Boxing Injuries in the Army

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SUMMARY: Boxing injuries in the Army were studied over the period 1969-1980. On average there were 35 cases a year each spending an average of 10.4 days in hospital. There were no deaths but there were 10 medical discharges due to injuries sustained from boxing during the period. Head injuries predominated and occurred relatively more frequently in the young and inexperienced boxers.

Introduction

The recent death of a junior soldier following a civilian boxing match raises the question of the safety of boxing as a sport. Rosenbaum¹ found that in 1962, in terms of injuries received per period played, boxing was less dangerous than skiing, rugby football and association football. We decided to look at the different types of injury received, the length of stay in medical units and the final disposal of the patients.

Methods

In Stats (G) 4 we hold records (F Meds 14) of all admissions to Hospitals and Medical Reception Stations of Service Personnel for two days or more. Information on types of disease/injury (using ICD² codes), causes of injury and various items of personal information (name, number, age etc) are extracted from the records and held on a computer.

For this study we retrieved details of all Army personnel admitted because of boxing injuries during the years 1969-1980 or who died or were medically discharged between 1952 and 1980.

In most instances we have restricted ourselves to the computer held data for those patients who were admitted but for unusual cases and the medical discharges after 1967 we have examined the F Med 14s, F Med 23s (records of medical board proceedings) and any other relevant records held in the branch.

Durations of stay include both the day of admission to a medical unit and the day on which the patient was discharged.

Admissions

During the 12 year period under consideration (1969-1980) there were 437 admissions. Table 1 shows the distribution of the injuries by year and

Table 1
Admissions to Medical Unit from Boxing Injuries Army Personnel 1969-1980

Year	Site Total	Head	Upper Limb	Lower Limb	Trunk	Internal	Other
1969	53	35	9	2	2	1	4
1970	34	20	6	1	3	1	3
1971	18	11	4	0	0	0	3
1972	40	28	5	1	1	1	4
1973	27	18	4	2	0	1	2
1974	24	11	3	3	6	0	1
1975	34	26	4	1	1	2	0
1976	26	18	4	0	2	0	3
1977	43	32	2	5	0	2	2
1978	47	30	7	2	2	3	3
1979	36	29	2	2	1	0	2
1980	54	38	9	2	2	2	1
Totals (%)	437	296 (67.7)	59 (13.5)	21 (4.8)	20 (4.6)	13 (3.0)	28 (6.4)

site. There is no obvious trend over time for the number of injuries or between types of injury but, as might be expected, head injuries predominated and accounted for some 67.7% of all admissions. Table II gives the total cases and inpatient days for selected diagnoses.

(code 921), 2 cases (0.68%) of cerebral laceration and contusion (code 851) of which one resulted in a medical discharge, and 3 (1%) cases of subdural haemorrhage (code 852) all of which resulted in medical discharges. The others were made up of a miscellaneous collection ranging from 2 cases of

Table II
Number of Admissions and Inpatient Days for Selected Diagnosis for Boxing Injuries,
Army Personnel 1969-1980

Diagnosis	ICD Code Ninth Edition	Number of Admissions	Total Inpatient Days	Average Inpatient Days
Total	—	437	4540	10.4
Head Injuries	—	296	2595	8.8
Fracture of Face Bones	802	83	737	8.9
Concussion	850	115	450	3.9
Cerebral laceration and contusion	851	2	484	242.0
Subdural haemorrhage	852	3	178	59.3
Other Intracranial Injury	854	69	592	8.6
Contusion of Face Scalp and Neck	920	13	104	8.0
Other	—	11	50	4.5
Upper Limb Injuries	—	59	740	12.5
Fracture of humerus	812	1	21	21.0
Fracture of radius and ulna	813	3	48	16.0
Fracture of metacarpal bones	815	28	342	12.2
Open wound of elbow forearm and wrist	881	2	177	88.5
Other	—	25	152	6.1
Lower Limb Injuries	—	21	580	27.6
Fracture and tibia and fibula	823	3	136	45.3
Dislocation of knee	836	7	248	35.4
Sprains and strains of knee and leg	844	3	152	50.7
Other	—	8	44	5.5
Trunk Injuries	—	20	365	18.3
Spondylosis	713	1	153	153.0
Fracture or fracture dislocation of the vertebral column without spinal lesion	805	2	45	22.5
Fracture of the ribs or larynx	807	3	40	13.3
Spinal cord lesion	958	1	33	33.0
Other	—	13	94	7.2
Internal Injuries	—	13	81	6.2
"Other" Injuries	—	28	179	6.4
Injuries other and unspecified	959	21	125	6.0

Note: Conditions for inclusion of specific diagnosis — twelve or more cases during the period or an average of ten or more a day in hospital.

There were 296 head injuries made up of 83 (28%) fractures of the face bones (ICD code 802), 115 (39%) cases of concussion (code 850), 69 (23%) cases of "intracranial injury of other and unspecified nature" (code 854), 13 (4.4%) cases of contusion of face, scalp and neck (code 920), 5 (1.7%) cases of contusion of the eye and orbit

open wound of ear (code 872) to one crushing injury of face, scalp and neck (code 925).

The average length of stay for head injuries was 8.77 days. The highest average length of stay was 242 days for cerebral laceration and contusion but one of the cases was in hospital for 471 days before being medically discharged from the Army.

The fractured face bones cases stayed for 8.88 days and the concussion patients for 3.91 days on average. The other intracranial injuries averaged 8.58 days with a maximum of 21 days. The other high average of this group was 59.3 days for three cases of subdural haemorrhage, all resulting in medical discharge.

Of the 59 upper limb injury admissions 28 (47.5%) were for fractured metacarpal bones (code 815) and these cases averaged 12.2 days in hospital. The other cases were for various minor fractures, dislocations, sprains, strains and contusions and the only groups of any note were 8 (13.6%) cases of fractured fingers or thumbs (code 816) and 9 (15.3%) cases of dislocated shoulders (code 831). Of the two cases of open wounds of the upper limb (code 881) one case of laceration of the right wrist was in hospital for 174 days before being medically discharged. This accounts for the high average stay (12.5 days) for arm injuries.

There were only 21 injuries to the lower limbs and no large group, however, 3 cases of fractured tibia and fibula (code 823) involved a total of 136

days in hospital and 7 cases of dislocated knee (code 836) totalled 248 days. One of these cases was medically discharged after 82 days in hospital and another required extensive rehabilitation with a total stay of 84 days. There were 3 cases of sprains and strains to the knee and leg (code 844) involving 152 days in hospital but this was inflated by one of the cases which required an operation on the patella ligament and joint capsule followed by physiotherapy, the total stay being 143 days.

There were 20 admissions for injuries to the trunk with contusions (code 922) accounting for 7 of them. Of the remainder 2 fractures of the vertebral column (code 805), one case of spondylosis (code 713), and one case of spinal cord lesion (code 952) were the more serious cases. The latter two cases resulted in medical discharges.

Internal injuries accounted for only 13 of the cases and there were no outstanding types either for number or length of stay. The injuries varied between injuries to kidneys (4) to those of the pelvic organs (3). Average length of stay was 6.23 days.

The "Other" injuries group consists mainly of those injuries where sufficient information was not given on the records received for us to determine

Fig. 1 Number of cases by length of stay

Fig. 2 Total stay by length of stay

the location and nature of the injury. All the cases were of short duration.

Fig. 1 shows number of cases with each length of stay. It can be seen that 173 out of the 437 cases (40%) only stayed in hospital for three days (note that (1) both the day of discharge and the day of admission are counted and thus three days stay represents only two nights in hospital and (2) no cases of two days or less are included in the study). A further 16% of cases were in for only four days and 90% of cases were discharged within two weeks of admission.

Fig. 2 shows the same data but highlighting the total length of stay in each group. Thus although only 10 (2%) cases had lengths of stay of more than 50 days they accounted for 39% of the total days in hospital.

Medical Discharges and Deaths

During the 29 year period from 1952 to 1980 no deaths occurred in the Army as a result of injuries received while boxing. There were, however, 29 injuries serious enough to result in the patient being medically discharged from the Service. Details of these cases are given in table 3. The cases were evenly spread over the period and there is no evidence to suggest either a rising or falling trend. There also seems to be no trend in the type of injury for which people are being discharged.

The majority of discharges (16 out of 29, 55%) were to patients suffering from injuries to the head and 7 of these were for intracranial haemorrhage. The remaining cases were mainly for fractures, dislocations and sprains. Most of the discharges occurred after long hospital stays. Conversely many

Table III
Medical Discharges 1952-1980

Year of Discharge	Year of Injury (1*)	Age at time of Discharge	Princ Dis at Discharge ICD Code (2*)	Sec Dis at Discharge ICD Code (2*)	Princ Dis at Discharge If Different ICD Code (2*)	
1952	—	—	8141	—	—	Fracture of Carpal bones
1953	—	—	8540	—	—	Head injury of other and unspecified nature
1955	—	—	8340	—	—	Dislocation of finger
1956	—	21	8530	3100	—	Intracranial haemorrhage, borderline intelligence
1957	—	20	8530	9968	—	Intracranial haemorrhage injury of other and unspecified nature
1958	—	19	8141	—	—	Fracture of carpal bones
1958	—	19	8520	—	—	Subarachnoid subdural and extradural haemorrhage
1958	—	40	2962	3007	—	Depressive, Psychoneurotic disorders
1959	—	22	8300	—	—	Dislocation of Jaw
1961	—	18	8540	—	—	Head injury of other and unspecified nature
1962	—	18	376	8700	—	Detachment of retina, open wound of eye and orbit
1963	—	22	8120	—	—	Fracture of humerus
1964	—	20	8130	—	—	Fracture of radius and ulna
1964	—	23	8460	—	—	Sprains and strains of Sacro—ilias region
1964	—	22	3899	—	—	Other deafness
1964	—	50	8540	—	—	Head injury of other and unspecified nature
1964	—	23	8130	—	—	Fracture of radius and ulna
1968	1965	23	8720	—	—	Traumatic perforation of ear
1968	1967	24	9500	—	9210	Injury to optic nerves, contusion of eye and orbit (sub total blindness)
1969	1968	20	8540	—	8530	Intracranial haemorrhage
1970	1969	25	8812	—	8819	Laceration of wrist
1972	1972	16	8360	—	—	Dislocation of knee
1973	1973	23	8520	2250	—	Subdural haemorrhage, benign neoplasm of brain
1975	1973	18	8519	—	8510	Cerebral laceration and contusion
1976	1974	20	7131	9954	—	Spondylolysis—adhesions and nerve root irritation
1977	1976	22	8529	7810	—	Subdural haemorrhage, disturbance of vision
1978	1978	17	8122	—	—	Fracture of humerus
1979	1979	19	9580	—	—	Cervical spine injury with nerve root contusion
1980	1979	21	8520	3451	—	Subdural haemorrhage, epilepsy

*Note: 1 Not available prior to 1968 2 ICD Codes refer to the eighth edition throughout.

Table IV
Number and Percentage of Cases by Age and Injury Group

	15	16	17	18	19	20	21	Age 22	23	24	25	26	Over 26	Total
Injury Group														
Number of Cases														
Head	7	61	35	38	29	30	20	18	17	11	10	8	12	296
Upper Limb		1	7	10	8	8	8	4	6	3	3	1		59
Lower Limb	1	2	2	4	1	2	1	2	1	1	2	1	1	21
Trunk	1	1		1	4	2	3	2	1	1			4	20
Internal	1	1	1	1	2	2	1		1	1			2	13
Other	6	5	4	2		2	2	2		2	2		1	28
TOTAL	16	71	49	56	44	46	35	28	26	19	17	10	20	437
Average Strength 1969-80 (1000's)		13.8		9.2	10.9	11.5	10.3	9.4	8.9	8.3	7.9	7.4	62.8	160.4
Percentage of Cases in each Age Group														
Head	2.4	20.6	11.8	12.8	9.8	10.1	6.8	6.1	5.7	3.7	3.4	2.7	4.1	100
Upper Limb		1.7	11.9	16.9	13.6	13.6	13.6	6.8	10.2	5.1	5.1	1.7		100
Lower Limb	4.8	9.5	9.5	19.0	4.8	9.5	4.8	9.5	4.8	4.8	9.5	4.8	4.8	100
Trunk	5.0	5.0		5.0	20.0	10.0	15.0	10.0	5.0	5.0			20.0	100
Internal	7.7	7.7	7.7	7.7	15.4	15.4	7.7		7.7	7.7			15.4	100
Other	21.4	17.8	14.3	7.1		7.1	7.1	7.1		7.1	7.1		3.6	100
TOTAL	3.7	16.2	11.2	12.8	10.1	10.5	8.1	6.4	5.9	4.3	3.9	2.3	4.6	100
Strength 1969-80 (+)		8.6		5.7	6.8	7.2	6.4	5.8	5.6	5.2	4.9	4.6	39.2	100
Percentage of Cases in each Injury Group														
Head	43.8	85.9	71.4	67.9	65.9	65.2	57.1	64.2	65.4	57.9	58.8	80.0	60.0	67.7
Upper Limb		1.4	14.3	17.9	18.2	17.4	22.9	14.3	23.1	15.8	17.6	10.0		13.5
Lower Limb	6.3	2.8	4.1	7.1	2.3	4.3	2.9	7.1	3.8	5.3	11.8	10.0	5.0	4.8
Trunk	6.3	1.4		1.8	9.1	4.3	8.6	7.1	3.8	5.3			20.0	4.6
Internal	6.3	1.4	2.0	1.8	4.5	4.3	2.9		3.8	5.3			10.0	3.0
Other	37.5	7.0	8.2	3.6		4.3	5.7	7.1		10.5	11.8		5.0	6.4
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

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of the long stay cases resulted in medical discharges. 67% of discharges occurred in a different year from the original injury.

Discussion

One of the problems with trying to assess how dangerous an activity is lies in estimating the population at risk. Rosenbaum¹ found that, in 1962, of a random sample of 3185 Army personnel 113 boxed and that they spent on average 4.9 hours a month each boxing (or training).

If the above ratios still hold then throughout the period 1969-1980 there would have been about 5700 boxers in the Army each spending about 59 hours a year boxing. On average there were 35 injuries a year serious enough for admission to hospital and one medical discharge a year so that about one in every 150 boxers is admitted per year or one injury occurs after every 9000 man hours of boxing. These figures are very approximate and the rates are somewhat less than found by Rosenbaum.

With an average length of stay per injury of 10.4 days there will, on average, be one person in hospital at any one time because of a boxing injury.

Without performing a similar study of injuries sustained from other forms of athletic activity (and we are planning to do this) the relative dangers of boxing are impossible to assess. It is interesting to note however that between 1978 and 1980 boxing injuries accounted for 3.6% of all sports injuries with association football, rugby and skiing accounting for 37.3%, 23.8% and 6.9% respectively. Rosenbaum found that boxing took 1.6% of total sports time, football 13.7%, rugby 2.7% and skiing 2.5%. Thus boxing has a ratio of 2.3:1, football 2.7:1, rugby 8.8:1, and skiing 2.8:1, of expected injuries to actual injuries (this ratio is calculated by dividing the number of injuries which would be expected if all sports were equally dangerous into the actual number of injuries). Assuming that individual injuries are equally serious (which is probably not true) then rugby, football and skiing are more dangerous than boxing.

The aim of this paper is not however to compare boxing with other sports but to outline the types of injury received and to highlight the problems arising from them. Head injuries predominated, as would be expected, and concussion was the most common

single diagnosis with 115 cases, 39% of all admissions. Most cases were fairly minor, 57% of them being of less than 5 days duration, but many injuries to the head have secondary and late effects (which we have not been able to quantify) and a number of the medical discharges did not occur until well after the original injury.

Table 4 shows the distribution of injuries by injury group amongst the ages 15-26 and over 26. The percentages are given in two ways; first as a percentage of the injuries within an injury group and secondly as a percentage of the total injuries at a given age. Also shown is the distribution of the average strength of the Army from 1969-1980.

It can be seen that while only 8.6% of the Army strength was less than 18, 31.1% of the injuries occurred to people in that age group. It is not known what proportions of soldiers within each age group participate in boxing therefore it is impossible to say whether this is significant, however, it appears that even amongst the younger members of the Army (up to age 26), who might be expected to be equally at risk, the injury rate decreases with age and thus experience. This is borne out by the fact that the proportion of injuries which affect the head is considerably higher in the younger age groups than in the older groups. Injuries to the limbs and trunk appear to increase with age while internal injuries remain fairly constant.

Perhaps with so many head injuries occurring to so many young men some form of head protection should be worn during matches as it is during training.

In absolute terms boxing injuries are costing the Army one medical discharge per year and one person in hospital at any one time. In addition there must be many minor injuries which do not result in admission but which may have long term effects on the health of the patient. It is not for us to say whether this price is too high for the 3.5% of the Army who participate in the sport.

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