

ORIGINAL PAPERS

Sports And Training Injuries In British Soldiers: The Colchester Garrison Sports Injury And Rehabilitation Centre

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ABSTRACT

Objectives: To record and analyse the injuries and conditions requiring referral to the Colchester Garrison Sports Injury and Rehabilitation Centre over a three year period, with special reference to type and site of injury, aetiology, and outcome.

Methods: An ongoing prospective study in which data on the diagnosis, cause of injury, and treatment of all patients referred to the Centre was coded and stored on a database. A total of seventeen variables were recorded.

Subjects: All patients were trained, serving soldiers in the British Army referred via their General Practitioner to the Sports Injury and Rehabilitation Centre.

Results: A total of 3921 referrals were made over the three-year period. The most common specific condition seen was low back pain (22.2%) followed by sprain of the ankle (15.1%). Lower limb conditions, both overuse and traumatic, accounted for over half (55.8%) of all referrals. Military training was the most common cause of all conditions (35.2%) followed by organised or personal sport (28.5%). In addition to medical treatment and physiotherapy, 30% of patients required formal rehabilitation.

Conclusions: This is the first full review of the data collected by the Sports Injury and Rehabilitation Centre. It defines the injury patterns for trained soldiers rather than military recruits. Low back pain is identified as a major cause of morbidity in this population. The review serves as a benchmark in the planning of injury prevention strategies and the establishment of future rehabilitation services.

Introduction

The concept of primary care rehabilitation began in Colchester in 1996 with the aim of providing physiotherapy and simple gymnasium based rehabilitation to injured soldiers in order to accelerate return to full fitness and reduce the incidence of re-injury. Locally known as "Bodyshop", the Col-

chester Garrison Sports Injury and Rehabilitation Centre expanded in 1998 with the arrival of a general practitioner with a special interest in sports and training injuries medicine.

The Sports Medicine and Rehabilitation Centre now encompasses the seamless progression of the injured soldier from the general practitioner, through physiotherapy, to rehabilitation and return to full fitness and duty. Staffing currently comprises two special interest general practitioners, three chartered physiotherapists and a qualified remedial therapist. A consultant orthopaedic surgeon performs an outpatient clinic approximately twice per month. All clinics, physiotherapy, and rehabilitation occur on-site and are co-located with the medical centre. In addition to the clinical activities, the centre regularly communicates with unit physical training instructors regarding individual and unit training as well as providing feedback to the command structure on unit injury rates. Patients who fail to respond to treatment are either referred for orthopaedic or rheumatology opinion, or if the condition is considered permanent, downgraded.

Much work has been published on the types of injury commonly suffered by military recruits whilst undergoing basic training (1-9), however little work has been done on analysing the injury patterns of trained soldiers once they reach their units. The primary aim of this study is to document the workload of the Sports Injury and Rehabilitation Centre, and analyse the injury patterns and aetiology in this group of soldiers.

Subjects and Methods

Colchester Garrison is the home and headquarters of 16 Air Assault Brigade, including two battalions of the Parachute Regiment and supporting units. Prior to the formation of the current Brigade, it was the home of 24 Air Mobile Brigade.

The average population covered by the Colchester Garrison Sports Injury and Rehabilitation Centre over the period of the study was 3555, comprising 3377 males and 178 females. The soldiers had all completed basic training and ranged in age from 17 to 55 years old (17 - 24 yrs 41%, 25 - 35 yrs 43%, over 35 yrs 16%). All patients who first attended between 1st November 1998 and

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Table 1. Classification of Injuries and Conditions

Injury or Condition	Comments
Disorders of the knee	Traumatic injuries: Dislocations, injuries to the internal ligaments of the knee
Other musculo-skeletal disorders	Arthropathies, RA, OA, gout, connective tissue diseases
Injuries to the shoulder and upper limb	Traumatic injuries
Injuries to the hip, thigh and lower leg	Traumatic injuries
Sprains and strains of the collateral knee ligaments	Traumatic injuries
Sprains and strains of the joints and ligaments at the ankle and foot level	Traumatic injuries
Neck pain and pain referred from the cervical spine	
Low back pain with or without sciatica	
Ligament and tendon lesions of the lower limb	Overuse injuries including: Tendinitis, bursitis, ITFBS. Excluding: Patella disorders, Anterior knee pain, and Chondromalacia patellae.
Disorders of the patella	Patello-femoral disorders, AKP, and CP
Achilles teninitis	Includes Achilles bursitis
Tibial syndrome	Includes compartment syndromes, medial tibial syndrome and periostitis
Stress fracture	Lower limb and foot - confirmed
Other ligament or tendon lesions	Those not classified above such as lateral epicondylitis, and overuse lesions of the shoulder such as impingement, and rotator cuff syndrome
Fractures	
Thoracic disorders	

31st October 2001 were included in the study. Patients presented in one of two ways, either by self referral to the medical officer (general practitioner) or via a secondary care specialist for ongoing care. Practice guidelines state that all acute injuries are referred to the Centre as well as overuse injuries and other musculo-skeletal conditions that would benefit from physiotherapy, rehabilitation or a specialist sports medicine opinion. Radiological examination, where indicated, took place either on site (plain radiographs), Colchester General Hospital (fractures and acute trauma needing Accident and Emergency Department treatment), or at the Royal Hospital Haslar (MRI examinations and Bone Scans).

Each patient was allocated, by the medical officer, either an urgent (all acute injuries) or routine appointment and subsequently assessed by a chartered physiotherapist. Acute injuries were usually seen the same working day and routine cases within five working days. The exact diagnosis was made in conjunction with the medical officer and recorded in a category corresponding to those used by the Defence Medical Services (Table 1). During the first assessment, the physiotherapist also elicited the cause of the acute injury, or the activity resulting in an overuse injury (Table 2).

Prior to the study, a computer database was designed, allowing the recording of information for each referral. Data recorded

Table 2. Cause of Injury – Definitions

Cause	Definition
Military Training or PT	Any condition occurring as a direct consequence of anything carried out as formal military training. This includes organized runs, physical fitness programmes, routine gym work, squadded roadwork, or adventurous training
Sport	Conditions occurring as a direct consequence of the pursuit of personal or group fitness outside military training, e.g. football, rugby, etc
Road Traffic Accident (RTA)	Conditions occurring as a result of any road traffic accident whatever the context
Recreation or Other	Conditions occurring due to activities off duty but excluding sport or RTA. This category includes injuries sustained from pastimes and hobbies (e.g. DIY or gardening) or under the influence of alcohol
Work	Any condition occurring as a direct consequence of the individual pursuing the primary military role e.g. injuries sustained in the workplace as well as those caused by operations or war
Pre-existing	Conditions that pre-date military service

Table 3. Injury Distribution.

Injury or Condition	Total	Percentage
Low back pain	870	22.2%
Sprains of the ankle and foot	593	15.1%
Disorders of the knee	470	12.0%
Injuries to the hip, thigh and lower leg	462	11.8%
Injuries to the shoulder and upper limb	331	8.4%
Neck and cervical spine pain	319	8.1%
Ligament and tendon lesions of lower limb	173	4.4%
Disorders of patella	130	3.3%
Tibial syndrome	124	3.2%
Sprains and strains of collateral knee ligaments	119	3.0%
Achilles tendinitis	117	3.0%
Thoracic disorders	55	1.4%
Fractures	52	1.3%
Other musculo-skeletal diseases	47	1.2%
Other ligament and tendon lesions	35	0.9%
Stress fracture	23	0.6%
Other Diseases and Conditions	1	0.0%
Total Cases	3921	100.0%

included personal details, military unit, gender, diagnosis, cause of injury or condition, date of referral, date of initial assessment, number of subsequent appointments, date of referral from physiotherapy to rehabilitation, date of discharge, outcome and physiotherapist. The same database is also used to generate patient reports and statistical returns. A pilot study was performed in the six months before the current study in order to familiarise all staff with the computer system and criteria.

Results

A total of 2662 individual patients were seen during the 3 years of the study as a result of 3921 injuries. Table 3 shows the distribution of cases. Low back pain was the most

common complaint (22.2% of all cases seen), followed by sprains of ankle and foot (15.1%).

Table 4 shows that 1382 injuries were due to military training (35.2% of cases), 1117 due to sport (28.5%), 643 due to work (16.4%), 514 due to recreation or leisure activities (13.1%), 152 due to road traffic accidents (3.9%), 106 had pre-existing conditions (2.7%), and 7 had no cause recorded (0.2%).

Low back pain was the most frequent condition associated with military training, comprising 275 cases out of 1382 (19.9%), followed by sprains of ankle and foot, 227 cases (16.4%), knee disorders, 223 cases (16.1%), injuries of hip, thigh and lower limb, 114 cases (8.3%). All other injuries accounted for 39.3%. Injuries due to sport showed a different distribution with sprains of ankle and foot being the most common, 233 cases out of 1117 (20.9%), followed by injuries to hip, thigh and lower limb, 160 cases (14.3%), knee disorders, 148 cases (13.3%), then low back pain, 147 cases (13.2%). Other injuries accounted for the remaining 38.5%.

The military unit of each individual was recorded and classified as either infantry, artillery, logistic and support (RLC), medical, headquarters (including signals), military police (RMP) and others. Individuals were classified according to the parent unit rather than individual trade or Corps. Table 5 shows the breakdown of injuries by type of military unit and by aetiology of injury. All figures have been expressed as rate of injury within the unit (expressed as Cases/1000/Month) in order to compensate for the variations in unit size. The highest overall rate of injury was found in the

Table 4. Aetiology of Injury or Condition.

Injury or Condition	Military training or PT		Sport		Work		Recreation or Other		RTA		Pre-existing	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Low back pain	275	19.9%	147	13.2%	247	38.4%	153	29.8%	29	19.1%	16	15.1%
Sprains of the ankle and foot	227	16.4%	233	20.9%	40	6.2%	69	13.4%	3	2.0%	20	18.9%
Disorders of the knee	223	16.1%	148	13.2%	35	5.4%	50	9.7%	4	2.6%	10	9.4%
Injuries to the hip, thigh and lower leg	114	8.2%	160	14.3%	124	19.3%	33	6.4%	17	11.2%	13	12.3%
Injuries to the shoulder and upper limb	77	5.6%	122	10.9%	37	5.8%	63	12.3%	17	11.2%	14	13.2%
Neck and cervical spine pain	51	3.7%	74	6.6%	41	6.4%	74	14.4%	62	40.8%	16	15.1%
Ligament and tendon lesions of lower limb	76	5.5%	50	4.5%	32	5.0%	12	2.3%	2	1.3%	1	0.9%
Disorders of patella	67	4.8%	24	2.1%	27	4.2%	8	1.6%	0	0.0%	4	3.8%
Tibial syndrome	82	5.9%	16	1.4%	23	3.6%	3	0.6%	0	0.0%	0	0.0%
Sprains and strains of collateral knee ligaments	34	2.5%	62	5.6%	7	1.1%	8	1.6%	4	2.6%	4	3.8%
Achilles tendinitis	75	5.4%	31	2.8%	4	0.6%	5	1.0%	0	0.0%	2	1.9%
Thoracic disorders	23	1.7%	7	0.6%	8	1.2%	11	2.1%	4	2.6%	2	1.9%
Fractures	21	1.5%	20	1.8%	1	0.2%	3	0.6%	7	4.6%	0	0.0%
Other musculo-skeletal diseases	19	1.4%	10	0.9%	4	0.6%	11	2.1%	0	0.0%	3	2.8%
Other ligament and tendon lesions	8	0.6%	9	0.8%	9	1.4%	9	1.8%	0	0.0%	0	0.0%
Stress fracture	10	0.7%	4	0.4%	4	0.6%	2	0.4%	3	2.0%	0	0.0%
Other Diseases and Conditions	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.9%
Total	1382		1117		643		514		152		106	
% of Total	35.2%		28.5%		16.4%		13.1%		3.9%		2.7%	

Table 5. Aetiology of Injury by Type of Unit. All Rates expressed as Rate/1000/Month.

Cause	Total	Overall Rate	Infantry	Artillery	RLC	Medical	HQ	RMP
Military training or PT	1382	10.8	10.4	11.6	11.6	9.0	11.2	9.4
Sport	1117	8.7	6.8	8.5	11.6	6.5	9.1	9.4
Work	642	5.0	4.2	4.8	6.3	3.2	5.9	7.4
Recreation or other	514	4.0	3.2	4.8	5.0	2.3	4.5	6.9
RTA	152	1.2	0.9	1.5	1.6	0.5	1.3	2.3
Pre-existing	106	0.8	0.5	1.1	1.4	0.5	0.9	0.5
Total		30.6	25.9	32.1	37.4	22.0	32.6	35.9

logistics units (37.4/1000/ month) followed by RMP (35.9). The lowest rate was in the medical unit (25.9). The highest rate of injury in each type of unit was military training, followed by sport, however in RLC units, as many injuries were caused by sport as by military training. RMP personnel have an apparent higher rate of road traffic accident injuries (2.3 compared with an overall rate of 1.2), however this may be due to increased reporting of injuries for legal reasons.

Table 6 shows the injury profiles of each type of unit. In all cases, low back pain was the most commonly occurring injury followed by sprains of the ankle and foot. As noted above, the RLC and RMP units had a far higher rate (8.5 and 8.4 respectively) of low back pain than either the infantry (5.5) or artillery (6.6).

Analysis of the workload of the centre throughout the three years of the study (Table 7 and Figure 1) shows a general trend of increasing workload year on year but with a superimposed pattern of dips three times each year (December, April and August) corresponding to holiday periods. Exceptions are due to the deployment of troops on Operations between August and October 2001. Following each dip there is a corresponding surge in activity. There were

1184 new referrals in 1998/1999, 1404 in 1999/2000, and 1333 in 2000/2001. This represents an 18.6% increase in workload between years 1 and 2 of the study. Year 3 showed a slight reduction in total but with a wider variation per month due to heavy operational commitments. The most consistent finding was that in each year of the study, October was the busiest month with approximately 12% of the years workload (11.8% in year 1, 11.9% in year 2, 11.8% in year 3). Onward referral for rehabilitation depends on clinical need but is also restricted by the number of patients that can be supervised in a class, and the availability of the remedial instructor. Of the 3921 cases, 1144 (29.2%) underwent rehabilitation.

Table 8 analyses the workload caused by each injury in terms of the number of appointments needed for treatment. As can be seen, the four most significant injuries were low back pain resulting in 1718 appointments (23.4% of workload), sprains of the ankle and foot resulting in 970 appointments (13.2%), disorders of the knee resulting in 929 appointments (12.6%), and injuries to the hip, thigh and lower leg resulting in 833 appointments (11.3%). The length of the outpatient based rehabilitation varied according to the original diagnosis. The mean number of days varied between 73

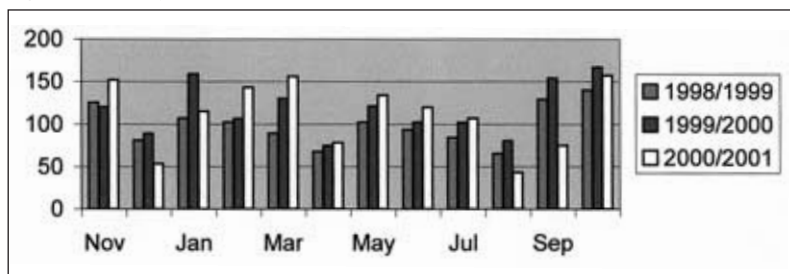
Table 6. Rate of Injury by Type of Unit All rates expressed as cases/1000/month.

Injury or Condition	Total Cases	Overall Rate	Infantry	Artillery	RLC	Medical	HQ	RMP
Low back pain	870	6.8	5.5	6.6	8.5	5.1	6.9	8.4
Sprains of the ankle and foot	593	4.6	4.4	5.6	6.0	2.5	4.1	3.6
Disorders of the knee	470	3.7	2.9	4.3	4.2	3.3	3.9	6.9
Injuries to the hip, thigh and lower leg	462	3.6	3.0	3.3	4.6	3.0	3.6	4.1
Injuries to the shoulder and upper limb	331	2.6	2.1	3.1	3.1	2.1	2.7	2.3
Neck and cervical spine pain	319	2.5	1.8	2.5	3.1	1.9	2.9	4.1
Ligament and tendon lesions of lower limb	173	1.4	1.3	1.0	1.7	1.0	1.4	1.3
Disorders of patella	130	1.0	1.1	0.8	1.2	0.5	1.0	0.8
Tibial syndrome	124	1.0	0.9	0.9	0.9	0.8	1.2	1.8
Sprains and strains of collateral knee ligaments	119	0.9	0.7	0.9	1.3	0.4	1.3	0.3
Achilles tendinitis	117	0.9	0.9	1.4	0.8	0.5	1.4	0.8
Thoracic disorders	55	0.4	0.3	0.7	0.6	0.2	0.7	0.3
Fractures	52	0.4	0.5	0.6	0.3	0.5	0.2	0.3
Other musculo-skeletal diseases	47	0.4	0.3	0.2	0.6	0.2	0.5	0.3
Other ligament and tendon lesions	35	0.3	0.2	0.2	0.3	0.2	0.4	1.0
Stress fracture	23	0.2	0.1	0.1	0.3	0.2	0.3	0.0

Table 7. New Referrals to Physiotherapy and Rehabilitation.

Month	To Physiotherapy			To Rehabilitation		
	98/99	99/00	00/01	98/99	99/00	00/01
November	125	120	152	17	33	62
December	81	89	53	28	30	20
January	107	159	115	42	58	34
February	102	106	143	47	19	25
March	89	130	156	29	48	15
April	67	74	78	29	18	19
May	102	121	134	34	49	32
June	93	102	120	41	28	26
July	84	102	107	41	28	34
August	65	80	43	16	10	0
September	129	154	75	49	48	26
October	140	167	157	57	30	19
Total	1184	1404	1333	430	399	312
Grand Totals			3921			1144

Figure 1. New Referrals.



for confirmed stress fractures to 29 for disorders of the patella. Overall, the mean length of rehabilitation was 48 days with a standard deviation of 10.3 days.

A large number of individual patients were referred more than once for either a recurrence of the original injury or for a new injury. 2662 separate individuals were seen in 3 years. Of these 633 were referred twice, 214 on three occasions, and 58 on four or more occasions.

The treatment outcome codes for each referral show that 2620 (66.8%) were

discharged and returned to normal duty; 954 (24.3%) were discharged for administrative reasons such as failure to attend or posting; 190 (4.8%) were referred for further medical care; 68 (1.7%) were considered, on assessment, not to need physiotherapy or rehabilitation; and 89 (2.3%) are still undergoing treatment.

Discussion

The stated aims of Colchester Garrison Sports Injury and Rehabilitation Centre are to maximise the number of fully fit deployable soldiers by providing rapid high quality medical treatment, physiotherapy and rehabilitation whilst also reducing the economic impact of injury in the long term. The number of injured soldiers that return to full duty reflects the overall effectiveness of the service. The Centre is based within primary care and uses existing facilities and staff. Patients are treated as outpatients and are able to continue with their normal job (as far as the injury allows) outside treatment periods.

Primary care sports medicine and rehabilitation is a cost effective method of treating soldiers with musculo-skeletal injuries and has been shown to reduce the demand on orthopaedic surgeons for non-surgical treatment (10) and hence reduce waiting times for treatment.

The use of coding systems in order to record data on sports and training related injuries in civilian sports injury clinics is well established (11, 12) and many clinics have published data on workload and injury distribution (13, 14, 15).

Prevention of injuries sustained whilst developing and maintaining high levels of fitness is an important factor in reducing the loss to operational effectiveness. Injury control requires five steps; surveillance to determine the scale of the problem, deter-

Table 8. Physiotherapy and Rehabilitation Workload.

Injury or Condition	Physiotherapy Average Number of Appointments	Range	Percentage of Workload	Rehabilitation Average Duration (Days)
Low back pain	2.8	1 to 24	23.4%	47
Sprains of the ankle and foot	3.4	1 to 19	13.2%	40
Disorders of the knee	3.3	1 to 19	12.6%	50
Injuries to the hip, thigh and lower leg	3.1	1 to 19	11.3%	50
Injuries to the shoulder and upper limb	3.1	1 to 17	8.3%	40
Neck and cervical spine pain	2.9	1 to 15	7.8%	41
Ligament and tendon lesions of lower limb	3.3	1 to 15	4.7%	42
Achilles tendinitis	3.9	1 to 17	3.5%	46
Disorders of patella	2.7	1 to 13	3.3%	29
Tibial syndrome	2.5	1 to 11	3.2%	56
Sprains and strains of collateral knee ligaments	4.1	1 to 18	3.0%	56
Thoracic disorders	2.7	1 to 14	1.6%	45
Fractures	3.3	1 to 16	1.3%	59
Other musculo-skeletal diseases	3.2	1 to 12	1.1%	57
Other ligament and tendon lesions	2.9	1 to 13	0.9%	40
Stress fracture	2.8	1 to 18	0.7%	73

mination of the cause of injury, studies to ascertain if the proposed method of intervention is effective, implementation of the intervention and audit of effectiveness (16). This paper attempts to define the scale of injuries sustained by trained soldiers and analyse the cause of each type of injury in terms of activity and occupation.

Workload

A total of 3921 referrals were made to the centre over the three-year period. This represents 2662 individuals, with a proportion suffering different injuries at a later date, or re-presenting with a recurrence of the initial problem. Re-referral was necessary if a patient had previously returned to full duty and been formally discharged from treatment. A review of the re-attendance rate shows that a total of 1259 patients were injured more than once, representing a rate of just over 47%. Further analysis shows that only a minority were re-attending for the same problem (11.1%), the vast majority suffered from a different injury. The most common reason for re-referral for a single condition was acute exacerbation of chronic low back pain.

Over the 3 years of the study, of the 3921 episodes of patient care, 2466 soldiers were returned to full duty, representing 62.9%. However 846 soldiers (21.6%) were discharged from the centre for administrative reasons, having either failed to attend for treatment or having been posted to another military unit outside of Colchester Garrison. Clarifying the exact outcomes of this cohort of patients is extremely difficult due to the highly mobile nature of the military population in question.

The workload of the Centre demonstrated an increase year on year until the final three months of the study. There was an 18.6% increase between the first and second year and until July 2001; there had been an increase of 5.5% for the same period of year three over year two. August to October 2001 showed a sharp decline in numbers as a result of the deployment of 16 Air Assault Brigade to Macedonia.

Fluctuations in monthly workload correspond with holiday periods. These dips are followed by surges of activity when the soldiers return to intensive training. Analysis of the aetiology of these surges reveals that there is an increase in military training injuries without a corresponding increase in sports injuries. This suggests that soldiers are at increased risk of training injuries after leave, and that units should introduce a short programme to regain prior levels of fitness rather than assuming full fitness from day one.

The increase in injuries year on year has several explanations: the Garrison has changed in character during the study from its previous Air Mobile role to the new Air

Assault role with a corresponding increase in number of deployments and training. There is a strong and consistent association between the total amount of exercise and higher risks of injury (17). It is possible to speculate that there may also be an element of fatigue amongst soldiers due to increased commitments in terms of deployments, exercises and training, however the effect of repeated deployments on an individual has yet to be assessed by study.

The profile of rehabilitation in the Army has also been raised in recent years and particularly within Colchester Garrison as the Sports Injury and Rehabilitation Centre has become established. This may have led to increased patient awareness and increased utilisation of the services on offer. The Centre can now offer treatment to patients, who would in the past, have been referred for secondary care rehabilitation at DSMRC Headley Court.

Injury Distribution and Aetiology

Injury levels amongst military recruits has been studied extensively (1-9), however few studies have been performed on the injury patterns and cause of injury amongst trained soldiers in the British Army apart from those discharged as being unfit for further service (18).

An important finding of this analysis is that low back pain is the single most frequent injury resulting in 22.2% of all the injuries seen and creating 23.4% of the workload of the Centre. Low back pain is also the most common reason for repeat attendance. Aggregated lower limb conditions, both overuse and traumatic constitute 55.8% of all injuries.

Sports injuries have been classically subdivided into overuse or traumatic. Overuse conditions occur when repetitive microtrauma results in structural changes in the tissue, examples include stress fractures and tendonitis. Traumatic injuries, as the name suggests, arise from a single traumatic event. A significant number of diagnoses fall outside this simple classification and are more aptly described as multi-factorial. For example, spinal pain in the neck or lower back may result from overuse, trauma, or the interaction of one upon the other. Using this classification, 51.6% of the cases can be considered traumatic, 33.0% multi-factorial, and 15.4% overuse.

These figures demonstrate the significant difference in the injuries sustained by soldiers who are fully trained and recruits in a training establishment where figures in excess of 80% have been quoted for overuse injuries (1,3). The figures do, however, compare with those quoted for a civilian sports injury clinic (14), i.e. 70.4% traumatic injuries, 12.6% overuse injuries and 17.0%

other injuries.

This study attempted to ascertain what activities gave rise to specific injuries. The recording of comprehensive data on the aetiology of injury is a vital and necessary tool in the delivery of evidence for the prevention of injury and allows planning for resource allocation (16, 19, 20). Overall, the most common cause of injury was military training (35.2%) followed by sport (28.5%). Previous studies have examined the effect of sport on injury rates of soldiers in Bosnia (21) and concluded that it was a major cause of manpower wastage.

The most notable difference in the profile between military training and sport related injuries is that low back pain is the commonest training injury (19.9%) but only the fourth most common sports injury (13.2%). Ankle sprains, however, are the greatest hazard when playing sport (20.9%). Targeted injury prevention might, therefore, include lumbar spine protection whilst training and increased ankle support whilst playing sport.

Work is the third largest cause of injury and includes such disparate activities as heavy lifting in a REME workshop and sitting at a VDU display. Once again, the commonest injury in this group was low back pain (38.4%).

Initial analysis of the data has indicated a significant difference in the rate of injury between male and female soldiers corresponding to the findings of Gemmell (18). It is anticipated that these results will form the basis of further investigation.

Injury Profile of Different Military Units

The pattern of injury discussed above was common for all units, however there was variation in the overall rate of injury (quoted as cases/1000/month) between different types of unit. In the case of low back pain, infantry and artillery units which might have been expected to have high rates of injury, had a rate that was below average (5.5 and 6.6 respectively against an average of 6.8). Conversely, RLC and RMP units had a higher rate (8.5 and 8.4).

The figures analysing the aetiology of injury by type of unit confirms the trend of military training being the most important cause. The exceptions again being RLC and RMP where training and sport were of equal importance.

These figures demonstrate trends but must be treated with caution, as many other variables should be considered. For example, RMP personnel appear to have the highest rate of RTA injuries but this may be a reflection of increased reporting of these injuries for legal reasons. Similarly, the apparent low rates injury of medical personnel may be due to significant periods on deployment and self-treatment.

Low Back Pain

The impact of low back pain both on workload and manpower wastage merits further attention. As stated above it is the most common injury sustained during military training and at work. Studies from Finland, Denmark and Switzerland have studied the impact of low back pain on military service (22, 23, 24) and concluded that the main factors in the aetiology of this condition were lifting, carrying, standing for long periods, twisting and heavy work. Long term follow up (22, 23) demonstrated that the frequency of attacks of low back pain increased during military service and was a major cause of time off work after leaving. Those affected tended to have a pessimistic outlook for the future.

Work related low back pain is a significant Health and Safety issue and warrants further investigation. Ergonomic reorganization of the workplace and targeted prevention of back injuries during military training should represent a major element of a future strategy to prevent low back pain.

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