

# A SURVEY OF OVERUSE LOWER LIMB INJURIES IN BRITISH ARMY RECRUITS

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## **ARMY** PERSONNEL RESEARCH ESTABLISHMENT

### INTRODUCTION

In recent years the problem of training injuries in British Army recruits has aroused much concern. This has centred on the repetitive strain or overuse type of Lower Limb Injury (LLI).

The problem is not unique to the British Army, overuse injuries and stress fractures have been recorded in other military organisations<sup>1,2</sup>.

In 1986 the Army Personnel Research Establishment (APRE) was tasked to undertake a wide-ranging study of recruit training, an integral part of which was to assess the medical and training implications of overuse LLIs.

The aims of the study were to; define the incidence of LLI during basic recruit training ; assess the influence such injuries had on training outcome and wastage ; attempt to identify physical characteristics which might predispose to overuse injury.

### METHOD

Two different training establishments were chosen for the study. A total of 519 recruits took part in the survey. Of these 408 were infantry recruits and 111 were adult artillery recruits.

On arrival at the training depot each recruit completed a Physical training questionnaire designed to assess their level of pre-training physical activity and fitness.

A medical examination of each recruit was completed and a battery of tests to assess simple anthropometric characteristics and aspects of physical performance was carried out. These included ; anthropometry ; isometric muscle strength and endurance; indirect maximal aerobic power cycle ergometer test.

Medical officers in the two establishments completed a LLI overuse record form, when recruits presented with an injury.

Administrative data on the outcome of training was also collected.

### RESULTS

The mean age of the recruits on entry was 18.9 years for the adult artillery soldiers and 16.6 years for the infantry soldiers.

From the physical training questionnaire 72.5% - 76.6% of all recruits had endurance training as part of their school PT. Between 84.6% - 92.8% of recruits had attempted to improve their fitness level in preparation for basic training.

The pre-training assessment of physical performance showed, as might be expected, the adult recruits to be generally taller, heavier and stronger than the junior infantry soldiers. The latter however demonstrated greater aerobic fitness.

No association between anthropometric characteristics and LLI was demonstrated. However a weak association between thigh strength (measured as knee extension) and LLI was shown. Those who suffered a LLI had a mean knee extension of 111.25kg against a mean of 120.17 kg in those with no injury ( $p > 0.01$ ).

The overall incidence of overuse LLI during training was 18.7%. In infantry recruits, 13.1% of junior soldiers (n=183), and 20.4% of junior leaders (n=225) suffered a LLI while 20.7% of adult artillery recruits (n=111) presented with an injury. In the infantry soldiers 67 suffered an injury 90% of which were to the knee. All medical discharges in the study (n=16) were due to knee problems.

In adult recruits 23 suffered an injury; of these 8 (35%) were to the knee and 11 (47%) were to the calcaneum. None of the adult recruits were discharged due to LLI.

A total of 51 recruits (9.8%) successfully completed training after having suffered a LLI. They spent 1143 days away from training due to their injury. The mean injury absence was 22.4 days.

37% of infantry soldiers with a LLI had a previous history of the same complaint.

The combination of equipment and type of training most provocative of overuse LLI was identified; in junior infantry soldiers, running in boots especially with backpacks was closely associated with knee injury; in artillery recruits, wearing boots during physical training was closely associated with heelbone injuries.

Of those discharged from the Army as a direct result of their injury (3.1%), the mean time in training before leaving was 63 days. The annual recruit population is about 20000. Therefore 620 recruits might be expected to suffer a LLI each year. This would result in 39,060 wasted training days. Injury absence would account for a further 43,000 lost training days. There is an obvious cost benefit to be obtained by reducing this injury rate.

## CONCLUSIONS

From the study it was apparent that greater emphasis must be placed on the previous medical history of all recruits especially juniors.

The earliest stages of recruit fitness training should concentrate on gymnasium work designed to increase thigh muscle strength and tone.

Training which combines distance running in boots and load carriage should be forbidden for junior recruits. In adult recruits such training should be reduced or modified to reflect true operational requirements.

## REFERENCES

1. Jones BH., Over use Injuries of the Lower Extremities Associated with Marching, Jogging and Running: A Review. Milit. Med. Vol 148 Oct 1983
2. Milgrom C, Giladi M, Stein M., Stress Fractures in Military recruits; a prospective study showing an unusually high incidence; J. of Bone and Joint Surg. (Br) 67B, 732-741; 1985