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Management of high-energy bicondylar tibial plateau fractures by minimal internal fixation and the ilizarov frame: The knee function

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Background: Management of comminuted bicondylar tibial plateau fractures remains a challenge to orthopedic surgeons. Studies of long-term outcomes of treatment of the tibial plateau have included a mixture of fracture types, including low-energy split and split-depressed fractures. Thus, the middle- to long-term results of management of high-energy fractures are still lacking. The aim of this study was to evaluate the knee function and development of arthrosis after a minimum of 3 years in high-energy tibial plateau fractures treated by the Ilizarov external fixator.

Methods: This is a retrospective study performed at an academically supervised level III, trauma center, in which percutaneous and/or limited open internal fixation and an Ilizarov frame were applied for displaced bicondylar high-energy tibial plateau fractures (Schatzker types V and VI and Orthopedic Trauma Association types C1, C2 and C3). There were 55 patients in this study and they were followed for a minimum of 3 years. Completion of the Iowa knee score and the Short Form-36 (SF-36) General Health Survey was a must.

Results: After healing, none of the studied patients needed a secondary reconstructive procedure. The knee motion ranged between 15° of extension and 155° of flexion, with an average of 88 % of the total arc of the contralateral knee. The average Iowa knee score was 94 points (range, 65 to 100 points), at the final follow-up visit. Twenty-eight patients rated their out- come as excellent; 17, as good and 10, as fair. All the studied patients returned to their previous original works. Thirty-five of them were performing strenuous labor. At the final follow- up visit, there was arthrosis grade 1 in the X-rays of 25 patients, grade-2 in 10, grade 3 in 2 and no evidence of arthrosis was found in 18 X-rays (grade 0). Compared with the radiographic appearance 3 years after surgery, there was no evidence of progression of arthrosis in 42 patients, while arthrosis progressed for one grade in 13 patients. The SF-36 subscale scores were similar to those of age-matched controls.

Conclusion: Patients suffering from high-energy bicondylar tibial plateau fractures could be safely treated by minimal internal fixation and Ilizarov external fixation. This procedure has good prognosis for satisfactory knee function for up to 16 years of follow-up. The intra-articular displacement should be reduced properly and only very minimal displacements are accepted. This leads to a better knee function and low arthrosis rate.

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