NEW SCREW (ACUTRAK®) IN THE SURGICAL TREATMENT OF ELITE FOOTBALL PLAYERS WITH FIFTH METATARSAL

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ABSTRACT

Objective: There is considerable variability in the literature concerning the optimal treatment of fifth metatarsal fracture. The purpose of this study is to report the outcome of surgical fixation of fifth metatarsal fractures using Acutrak® screw in elite football players. Material and Method: Three cases of fifth metatarsal fracture in elite football players. The mean age was 24 years old (18-26 years). We treated three fifth metatarsal fractures in elite football players. The cases in our study consisted of one diaphyseal fifth metatarsal fracture and two Jones fractures. The fractures had been occurred during sports participation. We applied internal fixation using a percutaneous Acutrak® screw under local anesthesia with the aid of fluoroscopy. The patients were clinically and radiographically evaluated. Results: Clinic healing was obtained at 10 weeks postoperatively. Radiographic consolidation occurred at 8 weeks postoperatively and the patients returned to pre-injury activity levels at 11 weeks postoperatively. No postoperative complication was seen. No skin irritation due to a headless screw of Acutrak® was observed. Conclusion: The result suggested that Acutrak® may be used in elite football players with fifth metatarsal fractures. In spite of factors such as ease of implementation, cost and resistance to bending also need to be considered.

Keywords: *Fractures, bone. Metatarsal bones. Internal fixators. Bone screws.*

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INTRODUCTION

Fifth metatarsal fractures are most frequently related to chronic stress, especially in athletes. These fractures are treated operatively or nonoperatively.[1,2] Operative treatment is often recommended for athletes.[3] But the optimal surgical treatment has not yet been determined.

Intramedullary screw fixation is popular because the return to competitive sports can be faster than with bone grafting without screw fixation. However, refracture has been reported.[4] The purpose of this study is to report the outcome of surgical fixation of fifth metatarsal fractures using Acutrak screw in elite football players.

PATIENTS AND METHODS

We treated three elite football players with fifth metatarsal. Our cases consisted one diaphyseal fifth metatarsal fracture and two Jones fractures. The fractures had occurred during sports practice**.** The mean age was 24 years old (18-26 years).

We applied surgical treatment in order to provide an early return to sports and for preventing recurrences**.**

Under local anesthesia (deep peroneal and posterior tibial nerve blocks) a straight mini incision parallel to the plantar aspect of the foot was used in order to approach the base of the fifth metatarsal.

Careful blunt dissection was performed taking care to not to sever the cutaneous branches of the sural nerve. Then, a guide wire was placed down the shaft of the metatarsal and placement was verified using fluoroscopy at anteroposterior and lateral planes. Acutrak was placed into the intramedullary canal of the fifth metatarsal with the aid of fluoroscopy.

Patients were asked to not to apply load for three weeks. Subsequently, they were allowed to progressively bear weight for three to four weeks while immobilized in cast brace.

We applied rehabilitation including ankle range-of-motion exercises, manual resistive exercise, proprioceptive activities, and cardiovascular workouts using a stationary bicycle.

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RESULTS

Clinical healing was achieved within 10 weeks in average (range 9-11 weeks) postoperatively. Radiographic consolidation occurred within 8 weeks in average (range 6-10 weeks), with patients returning to pre injury activity levels at 11 weeks postoperatively. No postoperative complication was reported. (Figures 1 - 4)

Intramedullary screw fixation has become a popular surgical management method for Jones fractures. The screw head problems are found in more traditional AO screw techniques. Acutrak doesn't irritate skin because of its headless screw. Acutrak may be the treatment of choice in elite football player with Jones fractures. In spite of factors such as ease of implementation, the costs and resistance to bending also need to be considered.

Figure 1 – *Jones fracture*

Figure 2 – *Jones fracture after treatment with Acutrak®*

Figure 3 – *Fifth metatarsal diaphyseal fracture*

Figure 4 – *Fifth metatarsal diaphyseal fracture after treatment with Acutrak®*

DISCUSSION

Nonoperative treatment of these fractures often requires prolonged immobilization and has been associated with a relatively high incidence of delayed union or nonunion.[5]

Surgical fixation for managing Jones fractures was first described by Kavanaugh et al in 1978. Since then, high success rates have been reported by many studies in minimizing the risk of nonunion, delayed union, and potential recurrences, as well as for reducing the time to return to athletic activity.[6] Three recurrence cases after intramedullary screw fixation were previously reported by Josefsson et al., but these refractures occurred after the removal of the intramedullary screw.[7] Surgical treatment is preferred for returning to previous levels of sports activities and for preventing recurrences in elite football players.

The Acutrak (Acumed, Inc., Beaverton, OR) system is made of a titanium alloy and is a fully-threaded, self-tapping, cannulated, and tapered headless screw with varying thread pitches with both the diameter and pitch gradually increasing toward the trailing end.[8]

Four small metallic screws were compared to the Little Grafter (LG) screw, using a bone model made of rigid polyurethane foam. The screws included the Acutrak, Asnis III, Herbert and Herbert–Whipple types. The mean maximum compression forces for the LG screw, Asnis and Acutrak were comparable (LG 32.3 N, Asnis 32.8 N, Acutrak 38.3 N), whereas those using the Herbert and the Herbert–Whipple screw we re significantly lower (Herbert 21.8 N, Herbert–Whipple 19.9 N).[9]

While obvious advantages have been shown to be associated with operative treatment, significant complications have been reported, including hardware failure, wrong positioning of the intramedullary screw and persistent pain at the operative site.[10]

We preferred Acutrak for our cases because it has the best compression forces among any other headless screw. In addition, headless screws are commonly used because they minimize interference with joint surfaces and reduce tissue irritation and immobilization.

Acutrak may be used in elite football players with fifth metatarsal fractures. In spite of factors such as ease of implementation, its costs and resistance to bending also needs to be considered.

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