

Cervical spine injuries in rugby players

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Nine patients with serious cervical spine injuries that occurred while they were playing rugby were seen in a British Columbia acute spinal cord injury unit during the period 1975–82. All the injuries had occurred during the “scrum” or the “tackle”. Two of the patients were rendered permanently quadriplegic, and one patient died. There is a need for a central registry that would record all cervical spine injuries in rugby players as well as for changes in the rules of the game.

En Colombie-Britannique, neuf patients qui avaient subi des blessures graves à la colonne cervicale alors qu'ils jouaient au rugby ont été vus dans une unité de soins pour victimes de lésions de la moelle épinière aigües au cours de la période de 1975 à 1982. Toutes les blessures sont survenues à la mêlée ou lors d'un plaquage. Deux patients sont devenus quadriplégiques de façon permanente et un est décédé. Il paraît nécessaire d'établir un registre central qui permettra d'enregistrer toutes les blessures de la colonne cervicale à survenir chez les joueurs de rugby. Il semble aussi nécessaire de modifier les règlements de ce sport.

As a source of cervical spine injury rugby is surpassed by very few other sporting activities. O'Carrall and colleagues,¹ in a review of sport-related neck injuries, reported that rugby caused more neck injuries than any other sport except diving. These injuries have serious long-term effects on the patients and on society.

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We reviewed 390 consecutive admissions of patients with cervical spine trauma to the acute spinal cord injury unit at Shaughnessy Hospital, Vancouver during the period 1975–82. Only patients requiring hospital admission because of the seriousness of their injury were included in the survey; those with minor spinal cord and root concussions were excluded. Of the 390 patients 9 had rugby-related injuries, which we analysed further.

Observations

In the nine patients the type of injury varied. There were injuries to each level of the cervical spine. The associated neurologic deficit varied from transient numbness to quadriplegia (Table I). One patient (no. 4) suffered a unilateral facet lock that was associated with Brown–Séquard syndrome (Fig. 1).

The mechanism of injury varied too. Five patients were injured in the “scrum”, an ordered formation in which two sets of forwards pack themselves together with heads down and attempt to push the opposing team off the ball; two were injured in the “loose ruck”, a less organized version of the scrum; and two were injured in the “tackle”, which includes the various methods of taking down a ball carrier. The severity of the injury did not seem to be related to its mechanism.

Discussion

As there is no central registry for recording injuries in rugby players, the exact incidence of cervical spine

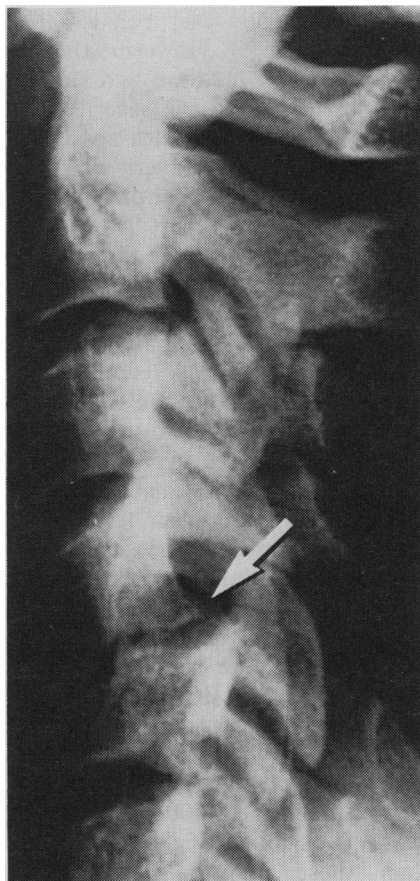


Fig. 1—Unilateral facet lock resulting from hyperflexion force during scrum. Arrow shows subluxation of C4 on C5.

Table I — Cervical spine injury and associated neurologic deficit in nine rugby players

Patient no.	Age (yr)*	Bone injury	Neurologic deficit
1	26	C1 fracture	Neck pain
2	51	C3 compression fracture	Quadriplegia (patient died)
3	28	C7–T1 bilateral facet lock	Quadriplegia
4	21	C4–C5 unilateral facet lock	Brown–Séquard syndrome
5	18	C5–C6 bilateral facet lock	Quadriplegia
6	31	C6–C7 subluxation	Numbness of area served by C6 roots
7	25	C2 fracture	Transient quadriplegia
8	36	None	Transient numbness of upper extremities
9	21	C4–C5 subluxation	Neck pain

*Average 28.6.

injury in these players is unknown. However, recent reports from New Zealand,² South Africa,^{3,5} and Ireland¹ show such injuries to be more common than previously thought. Burry² reported 54 cervical spine injuries in a population of 200 000 players over the period 1973–78 (4.5 injuries per 100 000 players per year). Scher³ reported 26 injuries in a population of 45 000 players over a 14-year period (4.1 per 100 000 players per year). However, the injuries reported in these two studies may not be matched in severity: the figures from South Africa appear to include only those players who suffered permanent partial or total paralysis,³ and the report from New Zealand fails to describe the injuries in detail.²

In Scotland, where there are 11 000 rugby players, only one injury — a fatality — was recorded in a 10-year period. The Welsh Rugby Union records show two serious cervical spine injuries over a 20-year period in a population of 20 000 players. It would appear from these figures that most injuries in rugby players in Scotland and Wales are not recorded.

According to the British Columbia Rugby Union there are about 9000 players in BC, 6000 at the school-age level and 3000 at the senior level. Nine cervical spine injuries in this small population in 8 years (12.5 per 100 000 players per year) is a much higher incidence than those reported from other studies. This incidence is even more significant in that all the injuries occurred in senior players.

As our study included only those injuries that were treated at the Shaughnessy Hospital, the actual number of injuries could have been much higher. Approximately 1 million people live in the area served by the acute spinal cord injury unit; this probably includes three quarters of all rugby players in the province.

Many cervical spine injuries in rugby players occur in the scrum. Scher³ reported that 40% of such injuries occurred in the scrum, and in a study of cervical spine injuries in English schoolboy rugby players Hoskins⁶ also found that the scrum was the source of 40% of these injuries. The front row of players is most vulnerable, especially when the

scrum collapses and the players are unable to extricate themselves. The hands are trapped above the shoulders, which allows for a dangerous amount of hyperflexion of the neck.

Another source of injury to the cervical spine is the tackle. When a tackler collides with an opponent or misses the tackle and strikes the ground head first he does so with great force. One form of the tackle, the "high tackle", is particularly dangerous. As it is made with one arm, the neck is pulled downwards and posteriorly. Rotational stress is added by the angle of the tackle. Joints and ligaments are very resistant to compression, distraction, flexion and extension but are very vulnerable to rotational stress and horizontal shearing forces, which can cause serious injury. Furthermore, it is often the poorly conditioned "weekend athlete" who is injured. It would seem essential to specifically strengthen the neck musculature for a game in which the neck is so vulnerable to injury. It has been shown in football training in the United States that the neck can be significantly strengthened in a fairly short time: a gain of 3 cm in circumference in 6 weeks is possible.⁷ Technique is important in tackling, and proper skills need to be practised. Awareness of the potential dangers by players, coaches and referees may also help reduce the incidence of injuries.

There have been some changes in the rules of rugby. In the scrum, for example, front-row players may now prop themselves up with their free hand. This, however, does not help the "hooker", who has both arms extended over his head. Further changes in the rules would seem to be needed.

Conclusions

The scrum and the tackle seem to be the most dangerous aspects of rugby. Further rule changes as well as awareness of the potential dangers may help reduce the incidence of injuries. To determine the exact incidence of cervical spine injuries in rugby players a central registry for recording such injuries should be established.

References

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4. Ibid: The high tackle — an avoidable cause of cervical spinal injury? *S Afr Med J* 1978; 53: 1015–1018
5. Ibid: Vertex impact and cervical dislocation in rugby players. *S Afr Med J* 1981; 59: 227–228
6. HOSKINS T: Rugby injuries to the cervical spine in English schoolboys. *Practitioner* 1979; 223: 365–366
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NEW BOOKS OF INTEREST

This list is an acknowledgement of the books received that we intend to send out for review.

CANNABIS AND HEALTH HAZARDS. Proceedings of an ARF/WHO Scientific Meeting on Adverse Health and Behavioral Consequences of Cannabis Use. Edited by Kevin O'Brien Fehr and Harold Kalant. 843 pp. Alcoholism and Drug Addiction Research Foundation, Toronto, 1983. \$65, paperbound. ISBN 0-88868-084-8

CARDIAC DRUG THERAPY. Cardiovascular Clinics Series 14/3. Edited by C. Richard Conti. 309 pp. Illust. F.A. Davis Company, Philadelphia, 1984. \$45 (US). ISBN 0-8036-1975-8

DEVELOPMENTAL PHARMACOLOGY. Progress in Clinical and Biological Research Series, Vol. 135. Proceedings of a Symposium held in Toronto, October 3–6, 1982. Edited by Stuart M. MacLeod, Allan B. Okey and Stephen P. Spielberg. 438 pp. Illust. Alan R. Liss, Inc., New York, 1983. \$78 (US). ISBN 0-8451-0135-8

EEG AND EVOKED POTENTIALS IN PSYCHIATRY AND BEHAVIORAL NEUROLOGY. Edited by John R. Hughes and William P. Wilson. 411 pp. Illust. Butterworths & Co. (Publishers), Woburn, Massachusetts, 1983. \$29.95 (US). ISBN 0-409-95062-9

THE ELECTROCARDIOGRAM IN INFANTS AND CHILDREN: A Systematic Approach. Arthur Garson Jr. 421 pp. Illust. Lea & Febiger, Philadelphia, 1983. \$56.25. ISBN 0-8121-0872-8

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