



EARLY RESULTS FROM HIP ARTHROPLASTY USING CEMENTLESS ACETABULAR COMPONENT ALLOFIT PRESS-FIT

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ABSTRACT:

We present early and first decade results in patients with primary and revision total hip arthroplasty (THA) using an uncemented acetabular press-fit cup (Allofit; Zimmer Inc., Warsaw, IN). We examined 30 clinical cases using this implant and achieved very good to excellent results. We correlate our results with the Allofit acetabular cup's primary stability. We believe that the Allofit press-fit cementless acetabular component is an excellent alternative to cemented implants in regards to the stability of the acetabular cup in primary total hip arthroplasty, as well as selected revision hip arthroplasty cases.

Purpose: Our purpose is to showcase our results using the Allofit acetabular cup in a study that included 30 cases.

Material and methods: Over the period from 2018 to 2022 in our clinic - 30 hip arthroplasties were performed using the Allofit press-fit implant. In all clinical cases, the patients were verticalized on the second postoperative day and early ambulation, and physiotherapy was instituted with partial involvement of the replaced hip. There were no complications or instability in any of our primary THAs.

Results: We examined 30 clinical cases over the period of 48 months. There were no complications due to surgical technique, as well as no pathological X-ray findings. We correlate these results with the Allofit acetabular cup's primary stability.

Conclusions: We believe that the Allofit press-fit cementless acetabular component is an excellent alternative to cemented implants in regards to the stability of the acetabular cup in primary total hip arthroplasty, as well as selected revision hip arthroplasty cases.

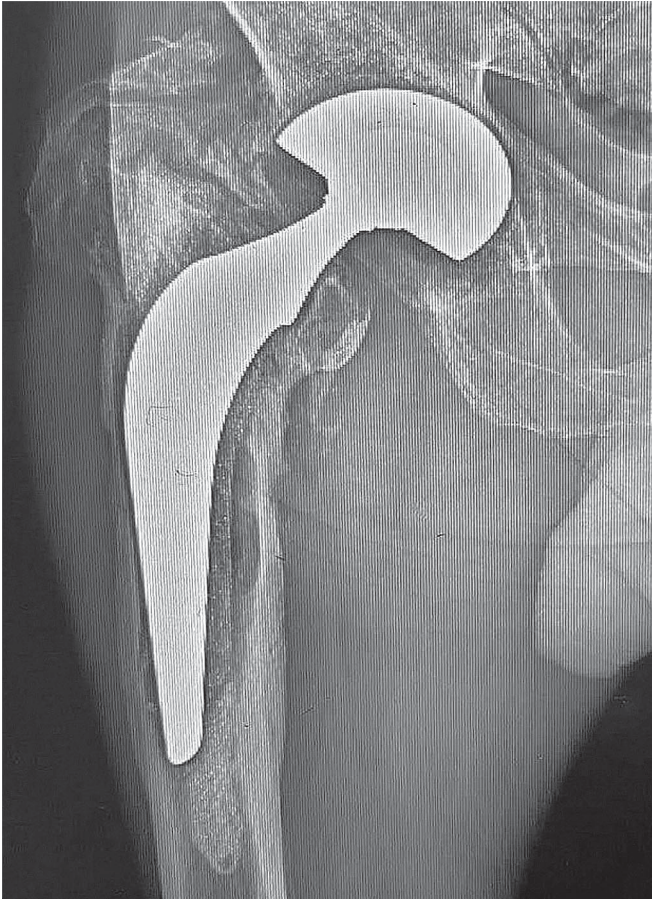
Keywords: Allofit press-fit cementless acetabular cup, total hip arthroplasty (THA), revision hip arthroplasty (RHA), cementless hip implants,

INTRODUCTION:

Total hip arthroplasty (THA) was introduced by John Charnley in 1960, using cement for securing hip implants, which was promptly adopted and popularized in clinical practice worldwide. This technique's shortcoming is the aseptic loosening of the cement-adhered components, which is the main reason for revision hip arthroplasty (RHA) [1]. Another problem is the bone cement implantation syndrome, which can cause severe problems for the patients and even death. Technological progress led to the development of cementless fixation of hip implants as an alternative. The current design and make of these implants, along with improved surgical technique, allow optimal contact between the patient's own bone and the acetabular component - resulting in excellent primary stability of the joint. [2] This resulted in better long-term outcomes for the patients. We have examined early and first decade results in patients with primary and revision total hip arthroplasty (THA) using an uncemented acetabular press-fit cup.

In 1960, John Charnley introduced the application of fast setting bone cement when securing in place the acetabular component of the hip implant. According to Berry DJ et al. [3], the sex, age and comorbidities of the patient all affected the likelihood of long-term survivorship of the acetabular and femoral components. Using polymethyl methacrylate (PMMA), a synthetic resin, is used as filling, allowing strain forces to be transmitted from the implant to the acetabular bone [4]. The optimal width of the cement layer is 1 mm. Up to the 1990s, THA was done primarily using this method. However, long-term unfavorable results in physically active patients [5], mainly because of an aseptic loosening of the hip implants, and the osteolysis in over 30 % of the examined clinical cases (Fig. 1), resulting in different bone defects of the acetabulum [6] required the development of cementless hip implants.

Fig. 1. Aseptic loosening and osteolysis.

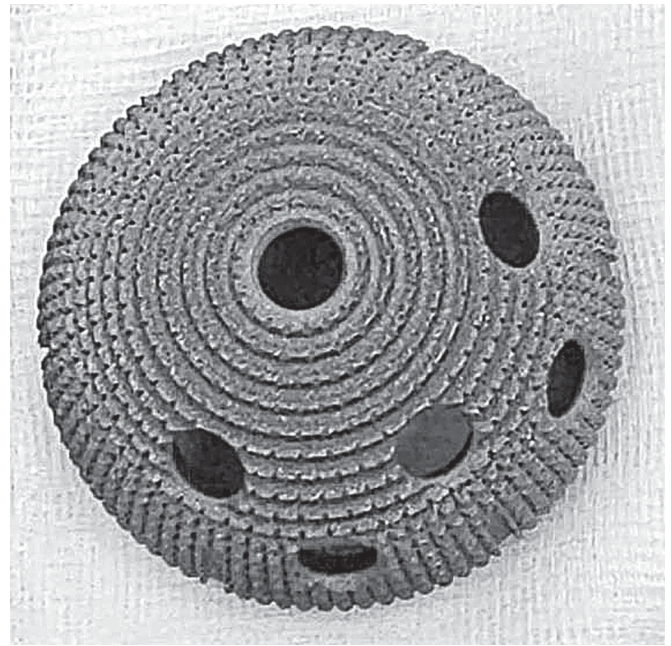


The Allofit acetabular component design is modular and biradial with a hemispherical periphery and a flattened polar region. The metal backing is made of pure titanium (Protasul-Ti) and has a thickness of 2.9 mm, irrespective of the shell size. The surface is prepared with a macrostructure of grooves and ridges that create “teeth” with a dimension of 400 µm to 600 µm. The entire external surface is grit-blasted with corundum. For optimal press-fitting, the cavity was under-reamed by 2 mm in relation to the peripheral dimension of the device. The design of the acetabular cup makes the contacting surfaces of the implant and the underlying acetabular bone much bigger, which is the key factor for the primary stability of the implant. The implant is available with screw holes for additional fixation or with a solid continuous outer surface without holes. [7]

MATERIAL AND METHODS:

From 2018 to 2022, 30 hip arthroplasties were performed in our clinic using the Allofit press-fit implant (Fig. 2).

Fig. 2. Allofit press-fit cup.



Of these cases, 16 were male, 14 were female. The average age of the patients is 64,5 (41 to 77 years old). 19 of the cases (63 %) were primary total hip replacement due to degenerative arthrosis. In two of these 19 cases, due to the large size of the acetabular cup, we used screws for additional fixation. In the other 11 cases (37 %), we used Allofit for revision hip arthroplasty (Tab. 1), and in all of them, we applied screws to secure the cup in place. The preferred surgical approach in our clinic is the modified Hardinge anterolateral approach for its excellent exposure (Fig.3).

Table 1. Our 30 cases use the Allofit press-fit implant.

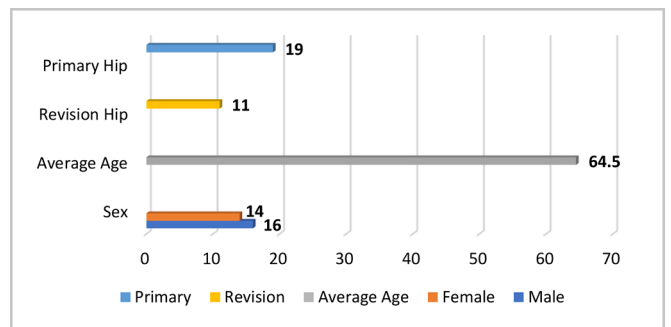


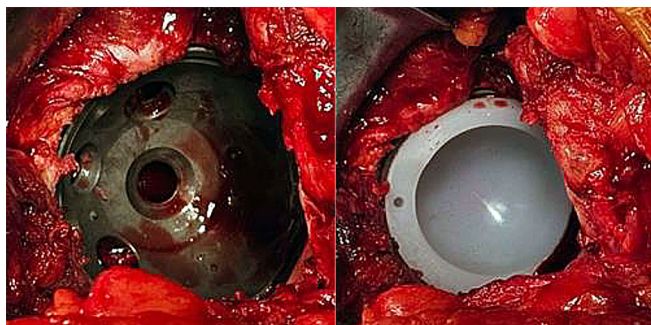
Fig. 3. Hardinge approach



In 1 patient with revision hip arthroplasty, we used a transtrochanteric approach due to proximal femur translation.

In all clinical cases, the patients were verticalized on the second postoperative day and early ambulation, and physiotherapy was instituted with partial involvement of the replaced hip. There were no complications or instability in any of our primary THAs (Fig.4).

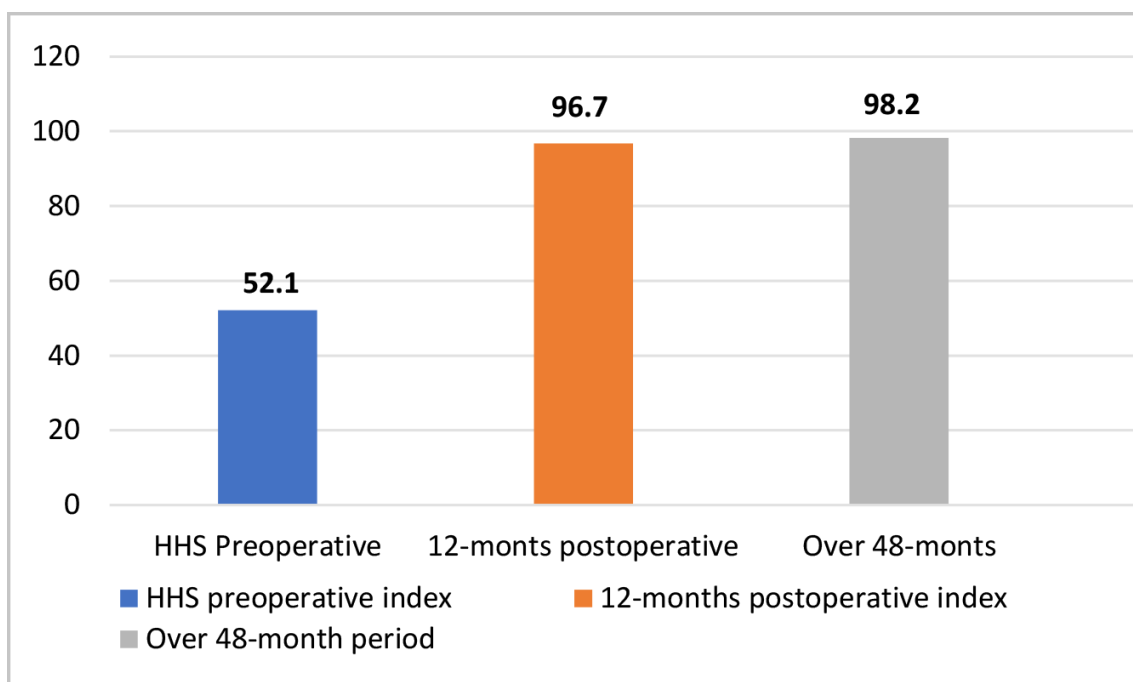
Fig. 4. Acetabulum implantation



RESULTS:

We examined 30 clinical cases over the period of 48 months. To evaluate the hip stability, we used the Harris Hip Score and standard AP and lateral X-rays. The Harris Hip Score is a clinician-performed scale that consists of 13 scores across the four areas of pain, function, activity and range of motion. It is graded from 0 to 100, with results less than 70 considered poor and results from 90 to 100 considered excellent. The median Harris Hip Score preoperatively is 52,1, while the 12-month postoperative score is 96,7, improving up to 98,2 over the 48-month period (Tab.2).

Table 2. Harris Hip Score of our patients



We evaluate our early clinical results as very good to excellent. There were no complications due to surgical technique (dislocations, vascular or neurological problems), as well as no pathological X-ray findings (osteolysis around the acetabular cup, bone thinning over 1 mm, or change in initial placement). We correlate these results with the Allofit acetabular cup's primary stability.

DISCUSSION:

The fixation of the acetabular component to the acetabular bone defines the stability of the hip implant [8]. Using bone cement is the primary reason for aseptic loosening of the acetabular cup in the long-term observation of physically active patients, according to some authors [1]. From our experience, this is true, and we believe that using the non-cemented Allofit acetabular cup is one of the best alternatives available at the moment [9]. The Allofit acetabular component design is modular and

biradial with a hemispherical periphery and a flattened polar region, additionally, the surface is prepared with a macrostructure of grooves and ridges that create "teeth" for optimal implant-bone surface contact. This secures the cup in place, creating primary stability [10], which is the base for long-term favorable clinical results and lowers the possibility of aseptic loosening of the acetabular component, thus minimizing the risk of revision surgery [11].

CONCLUSIONS:

We believe that the Allofit press-fit cementless acetabular component is an excellent alternative to cemented implants in regards to the stability of the acetabular cup in primary total hip arthroplasty, as well as selected revision hip arthroplasty cases. This stability, in our experience, is the basis for excellent clinical results in early and long-term follow-ups. Our experience gives support to these results.

REFERENCES:

1. Feng X, Gu J, Zhou Y. Primary total hip arthroplasty failure: aseptic loosening remains the most common cause of revision. *Am J Transl Res.* 2022 Oct 15;14(10):7080-7089 [[PubMed](#)]
2. Zietz C, Fritsche A, Kluess D, Mittelmeier W, Bader R. Influence of acetabular cup design on the primary implant stability: an experimental and numerical analysis. *Orthopade.* 2009 Nov;38(11):1097-105. [[PubMed](#)]
3. Berry DJ, Harmsen WS, Cabanela ME, Morrey BF. Twenty-five-year survivorship of two thousand consecutive primary Charnley total hip replacements: factors affecting survivorship of acetabular and femoral components. *J Bone Joint Surg Am.* 2002 Feb;84(2):171-7 [[PubMed](#)]
4. Stea S, Comfort T, Sedrakyan A, Havelin L, Marinelli M, Barber T, et al. Multinational comprehensive evaluation of the fixation method used in hip replacement: interaction with age in context. *J Bone Joint Surg Am.* 2014 Dec 17;96 Suppl 1(Suppl 1):42-51. [[PubMed](#)]
5. Monzon RA, Coury JG, Disse GD, Lum ZC. Bone Cement in Total Hip and Knee Arthroplasty. *JBJS Rev.* 2019 Dec;7(12):e6. [[PubMed](#)]
6. Caton J, Prudhon JL. Over 25 years survival after Charnley's total hip arthroplasty. *Int Orthop.* 2011 Feb; 35(2):185-8. [[PubMed](#)]
7. Wroblewski BM, Siney PD, Fleming PA. Charnley low-friction arthroplasty: survival patterns to 38 years. *J Bone Joint Surg Br.* 2007 Aug; 89(8):1015-8. [[PubMed](#)]
8. Ahmed GA, Auge L, Loke J, Fonseca Ulloa CA, Fölsch C, Rickert M, et al. How screw connections influence the primary stability of acetabular cups under consideration of different bone models. *J Orthop.* 2020 Jun 6;21:302-308. [[PubMed](#)]
9. Morshed S, Bozic KJ, Ries MD, Malchau H, Colford JM Jr. Comparison of cemented and uncemented fixation in total hip replacement: a meta-analysis. *Acta Orthopaedica.* 2007 Jun;78(3):315-26. [[PubMed](#)]
10. Varnum C. Outcomes of different bearings in total hip arthroplasty - implant survival, revision causes, and patient-reported outcome. *Dan Med J.* 2017 Mar;64(3):B5350. [[PubMed](#)]
11. Schulze C, Morgenroth R, Bader R, Kluess D, Haas H. Fixation Stability of Uncemented Acetabular Cups With Respect to Different Bone Defect Sizes. *J Arthroplasty.* 2020 Jun;35(6):1720-1728. [[PubMed](#)]

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