

## Treatment of comminuted acetabular fractures using Ilizarov ligamentotaxis and minimal fixation

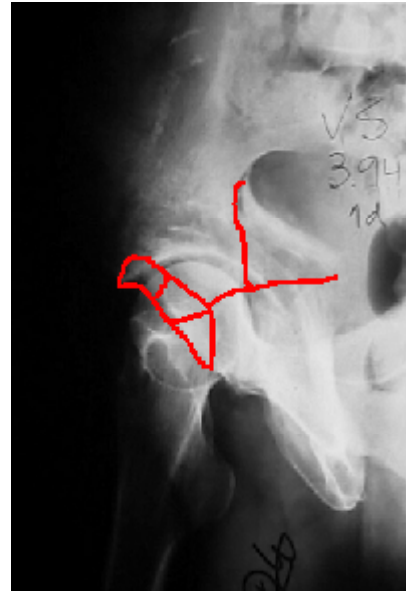
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The comminuted acetabular fractures, namely those of the acetabular roof, have a difficult and complex surgical management and a reserved prognosis, in what concerns the acetabular congruency and femoral head viability.



Transverse and posterior wall comminuted fracture of the acetabulum with posterior dislocation of the femoral head.



After reduction and bone traction, a good reduction is maintained. A good indication for Ilizarov ligamentotaxis alone.

Routinely these fractures have been treated by balanced traction in bed, keeping in mind that they will need a total hip replacement in the short run. However, this type of treatment requires a long stay in ward, leading to an increase of treatment costs and a delay in rehabilitation.

Hip ligamentotaxis, utilizing an external fixator, introduced not only a way of simple reduction and efficient stabilization of articular fractures, and also allowed early walking and rehabilitation.



Ilizarov frame for ligamentotaxis, utilized from 1996-1999



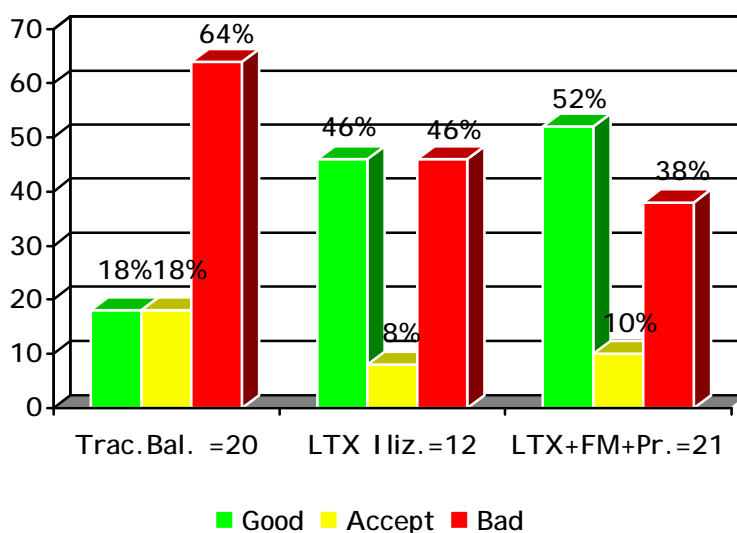
Ilizarov frame for ligamentotaxis, utilized from 1999-2006

From June 1991 to June 2006 (15 years), we have treated a total 133 acetabular fractures. From those cases, 49 (37%) were small fragment fractures of the posterior wall, treated by a short period of bed traction and early walking with crutches. 28 cases (21%), presented as unstable hip dislocation with one or two big fragments of the posterior or anterior wall or a pure transverse fracture, and were treated by open reduction and internal fixation with plates and screws. Finally, 56 cases (42%), presented associated comminuted acetabular fractures of the walls and columns.

In this group, we have reviewed the cases treated between 1996 and 2006 (10 years), where we have utilised initially prolonged balanced traction (20 cases, mean follow up 5 years, mean age 47,5 years), then we initiated the use of ligamentotaxis with Ilizarov frame (12 cases, mean follow up 3 years, mean age 47,3 years), finally we introduced a modification on the Ilizarov frame utilizing open reduction and minimal internal fixation and early treatment of avascular necrosis, whenever needed (21 cases, mean follow up 4 years, mean age 49,5 years). The Ilizarov frame was used during 8-9 weeks, followed by walking with crutches and rehabilitation. Mean stay in ward was 34 days for the group treated by balanced traction and 14 days for ligamentotaxis.

Our current treatment protocol includes, the immediate reduction of the dislocation when this exists and its maintenance with skin traction. In the cases where a suspicion of aseptic necrosis exists, a nuclear magnetic resonance was done at 48 hours for confirmation. In the cases where it is negative and the traction table produces a acceptable reduction, Ilizarov frame for ligamentotaxis alone is done (23 cases, 70%). When there are incarcerated fragments in the acetabulum or deficient reduction, we proceed to an open reduction and minimal fixation of the fragments with olive wires and then ligamentotaxis (8 cases 24%). Finally, when the RMN detects an aseptic necrosis in evolution, we proceed to a neck-head tunnelling previously to the Ilizarov frame assemblage (2 cases, 6%).

We evaluate the functional and radiological result, based in our protocol of evaluation, which considers the existence of pain, necessity of walking aids and walking distance. The group treated by balanced traction got 18% of good results, 18% of acceptable results and 64% of bad results. The group of simple ligamentotaxis got 46% of good results, 8% of acceptable and 46% of bad results. The group of simple ligamentotaxis got 46% of good results, 8% of acceptable and 46% of bad results. The group of associated ligamentotaxis, open reduction, minimal internal fixation and early treatment of aseptic necrosis, had 52% of good results, 10% of acceptable results and 38% of bad results.



Finally, the group where we have associated ligamentotaxis, open reduction, minimal internal fixation and early treatment of aseptic necrosis, had 52% of good results, 10% of acceptable results and 38% of bad results.

acceptable and only 38% of bad results. The rate of total reconversion in total hip arthroplasty was respectively 64%, 46% and 28,5%.



Comminuted and irreducible fracture of the posterior wall with incarcerated fragments



Open reduction, internal minimal fixation with olive wires and ligamentotaxis with Ilizarov frame



2 years follow up.  
Radiological aspect.



2 years follow up.  
Clinical aspect

All the patients treated with ligamentotaxis, had problems of superficial infections of the pins, that had been dealt efficiently with local disinfection and antibiotherapy in out patient clinic. Other obstacles or complications had not been detected, namely blood lose needing transfusion, deep infections, or iatrogenic fractures. In the 11 cases submitted to total hip arthroplasty after the use of the Ilizarov frame, no one had postoperative infection or aseptic loosening. By the other side, the replacement was much more simple to execute because the patients had no hardware implanted.

The authors conclude that the ligamentotaxis with Ilizarov frame associated with open reduction and internal minimal fixation with olive wires, showed to be a promising method for the treatment of the comminuted and complex acetabular fractures, allowing to associate a short stay in ward, early deambulation and a anatomical reduction of the small fragments with hip protection and stabilization by joint diastasis.