THE MANAGEMENT OF TIBIAL TORSION IN PATIENTS WITH SPINA BIFIDA

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We reviewed 20 patients with spina bifida who had had surgical management of tibial torsion. Eight had had bilateral procedures and 12 a unilateral procedure, giving a total of 28 limbs for analysis. We performed closed osteoclasis on seven limbs and tibial osteotomy on 21.

In the closed osteoclasis group six limbs (85%) had a good result after an average follow-up of nine years (2 to 22). All limbs developed postoperative anteromedial bowing of the tibia which later remodelled. In the tibial osteotomy group 19 (90%) had a good result. The average follow-up was nine years (2 to 28). Complications occurred in seven limbs (33%).

We recommend closed osteoclasis of the tibia for the young patient with spina bifida in whom walking is impeded by excessive internal tibial torsion, and supramalleolar tibial osteotomy in the older patient with excessive external tibial torsion and a planovalgus foot.

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The natural history of tibial torsion in normal children has been well described by Staheli et al (1985), but the data are not directly applicable to children with spina bifida. Such patients may develop either excessive internal tibial torsion or the classic triad of ankle valgus, external tibial torsion and genu valgum with fibular shortening, which is secondary to muscle paralysis (Makin 1965; Dias 1978).

Excessive *internal* tibial torsion may be dynamic, when it is secondary to an imbalance between the medial and lateral hamstrings, or fixed (Golski and Menelaus 1976). Excessive *external* tibial torsion is always fixed. It may be an isolated deformity or associated with ankle valgus, an abduction deformity of the mid-tarsal joint and a planus deformity of the medial longitudinal arch (Nicol and Menelaus 1983). These torsional deformities result in an awkward gait, excessive shoe wear, difficulties with orthotic fitting and secondary trophic ulceration of the foot.

Dynamic internal tibial torsion, with no associated fixed bony deformity, may be treated by transfer of either the semimembranosus and semitendinosus tendons or the semitendinosus tendon alone to the head of the fibula (Golski and Menelaus 1976; Dias, Jasty and Collins 1984). Fixed tibial torsion is usually corrected by a derotation osteotomy, but this procedure in children has been associated with significant complications in up to 35% of cases (Steel, Sandrow and Sullivan 1971; Mycoskie 1981; Van Olm and Gillespie 1984).

We could find no previous reports of the use of closed osteoclasis to correct excessive tibial torsion in patients with spina bifida. We therefore report its use to correct internal tibial torsion in such children.

PATIENTS AND METHODS

During the 31 years from 1960 to 1990, 26 patients with spina bifida had surgical correction of tibial torsion at the Royal Children's Hospital, Melbourne. One subsequently died and five could not be traced, leaving 20 (77%) for review. There were seven females and 13 males. Eight patients had had bilateral procedures giving a total of 28 limbs.

The neurological level of each limb was assessed according to the criteria described by Sharrard (1964), with minor modifications. At review, the rotational profile of each limb was recorded. The foot-progression angle was measured in those patients who were ambulant. Hip rotation, the thigh-foot angle, the transmalleolar axis, and the foot shape were recorded with the patient prone. Measurements that were within the rotational variations described by Staheli et al (1985) were accepted as normal. Union of the osteotomy site was defined as the time at which there was no pain or movement on stressing it and at which bony trabeculae were seen radiographically to cross the osteotomy site. Delayed union was defined as failure to unite by 16 weeks after surgery.

The results were graded according to the criteria of Dias et al (1984). A good result is complete correction of

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