game also needs careful study. Only two players felt that foul or illegal play had caused their injuries, one claiming a scrum had been collapsed deliberately, the other having been kicked.

Immediate management of the injured players were generally satisfactory, and the fact that two-thirds of the accidents were attended and managed by members of the St. John's Ambulance Brigade was impressive evidence of the debt the game owes to this organisation.

A matter for great concern was that only one player reported that he had been aware that he was in any danger at the time of his accident, so 53 players presumably made no effort to avoid the danger of hyper-extension and hyperflexion with or without rotation. The authors believe that greater attention to coaching players to awareness of danger and the importance of maintenance of the head in a neutral position (preferably with the head sunk into the shoulders as far as possible to decrease leverage when entering danger e.g. rucks and mauls) would help to reduce the number of accidents.

In conclusion, the study shows that the risk of serious cervical injury in rugby is small. Nevertheless, it is believed that there are some areas in which the risk could be further reduced, by changes in the game's laws and by the promotion of awareness of danger among players, coaching in correct techniques and firm refereeing is essential. Consideration must be given to changing the laws of the game.

DISCUSSION

Dr. Lucking: I'd like to ask Dr. Burry if injuries are related in any way to ground conditions, and also ask him to comment on the five fatalities in one year.

Dr. Burry: Dealing with the second point first, I don't think one could say it was any more than chance. There was no overall trend, it just happened that we got such a phenomenon in one year. One of the important points in our survey was that we were able to see that there wasn't an escalation over a period of time, but these events occurred quite by chance. A major factor was the way the game was played, and Dr. Davies will report on a survey of the incidence of injuries in the British Isles. This was a carefully designed study, and seemed to show that a lot of injuries occurred because of foul play. We were grateful to discover that only two victims — and remember we are talking about people likely to feel ill-used — felt that they had been deliberately fouled. One victim felt that he had been deliberately kicked while he was on the ground, while the other felt he had been injured in a scrum. None of the victims felt he had been injured as a result of foul play. Ground conditions seem to be of no importance. The ground is firm to hard at the beginning and end of the season, and usually very soft in the middle, but this seemed to make no difference. I think that the only indication of playing surface affecting injuries is that two or three players were hurt because they slipped going into a tackle.

Dr. Thomas: Does the class of game affect the type of injuries that occur?

Dr. Burry: The survey centred on injuries in school and club games. What is interesting is that there has never been a fatal injury in an international game in New Zealand. Although there is a much greater bulk of players, in, say, the scrum, the players' expertise prevents them being injured.