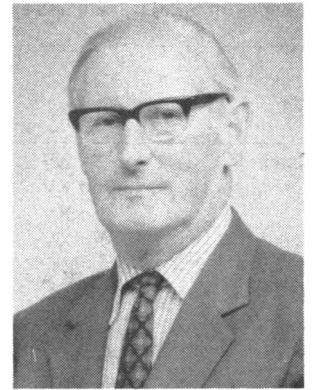


RUGBY FOOTBALL INJURIES, 1980-1983

J. P. SPARKS, MD, FRCP*

Former Medical Officer to Rugby School



J. P. Sparks

ABSTRACT

The injuries sustained by the boys at one English public school have been recorded and analysed by age, experience, position, phase, duration of the game and of the season. Few injuries have been serious. Detailed reference is made to concussion, injuries from collapsed scrums and injuries of the cervical spine. The paper emphasises that the tackle leads to most injuries.

This paper presents the Rugby football injuries sustained by the boarders of Rugby School in the four seasons 1980-1983. The injury rate was 194 per 10,000 player hours, compared with the rate of 198 per 10,000 player hours for the thirty seasons 1950-1979 (Sparks, 1981). Tables I-VI list the injuries by different criteria. Table VII lists the sites of injury; Table VIII the time off Rugby football after injury; Table IX lists some of the more important injuries; Table XI summarises the playing results of the various school teams; Table XIII compares some of the Rugby School figures with those recorded in the Accident and Emergency Department of Christchurch Hospital during the 1979 New Zealand Rugby football season (Inglis and Stewart, 1981); Table XIV records information on three aspects of Rugby football that have occasioned much recent concern, viz:— Time off playing after concussion, injuries caused by collapsed scrums and neck injuries.

STRUCTURE OF THE GAME IN RUGBY SCHOOL

Rugby football is the main team game in the Advent (Autumn) term. Ten teams are fielded against other schools at different levels of age, experience and skill. The XV's regular fixtures are with Uppingham, Cheltenham, Harrow, Stowe, Oundle, Bedford, St. Edward's, Oxford, Warwick, Lawrence Sheriff, King Henry VIII, Coventry, Bablake and the Old Rugbeians; one other school outside the normal circuit is played each season, usually on the Close — e.g. Llandoverly, Fettes, Campbell College, Belfast.

Members of the various school teams play few domestic games other than House Matches. They are ineligible for Countings, an inter-House League competition at different age levels. Instruction is given in the first half of the term in Under 14 and Under 15 Block Football.

COMMENTS ON THE INJURIES

Injuries are commoner in the early weeks of term, reflecting unfitness and a keenness, by no means confined to the boys, to play competitive football. Injuries increase with age, due to physical maturation. The Under 15 school teams are exceptional in this respect. In this age group the body, and especially the bony skeleton, has not yet had time to adapt to the recent, rapid increase in muscular strength. The injury rates vary little with the position of the player; half backs and centre three quarters are marginally more vulnerable than other players.

The tackle is outstandingly the most injury prone phase of the game; followed at a considerable distance by the ruck and set scrum. As one would expect the first and last quarters have the highest injury rates. Injuries to the head and neck have

been relatively commoner in the last four seasons than in the previous thirty. This agrees with other recent series (Weightman and Browne, 1974; Davies and Gibson, 1978; Davidson, 1978). Few injuries have been serious, with over 80% of the players returning to the game within two weeks.

Table I Injuries by week of term.

Week	Number	%	
I	37	4.8	
II	85	11.0	
III	74	9.6	
IV	81	10.5	1st Half 60.9%
V	67	8.7	
VI	74	9.6	
VII	52	6.7	
VIII		EXEAT	
IX	74	9.6	
X	56	7.3	
XI	62	8.0	
XII	35	4.5	2nd Half 39.1%
XIII	52	6.7	
XIV	18	2.3	
XV	5	0.7	
	772	100	

Table II Injuries by age groups.

Age	Number	Injuries	%
14 and under	424	83	19.6
14.1-15	497	149	30.0
15.1-16	503	156	31.0
16.1-17	505	197	39.0
17.1 and over	498	187	37.6
	2,427	772	31.8

*Present address:

Bridge End
1 Main Street
Thurlaston
Rugby CV23 9JS

Table III Injuries by skill and experience.

		Player Hours	Injuries	Injuries 10,000 Player Hours
Matches	XV	840	44	523.8
	2nd XV	585	28	478.6
	3rd XV	605	16	264.5
	4th XV	400	16	400.0
	Under 16 A	519	13	250.5
	Under 16 B	466	16	343.3
	Under 15 A	389	21	539.8
	Under 15 B	312	17	544.9
	Under 14 A	325	11	338.5
	Under 14 B	295	6	203.4
Team Practices	Bigside 1	2,130	29	136.2
	Bigside 2	2,270	31	136.6
	Under 16	2,040	34	166.7
	Under 15	1,707	20	117.2
	Under 14	1,323	11	83.1
Matches	1st House	2,335	72	308.4
	2nd House	2,345	34	145.0
	3rd House	1,580	29	183.5
	Countings 1	4,725	120	254.0
	Countings 2	3,910	64	163.7
	Countings 3	3,145	53	168.5
Practices	Block Under 15	2,810	29	103.2
	Block Under 14	2,810	17	60.5
House Practices		1,200	23	191.7
Training		800	18	225.0
TOTAL:		39,866	772	193.7

Table IV Injuries by position.

Position	No. in each Position	Number	Per Player
Full Back	1	46	46
Wing Three Quarters	2	100	50
Outside Centre	1	52	52
Inside Centre	1	60	60
Fly Half	1	59	59
Scrum Half	1	56	56
Prop	2	103	51.5
Hooker	1	52	52
Lock	2	99	49.5
Flanker	2	94	47
No. 8	1	51	51
TOTAL: 15		772	51.5

Table V All injuries by phase of game.

			More Severe Injuries		
	N	%	N	%	
Tackling	156	20.2	39	28.7	53.0
Tackled	150	19.4	33	24.3	
Ruck	144	18.7	19	14.0	
Maul	53	6.9	3	2.2	
Tight Scrum	92	11.9	9	6.6	
(Collapsed Scrum)	(31)	(4.0)	(4)	(2.9)	
Line Out	11	1.4	1	0.7	
Open Play	75	9.7	19	14.0	
Not known/Other	91	11.8	13	9.5	
TOTAL:		772	100.0	136	

Table VI Injuries by time.

Period	Number	%	
First Quarter	138	26.4	
Second Quarter	109	20.8	
Third Quarter	108	20.7	
Fourth Quarter	168	32.1	
TOTAL:		523	100.0

Table VII Site of injury.

Site	1980/83 %	1950/79 %	
Head and Neck	26.8	16.9	
Chest	3.1	2.6	
Abdomen	1.2	1.0	
Back and Spine	6.1	6.4	
Shoulder Girdle	4.7	5.4	
Arm	5.6	6.3	
Hand	16.2	14.2	
Pelvic Girdle	1.3	1.1	
Thigh	8.1	9.4	
Knee	11.8	11.0	
Shin and Calf	3.9	5.2	
Ankle	7.5	14.6	
Foot	3.7	5.9	
TOTAL:		100.0	100.0
Head and Neck	26.8	16.9	
Trunk	10.4	10.0	
Upper Limb	26.5	25.9	
Lower Limb	36.3	47.2	
TOTAL:		100.0	100.0

1950/1979 9,885 injuries
1980/1983 772 injuries

Table VIII Days off Rugby football through injury.

Days	Number	%	
0	19	2.5	
1-7	421	54.5	
8-14	196	25.4	
15-21	62	8.0	
22-28	29	3.8	
29 and over	45	5.8	
TOTAL:		772	100.0

DISCUSSION

The injuries described demand little discussion – they are run of the mill, and much as one would expect from a game of hard, physical contact. Three areas have aroused concern, some of it emotional, and I shall now refer in more detail to these:— (A) Concussion and its implications (B) Injuries caused by the collapse of set scrums and (C) Injuries to the cervical spine (Table XIV A, B, C).

The Rugby Football Union has rightly been deeply concerned at the possibly increased number of injuries, and more specifically of serious injuries to the cervical spine. The Union has produced a series of admirable proposals, comments, law interpretations, pamphlets and so on designed to minimise unnecessary/avoidable injuries (rather over half in my experience) and dangerous practices in schoolboy football. The Rugby Football Union is actively pursuing a research project and one hopes that this will remove current fears on the future development of the game.

Table IX Injuries 1980/1983.

HEAD	Concussion	49
	Fractured Nasal Bones	17
	Fractured Maxilla	1
	Fractured Mandible	1
	Fractured Teeth	15
	Subluxation T-M Joint	2
NECK	Fractured Spinous Process	1
	Torn Neck Muscles	31
	Torn Neck Ligaments	8
CHEST	Fractured Ribs	7
	Subluxation Sterno-clavicular joint	1
ABDOMEN	Ruptured Kidney	1
	Contused Scrotum	1
SHOULDER GIRDLE	Fractured Clavicle	6
	Gleno-Humeral Dislocation	6
	Acromio-clavicular Subluxation	8
ARMS	Slipped Humeral Capital Epiphysis	1
	Fractured Shaft of Humerus	1
	Supra-Condylar Fracture of Humerus	1
FOREARM	Fractured Shaft of Radius	1
	Colles' Fracture (or Greenstick)	4
	Slipped Lower Radial Epiphysis	1
HAND	Fractured Metacarpal	6
	Fractured Phalanx	15
	Dislocated Finger (a) p-i-p joint	5
	(b) d-i-p joint	1
THIGH	Torn Quadriceps	10
	Torn Hamstrings	10
	Torn Adductors	14
	Calcified Quadriceps Haematoma	1
KNEE	Dislocated Patella	4
	Torn medial ligament	9
	Torn lateral ligament	1
	Torn cruciate ligament	2
	Torn medial meniscus	5
	Traumatic haemarthrosis	2
	Traumatic effusion	11
	Hyperextension injury	3
	Schlatters' syndrome	2
ANKLE	Potts' Fracture	2
FOOT	Fractured Metatarsal	1
		268
OTHERS		504
TOTAL:		772

Table X Miscellaneous and minor injuries.

Injury	Number
Cuts and Bruises	355 (Head and Neck 80, Hands 98, Knees 45)
Torn Muscles	43
Strains and Sprains	97
Miscellaneous	9
504	
Miscellaneous:	
Haemorrhage into eardrum	1
Ruptured ear drum	2
Sub-conjunctival haemorrhage	3
Blistered feet	2
Sub-ungual haematoma (toe)	1
	9

Table XI School matches, 1980/83.

Team	Played	Won	Drawn	Lost
XV	52	29	4	19
2nd XV	43	28	3	12
3rd XV	38	28	1	9
4th XV	28	15	1	12
Under 16 A	40	30	4	6
Under 16 B	34	22	2	10
Under 15 A	42	33	1	8
Under 15 B	29	20	1	8
Under 14 A	35	21	0	14
Under 14 B	24	20	1	3
TOTAL:	365	246	18	101

A. CONCUSSION

1984-5 Season. (2) Law 3. Laws of the Game and Notes. (Laws of the Game of Rugby Football 1984). (Attention is drawn to the Resolution adopted by the Board which states that "A player who has suffered definite concussion should not participate in any match or training session for a period of at least three weeks from the time of injury, and then only subject to being cleared by a proper neurological examination".)

The basis for the three week lay-off is the recommendation of the British Boxing Board of Control; originally an empirical lay-off of four weeks. There are differences between boxing and Rugby football which I need not belabour. The boxing recommendations have been endorsed in New Zealand (Gronwall and Wrightson, 1974, 1975).

In Rugby School concussion is defined as "loss of consciousness, however transient, caused by a blow to the head or neck". Implicit in this definition is that the victim does not remember the blow. Table XIVA shows the time off competitive Rugby football for the 49 players concussed in the seasons 1980-1983; 60% played again a week later, and a further 35% in a fortnight. Two boys, who were concussed twice in one term were put off Rugby football for the season. One boy was concussed five times in three years. I referred him to a neurologist with the suggestion that he should not play Rugby football again (the boy always tackled with his eyes shut!) and this suggestion was firmly quashed. The boy obtained 'A' level Grade A in Ancient History, Grade B in History and Grade C in English - with University entrance; well up to his Housemaster's expectations.

Table XII Population at risk - Boarders at Rugby School.

	Players	Non-Players	Total
1980	616	5	621
1981	612	8	620
1982	605	24*	629
1983	594	41*	635

*During these years, many boys from the Far East entered the school, of whom several were high myopes and therefore excused from playing.

B. COLLAPSED SCRUMS

Much attention has been paid to the potential dangers of collapsed set scrums. Table XIVB analyses the injuries from this situation. In the last four seasons only one injury from a collapsed scrum gave me concern - a prop who developed dysaesthesiae in both arms. He made a full and rapid recovery. Sensibly thereafter he played in the back row.

The need for pre-season training and for suitability of physique have been constantly and repetitively stressed.

Table XIII Injuries.

(A) By Phase of Game		
	Rugby School 1980/83 772 Injuries	New Zealand 1979 1076 Injuries
Tackle	39.6	43.6
Ruck/Maul	25.6	31.0
Set Scrum	11.9	4.5
Line Out	1.4	2.1
Open Play	9.7	9.4
Not Known/Other	11.8	9.4
TOTAL:	100.0	100.0

(B) By Position		
Full Back	6.0	5.4
Three Quarter	27.5	19.5
Fly Half	7.6	14.4
Scrum Half	7.3	8.2
Hooker	6.7	6.7
Prop	13.3	12.2
Lock	12.8	10.9
Back Row	18.8	22.7
TOTAL:	100.0	100.0

C. NECK INJURIES

This is a very emotive subject, as the injury can be mortal or devastating. I write with diffidence as the only life threatening Rugby football injuries that I have met in 34 seasons have been three cases of rupture of the spleen. Excellent papers have been written on this topic (Williams and McKibbin, 1978; Hoskins, 1979). The Irish and New Zealand Rugby Football Unions have produced firm recommendations while the Rugby Football Union's sub-Committee, under the Chairmanship of Mr. I. D. S. Beer, has investigated the topic in depth and has made recommendations, which it is hoped will reduce the number of serious injuries. It is too early to assess the effect of these recommendations; the RFU is carrying out a research programme which should clarify matters.

To refer to the Rugby School neck injuries of seasons 1980/83, these were 27 in number, 3.5% of all injuries. The front row forwards suffered most (55.6%) and set scrums were responsible for many of these injuries (41%).

The only fracture was that of a cervical transverse process when a full back was kicked in the neck. No cervical spine injury caused any anxiety, and no player was off football for long.

CONCLUSIONS

This paper does not pretend to offer any firm views on the prevention and management of Rugby football injuries. It does provide data on the manner of injuries in the adolescent schoolboy game. Thirty-four years' experience suggests that the time out of the game after an episode of concussion should be more flexible.

In 34 years I may have been fortunate never to have had to cope with a serious neck injury. The fact that no neck injury has occurred in about 600,000 player hours of Rugby football — I include in this number 20 Lent term seasons of Rugby football not analysed in my papers — perhaps puts this injury in some perspective. Outstandingly the most important area of injury is the tackle; the corollary of this is that boys must be relentlessly taught how to tackle and how to ride a tackle safely.

Many people have helped with this paper — David Ray,

Table XIV

A. Concussion (49 cases)			
Age Group	Number	Time off in days	
14 and under	7	7	29
14.1-15	4	8-14	17
15.1-16	7	15-21	1
16.1-17	14	22 and over	2
17.1 and over	17		
	49		49
	Visual Disturbance	6	
	X-Ray Skull	2	

B. Collapsed Scrums			
Age Group	Number	Position	N
14 and under	6	Prop	11
14.1-15	6	Hooker	8
15.1-16	5	Lock	11
16.1-17	7	Flanker	1
17.1 and over	7		
	31		31

Injury

Cervical Spinous Ligament Strain	4
Wrenched Neck Muscles	8
Wrenched Back Muscles	7
Sacro-iliac Strain	2
Bruised Abdomen	1
Upper Limb Injuries	3
Lower Limb Injuries	6
	31

C. Neck Injuries

Age Group	Number
14 and under	5
14.1-15	6
15.1-16	5
16.1-17	6
17.1 and over	5
TOTAL:	27

Position	N	Phase	N	Injury	N
Full Back	1	Tackling	3	Cervical Transverse Process	1
Wing Three Quarter	2	Tackled	3	Cervical ligament Strain	4
Outside Centre	1	Tight Scrum	11	Wrenched Neck Muscles	22
Inside Centre	3	Ruck	3		
Prop	11	Maul	3		
Hooker	4	Loose Play	1		
Lock	1	Not known	3		
Flanker	1				
No. 8	3				
TOTAL:	27	TOTAL:	27	TOTAL:	27

Master in Charge of football at Rugby School, Jean Russell and Carol Attwell, who helped to record information on the casualties, Mr. Ian Beer, Dr. Leon Walkden and Mr. G. R. McLatchie gave much helpful advice and information on the RFU's policies on certain injuries; Edna Graham checked the tables and made time in her extremely busy life to type the manuscript. To them all I express my gratitude.

References

- Davidson, R. M., 1978 "Factors associated with Rugby injuries in schoolboys", a paper delivered at the Australian Sports Medicine Conference, Adelaide, August 18th.
- Davies, J. E. and Gibson, T., 1978 "Injuries in Rugby Union football". *Brit.Med.Journ.* 2: 1759-61.
- Gronwall, D. and Wrightson, P., 1974 "Delayed recovery of intellectual function after minor head injury". *Lancet*, September 14: 605-09.
- Gronwall, D. and Wrightson, P., 1975 "Cumulative effects of concussion". *Lancet*, November 22: 995-997.
- Hoskins, T. W. 1979 "Rugby injuries to the cervical spine in English schoolboys". *Practitioner*, 223: 365-66.
- Inglis, G. S. and Stewart, I. D., 1981 "Rugby injury survey, 1979". *N.Z.Med.Journ.* 94 (695): 349-50.
- Laws of the Game of Rugby Football, with instructions and Notes on the Laws as framed by the International Rugby Football Board, 1984. Walker and Company, Twickenham.
- Sparks, J. P., 1981 "Half a million hours of Rugby football - the injuries". *Brit.Journ.Sports Med.* 15: 30-32.
- Weightman, Doris and Browne, R. C., 1974 "Injuries in Association and Rugby football". *Brit.Journ.Sports Med.* 8: 183-87.
- Williams, J. P. R. and McKibbin, B., 1978 "Cervical spine injuries in Rugby Union football". *Brit.Med.Journ.* ii: 1747.

BOOK REVIEW

Title: SYMPOSIUM ON SPORTS MEDICINE - THE KNEE (AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS)

Editor: Gerald Finerman, MD

Publishers: The C. C. Mosby Company, 1985

Price: £55 Hard back 243 pages Index Illustrations ISBN 0-8016-0025-1

This is a 243 page book resulting from a Symposium held in Denver, Colorado in April 1982, and addresses a variety of topics concerned with knee injuries. These are as diverse as the physiologic basis for athletic training; the adaptability of skeletal muscle to altered patterns of physical activity; and the current status of prosthetic anterior cruciate ligament repairs.

Much of the book is specifically directed to the problem of ligament injury and repair, and the content is generally both an excellent review of previous work and clinical practice; and a good perspective of current (1982) research and advances. I particularly liked the chapters on determination of patellofemoral contact pressures where one aspect of the investigation related pressures to patella geometry and found no correlation between the Wiberg morphology and contact pressure: and, biomechanical function of knee ligaments using Buckle transducers. However it seems invidious to highlight just these two since there are many others which are also first class.

Overall, this is an excellent book which I would recommend to all concerned with this interesting area of orthopaedic practice.

M. L. Harding

BOOK REVIEW

Title: CHONDROMALACIA OF THE PATELLA

Editors: J. C. Pickett and E. L. Radin

Publishers: Williams and Wilkins, Baltimore/London

Price: \$23 Hard Cover

This volume of 155 pages is the published proceedings of a small symposium held in 1981. "This volume contains the formal presentations of the participants, the discussion among themselves, and the answers to the questions from the audience of over 200 orthopaedic surgeons".

The participants themselves were selected for their international reputation in the subject and included pathologists such as George Meachim from Liverpool and surgeons such as Professor John Goodfellow from Oxford as well as 5 American orthopaedic surgeons, and two from Europe.

I was given the book to review as I had an intimate acquaintance with the condition at the time and wished to know more about this mysterious condition. The book is well illustrated with diagrams and top quality black and white photographs of X-Rays, microscope sections and arthroscopy views of the knee joint as well as operative photographs.

A great deal of experimental work is well presented on topics such as "Can articular cartilage heal?".

I found it a fascinating and well produced book. The discussion was particularly interesting and the poor relationship between symptoms and pathological changes well ventilated.

Dr. Dan Tunstall Pedoe