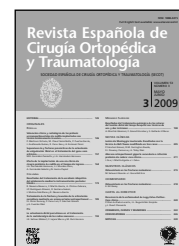


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OUR CLASSICS

Osteosynthesis in malleolar fractures

Osteosíntesis en las fracturas maleolares

M. Salaverri Bearán and I. Gorostidi Erro

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The severity of malleolar fractures is derived from the destruction of the tibiofibular syndesmosis, which firmly hold the talus in its physiological position. This destruction results in a displacement of the talus, which also drags fractured malleolus with it. This explains the disruption created by a tibiofibulotarsal disruption. A malleolar fracture alters the static and dynamic functions of the ankle since a modification takes place in the gravitational factors conveyed by the mortise through the talus to the calcaneus and the arch of the foot. The talus, firmly held by the mortise, bears the body's weight on its posterolateral region; when a talar diastasis occurs it ceases to support the gravitational force at the physiological point, for which reason it is extremely important to reduce these fractures as anatomically as possible since the circumstances described above turn the ankle into the body's main foundation on which the whole body weight must gravitate. Failure to achieve an anatomically perfect reduction will not afford the good functional results that may be obtained in other parts of the musculoskeletal system without a perfect reduction. Indeed, the balance of the arch of the foot is so precise that even a minute tilting of the talus changes the direction of the forces, with ensuing static and dynamic alterations.

In the literature there is a surprising diversity of (generally conflicting) opinions regarding treatment of these fractures, which makes neutrality very difficult. For some orthopedic surgeons malleolar fractures are serious injuries but they can always be reduced conservatively. On the other hand, other authors plead for *ex ante* surgical fixation of the fractured fragments to be certain to bring about an anatomically perfect reduction; they relieve that failure to obtain this result will result in troublesome sequelae that may reduce the patients' functional capacity. Wishing to preserve a neutral position regarding the treatment of these

injuries, we do not rigidly apply either of the solutions mentioned; instead we always proceed in accordance with the most appropriate indication for each case.

Trauma to the ankle is becoming more and more pervasive given the hectic pace of modern life, mechanization, Sports practice, etc. Fracture-dislocation of the ankle raises serious problems for treatment, conservative methods usually fail to resolve them, not only because it is often impossible to reduce these injuries non-surgically but also because cast immobilization tends to be insufficient as a method for external fixation. Therefore, some of these fractures fall within those where open surgery must be performed in order to apply internal fixation.

In all cases of malleolar fractures we usually perform radiographs on 2 planes and early reduction and apply cast immobilization making sure the position of the tibiotalar joint is correct. We subsequently perform further x-rays to ascertain that the reduction has been achieved successfully. We do not settle for partial reduction; instead, we strive to obtain as anatomic a reduction as possible. We do not usually employ an image intensifier, as we do not deem it necessary, but this depends on surgeon preference. With Boppe and Vassitch, we believe the urgency to reduce malleolar fractures is comparable to that of acute appendicitis. Generally, fracture patients come to us a few hours after injury, which greatly facilitates reduction. But we do not think that later presentation, i.e. 48 hours after injury, with numbness, phlyctenae, etc., is a contraindication to proceed to reduction of the fracture. When this happens, in the case of displaced fractures, we perform reduction under general anesthesia, applying an alcohol-impregnated sterile gauze and subsequently a plaster cast, which must be exchanged at 15 days when the numbness has disappeared. So far we have not had the need to resort to Achilles tenotomy or continuous traction to reduce a fracture of this kind; nevertheless, in a small number of patients we did have to surgically fix the malleolar fracture given the failure

of manual orthopedic reduction maneuvers. In our hands, manual reduction has failed for one of the following reasons: rotation of the malleolus, with the surface of the fracture ending up pointing to the skin, and the interposition of soft tissue between both fractured surfaces. Once the fracture site has been opened, we fix the malleolus with a screw that we apply to the medial malleolus through a small incision on the medial aspect of the ankle. If there is soft tissue interposition, we resect these carefully after extracting them from the fracture site. We suture the wound with silkworm gut stitches and apply a plaster cast.

Until now it was considered that osteosynthesis was not exempt from danger, as a result of the risk of infection entailed in opening the fracture site and of the intolerance of the hardware by the bone tissue. It can be said that recently, with the use of antibiotics and tolerable osteosynthesis materials (Vitalium), this danger has all but disappeared. However, probably under the influence of old fears (and although we have not witnessed any pathological reactions), we extract the screw only after a reasonable period has elapsed, and once we are certain that bone callus has formed. When fixing a malleolus, we shift it together with the talus and the calcaneus to their normal anatomic location, which means that gravitation can operate correctly through the mortise, the talus and the heel. The force decomposition in an ankle operated in this way should in theory be equal to that of a normal foot, thus complying with the requirement that there must be dynamic and static restoration. This is undoubtedly attractive, but we are extremely conservative when addressing all sorts of malleolar fractures that may be amenable to non-surgical orthopedic reduction. Proof of this is that of 64 fractures of this kind that we have treated in our hospital in the last 2 years, we have only used osteosynthesis in 5 cases, which we were forced to operate on because they could not be reduced or stabilized with conservative treatment. For this reason, the purpose of this paper is not to present an out-and-out interventionistic approach to malleolar fractures, but rather to provide an account of the good results we have obtained in the cases where orthopedic reduction proved impossible.

By affording a stable fixation of the fracture fragments, osteosynthesis has made it possible for us to shorten post-operative hospitalization times and permit early ambulation. Indeed, the uniform pressure exerted on the fracture site by the screw favors earlier callus formation.

We have obtained extremely satisfactory results, which do not agree with those of Patoir whose most favorable result, in a 12-patient series, was a case of ankylosis with 35% functional impairment.

After removing the plaster cast at 5 weeks, we are not in favor of using Unna's paste to prevent edema, but rather recommend application of a below-the-knee elastic stocking that can be removed as required to administer massage therapy and hot saline soaks.

Clinical cases

Case no. 1. Aurelio M., 26 years old. He was admitted on 10 March 1948 with a left ankle fracture 3 hours after the

accident. He came with his foot in a bandage and protected from the toes to the popliteal fossa with a Kramer splint that was bent to a straight angle. Two radiographic views were taken on admission; the x-rays revealed a bimalleolar fracture with outward displacement of the talus and medial malleolus inversion. At 10 minutes from admission an attempt was made at manual reduction, which failed. As a result, a surgical procedure was carried out to reduce and fix the medial malleolus; a plaster cast was applied. Sutures were removed after 12 days.

Normal pre-op period. At 6 weeks, the cast was removed and massage therapy and hot soaks were prescribed. The screw was extracted at 3 and a half months and one month later the patient was discharged without any disability.

CASE NO. 2. Venancio Z., 62 years old. He was admitted on 11 August 1949. The patient reports that he sustained a strong lateral blow on the right ankle with a strong piece of iron. He presented with a valgus foot deformity, with Dupuytren's contracture and acute pain in the medial malleolus. Two radiographic views were taken, which revealed fractures of the medial malleolus and the lower third of the fibula with a lateral talar dislocation.

Nonsurgical reduction was attempted with local anesthesia, but this failed to achieve perfect reduction and talar restoration. Therefore surgical reduction and fixation were performed. Under general anesthesia, screw fixation of the medial malleolus was performed together with intramedullary nailing of the fibula with a Focher rod.

Post-op was normal. On 25 September the cast was removed. On 24 November, the hardware was removed and one month later the patient was discharged without any disability (figs. 1 and 2).

CASE NO. 3. Josefa M., 63 years old. She was admitted on 12 November 1949. She had sustained a fall at home but was not able to provide any details about the occurrence. Her foot had a valgus and an equinus deformity. She reported pain in both malleoli and presented with slight inflammation. Two radiographic views were taken, which revealed a bimalleolar fracture with anterior fibular displacement and lateral talar dislocation. Orthopedic reduction failed.

Subsequently, we set about performing an open reduction of the medial malleolus under general anesthesia; the malleolus was entrapped between the talus and the internal angle of the mortise, held in this position by the tibialis posterior tendon, which was extremely taut. Once this obstacle was overcome, the malleolus was reduced and screw fixation was applied, restoring the tibialis posterior tendon to the retromalleolar groove and repairing the gap in the osteofibrous area.

A short-leg cast was applied in a physiological posture, which was removed at 6 weeks. Subsequently, an elastic stocking was indicated together with hot soaks.

The hardware was extracted on 12 April in an outpatient facility. To date, the patient has completely recovered foot motion and function (figs. 3 and 4).

CASE NO. 4. Narciso G., 47 years old. This patient was a dock-worker who fell into the hold of a ship in the course of his usual occupational activities. After radiographic

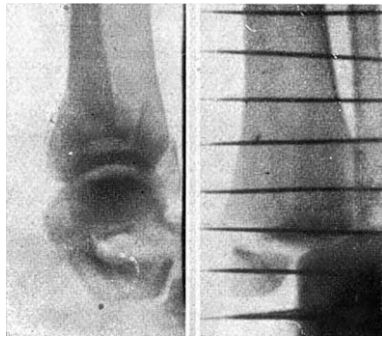


Figure 1 Case 1: Aurelio M. Bimalleolar fracture with medial malleolar inversion.

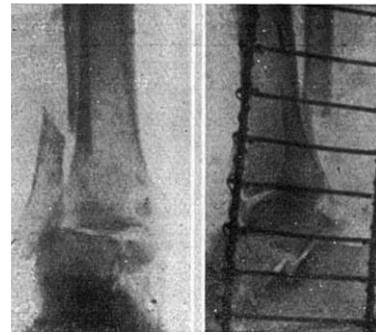


Figure 3

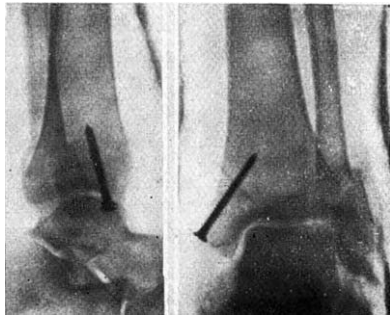


Figure 2 Case 1: Same case as in the previous figure, further to osteosynthesis.

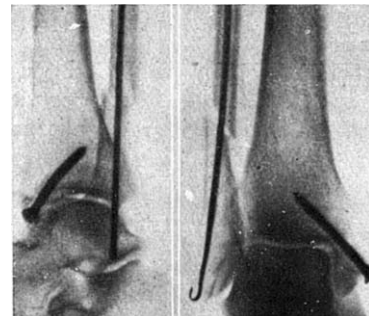


Figure 4

assessment, he was diagnosed with a bimalleolar fracture with talar subluxation.

Orthopedic reduction was carried out, with subsequent radiographic evaluation of medial malleolus stability. We decided to perform an osteosynthesis.

Surgical reduction was carried out through a Windows opened in the cast, after careful resection of the soft tissues entrapped in the fracture site. Screw fixation was applied.

The cast was removed at 5 weeks. This was followed by mobilization and balneotherapy. The screw was removed at 3 months and the patient discharged within 5 months of the initial injury, without any limitations to resume his previous occupational activities.

CASE NO. 5. Luis H., 33 years old. He was admitted on 3 January 1950, further to a fall down the stairs sustained at home. Radiographic evaluation revealed a fracture with inversion of the medial malleolus. The immediate decision was to carry out an open reduction with screw fixation.

Post-op was normal, with the cast being removed after one month and a half and the screw at 4 months.

The result was satisfactory.

CASE NO. 6. R. Cristina. This patient had a bimalleolar fracture that had healed with marked plantar malalignment. This was caused by a suboptimal reduction.

When she presented to us, we suggested to her a wedge resection of the fibular fracture callus and an oblique top-down linear osteotomy of the medial malleolus in order to bring it down and thus facilitate restoring the dislocated lateral talus to the tibiofibular mortise. Once the patient gave her consent, she was operated with the technique described and the medial malleolus was fixed to the tibia with a screw.

The anatomic result of the talar reduction and the correction of the deformity resulting from the bimalleolar fracture were perfect and the post-op period was uneventful. The patient fully recovered normal tibiotarsal motion.