Role of gymnastics in the Army School of Physical Training

DE GRIFFITHS, R HARGROVE, J CLASPER

Department of Orthopaedics, Frimley Park Hospital, Camberley, Surrey, UK

ABSTRACT

INTRODUCTION As a result of a single spinal injury seen at Frimley Park Hospital, we reviewed the injuries recorded at the Army School of Physical Training since December 1996.

PATIENTS AND METHODS This was a retrospective review of all acute accidents and injuries recorded in the Accident Book since its inception.

RESULTS Over 75% of the injuries that were serious enough to result in soldiers having their training terminated were as a direct result of gymnastic events such as vaulting, trampolining and somersaults. These events were also responsible for most of the small number of career-threatening injuries.

CONCLUSIONS This raises questions about the inclusion of gymnastic events in course training programmes, especially when considering its relevance to army training in general.

KEYWORDS

Gymnastics – Military – Injuries – Physical training

CORRESPONDENCE TO

Major DE Griffiths, Department of Orthopaedics, Frimley Park Hospital, Portsmouth Road, Camberley, Surrey GU16 7UJ, UK
M: +44 (0)7803 009826; E: dylgrif@hotmail.com

The Army School of Physical Training (ASPT) is the focal point for physical training within the army and is where aspiring army physical training instructors (PTIs) are taught.

As a result of a single spinal injury seen at Frimley Park Hospital, we decided to review the injuries recorded in the Accident Book at the ASPT from December 1996 when it first came into use. In addition, those more severe injuries which required hospital attendance were also retrospectively reviewed.

There is increasing awareness within the army of the effects of sporting injuries on the overall fitness and availability of personnel for operational deployments.^{1,2} In addition, a number of authors have reported the dangers of gymnastic events with regard to musculoskeletal injury.^{3–8} At the ASPT, gymnastic events (now termed agility events) have always formed an integral part of the training and the passing out parade for the instructor courses.

Patients and Methods

The Accident Book is a legally required document and has been held at the ASPT from December 1996. Using this as our primary reference, we reviewed all the injuries it recorded since its inception to April 2004. For each injury, details were noted of the type of event in which the injury occurred, the part of the body that was injured and the

number of injuries that required referral to Frimley Park Accident and Emergency (the only referral point).

Patients referred to Frimley Park Hospital were studied using the hospital records to establish outcome and whether these injuries resulted in termination of the soldier's training or were potentially career threatening.

In addition, a copy of each training programme for the three grades of PTI course was obtained, so that the percentage of time spent on each particular activity could be assessed.

Results

From December 1996 to April 2004, 162 accidents were recorded at the ASPT. An injury incidence was not possible because we were unable to obtain the exact numbers attending the school but the highest proportion of accidents were sustained in gymnastic events, accounting for 37 of the 162 (22.8%; see Table 1). Relating this to the teaching of gymnastics it was found that a variable amount of time was spent on gymnastic events during the three main PTI courses: Class I, 7.6% of time; Class II, 5.2% of time; and Class III, 10.2% of time (Table 2).

What we have termed 'Battle Physical Training' (Battle PT) was responsible for the second highest number of accidents at 19.7%. Battle PT can involve a variety of activities

Table 1 Breakdown of injuries from December 1996 to April 2004 and sports responsible

Event/sport	Total injuries (%)
Gymnastics	22.8
Battle PT	19.7
Non-course accidents	13.0
Tabbing	8.0
Martial arts/combat training	6.8
Football	6.1
Volleyball/basketball	5.6
Rugby	1.9
Adventure training	0.6
Boxing	None

Table 2 Time spent on gymnastic activities in relation to severity of injury

Mean percentage of time allocated to gymnastics on course programmes	7.7
Percentage of total number of injuries from gymnastics	22.8
Percentage of hospital referrals that were from gymnastics	59.1
Number of gymnastic injuries leading to termination of training	10 of 13
Number of potentially career-threatening injuries from gymnastics	4 of 5

which are thought to relate specifically to tasks a soldier might encounter in a military battle, *e.g.* assault courses, group races carrying logs or weighted stretchers, and initiative tasks where a group may have to traverse a physical obstacle with limited resources to assist them.

Of the 162 injuries, 22 (13.4%) required attendance at Frimley Park Hospital. Thirteen injuries were of a sufficient severity for the soldier's training to be terminated (7.9% of all injuries and 59% of all accident and emergency referrals). The number of injuries thought to be potentially career threatening was 5: these were anterior cruciate ligament rupture, bilateral tendo-calcaneus ruptures, dislocation of patella, Grade III acromioclavicular joint disruption, and C6–C7 fracture dislocation of cervical spine.

Of the 13 injuries that required the soldier's training to be terminated, 10 (77%) of these injuries were from gymnastic events, far exceeding any other cause. In addition, gymnastic events were responsible for 4 of the 5 career threatening injuries.

The most commonly injured body part was the ankle (32.5%), with head and neck injuries the second highest at 16.6% (Table 3). Over one-quarter of the ankle injuries (26.9%) and half of the total head and neck injuries were sustained in gymnastic events.

Discussion

Military literature usually concentrates on recruit training when looking at training injuries. We are not aware of a paper or report of training instructor injuries specifically.

It has long been recognised that sporting injuries in the military are a serious problem. In 2002, Strowbridge and Burgess⁹ looked at sports and training injuries in British serving soldiers. Their results included acute and chronic injuries

but showed training injuries accounted for 35.2% of referrals and sporting injuries for 28.5% of referrals; therefore, training injuries were a greater problem than sporting injuries.⁹

Efforts have been made (successfully) to reduce these sporting injuries through education and simple means.^{10,11} The ASPT has long had a policy of recruiting those with high fitness levels as low levels of physical fitness have been linked with increased injury rates.¹²

In the ASPT, the overall acute accident/injury incidence for the last year was low at 12.7 per 1000, but this figure does not include chronic injuries so comparison with previous studies is difficult. This is much higher than the figures of 6.5 per 1000 reported in Tointon's study¹⁵ for the period 1969–1980 for sports injuries in British servicemen.

However, the ASPT courses are of very high intensity and these figures compare favourably with the Clasper study¹ of 2001 which showed the impact of sporting injuries on operationally deployed troops in Bosnia Herzegovina (incidence

Table 3 Anatomical location of injury

Anatomical location	Total injuries (%)
Ankle	32.5
Head/neck	16.6
Knee	12.3
Hand	9.3
Back	8.6
Shoulder	3.7
Lower leg	3.1
Others (including thigh, abdomen, arm wrist, hip, elbow, chest)	8.6

of 26 per 1000 but included both acute and chronic injuries).

This paper is not intended as a criticism of the important work that the ASPT does. The fitness training of our Armed Forces is an essential part of combat readiness and is one of a number of reasons why our Armed Forces are so highly regarded around the world. Nevertheless, the highest proportion of accidents/injuries occurred during gymnastic events and it is important that those in charge of training at the ASPT receive feedback on the types of injuries and accidents that are prevalent.

In the US, gymnastics injuries account for 1.2% of all injury-related emergency department visits and 5.6% of all sporting injuries.¹⁴

A large volume of sports literature exists on gymnastic injuries most of which is descriptive of young girls at highly competitive levels, which is not relevant to our review. In 1996, Bayliss *et al.*⁵ looked at gymnasts at three levels from international level (level 1) down to recreational (level 3). While they found that the level 3 (recreational) athletes had overall fewer injuries, when they occurred they were more serious.⁵ It has also been shown that male gymnasts have more upper limb injuries than female gymnasts perhaps reflecting increasing emphasis on upper body activities.⁴ Even so, in male gymnasts the single most commonly injured area is the ankle, which is similar to our review.⁵

The use of trampolines and smaller trampets has long been linked with serious injury. The scale of the problem grew so bad in the US that, in 1999, the AAOS published an estimated 186,405 trampoline-related injuries with a cost of \$4.1 billion and advised removal of trampolines for use by children at home or school.⁶ Yet there is evidence that overall serious spinal cord injury from gymnastics and trampolining is falling in the general population.⁷

The ASPT implements all recommended safety measures to reduce accidents from gymnastics to a minimum. However, serious injuries do still occur (as evidenced by the C-spine fracture-dislocation seen in a trainee this year) and gymnastic events are clearly the single largest cause for PTIs' training being terminated due to acute musculoskeletal injury. It can also be seen from the time spent teaching gymnastics on the three main PTI courses that the injury rate appears to far outweigh the timetabled importance given to gymnastics. However, considering the number of other events/aspects that need to be covered on these PTI courses, it is difficult to see how the time spent on gymnastics could be increased.

The question of whether gymnastic-type events should form such a key part of the training programme for aspiring PTIs has to be raised. We would agree that agility and quick reactions should form an essential part of a soldier's training, but it is difficult to draw a direct correlation between the necessary physical ingredients of a soldier and specific

gymnastic-type events such as somersaults, trampolining and vaulting, which were responsible for a large proportion of the injuries. Our PTIs are soldiers not gymnasts, and their role is to train and ensure the physical fitness of our armed forces.

Conclusions

It would appear that the number and gravity of injuries sustained through gymnastic events at the ASPT is high in comparison to the time devoted to it on the instructor courses. The emphasis placed on gymnastics has reduced over the years and if the gymnastic programme were to be cut any further, this would almost certainly mean an end to the gymnastic type of final parade and an end to a great Army tradition. The question that needs to be addressed is whether the Army, already considerably undermanned, can afford to lose potential PTIs through maintaining this tradition.

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