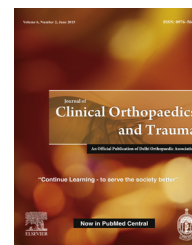


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## Surgical Technique

# A novel technique of patella fracture fixation facilitating early mobilization and reducing re-operation rates

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## ABSTRACT

**Objective:** Fractures of patella constitute 1% of all fractures. Various techniques have been described for internal fixation of patella fractures. Superiority of one technique over the other has long been debated. We reviewed a series of fifty-one patients with transverse or comminuted fractures of patella treated with a novel technique to assess if it had any advantages over the existing methods of fixation.

**Design:** Retrospective.

**Setting:** A tertiary care centre.

**Patients & methods:** Fifty-one patients with patella fracture OTA 34C, with a mean age of 39 years (range 18–61) were treated with technique of cerclage and two tension bands at our institute. Forty-eight patients completed the study.

**Main outcome measurements:** Range of Motion and evidence of radiological union were assessed at regular follow-ups.

**Results:** Forty-four out of forty-eight patients had gained up-to 90 degrees of active flexion at the end of 1 week. Two patients (4.2%) developed superficial infection. All fractures had united at the end of 12 weeks. Five patients (10.3%) underwent a second surgery; four (8.3%) due to implant related complications. Malunion or non-union was not noted in any of the cases.

**Conclusion:** The advantages of the described method are early mobilization, elimination of k-wire related complications, and ease of use in comminuted fracture pattern as well and a lower reoperation rates as compared to the available literature. We strongly recommend its use in cases of displaced comminuted/transverse fractures of patella as an alternate method of treatment.

**Level of evidence:** Level III.

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## 1. Introduction

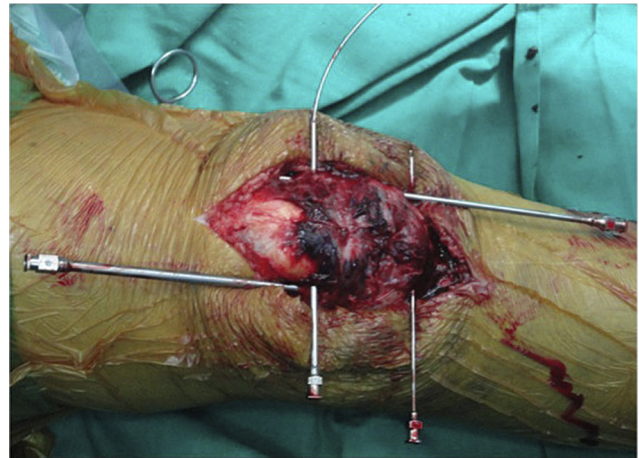
Fractures of patella constitute 1% of all fractures.<sup>1</sup> Displaced fractures with disruption of the extensor mechanism of knee require operative treatment.<sup>2</sup> Various techniques have been described for internal fixation of patella fractures, except for severely comminuted fractures that require partial or total patellectomy. Of the various techniques described, cerclage wiring has been used for many years, however when used alone it is not rigid enough to allow early mobilisation.<sup>3</sup> Schauwaker was the first to describe a fixation technique involving open figure of eight wiring of patella.<sup>4</sup> The Tension band technique provides strong fixation for transverse fractures. Modification of this method using two longitudinal Kirschner wires (k-wires) has been described as the method of choice by some authors.<sup>5</sup> But this technique is associated with complications due to k-wires.<sup>6</sup> Subsequently, Pyrford technique was described as a combination of cerclage wiring and anterior tension band principle.<sup>4</sup> Superiority of any one technique over the other has long been debated.

We reviewed a series of fifty-one patients with transverse as well as comminuted fractures of patella treated at our hospital with a combination of Pyrford and Schauwaker's "figure of eight" tension band (which is used in Modified AO method as well). Though both of these techniques have been previously described in literature, the aim of combining these two techniques was to eliminate the need of k-wires and their associated complications thus reducing the re-operation rate and to sufficiently strengthen the fixation allowing early mobilisation. The aim of this study was to evaluate the advantages of combining the technique of cerclage wiring with an anterior box type tension band and a figure of eight tension band.

## 2. Materials & methods

Out of the seventy eight patients of patella fracture treated at our institute from 1991 to 2013, fifty-one patients were treated with the technique of cerclage and two tension band wires, and are included in the study. Thirty seven were males and fourteen were females. The mean age of the patients was 39 (19-61) years. Fracture occurred on the right knee in 29 patients and on left knee in 22 patients. The most common mode of injury was involvement in motor vehicular accident. All the fractures included were closed injuries. The series included comminuted and transverse fractures in near equal numbers with or without separation of fracture fragments. All the fractures belonged to OTA class 34 C.<sup>7</sup>

Surgery was performed with patients under general or spinal anaesthesia, in supine position with the injured knee extended. A longitudinal midline incision was taken over the patella. After incising the superficial fascia, the extensor apparatus was exposed and any tear in the extensor retinaculum was identified. A 16-gauge needle was passed through the quadriceps, superior to the patella from lateral to medial side as close to the patella as possible. 1 mm gauge stainless steel wire was then passed through the needle exiting at the other end. The procedure was repeated with the

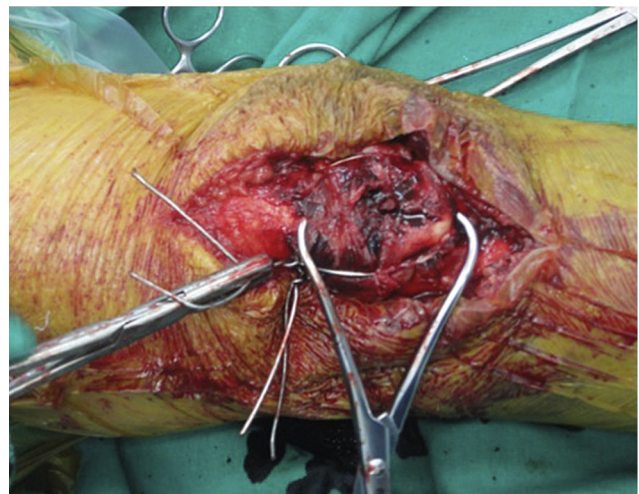


**Fig. 1 – Showing the railroad technique of inserting cerclage wire.**

needle placed along the medial, inferior and lateral aspects of patella through the corresponding needle entry site, and the wire was railroaded through it as described (Fig. 1).

At the end of the procedure the wire ends were next to each other at the supero-lateral corner of the patella. Articular reduction was held with a patellar clamp. The cerclage wire was then tightened to prevent further displacement of the fragments. Two wires were then passed proximally through the quadriceps tendon and distally through the patellar tendon, first in a box pattern and the second wire in a figure of eight pattern (Figs. 2-3).

During tightening of the tension band wires, congruity of the articular surface was checked by palpating the retro-patellar surface and also under the image intensifier. The tightened wire knots were buried under the soft tissue at the superolateral corner of the patella to prevent impingement related problems post-operatively. The stability of fixation was assessed by bending the knee and looking for any opening under image intensifier.



**Fig. 2 – Showing anterior tension band in box pattern.**

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