

## NON-METALLIC OSTEOSYNTHESIS OF PATELLA FRACTURES

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### Abstract:

The patella is the largest sesamoid bone in the human body. The dorsal surface of the patella contains a thick layer of cartilage, which is the thickest cartilage in the body. A vertical ridge separates the medial and lateral edges of the articular surface and articulates with the femoral condyle. The patella protects the anterior surface of the knee joint, serves as an attachment site for the quadriceps tendon, and functions as a fulcrum to maximize the efficiency of the extensor mechanism. Patella fractures account for approximately 1-1.5% of all bone fractures in the human body. They most often occur in men. The goal of treatment is to restore the articular surface of the patella and stable osteosynthesis of the fragments.

**Keywords:** *patella, fracture, Ethybond, osteosynthesis.*

### Introduction

#### Introduction

The patella is a critical component of the knee extension mechanism, contributing approximately 30% to the quadriceps force [ 1 , 2 ]. Patella fractures are common lower extremity injuries, accounting for approximately 1% of all skeletal injuries [ 3 ]. Among them, comminuted fractures account for 55% of all surgically treated patellar fractures. Direct impact of the patella on the ground often results in comminuted patellar fracture. [ 6 , 7 ]. Surgical intervention has been recommended for patellar fractures with displacement greater than 2 mm [ 2 , 4 ]. Various surgical techniques such as cannulated screw, cable pin, angled stable plate, and claw-shaped shape memory alloy have been used for the treatment of displaced patellar fracture [ 4 , 5 ]. The incidence of unsatisfactory treatment results remains high and ranges from 16.4 to 50% [8]. When treating a patellar fracture, some surgeons prefer maximum adaptation of bone fragments, while others prefer complete restoration of congruence of the articular surfaces [9]. Despite the fact that various surgical methods for treating comminuted patellar fractures have been described, stable fixation of the coronal comminuted articular fragment remains a difficult task even after open reposition.

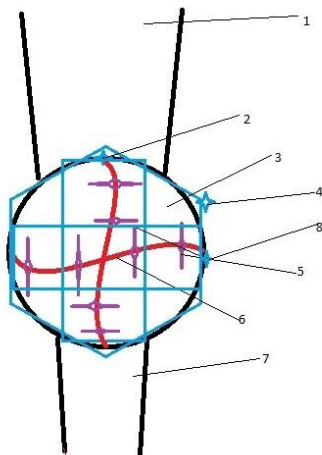
The aim of the study was to analyze the advantages of osteosynthesis of the patella fracture using PETF (polyethylene terephthalate, Ethibond) thread.

### Materials and methods of the study.

In the emergency traumatology department of the multidisciplinary clinic of the Tashkent Medical Academy, 17 patients with patellar fractures were operated on from the end of 2023 to 2024. The age range of the victims varied from 20 to 61 years. Men were admitted more often than women, and by the nature of the injury in both groups were street (58.8%) and domestic (29.4%), less often sports (5.9%) and transport (5.9%) (Table 1).

The technique of implementing the proposed method of osteosynthesis of the patella fracture (Fig. 1) consists in the fact that, after open reposition of the fragments, in two planes, we drill channels in both fragments: 1 - in the frontal, 2 - in the sagittal planes with 2 mm diameter pins, through which we pass PETF (Ethibond) threads with the help of a specially modified Kirschner pin with a hooked end "U" shaped in the area of the base of the patella (PETF threads passed through vertical channels) and the lateral projection of the patella (PETF threads passed through horizontal channels) under tension, tie and with these threads suture around the patella like a purse-string suture. The postoperative course is uneventful, the sutures are removed after 14-16 days. Development of the knee joint 4-6 weeks after the removal of the plaster cast, in order to prevent the development of arthrosis and the development of contractures of the knee joint, a course of therapeutic exercise was mandatory under the supervision of a rehabilitation specialist and traumatologist.

Fig. 1. Illustration of the implementation of the patella using the method we proposed:



1-Tendon of the quadriceps femoris. 2- Knot of the PETF thread passed through the vertical channel. 3- Patella. 4- Knot of the PETF thread of the purse-string suture. 5- Thin polyglycolic sutures applied to the soft tissue structure of the patella. 6- Fracture line. 7- Proper patellar ligament. 8- Knot of the PETF thread passed through the horizontal channel.

In the study group, 17 (100%) patients were studied for the immediate results after 3 months (Table 3). During the examination, outpatient cards were filled out using the 100-point SAO-1 scale (standardized assessment of the outcomes of fractures of the bones of the musculoskeletal system and their consequences) of the questionnaire for the study group. The scheme for assessing the outcomes includes 17 clinical and radiological indicators. The examination data allowed us to identify and systematize the problems that arose in the diagnosis and choice of osteosynthesis method for the patella fracture. The data from the medical history and outpatient journal are duplicated in the outpatient examination card of the patient 3 months after the operation.

**Table 1. Distribution of patients depending on gender and cause of injury.**

| Nature of injury | Male            |       | Female          |       | Total           |       |
|------------------|-----------------|-------|-----------------|-------|-----------------|-------|
|                  | absolut. number | %     | absolut. number | %     | absolut. number | %     |
| Street injury    | 8               | 47%   | 2               | 11,8% | 10              | 58,8% |
| Household injury | 3               | 17,6% | 2               | 11,8% | 5               | 29,4% |
| Transport injury | 1               | 5,9%  | -               | -     |                 | 5,9%  |
| Sports injury    | 1               | 5,9%  | -               | -     |                 | 5,9%  |
| Total:           | 13              | 76,4% | 4               | 23,6% |                 | 100%  |

In this group, a good result was achieved in 14 patients (82.4%), satisfactory - in 3 (17.6%). The period of disability depended on the severity of the patella fracture and ranged from 2 to 3 months, and the movement in the knee joint was restored in full. Results and their discussion. The main advantages of osteosynthesis of the patella fracture by the method proposed by us are to ensure reliable fixation of fragments without the threat of secondary displacement in the dynamics of functional treatment in the absence of a metal structure, the availability of the materials used, relatively less trauma to paraarticular tissues, articular cartilage and synovial environment. High stability of osteosynthesis allowed us to begin early rehabilitation measures and refuse long-term immobilization of the limb, which contributed to the reduction of treatment time, since there was a faster regeneration in the fracture zone.

**Table 3. Treatment results of the control and main groups 3 months after surgery (SAO-1)**

| Результаты по СОИ-1   | Main group      |       |
|-----------------------|-----------------|-------|
|                       | Absolut. number | %     |
| From 85 to 100 points | 14              | 82,4% |
| From 71 to 85 points  | 3               | 17,6% |
| Below 71 points       | -               | -     |
| Total                 | 17              | 100%  |

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