

## Loosened hip joint prosthesis - decision options

Byser Bonchev<sup>1</sup>, Tsvetoslav Yordanov<sup>1</sup>, Luben Stokov<sup>2</sup>, Teodor Ivanov<sup>1</sup>,  
Georgi P. Georgiev<sup>3</sup>(✉), L.L. Stokov<sup>4</sup>, Krisitan Nastev<sup>5</sup>

<sup>1</sup>Department of Orthopedics and Traumatology, UMHAT Sofiamed, Sofia, Bulgaria

<sup>2</sup>Clinic of Orthopedics and Traumatology, UMHAT “St. Anna”, Sofia, Bulgaria

<sup>3</sup>Department of Orthopedics and Traumatology, University Hospital “Queen Giovanna - ISUL”, Medical University of Sofia, Sofia, Bulgaria

<sup>4</sup>Clinic of Orthopedics and Traumatology, MHAT “St. Sofia”, Sofia, Bulgaria

<sup>5</sup>MHAT, Skin Systems, Bulgaria

[georgievgp@yahoo.com](mailto:georgievgp@yahoo.com)

**DOI:** <https://doi.org/10.58542/jbota.v6i101.112>

**Abstract**—For the period 2013-2015, 36 patients underwent revision surgery because of secondary developed complications after primary hip joint replacement surgery. 14 of them were male and 23 – female, with average age 73 years. Initially 33 patients suffered from hip joint osteoarthritis and the others 3 underwent hip joint replacement after fracture.

We examined 4 groups of patients depends on the complications type:

- Aseptic loosening in 23 patients, appeared 10 years' average following primary hip prosthesis surgery.

- Septic loosening in 2 patients revealed on second to the tenth month post operatively. In two other patients we observed infected hematoma.

- Hip joint prosthesis (luxation) because of trauma or extremely wrong motion we notice in 5 patients. In one of them we revealed acetabular cup malposition.

- Periprosthetic fractures with aseptic loosening in 3 patients.

All 36 patients had primary cemented hip joint prosthesis.

In the first group depends on which prosthesis parts were loosened we did acetabular cup and femoral stem replacement in 15 patients, only acetabular cup replacement in 4 patients and in 3 patients only femoral stem replacement.

In 2 patients from second group we replaced the primary prosthesis by total spacer for 8 months followed by revision prosthesis surgery. In 2 haematoma patients we performed debridement, lavage-drainage and long term antibiotic treatment.

In 2 patients of third group we replaced the primary head with a longer one and in 3 other patients we replaced the primary acetabular cup by shoulder collar cemented cup.

In 2 patients of fourth group we replaced the primary acetabular cup and femoral stem by shoulder collar cemented cup and by revisionary stem delivered by Implant and Zimmer (Revitan). In the third patient we implanted revisionary femoral stem (Implant).

3 years after revisionary hip joint prosthesis surgery we monitor good prosthesis stability and good functional scores.

**Keywords**— loosening, hip joint, revision, periprosthetic fractures.

## 1 Introduction

Hip arthroplasty, introduced by Sir John Charnley in the 1960s, is one of the most successful surgical interventions. Notably, the technique was accepted as the surgery of the 20th century. However, different problems and complications have been reported and a revision surgery needs<sup>1</sup>.

Revision of the hip arthroplasty is a complex procedure that poses several challenges for the arthroplasty surgeon: bone loss, removal of the previous implant and cement mantle without inducing additional bone destruction. The surgeon encounters altered and sclerotic bone, unable to support the revision component. Various options for revising have been described in the literature: reinforcement cage Burch-Schneider with bone grafting, long stem with cement fixation, cement fixation and impaction arthroplasty, proximal femoral replacement with a tumor prosthesis or massive allograft, and cementless fixation with distal stem anchorage<sup>1</sup>.

The goals of the current article are:

- To outline the main challenges in revision hip arthroplasty.
- To present some characteristics of preoperative planning.
- Share our experience with revision hip arthroplasty by presenting some of our clinical cases.

## 2. Materials and Methods

A group of 36 patient underwent revision hip arthroplasty in the years between 2013-2015. 14 males, 22 females, average age 73. Indication for primary hip arthroplasty was osteoarthritis in 33 patients and fracture of the femoral neck in 3 patients.

Acetabular bone defects are assessed by the Paprovski classification<sup>2</sup> and the periprosthetic fractures are classified according to the Vancouver Classification<sup>3</sup>. General perioperative risk is assessed by ASA classification<sup>4</sup>. The results are measured using Oswestry Disability Index (ODI)<sup>5</sup> and Visual Analogue Scale (VAS)<sup>6</sup>.

Anterolateral approach extended distally with or without extended trochanteric osteotomy is used in all cases. Implant used are: standard cemented stems, modular tapered stems, reinforcement cage Burch-Schneider as well as long cemented stems.

## 3. Results

Patients are divided into 4 groups according to the type of loosening:

### I. Aseptic loosening - 23 patients.

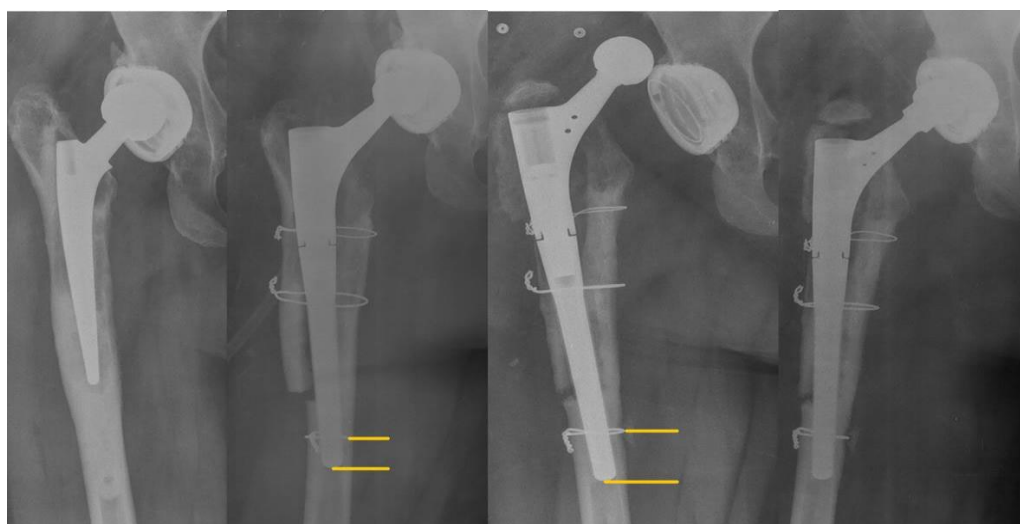
Reinforcement cage is used in acetabulum defect Paprovski 2nd and 3rd degree<sup>7,8</sup>. If needed bone grafting is performed with structural allograft or cancellous bone from tissue bank. Long stems are used in cases with severe proximal femur bone loss or after extended trochanteric osteotomy (*Fig. 1*).



**Figure 1.** Reinforcement cage with bone grafting and long tapered stem.

II. Prosthetic dislocation and joint instability - 6 patients.

Dislocations occur in variable postoperative term. Different causes for dislocation are found: insufficient offset, malposition, stem subsidence<sup>9,10</sup> (Fig. 2).



**Figure 2.** Dislocation with stem subsidence.

III. Periprosthetic fractures with aseptic loosening - 3 patients.

One partial and 2 complete revisions are made. Long tapered stems are used with distal to the fracture fixation<sup>11</sup> (Fig. 3).



**Figure 3.** Partial revision with long cemented stem.

IV. Septic loosening- 4 patients.

In cases with suspected infection, a quick PJI test is performed. Preferred treatment option for septic loosening is the two stage revision with antibiotic spacer for 4-6 months. Long tapered stems as well as standard stems are used, together with reinforcement ring if necessary (Fig.4).



**Figure 4.** Two stage revision with custom made antibiotic-loaded spacer.

ODI test done on the 2nd postoperative mount shows prevailing number of patients with minimal difficulties performing activities of daily life, which is reported as good clinical outcome. Postoperative follow-up is at 6 and 12 postoperative mounts.

### 3. Discussion and Conclusion

Aseptic loosening is the most common cause for revision hip arthroplasty. Reinforcement cage is used in acetabulum defect Paprovski 2nd and 3rd degree. In Paprovski 3A and 3B a structural allograft is used. Extended trochanteric osteotomy is reliable approach when using long femoral stems. In cases with late periprosthetic joint infections two stage revision has the highest success rate.

### 4. References

1. Кинов П. (2013) Ревизионно ендопротезиране на тазобедрената става. Дисертация. МУ София.
2. Paprosky WG, Perona PG, Lawrence JM. Acetabular defect classification and surgical reconstruction in revision arthroplasty. A 6-year follow-up evaluation. *J Arthroplasty*. 1994;9(1):33-44. doi: 10.1016/0883-5403(94)90135-x.
3. Patsiogiannis N, Kanakaris NK, Giannoudis PV. Periprosthetic hip fractures: an update into their management and clinical outcomes. *EFORT Open Rev*. 2021;6(1):75-92. doi: 10.1302/2058-5241.6.200050.
4. Irlbeck T, Zwißler B, Bauer A. ASA-Klassifikation : Wandel im Laufe der Zeit und Darstellung in der Literatur [ASA classification : Transition in the course of time and depiction in the literature]. *Anaesthesist*. 2017;66(1):5-10. German. doi: 10.1007/s00101-016-0246-4.
5. Fairbank JC, Pynsent PB. The Oswestry Disability Index. *Spine (Phila Pa 1976)*. 2000;25(22):2940-52; discussion 2952. doi: 10.1097/00007632-200011150-00017.
6. Bijur PE, Silver W, Gallagher EJ. Reliability of the visual analog scale for measurement of acute pain. *Acad Emerg Med*. 2001;8(12):1153-7. doi: 10.1111/j.1553-2712.2001.tb01132.x.
7. Ewers A, Spross C, Ebnetter L, Külling F, Giesinger K, Zdravkovic V, Erhardt J. 10-Year Survival of Acetabular Reinforcement Rings/Cages for Complex Hip Arthroplasty. *Open Orthop J*. 2015;9:163-7. doi: 10.2174/1874325001509010163.
8. Jain S, Grogan RJ, Giannoudis PV. Options for managing severe acetabular bone loss in revision hip arthroplasty. A systematic review. *Hip Int*. 2014;24(2):109-22. doi: 10.5301/hipint.5000101.
9. DeWal H, Su E, DiCesare PE. Instability following total hip arthroplasty. *Am J Orthop (Belle Mead NJ)*. 2003;32(8):377-82.
10. Parvizi J, Picinic E, Sharkey PF. Revision total hip arthroplasty for instability: surgical techniques and principles. *J Bone Joint Surg Am*. 2008;90(5):1134-42.
11. Masri BA, Meek RM, Duncan CP. Periprosthetic fractures evaluation and treatment. *Clin Orthop Relat Res*. 2004;(420):80-95. doi: 10.1097/00003086-200403000-00012.

## Authors

**Byser Bonchev, M.D., Ph. D.** is member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an ortopaedic surgeon at Clinic of Orthopedics and Traumatology, UMHAT “UMHAT Sofiamed”, Sofia, Bulgaria.

**Tsvetoslav Yordanov, M.D.** is member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an ortopaedic surgeon at Clinic of Orthopedics and Traumatology, UMHAT “UMHAT Sofiamed”, Sofia, Bulgaria.

**Luben Stokov, M.D., Ph.D.** is a member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an ortopaedic surgeon at Clinic of Orthopedics and Traumatology, UMHAT “St. Anna”, Sofia, Bulgaria. He is professor at the Department of Orthopedics and Traumatology, Medical University of Sofia, Sofia, Bulgaria. He is a member of the Editorial Board of the Journal of the Bulgarian Orthopaedics and Trauma Association (JBOTA).

**Teodor Ivanov, M.D.** is member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an ortopaedic surgeon at Clinic of Orthopedics and Traumatology, UMHAT “UMHAT Sofiamed”, Sofia, Bulgaria.

**Georgi P. Georgiev, M.D., Ph.D., D.Sc.** is member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an orthopaedic surgeon at the Department of Orthopedics and Traumatology, University Hospital “Queen Giovanna - ISUL”, Medical University of Sofia, Bulgaria. He is Assistant Professor at the Department of Orthopedics and Traumatology, Medical University of Sofia, Bulgaria. He is a member of the Editorial board of BMC Musculoskeletal Disorders and Clinical Anatomy.

**Luben Lubenov Stokov,** is a member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as volunteer at Clinic of Orthopedics and Traumatology, MHAT “St. Sofia”, Sofia, Bulgaria. He is medical student, Medical University of Sofia, Sofia, Bulgaria.

**Kristian Nastev, M.D.** is member of the **Bulgarian Orthopedic and Traumatology Association (BOTA)**. He works as an ortopaedic surgeon at MHAT, Skin Systems, Bulgaria.