CONSERVATIVE MANAGEMENT OF DISTRACTION-TYPE STRESS FRACTURES OF THE FEMORAL NECK

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Four military recruits with complete distraction-type stress fractures of the femoral neck were treated conservatively. The radiographic diagnosis was made within two weeks of the onset of symptoms and the activities of the patients were matched to the clinical and radiographic progress of fracture healing. None of the fractures displaced and union occurred uneventfully. Our experience suggests that prophylactic internal fixation of these fractures is not necessary.

Distraction-type stress fractures of the femoral neck tend to displace if the symptoms are not recognised (Kaltsas 1981), and the current view is that these fractures should be treated by immediate internal fixation (Devas 1975; Morris 1980). Our experience suggests that, if they are undisplaced, these stress fractures do not require internal fixation, provided that their programme of activity is matched to the progress of bone healing.

CASE REPORTS

Between 1969 and 1981 four military recruits with distraction-type stress fractures of the femoral neck were treated by us conservatively.

Case 1. A 20-year-old recruit developed pain in his right hip during basic training. Pain was insidious at first, gradually worsened and two weeks after the onset of the symptoms, he came to outpatients. Examination showed slight limitation of hip movements. The initial radiograph (Fig. 1a) showed the very faint line of a fresh stress fracture in the base of the right femoral neck with cortical cracks both in the upper surface of the neck and near the lesser trochanter. Absolute bedrest was begun immediately and the affected leg was immobilised by ankle traction for several days. Bedrest was continued for three weeks until the pain in the hip had disappeared. Radiographs taken after this period showed a more easily visible fracture line but there already was endosteal and periosteal callus formation (Fig. 1b). The patient was allowed to walk on crutches without weight-bearing, and repeated radiographs during this period confirmed rapid progress of fracture healing. At six weeks (Fig. 1c) the fracture line in the centre of the neck had disappeared; three weeks later tomograms showed endosteal callus across the fracture gap. The patient was by then asymptomatic and for the next five weeks was allowed to take partial weight on crutches. Radiographs now showed bony union in the upper and central parts of the neck; the lower cortex, however, still showed a crack despite the overlying callus. Eight weeks later radiographs showed sound union throughout the fracture line, and at five months bony union was confirmed (Fig. 1d). Unrestricted physical activity was allowed, no further treatment was needed and the patient completed his military training.

Fig. 1

Case 1. The initial radiograph shows a stress fracture in the base of the right femoral neck (Fig. 1a). Subsequent radiographs taken during treatment at three weeks (Fig. 1b) and six weeks (Fig. 1c) show the progress of healing, and the radiograph taken five months after discharge confirms bony union (Fig. 1d).

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Case 2. A dull ache in the right hip and an increasing limp prompted a 20-year-old recruit to seek advice two weeks after the onset of his symptoms. There was no record of any previous injury. Passive movements of the hip were limited and painful. The initial radiograph (Fig. 2a) showed the faint line of an undisplaced distraction-type stress fracture of the femoral neck with cortical cracks. He was treated by absolute bedrest for three weeks; to control pain, traction was applied to the leg and retained for one week. After two weeks of bedrest, radiographs already showed increasing sclerosis in the middle of the neck (Fig. 2b), evidence of endosteal callus formation. At three weeks, when he was asymptomatic, walking on crutches without weight-bearing was allowed. At six weeks (Fig. 2c) radiographs showed reconstitution of the upper cortex, and the fracture line was visible as a sclerotic zone; the lower cortex still showed a crack but partial weight-bearing was allowed. Three weeks later (Fig. 2d) radiographs showed solid union of the fracture. Full weight-bearing was then allowed (nine weeks after the initial radiographic diagnosis), and the patient’s military training recommenced two months later.

Case 3. A 22-year-old recruit, while running with a full pack on his back, suddenly felt severe pain in his right hip. Ten days later he was sent to hospital because of persistent pain. The initial radiograph (Fig. 3a) showed a complete distraction-type stress fracture of the femoral neck with cortical cracks. Bedrest with limb traction was started immediately, and the pain subsided within two weeks. Three weeks later there were already signs of endosteal callus (Fig. 3b) and walking on crutches without weight-bearing was allowed. The fracture line disappeared within four weeks and was visible only as a sclerotic zone (Fig. 3c); partial weight-bearing was then allowed. At nine weeks a radiograph showed solid consolidation of the fracture (Fig. 3d) and full weight-bearing was started. The patient was asymptomatic and unrestricted military training was allowed four months after the initial radiographic diagnosis.

Case 4. A 19-year-old recruit with no previous history of injury felt pain in his right hip during basic training; 10 days after the onset of symptoms he had begun to limp and radiographs showed a fresh distraction-type stress fracture of the right femoral neck (Fig. 4a). The fracture gap was open in the upper cortex of the neck and the lower cortex was slightly compressed. Immediate bedrest was begun. Radiographs taken at one week showed signs of fracture impaction without displacement (Fig. 4b). Within two weeks the hip was painless and radiographs showed signs of endosteal callus formation; walking on crutches without weight-bearing was therefore allowed. At five weeks, radiographs (Fig. 4c) showed sclerosis at the fracture line but the reconstitution of the cortical bone was still incomplete. At this stage of healing the patient was allowed to start partial weight-bearing, progressing to full weight-bearing four weeks later. Seven weeks after the diagnosis had been made he felt discomfort only after prolonged walking. Clinically the hip had a full range of movement without pain. He continued his military service but intense physical training was prohibited for a further two months.
DISCUSSION

The usual treatment of compression-type stress fractures of the femoral neck is a period of non-weight-bearing on crutches and the outcome is generally uneventful (Devas 1975). However, distraction-type stress fractures of the femoral neck show a complete fracture line with cortical cracks, and these fractures may displace; severe and prolonged incapacity, aseptic necrosis and non-union are not uncommon if these patients are treated by open reduction and internal fixation (Morris 1980). These disastrous sequelae are similar to those of young patients with traumatic femoral neck fractures (Zetterberg, Iristam and Andersson 1982). Because of the risk of displacement, Devas (1975) recommended immediate internal fixation in all patients with distraction-type stress fractures of the femoral neck. Morris (1980) also recommended immediate fixation of such fractures in young recruits, if even a slight cortical crack was seen, or if pain was not controlled by reducing weight-bearing.

There is no doubt that extreme caution must be exercised to prevent displacement of these femoral neck stress fractures, and the critical question is how to assess their stability. It is clear that if the symptoms are not recognised these fractures displace (Kaltsas 1981), and the purpose of this report was to show that they healed with conservative treatment if diagnosed before displacement.

Immediate internal fixation was not carried out because our patients had walked to the office, and had only a slight limp. After bedrest, the radiographs showed astonishingly rapid union and the patients soon became asymptomatic. These findings emphasise that this type of fracture is not as unstable as might be thought on the basis of the initial radiographs. Moreover, the rapid stabilisation of the fractures suggests that healing may have begun even before radiographic diagnosis.

It seems unnecessary to emphasise the benefits of conservative treatment or the risks of prophylactic internal fixation. Osteosynthesis per se may produce vascular damage in the femoral neck and hammering in a nail may produce diastasis at the fracture, especially in non-osteoporotic patients (Strömqvist and Hansson 1983). Moreover, patients with femoral neck stress fractures are usually young, and after internal fixation a second operation to remove the nail is necessary.

The conservative treatment of these fractures needs careful supervision and also co-operation from the patient. Walking on crutches without weight-bearing is not sufficient at first; the distraction forces caused by the hip muscles should be minimised by bedrest. Conservative treatment also needs the physiological protecting mechanisms which regulate the use of fractured limbs (Wardlaw et al. 1981; Aro, Eerola and Aho 1982).

Our experience has led us to conclude the following:
1. The diagnosis of distraction-type stress fractures of the femoral neck should be made within two weeks of the onset of symptoms.
2. To prevent fracture displacement, absolute bedrest with traction must be continued until passive movements of the affected hip cause no discomfort and radiographs show signs of internal callus formation (in our patients this took place within three weeks).
3. Walking on crutches without weight-bearing should be continued until radiographs show bony union across the fracture line (our patients reached this stage of healing within nine weeks).
4. Partial weight-bearing on crutches should then be continued until complete consolidation of the fracture (in our patients this took from six to 14 weeks).

REFERENCES