



## First experiences with the Fitmore<sup>®</sup> hip stem – Early results of the 16-month monitoring

Prvo iskustvo sa Fitmore<sup>®</sup> stemom kuka – rezultati 16-mesečnog posmatranja

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### Abstract

**Background/Aim.** Fitmore<sup>®</sup> hip stem belongs to the group of short stem prostheses with the metaphysar stabilization, with its shape and form that protects the bone mass in the greater trochanter region and the distal part of the femur. The aim of this paper was to present the early postoperative results in patients with implanted Fitmore<sup>®</sup> hip stem and point out some of the advantages. **Methods.** A series of 10 patients with implanted Fitmore<sup>®</sup> hip stem, was included in this study. The average age of the patients was 54.5 (48–65) years. There were 5 women and 5 men. The total monitoring time was 16 months. To rate the condition of the hip joint we used The Western Ontario and Mc Master Universities Arthritis Index (WOMAC) score. We also monitored the degree of hip pain, hip flexion, heterotopic ossification and indentation in the stem of the prosthesis. **Results.** After 12 months of monitoring 9 (90%) of the patients had no pain in the thigh region, and only 1 (10%) experienced mild pain. The hip flexion rose from the average 89° to postoperative 114°. WOMAC score rose as well, from 49 to 94 average points. Indentation in the stem was registered 3 months after the operation in 2 (20%) of the patients – in one of the patients the indentation was 3 mm and in the other patient 5 mm. After the 16-month monitoring, the results were excellent. The monitoring period was short though it should be continued and the results should be presented after 5 and then after 10 years. **Conclusion.** Early results of the implantation Fitmore stem showed good bone ingrowth with excellent functional result.

### Key words:

arthroplasty, replacement, hip; orthopedic procedures; postoperative period; recovery of function.

### Apstrakt

**Uvod/Cilj.** Fitmore<sup>®</sup> *hip stem* pripada grupi proteza kratkog stema sa metafiznom stabilizacijom, a svojim oblikom i formom šteti koštanoj masi u regionu velikog trohantera i u distalnom delu femura. Cilj rada bio je da se prikažu rani operativni rezultati kod bolesnika sa ugrađenim Fitmore<sup>®</sup> stemom kuka i da se ukaže na neke prednosti. **Metode.** Prikazana je serija od 10 bolesnika kojima je ugrađen Fitmore<sup>®</sup> stem kuka. Prosečna starost bolesnika, pet žena i pet muškaraca, bila je 54.5 (48–65) godina. Ukupno vreme praćenja iznosilo je 16 meseci. Za ocenu stanja zgloba kuka koristili smo *The Western Ontario and Mc Master Universities Arthritis Index* (WOMAC) skor. Pratili smo i stanje bola u butini, fleksiju kuka, heterotopne osifikacije i slegnuće stema proteze. **Rezultati.** Posle 12 meseci praćenja, 9 (90%) bolesnika nije imalo bolove u butini, a samo jedan (10%) imao je slabe bolove. Fleksija u kuku porasla je od 89° u proseku, na 114° posle operacije. WOMAC skor takođe je porastao, od 49 na 94 poena u proseku. Nalegnuće stema registrovano je posle tri meseca od operacije i to kod dva (20%) bolesnika: kod jednog tri, a kod drugog 5 mm. Posle praćenja od 16 meseci rezultati su bili odlični. Period praćenja bio je kratak i trebalo bi ga nastaviti i prikazati rezultate posle 5 i 10 godina. **Zaključak.** Rani rezultati primene Fitmore<sup>®</sup> stema kuka pokazuju dobro urastanje stema uz odličan funkcionalni rezultat.

### Ključne reči:

artoplastika kuka; ortopedske procedure; postoperativni period; funkcija, povratak.

### Introduction

Osteoarthritis is a very common chronic disease. It is detected in 60% of the population aged over 65, and hip osteoarthritis is detected in 5% of the population aged over 55<sup>1</sup>. Etiology of coxarthrosis is complex and depends on multiple

factors, all of these factors, individually or combined, can cause a degenerative hip disease.

Replacement of the natural hip joint with an artificial one restores the function of the diseased joint and establishes a painless and satisfactory locomotion. There are a number of cemented and uncemented prosthetic models used in

everyday practice. One of the models is Fitmore hip stem by Zimmer.

This particular system has a short uncemented stem which with its shape and curve restores the anatomy of the proximal part of the femur and allows adjustment of the prosthetic offset, *ie* it offers the possibility of adjusting the distance between the acetabulum and body of the stem. The transection of the stem has a trapezoid form, which allows the primary rotational stability. It belongs to the group of short stem prostheses with metaphysar stabilization and therefore it spares the bone mass in the greater trochanter region and the distal part of the femur<sup>2</sup>. With its curve, the stem of this prosthesis protects the lateral cortex of the femur, and directs its contact and the transmission of the mechanical forces and loads in the hip, towards the small trochanter. The greatest part of body weight is transferred through the medial part of the prosthesis towards the small trochanter, to the medial part of the resected femoral neck which has the shape

ten hip endoprostheses of the Fitmore stem type were implanted.

Total hip arthroplasty was performed in 5 female and 5 male patients. The average age was 54.5 years (57.4 in male and 50.4 in female patients). The average weight was 81 kg in male and 69 kg in female patients.

The patients were monitored after 3, 6, 12 and 16 months following the operation.

The main diagnosis was osteoarthritis – 7 (70%) patients, followed by avascular necrosis – 2 (20%) patients and rheumatoid arthritis – 1 (10%) patient.

We used the intermediate calcar radius stem in 8 patients, and in the remaining 2 a larger calcar radius stem A family (Figure 1).

To rate the state of the hip joint, prior to and after the operation, we used WOMAC score<sup>5</sup>.

It is critical with the use of the Fitmore<sup>®</sup> stem to use radiological templating to determine the appropriate stem

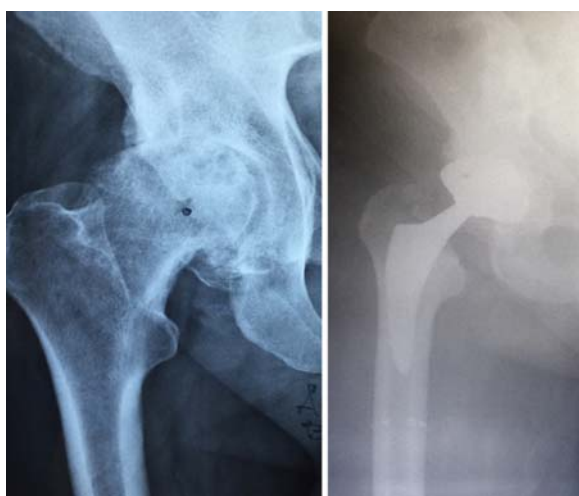


Fig. 1 – Implanted Fitmore<sup>®</sup> hip stem (larger calcar radius, A family).

of the letter U – this is *calcar femoris*. The surface of the cortical bone part of the resected femoral neck in the region of the small trochanter, which is used for the transfer of weight, is about 1.29 cm<sup>2, 3</sup>.

The short and curved prosthetic stem spares the distal femur part, this maladjustment of the proximal and distal part is avoided, which is one of the reasons for the loosening of the long prosthetic stem. Additionally, it spares the femur canal for the revision stem; it reduces the intraoperative bleeding and spares the soft tissue due to the reduced surgical exposition<sup>4</sup>. Fitmore<sup>®</sup> prosthesis has a narrower indication area, *ie* it is used in younger patients, vital and good physical shape with a small degree of osteoporosis.

The aim of this study was to present the early postoperative results in patients with the implanted Fitmore<sup>®</sup> hip stem and point out some of its advantages.

## Methods

In the period from December 25, 2013 to February 15, 2014 in the Clinic for Orthopedic Surgery the Niš, Serbia,

family preoperatively, as medial metaphyseal/diaphyseal contact cannot be visualized intraoperatively. Templating is needed to assess the center of femoral head, leg length, offset, level of femoral neck osteotomy and stem size. The neck osteotomy must be at an angle of 50° of the long axis of the shaft and also preservation of 5–10 mm of the lateral neck cortex.

Subsidence was defined as vertical stem movement of more than 5 mm according to Callaghan et al.<sup>6</sup>.

Heterotopic ossification was classified according to Brooker et al.<sup>7</sup>.

## Results

Three months after the operation, in 5 (50%) patients thigh pain disappeared, and in 9 (90%) after 12 months. Only one (10%) patient had mild pain 12 months after the operation.

The range of motion (the degree of flexion) increased significantly from 79° (40°–120°) preoperatively to 114° (95°–150°) at the time of the last monitoring ( $p < 0.001$ ).

The mean duration of the surgical procedure was 75 (38–125) minutes and the mean length of hospitalization was 9 (5–15) days.

Radiological results after 16 months of monitoring were in 2 (20%) of the patients hypertrophy of the femoral cortex at the height of the prosthetic stem was registered, but without clinical symptomatology. In 1 (10%) of the patient heterotrophic ossification gradus 1 according to Brooker et al.<sup>7</sup> was registered, in 2 (20%) of the patients there was an indentation in the stem up to 5 mm, registered 3 months after the operation.

## Discussion

Total hip arthroplasty is one of the most successful orthopedic procedures. The use of short stems is growing. With short stems good and permanent fixation is achieved and clinical results are good.

Joint Implant Surgery and Research Foundation (USA) has formed a classification system for the short stem uncemented prosthesis: head stabilized, neck stabilized, metaphyseal stabilized and conventional (metaphyseal/diaphyseal) stabilized<sup>8</sup>. Fitmore<sup>®</sup> hip stem by Zimmer that we used in our patients belongs to the group of metaphyseal stabilized, and its characteristics are the following: it spares the bone mass in the area of greater trochanter and diaphysis of the femur, crosssection is trapezoid and provides excellent stability, it has different curves in order to renovate the hip joint anatomy and achieve a good offset of the femoral neck<sup>4,8,9</sup>.

Radiological templating is mandatory to determine the position of the prosthesis, its size, offset center of the rotation and leg length<sup>10</sup>.

A long prosthetic stem can be implanted in the varus position. Berend et al.<sup>11</sup>, Khalily and Lester<sup>12</sup> mention the

varus of prosthetic stem from 4° to 8° as well as the fact that Fitmore<sup>®</sup> stem has a small potential to take the varus position. Additionally, sometimes a fracture of the long stem can occur.

Loosening of the stem did not occur in our series, perhaps due to the short monitoring period, although other authors do not list it either. This phenomenon occurs in prostheses with long stem due to different factors<sup>13</sup>.

The stem of the Fitmore<sup>®</sup> prosthesis can cause remodeling of periprosthetic bone structure. Pepke et al.<sup>14</sup> has found that both Fitmore<sup>®</sup> and long stem prostheses have proximal stability. Fitmore<sup>®</sup> stem also has rotational stability, so its rigidity is higher, which is the reason why the remodeling process of the bone is more prominent in this type of prostheses. Guske<sup>2</sup> as well, in his work reports cortical hypertrophy in 29% of the patients in the series of 100 patients. In our series, this phenomenon was present in 2 (20%) of the patients.

Indentation in the Fitmore<sup>®</sup> stem up to 5 mm was present three months after the operation. We had 2 (20%) patients – in one the indentation in the stem was 3 mm, and in the other 5 mm. In the series of 100 patients, Guske<sup>2</sup> reported indentation in 34% of the patients.

## Conclusion

The early results of Fitmore<sup>®</sup> stem implantation showed good bone ingrowth with excellent functional result in our patients. The number of published series of patients with implanted Fitmore<sup>®</sup> hip stem is small, so as in our study of the early results of the implantation of Fitmore<sup>®</sup> stem in 10 patients. Further monitoring of the patients and reporting the results 5 and 10 years after the operation are needed. Monitoring in our group of patients was 16 months.

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