

Total knee replacement in acute and chronic traumatic events



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ABSTRACT

Total knee replacement (TKR) is a widely used procedure for the treatment of post-traumatic arthritis. This type of solution has also been used recently for the treatment of acute fractures around the knee, particularly in joints that were already arthritic before the trauma. The purpose of this paper is to present our experience with TKR in both acute and chronic traumatic events, highlighting the main problems associated with these conditions and focussing on the indications, principles of technique, tips, tricks and pitfalls of this procedure. The main issues related to post-traumatic arthritis and the problem of TKR in acute fractures are discussed, and our case series of both groups of patients is presented.

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Introduction

Total knee replacement (TKR) is a viable and safe option for patients with primary osteoarthritis of the knee and is widely used for the treatment of post-traumatic arthritis [1,2]. This is a challenging condition because of the problems related to secondary deformity, poor bone quality, bone loss and ligament incompetence. TKR has also been used recently for the treatment of acute fractures around the knee [3–6], with the aim of avoiding difficult reconstructive surgeries in ORIF, thereby reducing the risk of infections [7], stiffness and rigidity, and poor final outcomes.

This paper aims to give an overview on both these problems and presents our experience with TKR in the treatment of chronic and acute traumas around the knee.

Chronic cases

Fractures of the distal femur or proximal tibia are relatively common orthopaedic injuries that can eventually lead to post-traumatic arthritis [8,9]. When knee replacement is deemed necessary in these patients, the orthopaedic surgeon is often confronted with several variables that may adversely affect the outcome of the arthroplasty. These potentially detrimental factors include malunion, non-union, intra-articular osseous defects, limb

malalignment, retained internal fixation devices, latent infection, arthrofibrosis, and compromise of the soft tissue envelope.

The main problems associated with TKR in post-traumatic knee arthritis are as follows: approach, axis, bone loss, choice of implant and level of constraint, and postoperative management.

Approach

One of the problems the orthopaedic surgeon may face during the treatment of patients with post-traumatic arthritis is knee stiffness [10]. Most cases can be addressed with a classic approach that can include a straight medial parapatellar arthrotomy, a medial release, an arthrolysis with clearing of gutters, a small patellar tendon release or split of the patellar fat pad and a quad snip; however, in some more demanding knees an extended approach is needed. In these cases, an osteotomy of the tibial tubercle is recommended, avoiding a VY turnaround or an epycondyle osteotomy. A trivector approach [11] to reduce the tension on the extensor mechanism and facilitate the exposure of the joint without enlarging the approach has been very useful in our experience.

Axis

Post-traumatic arthritis can be secondary to intra- or extra-articular deformities (Fig. 1). The aim of a TKR is to realign the limb. Adaptations in bone resections are sometimes necessary to enable acceptable component positioning [2]. In cases of intra-articular deformity, the main problems associated with treatment are related to the need for bone loss repair and possible ligament incompetence

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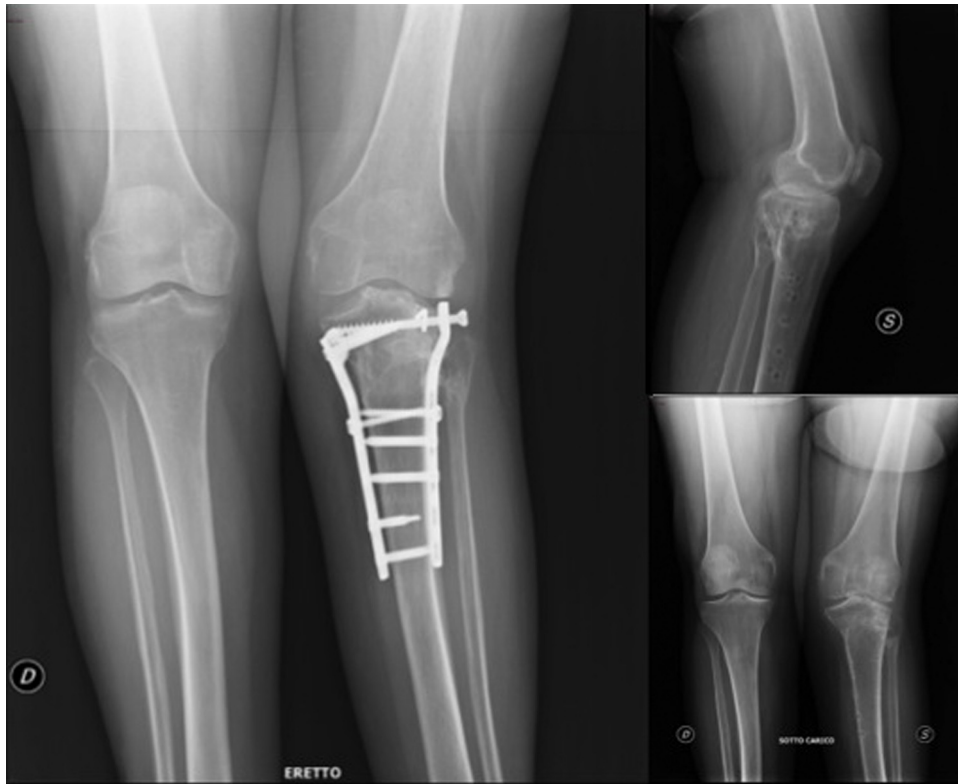


Fig. 1. Post-traumatic valgus deformity (pre- and post-plate removal; see post-op in Fig. 2).

[12]. The primary principle of treatment is to restore the correct bone stock and the secondary is to evaluate ligament competence. In most cases once the bone stock is reconstituted and the axis restored, ligament competence is not an issue, unless the patient suffered major damages (Fig. 2). In patients with ligament laxity, the level of constraint of the implant must be increased; conversely, if the

ligaments are tight and stiff, releases may be required. In patients with severe extra-articular deformities, the correction must be performed before or concomitantly with the TKR procedure. In these cases, there must be an accurate planning to evaluate the possibility of restoring a correct axis of the inferior limb with only the TKR procedure or whether an osteotomy should be added.



Fig. 2. Restoration of correct alignment with constrained condylar knee (CCK) implant, short cemented stems and tibial metaphyseal trabecular metal (TM) cone.

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