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ORIGINAL ARTICLE

To assess the care of Avulsion Fracture Tibial Spine by Open Reduction and Endobutton Fixation

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ABSTRACT:

Aim: The current study's goal is to assess the care of Avulsion Fracture Tibial Spine by Open Reduction and Endobutton Fixation. **Methods:** This research covered a total of 20 instances with Tibial spine avulsion. To confirm that the tibial spine avulsion stays anatomically minimised, a final intraoperative radiograph of the knee is done. The wounds are subsequently closed in the usual way. Static quadriceps workouts began on the second day after the knee was put in a functional brace and locked in extension. Sutures will be removed between the 12th and 15th post-operative day. The brace is worn for a total of 8 weeks, with the first two weeks kept in extension and progressively increasing range of motion. Weight bearing is advised after suture removal postoperatively. After suture removal, partial weight bearing is advised, followed by full weight bearing four weeks later while wearing a knee brace. All patients were followed up on at 6 weeks, 3 months, 6 months, 9 months, and 1 year intervals. **Results:** This research comprised a total of 20 patients. The research sample consisted of 16 men (80%) and 4 females (20 percent). The patients' median age was 31.5 years (range: 20–53 years). The mechanism of injury in 65 percent of instances (13) was a car collision, whereas 25 percent (5) of cases were related to a sports injury. Sixty-five percent of patients had outstanding outcomes, followed by a decent outcome. Thirty percent and one patient have a fair prognosis, while none have a terrible outcome. **Conclusion:** An endobutton-assisted open reduction of displaced tibial spine avulsion fractures results in a favourable functional outcome. This treatment does not need the removal of the implant and allows for early weight bearing and rehabilitation.

Keywords: Avulsion Fracture, Open Reduction, Endobutton Fixation

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INTRODUCTION

In both toddlers and adults, tibial eminence avulsion fracture is a serious intraarticular injury. In adults, it is a synonym for anterior cruciate ligament (ACL) rupture. [1,2]Meyer's and McKeever1 classified these fractures as type I (nondisplaced or little displaced), type II (elevated fractures with intact posterior half of eminence), type IIIa (totally displaced eminence fractures without rotation), and type IIIb (displaced eminence fractures with rotation). Zaricznyj[3] changed that categorization such that a comminute fracture is classed as type IV. The most prevalent injury mechanism is hyperflexion and rotation, which may occur when a skier falls back when landing after a jump. Swelling, discomfort, and reduced range of motion are among the patient's symptoms. As with a significant anterior cruciate ligament (ACL) damage, the Lachman or anterior drawer test is positive. [3,4]Some writers advocated using computed tomography (CT) or magnetic resonance imaging as supplementary diagnostic imaging to confirm the diagnosis and assess concomitant soft-tissue injury. [5] Traditionally, displaced tibial eminence avulsion fractures were treated with open reduction and external fixation. However, as arthroscopy procedures have advanced, arthroscopic therapy has become increasingly popular in recent years. Although a pullout procedure is often conducted under arthroscopic guidance, it is technically challenging to decrease the fragment with suture while maintaining sufficient tensioning throughout surgery. [6] Arthroscopic procedures have been developed effectively to reduce open reduction-induced morbidity. However, it requires specialised equipment and personnel, as well as being pricey. Open reduction with endobutton fixation with a small incision produces comparable outcomes to arthroscopy while requiring less specialised equipment and personnel. The purpose of this prospective research was to investigate functional outcomes after open reduction with endobutton fixation by minimum incision in tibial spine avulsion fractures.

METHODS AND MATERIALS

After receiving clearance from the protocol review committee and the institutional ethics committee, this research was carried out at the Department of Orthopaedics. This research covered a total of 20 instances with Tibial spine avulsion.

CRITERIA FOR INCLUSION

- Types 2 and 3 Meyer and McKeever

CRITERIA FOR EXCLUSION

- Patients suffering from ipsilateral meniscal injury

METHODOLOGY

Following an MRI assessment, informed permission was obtained for surgery. Following spinal anaesthesia, the patient was put on the operating table in the supine position. The injured knee is flexed, and a midline incision is made from the inferior pole of the patella to the tibial tuberosity. Infrapatellar fat is removed, and the fracture site is revealed. Fracture surface is cleaned, and the fragment is reduced with artery forceps; if communition is present, the reduction is accomplished by pushing on the anterior cruciate ligament. To sustain reduction, a K-wire was placed through the fracture fragment. Two guide wires were introduced through the fracture fragment, one from the medial side and one from the lateral side of the tibial metaphysis, and drilled with a 4mm cannulated drill bit. One transverse drill is performed in the metaphyseal region of the tibia underneath the previous drill. Polyester no. 5 RC suture was threaded through drilled canals using a beath pin and knotted laterally or medially over endobutton in extended knee position. If communition exists, a polyester no. 5 RC suture is inserted through the anterior cruciate ligament rather than the fracture fragment. The knee is flexed and stretched to assess stability before being re-examined under direct visualisation. To confirm that the tibial spine avulsion stays anatomically minimised, a final intraoperative radiograph of the knee is done. The wounds are subsequently closed in the usual way. Static quadriceps workouts began on the second day after the knee was put in a functional brace and locked in extension. Sutures will be removed between the 12th and 15th post-operative day. The brace is worn for a total of 8 weeks, with the first two weeks kept in extension and progressively increasing range of motion. Weight bearing is advised after suture removal postoperatively. After suture removal, partial weight bearing is advised, followed by full weight bearing four weeks later while wearing a knee brace. All patients were followed up on at 6 weeks, 3 months, 6 months, 9 months, and 1 year intervals. Patients were assessed clinically using the Lysholmscore7 and radiologically with suitable X-rays at each follow-up.

RESULTS

This research involved 20 participants. The research sample consisted of 16 men (80%) and 2 females (20 percent). The patients' median age was 31.5 years (range: 20–53 years). The mechanism of injury in 65 percent of instances (13) was a car collision, whereas 25 percent (5) of cases were related to a sports injury. Sixty-five percent of patients had outstanding outcomes, followed by a decent outcome. Thirty percent and one patient have a fair prognosis, while none have a terrible outcome.

Lachman's and pivot shift tests were negative in all patients at the end of the evaluation. There were no issues during or after surgery, such as fixation, failure, or infection. All patients had bone union within three months. After 6 weeks and 6 months, respectively, all patients had full functional recovery and were able to return to work and continue their sporting activities. We discovered that the average Lysholm score was 94.11.

Table 1: Demographic profile of the patients

Gender	Number of patients	Percentage
Female	4	20
Male	16	80
Age in years		
Below 25	3	15
25-40	9	45
Above 40	8	40
Mode of injury		
Road traffic accidents	13	65
sports injury	5	25
Others	2	10

Table 2: Outcome of the patients

Outcome (Score range)	Number of patient	Percentage
Excellent (94-100)	13	65
Good (84-93)	6	30
Fair (65-83)	1	5
Poor (<65)	0	0

DISCUSSION

As the population of young and active people grows, so does the frequency of sports injuries, falls, and traffic accidents. As a result, ACL injuries and prominence fractures are becoming more common in comparison to earlier years. [7] With advancements in

imaging, these injuries may now be diagnosed more quickly, and the need for new treatment alternatives has arisen. Nonunion, restricted range of motion, and anterior instability of the knee may occur if a tibial eminence avulsion fracture is not properly treated. Although open reduction and internal fixation had typically been used for displaced fractures, McLennan[8] reported the efficacy of arthroscopic reduction in 1982, emphasising its benefits over open surgery, including less invasiveness and faster return of knee function.

The goal of surgery for tibial spine avulsion is to keep the patient's range of motion intact and to avoid symptomatic knee laxity. Avulsion fractures are treated to the tibia utilising a number of techniques such as screws, button systems, anchors, and sutures. Screws and sutures are the predominant surgical techniques for tibial spine fracture repair, with both demonstrating excellent clinical and radiological results. [8]Cannulated screws have shown effective fracture healing with virtually instantaneous weight bearing postoperatively, however removal of the hardware is commonly required in a second operation. Other potential drawbacks of screw fixation include fracture fragment breaking after insertion and screw head impingement during knee extension. [9] The endobutton mechanism provided high compression and great holding force. Endobutton fixation of tibial eminence fracture provided significantly greater initial fixation strength and less displacement than suture anchor fixation or fixation with various high strength sutures, according to Hapa et al. in a biomechanical study with cycling loading conditions in a bovine model. [7] Furthermore, the suture tightening pulls the inferior ACL fibres down, which helps to maintain appropriate ACL tension.[10]

The advantage of arthroscopic reduction and fixation with sutures and absorbable anchors or endobutton is that no open arthrotomy is needed, and no subsequent surgery for hardware removal is necessary. However, arthroscopy is a technically difficult technique. Arthroscopy necessitates technical expertise and the use of specialised instruments. Open reduction with endobutton is a low-cost procedure that can be performed by the majority of orthopaedic surgeons without the need of specialised equipment. This procedure is not connected with hardware problems and may even be used in communited fractures. Endobutton is constructed of titanium and is thus MRI compatible.

CONCLUSION

Open reduction with endobutton is a safe and dependable approach for providing clinical and radiographic outcomes in displaced tibial spine avulsion fractures.

REFERENCES

1. Meyers MH, McKeever FM. Fracture of the intercondylar eminence of the tibia. J Bone Joint Surg [Am] 1959;41-A:209- 20.
2. SeonJK,ParkSJ,LeeKB,etal.Aclinicalcomparison ofscrew and suture fixation of anterior cruciate ligamenttibial avulsion fractures. *Am J Sports Med* 2009;37:2334-2339.
3. Faivre B, Benea H, Klouche S, Lespagnol F, Bauer T, Hardy P. An original arthroscopic fixation of adult's tibial eminence fractures using the Tightrope® device: a report of 8 cases and review of literature. Knee 2013;21:833-9.
4. Zaricznyj B. Avulsion fracture of the tibial eminence: treatment by open reduction and pinning. J Bone Joint Surg [Am] 1977;59:1111-4.
5. Binnet MS, Gurkan I, Yilmaz C, Karakas A, Cetin C.Arthroscopic fixation of intercondylar eminence fracturesusing a 4-portal technique. *Arthroscopy* 2001;17:450-460.
6. Hunter RE, Willis JA. Arthroscopic fixation of avulsionfractures of the tibial eminence: Technique and outcome.*Arthroscopy* 2004;20:113-121
7. Hapa O, Barber FA, Süner G, Özden R, Davul S, Bozdag E, *et al.* Biomechanical comparison of tibial eminence fracture fixation with high-strength suture, EndoButton, and suture anchor. Arthroscopy. 2012;28:681–7.
8. McLennan JG. The role of arthroscopic surgery in thetreatment of fractures of the intercondylar eminence ofthe tibia. *J Bone Joint Surg Br* 1982;64:477-480.
9. Sawyer GA, Anderson BC, Paller D, Schiller J, Eberson CP, Hulstyn M *et al.* Biomechanical analysis of suture bridge fixation for tibial eminence fractures. Arthroscopy. 2012;28:1533–9.
10. Hargrove R, Parsons S, Payne R. Anterior tibial spine fracture – An easy fracture to miss. AccidEmergNurs. 2004;12:173–5.