

## SURGICAL TREATMENT OF PERTROCHANTERIC FRACTURES USING PERSONAL EXTERNAL FIXATION SYSTEM AND TECHNIQUE

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**Summary.** In 126 elderly patients pertrochanteric fractures were treated using Mitkovic external fixation system. All fractures healed within 10 weeks. Eleven patients had a superficial pin tract infection and one deep infection. In 11 patients the fracture united with a shortening of 18 (10-40) mm. The causes for the shortening were impaction (17) and varisation (5). There was neither implant failure nor limitation of knee movement. Twenty-four patients died during the first 6 months from causes unrelated to the operation. The Mitkovic external fixation system is extremely simple for minimally invasive application (9 min), in two-axis dynamisable and represents an excellent alternative for the surgical treatment of high-risk, elderly patients.

**Key words:** Femur, trochanteric fractures, external fixation, dynamisation

### Introduction

Pertrochanteric fractures are very common among elderly patients. These patients occupy about 30% of hospital beds (8). These fractures are cause of significant morbidity and mortality in conservatively treated patients. Because of that the treatment of choice is surgery. Reliable fixation provides patients with early mobilization with full weight bearing, thus preventing 3 complications associated with prolonged bed rest (1,7). The most commonly used surgical method is internal fixation using dynamic hip screw. Internal fixation is associated with intraoperative blood loss and prolonged anesthesia. The elderly patients are high risk patients for surgery (4). Conservative treatment is a bad alternative as it is associated with mortality up to 60% (4).

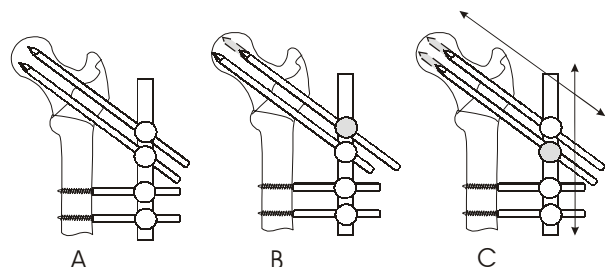


Fig. 1. Method of fixation and dynamisation using Mitkovic device and technique in the minimally invasive surgical treatment of pertrochanteric fractures:  
a) simple frame with smooth pins in femoral neck and head and threaded pins in diaphyseal area b) technique of dynamisation removing proximal pin for about 5 mm, while the first distal pin is fixed c) proximal pin is fixed and distal clamp is unlocked during the removing of the corresponding pin for 5 mm.

Our wide experience using Mitkovic's external fixation system, and results of the first 3 patients externally fixed using one extremely simplified method suggested by Prof. Mitkovic, has encouraged us to use routinely one simple external fixation device (Fig. 1). The aim of this retrospective study was to evaluate the results of the method and device in a group of high surgical risk elderly patients.

### Materials and Methods

Between 1990 and 1997, 126 patients sustaining pertrochanteric fractures were treated using Mitkovic's trochanteric external fixation frame produced by Ei-FMD, Nis. There were 56 males and 70 females of the mean age of 71 (65-82). In 59 cases, the right hip was involved and, in the remaining 67, the fracture occurred in the left hip. The fractures were classified according to the modified Evans classification (7) (98 of the fractures were unstable and 28 were stable).

The operations were performed under spinal or general anesthesia. After placing the patient on the fracture table a closed reduction of the fracture was performed under image intensification. One 5 mm diameter and 20-25 cm long smooth pin (without thread) with sharp tip (or Steinmann pin), was percutaneously inserted at the angle  $125^{\circ}$ - $130^{\circ}$  approximately into the center of the femoral head and neck. Second, the same pin is inserted 10-20 mm more distally and approximately parallel in relation to the first inserted pin. The pins were advanced to about 5 mm from the subchondral bone of the head. Both of these pins are inserted independently without any guidance. Then a frame with one 20 cm long bar

and 4 adjustable clamps is attached to the proximal pins. Two distal clamps acted as a guide for the insertion of

the two distal pins. The mean operative time was 9 min (5-18 min).

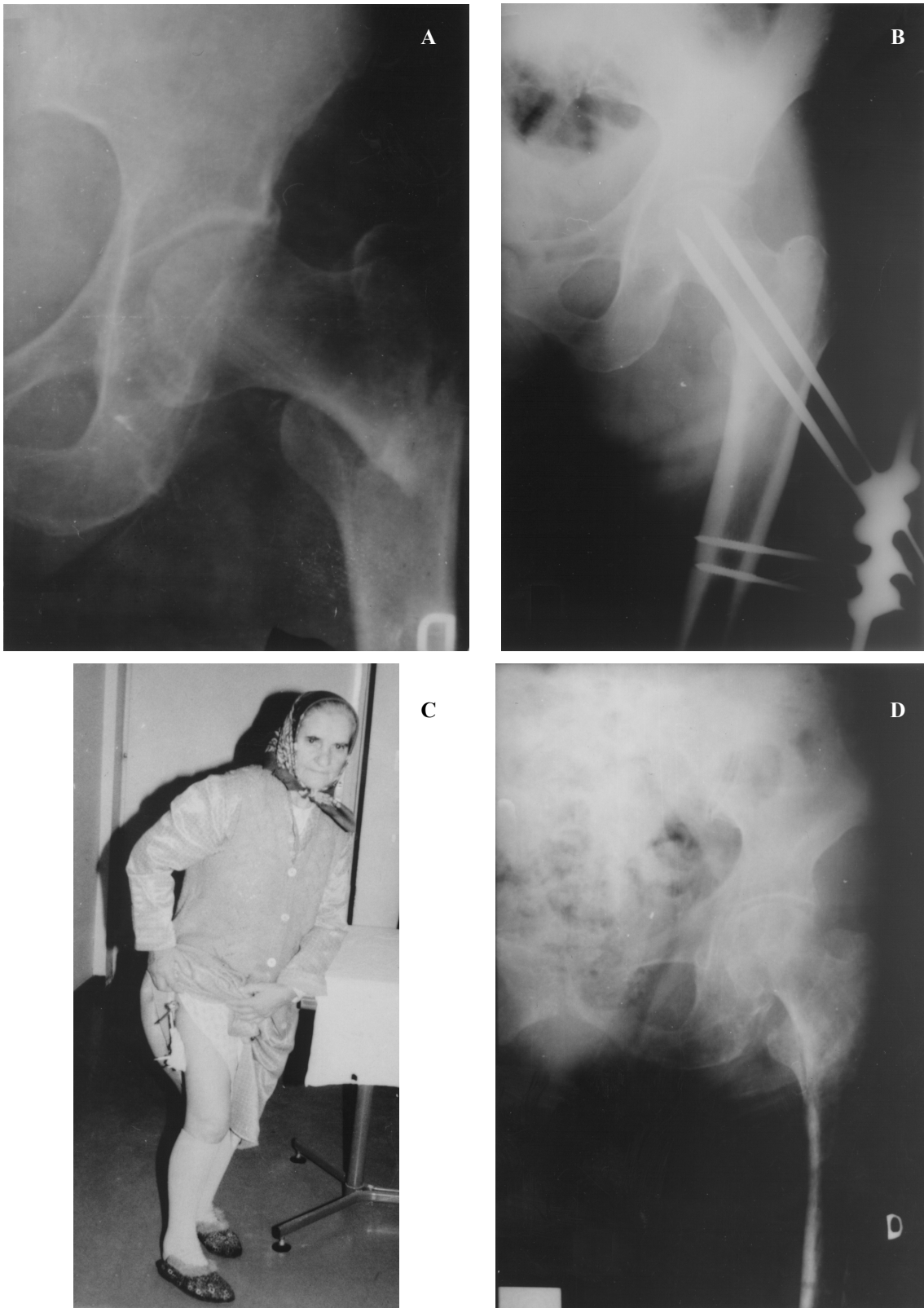


Fig. 2. 2a. x-ray of pertrochanteric fracture before the fixation  
2b. x-ray of the same patient after external fixation  
2c. Photograph of the same patient with the fixator in situ two weeks after operation  
2d. x-ray showing end result after removing of the fixator, 10 weeks after operation with healed fracture and preserved collodiaphyseal angle ( $130^{\circ}$ )

Postoperatively the patients were mobilized, fully weight bearing, on the 4 legs frame the day following surgery. Five senile patients started mobilizing out of bed within the first week. Hospitalization was 5 days (2-14 days). Pin site care was performed 3-4 times per month during the home visit by nursing staff or during out patient clinic checking. X-ray control was performed every 3-4 weeks until the fracture was united and the fixator was removed. Eventual dynamisation during the treatment was performed using the method shown in fig.1. The final follow up was at 6 months.

## Results

No patient required blood transfusion intraoperatively or postoperatively. Trochanteric frame is small and did not interfere with sitting, lying or walking in conventional clothes. The average time for fracture union was 10 weeks (8-12). There was no fracture healing failure.

There were no cases of pin loosening, breaking or penetration of the femoral head. Twenty-two patients had, on average, a limb shortening of 18 mm (10-40 mm). Shortening resulted from impaction (17) and from varisation (5).

Eleven patients developed superficial pin tract infection usually involving the proximal pins. The infections were successfully treated with daily cleaning using antiseptic solution and using antibiotics according to the antibiogram obtained. There was one deep infection in one patient living in a remote village and she unexpectedly couldn't come for the follow up and pin care during the time of 6 weeks. If it had been expected that this lady would not be able to come for checking during 6 week time she would not have been treated by external fixation.

During the 6 month follow-up period twenty-four patients died from causes unrelated to the operation. Most of the 102 surviving patients in 6 months returned to their prefracture ambulatory status.

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## Discussion

Longer life-span has been accompanied by an increase in the incidence of pertrochanteric fractures, which mainly occur in the elderly (6). Elderly patients with the host of medical conditions who sustained a pertrochanteric fracture usually require prolonged hospitalization following conventional fixation of their fracture. The need to reduce the risks of fracture fixation, permit early mobilization, and reduce hospital stay has prompted several authors to propose external fixation as an alternative treatment option for these elderly, high-risk patients (1,2,3).

The present study has confirmed the advantages of external fixation for treating pertrochanteric fractures in elderly especially high-risk patients. The operative time of 9 min is significantly reduced compared to internal fixation (mean 31 min in our clinic). Blood loss is negligible, the surgical stress for the patient is minimal and antibiotic administration very rare. Postoperative pain is minimal and easily controllable, making the nursing and mobilizing of the patients easier. The 19% mortality rate in the 6 months follow-up period compares well with the rates reported for the conventional dynamic hip screw (4). Despite evident advantages, external fixation has failed to become popular with most surgeons, because of the significant reported complications in previous study, infection being the most common. We believe that techniques and devices used for external fixation are inferior in comparison to extremely simplified method suggested by Mitkovic (5). The method used in this work, with no need for any guidance or screwing in the femoral neck and head provides significant reduction of operation time in comparison to any other method and technique.

External fixation is a minimally invasive method and causes no additional tissue trauma. In elderly patients, with poor health, stable fixation without surgical trauma could be vital for a faster recovery and mobilization, reduced morbidity and mortality.

## **HIRURŠKI TRETMAN PERTROHANTERNIH PRELOMA KORIŠĆENJEM TEHNIKE SPOLJNE FIKSACIJE PO MITKOVIĆU**

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*Kratak sadržaj: Prikazuju se rezultati hirurškog lečenja 126 pacijenata starije životne dobi sa pertrohanternim prelomima primenom sistema za spoljnu fiksaciju po Mitkovicu. Svi prelomi su zarasli u proseku za 10 nedelja. Kod 11 pacijenta je bilo pojave površne infekcije oko klinova a kod jednog pojava duboke infekcije. Kod 22 pacijenta zaostalo je prosečno skraćenje od 18 mm (10-40) do koga je došlo usled inpakcije na mestu preloma (17) i usled varizacije (5). Nije bilo komplikacija vezanih za spoljni fiksator niti je bilo kontraktura kolena. Tokom 6 meseci umrlo je 24 pacijenata od bolesti koje nisu u vezi sa hirurškim lečenjem. Spoljna fiksacija je minimalno invazivna metoda pogodna za lečenje pacijenata, lošeg zdravstvenog stanja, sa pertrohanternim prelomom a fiksator po Mitkovicu je pogodan za kratkotrajnu intervenciju (9 min u proseku).*

*Ključne reči: Prelomi trohantera, spoljna fiksacija*