HIGH STRESS FRACTURES OF THE FIBULA

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A high stress fracture of the fibula which occurred in 48 out of a class of 120 recruits doing a difficult jumping exercise is described. No more were seen when the exercise was stopped. The importance of this report is that it confirms the theory that different muscular activities cause different stress fractures.

The incidence of stress fracture of the fibula in recruits and athletes is well established (Hopfengärtner 1907; Burrows 1948; Devas 1975); in the former it is the middle third of the bone which is most often affected, in the latter it is the lowermost end. Running and jumping, in the normal manner, are usually the activities causing the stress fracture.

The army recruits whose cases are recorded here sustained stress fractures of the uppermost third of the fibula from doing a difficult, if ill-advised, exercise which they started two weeks after joining the service. The exercise consisted of doing a full knees bend to the squatting position and then, holding that position, jumping across the gymnasium. This was repeated several times a day.

MATERIAL

One hundred and twenty recruits aged between 17 and 20 years entered a class at a military academy. Two weeks after starting training, two recruits were referred with pain, swelling and tenderness

at the lateral aspect of the uppermost third of both fibulae in each case. These symptoms had come on gradually during the exercise already mentioned. There was no history of injury.

Radiography confirmed that in each case there were stress fractures in the uppermost thirds of both fibulae (Fig. 1). Further investigations revealed no other abnormalities in otherwise fit young men. Three more recruits then attended with the same symptoms, and radiographs showed similar stress fractures in every case (Fig. 2).

All the remaining recruits in the class were then seen, and radiographs were taken of those who complained of pain or had tenderness over the uppermost third of the fibula. Forty-eight (40 per cent) of the recruits were found to have stress fractures, 14 cases being bilateral. An enquiry about the recruits' fitness before joining the service showed that most of the stress fractures had occurred in those who had given up sport or other exercise in favour of academic studies for some six months in order to pass the entrance examination.

Radiological findings. In most patients the stress fracture was oblique or transverse, with the line of the fracture running downwards and outwards. In some patients the fracture line was not visible as such, but there was callus formation comparable to that seen in shin soreness of the tibia. These findings, together with the clinical signs, confirmed the diagnosis.

Fig. 1

Fig. 2

Bilateral stress fractures of the fibula. Figure 1—There is considerable callus formation in both fibulae. The line of the fracture is seen better on the left. Figure 2—Comminuted stress fractures of the fibula which show slight displacement and good callus formation.

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DISCUSSION

It is believed that the jumping exercises described produced the stress fractures. The soleus, peroneus longus, tibialis posterior and the long flexor of the great toe exert a very strenuous pull from their attachment to the fibula. Devas and Sweetnam (1956) showed that powerful contraction of the flexor muscles of the ankle and foot approximate the fibula to the tibia, and they considered that this was the causal mechanism of the stress fractures in runners. In our patients the position of the leg on contraction of the muscles was different: the knee was fully flexed and the ankle dorsiflexed, bringing the insertion of the calcaneal tendon to some five

centimetres posterior to the lateral malleolus. (In running, the ankle is plantarflexed and this insertion is approximated to the lateral malleolus.) This meant that the direction of the muscular force on the fibula was not only obliquely towards the tibia but also posteriorly.

Once the exercise was stopped there were no further occurrences of this type of fracture. It is probable that if the recruits had been brought up to proper athletic standard before the start of the particular exercises the fractures might not have occurred. Bone does not gain strength as rapidly as does muscle (Devas 1975), which may also explain why most of those recruits who had kept in training did not get a stress fracture.

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