BRIEF REPORTS

LEFT-HANDEDNESS AND ROTATIONAL FRACTURES OF THE SHAFT OF THE TIBIA

O. M. BÖSTMAN

There is some evidence that left-handedness is associated with increased morbidity and mortality (Aggleton, Kendrick and Neave 1993; Turner 1993). At a general level, an increased risk of accidental injury in left-handed people has been shown (Coren 1989).

The existence of side dominance in the human population also implies a rotational asymmetry. Right-handers have a predilection for counter-clockwise turning of the body and left-handers for clockwise turning. Many athletic activities reflect the more common right-sided dominance: running races in athletic stadiums are always in a counter-clockwise direction.

We considered that the torsional, helical configuration of common spiral fractures of the shaft of the tibia may be influenced by the handedness of the patients. We therefore reviewed patients with this specific injury and compared the proportion of right-handers and left-handers in patients with rotational fractures with that in patients with other types of fracture of the shaft of the tibia.

Patients and methods. We studied the records of 584 adult patients with fractures of the shaft of the tibia admitted from 1985 to 1992. Admission radiographs were reviewed to classify the fractures. Our criterion for a rotational fracture, caused by torsional forces, was a spiral configuration with no comminution, involving the junction of the middle and distal thirds of the tibial diaphysis (Fig. 1). This section of the bone is where the polar moment of inertia reaches its minimum (Minns, Bremble and Campbell 1975). All the other fractures, usually caused by direct impact or bending, comprised the control group. Many patients could not determine their dominant foot, and therefore only hand preference was recorded from a telephone enquiry during 1993.

Results. A total of 137 patients (24%) had suffered rotational fractures. Their average age was 38 years (18 to 76) and that of the 447 patients with other types of fracture was 37 years (18 to 73). The male:female ratios were 2.4:1 and 2.2:1, respectively. The fracture was in the right leg in 87 patients (64%) of the rotational group and in 241 patients (54%) of the control group (p = 0.06). There were 29 left-handed patients among the 137 patients with a rotational fracture (21%; 95% CI 14% to 28%) and 34 among the 447 patients with other fractures (8%; 6% to 10%). The difference between the groups was highly significant (p < 0.001).

Left-handed patients had rotational fractures more often in the left leg (16) than in the right leg (13; p = 0.03). The calculated odds ratio of sustaining a rotational fracture for left-handed subjects was 3.26 (95% CI 1.83 to 5.78).

Discussion. There was a clear over-representation of left-handed patients among those with rotational fractures as compared with other types of fracture. This distinct, rather uniform type of fracture is usually a solitary low-energy injury caused by stumbling or slipping at ground level.

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Fig. 1

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Torsional forces are the ultimate cause of fracture (Böstman 1986). We could obtain no exact data on the frequency of left-handedness in the corresponding general population, but the proportion of left-handers among the patients with non-rotational fractures observed in this study (8%), is close to the presumed universal prevalence of left-handedness, namely one in ten of the population (Turner 1993).

Our results confirm the hypothesis that left-handedness is associated with an increased rate of at least some types of accident. It is, however, of special interest that our results indicate that this susceptibility to injury may not be general and non-specific, but instead rather specific. In our study the increased risk seemed to be associated with rotation-related deviations from the normal mechanisms of posture control and motor performance that are required in attempts to parry a fall. Future research may be able to identify other types of injury which show a significant over-representation of left-handed patients.

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REFERENCES

MODIFIED REAMERS FOR FUSION OF THE FIRST METATARSOPHALANGEAL JOINT

J. A. JEFFERY. L. F. FREEDMAN

Fusion of the first metatarsal joint for hallux valgus or hallux rigidus was first described by Clutton in 1892. Since then, many different techniques have been described for preparing the bony surfaces and maintaining position until union. We report the use of specially designed powered reamers which simplify the operation, maximise the bony contact and facilitate correct alignment.

Operative technique. Through a standard dorsomedial incision the capsule and periosteum are reflected. Prominent osteophytes are trimmed, and the hallux is flexed and abducted to expose the whole joint surface. The new reamers (Fig. 1) are then used to remove articular cartilage and expose subchondral bone. These closely match the curves of the metatarsal head and phalangeal base and produce concentric surfaces which can easily be aligned in the correct position with wide bony apposition. The position is held with a 3.5 mm AO lagged screw obliquely through the base of the proximal phalanx (Fig. 2). Postoperatively, the foot is protected in plaster for six weeks, which is changed after two weeks for suture removal. Removal of the lag screw is required only if its head produces pressure symptoms.

Results. Twenty such operations have been performed by the senior author (LF) on 17 patients (3 male) with a mean

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Fig. 1

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Fig. 2a

Fig. 2b