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SURGICAL TREATMENT OF ANKLE INSTABILITY IN ATHLETES

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ABSTRACT

Eighteen athletes with symptoms of recurrent sprain and instability of the ankle during activity were treated by reconstructing the lateral ligament by the Evans technique. Before the operation 55 per cent had given up all athletic activities because of pain, swelling or instability, and 17 per cent had restricted their activities. The average age at operation was 24.6 years and the average follow-up period 3.1 years.

Normal stability was achieved in 67 per cent and improved stability in 11 per cent, but only 33 per cent were still engaged in athletic activities without any complaints from the ankle. The results are similar to other methods of surgical repair.

Key Words: Ankle injuries, Ankle joint, Ligaments.

Injury to the ankle is dreaded by the athlete. Acute inversion of the ankle commonly results in damage to the lateral ligament. A simple sprain must be distinguished from the more serious problem of a rupture since insufficient treatment may cause a torn ligament to heal with lengthening. The end result can be an unstable ankle (Ruth, 1961 and Freeman, 1968), a well-known disability seen especially in athletes (Chrisman and Snook, 1969).

Among the different methods of reconstructing the lateral ligament, the peroneus brevis tenodesis is most often used (Gallie, 1913; Nilsson, 1932; Evans, 1953; Watson-Jones, 1960; Chrisman and Snook, 1969). In performing the Watson-Jones modification of 1940 (Watson-Jones, 1960; Gillespie and Boucher, 1971; Hedebo and Johannsen, 1979) two different difficulties may be met: the tunnel in the neck of the talus may be

difficult to drill and the peroneus brevis tendon may be too short (Crenshaw, 1971). The Evans method (Evans, 1953) was designed to overcome these difficulties, and is technically easier.

The present follow-up study of athletes treated for recurrent lateral instability of the ankle joint by the Evans technique, was designed to analyse the athletic consequences of an unstable ankle, and of the reconstruction of the lateral ligament.

PATIENTS AND METHODS

During the period 1972-80, in the Department of Orthopaedic Surgery, Frederiksborg Central Hospital, Denmark, Evans' operation was performed on 26 ankle joints. 18 of these in 18 patients (11 males, 7 females) engaged in organised athletic activities, are the basis of this analysis. The ankle injury took place 3-4 months before the operation and was in 16 of the cases of athletic origin. The indication for surgery was in all cases recurrent sprain with deformity and an increased tendency to inversion in the joint compared with the normal ankle. The anterior drawer test was only recorded in 12 cases. The median age at operation was 24.6 years, range 15-37 years.

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The operative technique was that of Evans (1953): The peroneus brevis tendon was divided from the muscle as far proximally as possible and mobilised distally. The free end of the muscle was sutured to the peroneus longus tendon. A hole was drilled through the lateral malleolus from the tip of the fibula anteriorly, emerging posteriorly about 3 cm proximal to the top. The tendon was then guided through the tunnel from below and sutured under tension to the adjacent soft tissues at both ends of the tunnel. Postoperatively a below knee plaster of Paris cast was worn for 6 weeks without weight-bearing for the first 3 weeks.

Fig. 1. Reconstruction of lateral ligaments of ankle by a transposition of the peroneus brevis tendon through the lateral malleolus.

All patients were seen in 1980 at a follow-up examination carried out by the author. The follow-up period ranged from 1.1 to 6.3 years, average 3.1 years.

Athletic activity before and after operation was recorded and complaints were classified into four categories (Gillespie and Boucher, 1971):

The **EXCELLENT** category included patients with no complaints, and in whom the tendency to instability and deformity had disappeared.

The **GOOD** category included those with minor complaints such as slight pain after long walks or a feeling of moderate stiffness in the ankle, but no tendency to deformity or instability.

The **FAIR** category included patients who complained of residual instability, although less than before operation.

The **POOR** category were those patients who complained of unchanged persistent instability or stiffness with pain on even gentle weightbearing.

The physical examination tested the movements (extension/flexion, eversion and inversion) and included an anterior drawer test. The range of movement was classified as increased, normal or reduced as compared with the normal ankle.

X-rays comprised anteroposterior and lateral views of both ankles and included a standard varus stress view. The talar tilt was measured without knowing the results of the other investigations. If the tilt during forced inversion was 3 mm or more than during rest, the joint was considered radiologically unstable (Ruth, 1961). In 15 cases preoperative stress X-rays were available. These films were read in the same way as described above.

Fig. 2. Anterior-posterior view of the ankle. The opening of the tibiotalar joint is measured in millimetres by subtracting the normal distance at rest (left) from the abnormally opened distance at standard varus stress (right).

RESULTS

Athletic activity. Levels and type of sport being pursued at time of injury are shown in Table I. In Table II the athletic activity before and after operation is recorded. Before the operation 55% (10/18) had given up all athletic activities because of instability of the ankle, while 27% (3/18) had restricted their sports activities. The rest of the athletes, 28% (5/18), were still practising the same type of sport at the same level, though they had to wear some kind of supporting bandages.

Fig. 2a

Fig. 2b

X-rays of anterior posterior view of the ankle. The opening of the tibiotalar joint is measured in millimetres by subtracting the normal distance at rest (left 2a) from the abnormally opened distance at standard varus stress (right 2b).

At the time of the follow-up 33% (6/18) were engaged in athletic activities without any complaints, another 33% were also active, but complained of pain, stiffness or slight residual instability. 28% (5/18) had stopped taking any part in athletic activities because of postoperative symptoms and one patient had stopped for other reasons.

Complaints. In 28% (5/18) the result of the operative repair was found to be excellent. 39% (7/18) also found, that the tendency to deformity and instability had disappeared, but they had such minor complaints as slight stiffness (3 ankles) and/or moderate pain after long

walks (5 ankles). 11% (2/18) felt that the operation had improved the condition, but that some instability was present. In 22% (4/18) the results were categorised as poor. In 3 of these patients the frequency of deformity was unchanged, while the last patient complained of stiffness and severe pain after only short walks. The 4 patients in the latter group were all female athletes under thirty years of age.

Physical findings. Preoperatively all joints showed increased tendency to inversion and the anterior drawer test was positive in 92% (11/12) of the recorded cases. The range of movement after the operation is shown in

TABLE I

Type of sport being pursued at the time of injury

	Level of athletics		Total
	Competitive	Recreational	
Football	4	2	6
Handball	4	0	4
Badminton	2	2	4
Athletics	1	1	2
Others	0	2	2
	11	7	18

TABLE II

Athletic activity graded after level of athletics in 18 athletes operated upon because of instability of the ankle

	Before injury	At the time of operation	At the time of follow-up
Competitive	11	1	8
Recreational	7	7	4
No sports	0	10	6

TABLE III

Mobility of 18 ankles operated upon by Evans method for recurrent lateral instability

Direction of movement	Reduced range	Normal range	Increased range
Extension/flexion	3	15	
Eversion	1	17	
Inversion	13	5	
"Anterior drawer"		15	3

TABLE IV

Complaints compared with the physical findings in athletes treated for recurrent instability by Evans' method

Result	n	Postoperative clinical mobility		
		Increased	Normal	Reduced
Excellent	5		2	3
Good	7			7
Fair	2			2
Poor	4	3		1
Total	18	3	2	13

Table III. Decreased extension/flexion and/or eversion was always accompanied by decreased inversion, which was never associated with a positive anterior drawer test. So mobility could be classified as reduced when decreased inversion was found, and increased when a positive drawer sign was found. In Table IV the results of the clinical examination are compared with the complaints. All 3 ankles with increased mobility belonged to the poor category.

X-rays. The results of the radiological examination in the 15 ankles, where preoperative and postoperative varus stress films were available, compared with complaints and physical findings are listed in Table V. Of the 12 ankles categorised as excellent, good or fair seven preoperatively appeared radiologically stable. Postoperatively they were all clinically and radiologically stable. The 3 ankles belonging to the poor category before operation were radiologically stable, while one was unstable after operation as well.

DISCUSSION

Instability of the ankle is a clinical diagnosis based on symptoms of recurrent sprain and instability during activity. The value of the anterior stress radiograph has been questioned among others by Watson-Jones (1960), Rubin and Witten (1960) and Freeman (1965). In the present study only 33% (5/15) of the preoperatively instable ankles were assessed as unstable by the anterior view, and the ankles with positive anterior drawer sign

Fig. 3. Lateral stress view demonstrating anterior subluxating of the talus. The opening is measured between the dome of the talus and the posterior articular margin of the tibia. A distance of more than 6 millimetres is considered as abnormal.

Fig. 3a. X-ray of lateral stress view demonstrating anterior subluxating of the talus. The opening is measured between the dome of the talus and the posterior articular margin of the tibia. A distance of more than 6 millimetres is considered abnormal.

Fig. 3b. Normal ankle lateral view no stress.

was not disclosed. The lateral view, which shows the anterior subluxation of the talus is considered more reliable after acute injury to the ligament and in the patient with chronic instability of the ankle (Cedell, 1975; G6rdes and Viernstein, 1980; Glasgow et al, 1980).

Chronic instability of the ankle with recurrent and inconvenient deformity should be treated by operative repair (Cedell, 1975). Direct suture of the anterior talofibular ligament results in residual instability even years after the original injury, in 15% (Brostr6m, 1966), while about 20% of patients complained of instability (Gillespie and Boucher, 1971; Hedebo and Johannsen, 1979) after repair by the Watson-Jones method. The Evans method was, unlike that of Watson-Jones, not designed to reconstruct the anterior talofibular ligament, but only the calcaneofibular ligament (Crenshaw, 1971).

In the present study it seems that Evans' procedure stabilises the ankle joint by decreasing the tendency of the talus to subluxate anteriorly. In 92% (11/12) of the ankles the anterior drawer test was positive before operation, while this was only found in three cases after operation. These latter were all classified as poor by the

TABLE V

Complaints compared with clinical and radiographic assessment of the stability in 15 ankles before and after Evans' operation

Result	n	Before operation				After operation			
		Clinical		Radiological		Clinical		Radiological	
		Stable	Unstable	Stable	Unstable	Stable	Unstable	Stable	Unstable
Excellent	5		5	2	3	5		5	
Good	5		5	4	1	5		5	
Fair	2		2	1	1	2		2	
Poor	3		3	3			3	2	1
Total	15	0	15	10	5	12	3	14	1

patients, corresponding to the conclusions made by Broström (1966) about the importance of the anterior talofibular ligament in stabilising the ankle.

Of the 18 ankles operated on in this series, 67% were functionally stable and 11% improved. This is comparable with other methods and shows the efficacy of the Evans method. The level of athletic activities was

lowered after operation in 33% of the patients compared with the level before injury, but higher in 62% compared with the time of operation.

In previous studies no distinction was made between athletes and non-athletes. The former differs in that they make greater demands on the ankle joint in connection with continued athletic activities.

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