Temporary Vertical Extra-Articular Fixation Application of Tendon Healing in Ankle: A Technical Note

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ABSTRACT

Purpose: Research of effect of the extra-articular temporary pin fixation of the ankle to the results of tendon transfer and tendon injury in the ankle. Materials and Methods: Extra-articular temporary pin fixation used 14 cases between 2011-2017 years. Twelve of 14 cases had tendon transfers for paralytic patients and 2 patients had open tendon rupture. Postoperatively, pin fixation was performed 3-6 weeks according to the patient's clinic. Results: The technique was sufficient in immobilization. Soft tissues were easy to follow in the patients and there were no wound soft tissues problems. Did not develop major complication due to Steinman pins. Conclusion: Extra-articular temporary pin fixation of the ankle was successfully used in the tendon transfers and in the treatment of the immobilization and wound healing after the treatment of Achilles tendon injuries.

Keywords: Extra-articular temporary pin fixation, tendon transfer complication, technical note

1. INTRODUCTION

Temporary vertical trans articular fixation of the ankle joint is indicated for provisional fixation of severe ankle fractures [1,2,3,4]. Trans articular fixation of the ankle is performed from heel to tibia with two parallel Steinmann pins, but it has potential complications of hardware failure within the ankle or subtalar joints. This complication; intra-articular damage to articular surfaces of the ankle or subtalar joint, penetrating traumatic injury to the lateral plantar nerve or artery, pin migration with subsequent pin tract irritation or infection, and a potentially problematic plantar skin wound [2,5]. Trans articular versus extraarticular ankle stabilization is compared in terms of biomechanically and anatomical safety. League and author compared these two techniques and found similar fixation stiffness on cadaver [6]. Roukis published a series of cases with same technique [7]. This technique represents a safe, simple, reliable and a minimally invasive technique useful in situations in which traditional split or cast immobilization is not possible and external fixation is deemed inappropriate and helps wound care. Tendon transfer and tendon injuries require joint immobilization and soft tissue follow-up for tendon healing after surgery. Temporary vertical trans articular fixation may be a minimally invasive procedure with soft tissue attachment as well as a contribution to tendon healing.
This study purpose: Research of effect of the extra-articular temporary pin fixation of the ankle to the results of tendon transfer and tendon injury in the ankle.

2. METHODS

Surgery used this technique 14 cases between 2011-2017 years. Twelve of 14 cases had tendon transfers for paralytic patients and 2 patients had open tendon rupture. Patients ankle were treated with extra-articular temporary pin fixation after tendon repair or tendon reconstruction. Postoperatively, pin fixation was performed 3-6 weeks according to the patient's clinic.

**Technique**

The C-arm is necessary for this procedure. The ankle is held in desired position than one Steinman pin is inserted at anteromedial border of distal tibia (approx. 4cm. proximal to the joint line) to posterior to ankle and subtalar joint. Second pin is inserted posterior aspect of distal tibia to the anterior ankle joint and dorsal navicular bone. The tibiotalar joint is not penetrated with these two wires. The angle between these two pins is generally 60 degrees (Figure 1). Author advocates cutting the pins beneath under the skin and closed the associated wound to decrease the risk of pin site infection and possible development of deep infection. The tips of the pins stayed into the bone. The surgeon would change the insertion point or angle of the pins if the patient has hardware around the ankle joint. The technique is shown in figure 1 on the sawbones. A patient direct graph is shown in figure 2.

Insertion of the Steinman pins differs in open Achilles tendon ruptures and wounds around the heel. Two pins are driven from anterior aspect of the tibia to the posterior aspect of the calcaneus. The ankle is fixed in equinus position. This modification is safer in terms of saving the ankle joint and heel pad.

3. RESULTS

The technique was sufficient in immobilization. Soft tissues were easy to follow in the patients and there were no wound soft tissues problems. Did not develop major complication due to Steinman pins.

4. DISCUSSIONS

Tendon transfer and tendon injuries require joint immobilization and soft tissue follow-up for tendon healing after surgery. In our study; Temporary vertical trans articular fixation, often used in ankle fractures, was used as a technique in tendon healing. Extra-articular temporary pin fixation has low incidence of complication than temporary vertical trans articular fixation [2,5]. Also, extra-articular temporary pin fixation found similar fixation stiffness to temporary vertical trans articular fixation [6]. It was used preoperatively for the treatment of soft tissue and temporary fixation in ankle fractures and it was seen to be successful in the treatment [7].

Rensing et al. local complications were observed in 1.3% after 1626 Achilles tendon surgery. This rate was higher in patients with comorbidities. The complication rate was higher in open Achilles tendon injuries [8]. Clonton et al research complications after tendon transfer; In the study 31 patients, local complications were observed in 4 (12%) patients. Localized complications (delayed wound healing,
wound infection) have been necessary in the literature [9,10]. Extra-articular temporary pin fixation of the ankle was successfully used in the tendon transfers and in the treatment of the immobilization and wound healing after the treatment of Achilles tendon injuries.

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