

THE EFFECT OF TIBIAL TORSION ON THE PATHOLOGY OF THE KNEE

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Measurements of tibial torsion using a tropometer were made in more than 1200 consecutive patients attending an adult knee clinic. In total 1672 readings from 836 patients in 11 diagnostic categories were analysed. Patients with either patellofemoral instability or Osgood-Schlatter disease had a significant increase in lateral tibial torsion. The most important finding was a significant reduction in this torsion in patients with panarticular disease.

Many publications relating to torsional deformity of the legs of children make claims concerning the possible harmful effects which may ensue. These effects are either difficult to measure or unsubstantiated. The effects of femoral anteversion in adult life, tibial torsion, and the usefulness of derotation procedures are unknown. Although the deleterious effect of valgus and varus deformities in the frontal plane of the knee are well recognised, axial deviations are relatively neglected. In children with various neuromuscular disorders the role of torsional deformity is better understood. It is in the otherwise normal child where questions remain unanswered.

Torsion is difficult to estimate by eye and in spite of several methods of measurement (Table I) there have been few attempts to relate measurement to pathology. The uncertain role of tibial torsion in club foot was clarified when measurements were made in treated children (Wynne-Davis 1964) and in untreated children (Herold and Marcovich 1976). Only then was it ascertained that treatment tended to increase lateral torsion which otherwise lay within a normal range. The unstable patellofemoral joint has been associated with either a primary (Sharrard 1971; Fox 1975) or secondary (Ficat and Hungerford 1977) increase in lateral tibial torsion, as has the patellar compression syndrome (Larson *et al.* 1978). A torsional deformity of the femur has been noted in relation to patellofemoral instability (Weber 1977) and to chondromalacia of the patella (Bandi 1974). The prevalence of abnormal torsion in panarticular disease has been noticed (Smillie 1974; Blaimont and Scoon 1977) and in 1969 Brunelli designed a trapezoidal osteotomy correcting both torsional and varus deformities. However, no one to date has made measurements in adults to confirm these findings.

It has been shown that torsion in the tibia alters in

the growing child. At birth there may be medial or neutral torsion with the medial malleolus behind or at the same level as the lateral malleolus. As the child grows lateral torsion develops and by the age of about five the adult level of approximately 20 degrees of lateral torsion has been reached. Medial torsion is sometimes used to denote any reading below the normal range, but we have only used it when the tibia shows positive medial torsion.

CLINICAL MATERIAL AND METHODS

Measurements of tibial torsion were made in over 1200 consecutive patients attending an adult knee clinic. Patients with no definite diagnosis and those who did not fall into any of the chosen diagnostic categories were excluded. This left 836 patients giving 1672 measurements. These patients were divided into 11 diagnostic categories (Table II) and compared with a control group.

A number of different measuring devices have been used: the most common are tropometers, calipers and radiographs. Measurement by caliper involves flexion of the patient's knee to 90 degrees (Staheli and Engel 1972). This gives a lower reading than the other

Table I Summary of reports on the measurement of tibial torsion

Author	Year	Measurement	Tibial torsion (degrees)
Le Damany	1909	Post mortem	23
Hutter and Scott	1949	Post mortem	21
Dupuis	1951	Post mortem	20
Staheli and Engel	1972	Caliper	14
Herold and Marcovich	1976	Caliper	16
Wynne-Davis	1964	Tropometer	20
Jaffrès	1970	Tropometer	20
Smillie and Turner	1979	Tropometer	19
Wangarmez and Labarbe	1975	Radiograph	22

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