30-Years of experience with the cementless implanted Alloclassic CSF screw cup total hip arthroplasty system – An ultra-long-term follow-up

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ABSTRACT

Objective: The aim of this study was to evaluate our long-term results with the Alloclassic CSF screw cup total hip arthroplasty system. This is the first study to provide a 30-year follow-up, based upon our 30-year follow up study on the Alloclassic stem system.

Methods: We reviewed 178 Alloclassic CSF screw cup systems, implanted in 171 patients from 1986 to 1987. The Zweymüller stem family was used in all cases. 136 patients had died over the last 30 years, so twenty-nine out of 35 patients being still alive, with a mean follow-up of 29,46 years (SD 0,48), were contacted by telephone and evaluated radiologically and clinically. Our loss-to-follow up was 17,14%. The mean age at follow-up was 83,01 years (72,4–95,2; SD 6,86).

Results: If the endpoint is defined as the removal of the cup for aseptic loosening (3 cases), the overall survival rate is 98,31%. If the endpoint is revision for any reason (27 cases), the survival rate is 84,83%. Eleven patients needed an exchange of head and liner. The mean time from implantation until change of head and liner was 21,44 years (SD 5,92).

Conclusion: After 30 years of monitoring we can state that the evaluated system is very reliable in primary and secondary THA.

1. Background

Various studies and registry data deal with short and midterm results of the cementless implanted Alloclassic CSF screw cup system, which was developed in 1985 by Prof. Karl Zweymüller with Sulzer Medica, Switzerland.

Some studies describe long-term results up to 20 years.

Since the first publication of the results of our cohort,¹ 15 years have passed and we have been able to obtain reliable long-term results.

Up to now, there is no publication dealing with results after 30 years and the events causing a revision of the prosthesis during this long timelapse. The aim was to evaluate the results after 30 years.

2. Patients and methods

From 1986 on, our institution has been implanting the describes Alloclassic CSF screw cup total hip arthroplasty system in primary and secondary hip surgery.

All of the 178 Alloclassic CSF systems (AlloPro/Sulzer Medica, Winterthur, Switzerland), implanted in 171 patients from 1986 to 1987,

were included in this study. In all cases, a standard PE liner was used.

The stems used were cementless too and consisted of Zweymüller hochgezogen (107) and SL (71); AlloPro/Sulzer Medica, Winterthur, Switzerland and Centerpulse, Winterthur, Switzerland).

The group included 102 women and 77 men.

The mean age at surgery was 62,71 years (33,2–83,1; standard-deviation 9,56).

The indication (Table 1) for total hip arthroplasty was primary osteoarthritis in 136 cases (76,40%) and secondary osteoarthritis in 30 cases (16,85%). Others were revision surgeries in 12 cases (6,74%).

Over the last 30 years, 136 patients had died. Out of 35 patients being still alive, 29 could be contacted by telephone. Due to bad general medical condition and distant relocation in many cases, we did not expect to get the chance to clinically evaluate a majority of the shrinking cohort. Those patients and their relevants were interviewed by telephone if the prostheses were still in situ and if there occurred any problems over the past years, concerning the prostheses. In nine cases we were able to perform a full clinical and radiological examination.

Our total loss-to-follow up was 17,1%. The mean age at follow-up was 83,1 years (72,4–95,2; SD 6,86).

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Table 1
Indications for implantation of the cementless Alloclassic THA-system.

Indication	Absolute number	Percentage
Primary osteoarthritis	136	76,40%
Necrosis of the femoral head	18	10,11%
Dysplasia	7	3,93%
Trauma	4	2,25%
Perthes	1	0,56%
St.p. Girdlestone procedure	5	2,81%
St.p. loosening of cup	7	3,93%

We assessed the survival rate of the implant, the adverse events caused by the implant over the last 30 years, the occurrence of radiolucent lines and osteolytic zones in the recent weight bearing x-rays according to the classification of DeLee and Charnley on the a-p view and the patients' satisfaction with the result after 30 years.

Survival curves were calculated for all implanted stems for aseptic loosening as well as revision for any reason.

3. Results

3.1. Survival rate

If the endpoint is the removal of the cup for aseptic loosening (3 cases), the overall survival rate is 98,31% (Fig. 1). If the endpoint is revision for any reason (27 cases), the survival rate is 84,83% (Fig. 2). Eleven patients needed an exchange of head and liner, one of them was operated twice on one hip. The mean time from implantation until change of head and liner was 21,44 years (SD 5,92). Those patients, who died over the last 30 years, have lived with the arthroplasty system for an average of 18,57 years (2,5–30,3; SD 6,96).

3.2. Radiological

Most of the radiolucent lines and osteolytic zones were found in the lateral DeLee and Charnley zone 1 (87,5%; n = 8). None of the implanted cups was considered to be at risk.

3.3. Clinical

Overall satisfaction of our patients with the implanted Alloclassic

cup system was very good (Fig. 3). None of the 29 patients described pain.

3.4. Adverse events resulting in further surgery (Table 2)

We had three cases of aseptic loosening as well as three cases of septic loosening. Aseptic loosening of the acetabular component was found three times, whereof two were seen in cases of a loose stem and one as a result of a totally worn-out liner. Five patients had to be revised because of a periprosthetic fracture. Major calcification occurred in three cases.

We had one case of implant-fracture, which lead to revision-surgery of the femoral component. One totally worn-out liner led to revision surgery of the acetabular component (Figs. 4 and 5).

One case of periprosthetic joint infection and one periprosthetic fracture resulted in a Girdlestone-procedure.

In three patients a fissure of the proximal femur was seen intraoperatively, so no second surgical procedure was needed.

4. Discussion

Pursuing our published data for the Alloclassic stem system after 30 years of follow-up, our evaluation of the cementless implanted Alloclassic CSF cup system is the first ultra-longterm-study with a mean follow up of 29,46 years.² During this timespan, a broad variety of complications occurred in our cohort. Nevertheless, for a big majority of 84,83%, the implantation of the evaluated THA-system was the last surgery needed involving the replaced joint.

15,17% needed revision surgery for any cause. It has to be considered, that in those cases, which needed an exchange of head and liner, a regular PE-liner had been used in the initial surgery. Since the introduction of ultra-high cross-linked UHMWPE in 1998, revision surgery was performed under usage of this material, which promises less wear and as a result, a far smaller revision rate due to wear.^{3–5}

Having good data for the cost-effectiveness of THA, this effect gets stronger when the revision rate decreases.^{6,7}

The fear of creating a life-long patient when performing a THA in a younger individual, does not seem to be justified, regarding the small wear rates of modern materials.

As expected, most of the radiolucent lines and osteolytic zones were found in the lateral zones of the cup according to DeLee and Charnley.

Fig. 1. Survival curve for the endpoint 'aseptic loosening of the stem'.

Fig. 2. Survival curve for the endpoint 'revision for any reason'.

Fig. 3. Radiograph showing excellent results after 30 years in a highly active 73-year old male (I).

Osteolytic zones around the stem were not uncommon, but none of the implants was considered to be at risk.^{8–10} Shown by the authors in a previous study, there may be a positive effect on the reduction of osteolytic zones caused by wear when changing head and liner.¹¹

Our findings are comparable to previous results shown by Delaunay, showing survival rates of 99% for loosening after 7–8 years.¹²

Pieringer et al. showed in 2006 98,4% survival rate (aseptic loosening) for the cup after 157 months.¹³ Busch et al. showed in 2012 89%

Table 2

Reasons for revision surgery.

Type of failure	Absolute number	Relative risk
Aseptic loosening of stem	3	1,69%
Septic loosening	3	1,69%
Periprosthetic fracture	5	2,81%
Major calcification	3	1,69%
Implant fracture (stem)	1	0,54%
Aseptic loosening of cup	2, all of them with loose stem	1,07%
Totally worn-out liner	1	0,56%
Wear	11	6,18%
Overall cases needing revision surgery	27	17,14%

survival rate (any reason) for cup and stem after 17 years.¹⁴ Schröder et al. reported a survival rate of 95% percent for the cup in revision cases after 6,1 years.¹⁵ With 2677 evaluated stems, the czech register published a survival rate of 99,81% after 1–11 years.¹⁶

It has to be stated, that the criteria 'revision for any reason' increases with the years and usage because of progressive wear and the need for replacing head and liner.¹⁷

Knowing the excellent results for aseptic loosening of the discussed system a succeeding cup needs further benchmarks to prove superiority. Criteria such as bone loss in revision surgery and reproducibility of surgical results are arguments to pursue the development and evaluation of bone sparing, and more anatomically shaped arthroplasty systems.^{18–20}

Our evaluation is limited by the small number of patients being alive after 30 years. Furthermore, most of the surviving patients are in a bad general medical condition or have moved far away from our institution, which leads to a very small number of clinical evaluations. Nevertheless, our primary aim was not the collection of clinical scores, but the survival rate of the implant and the resulting complications during a 30-year-timespan. This objective was achieved satisfactorily.

The evaluated system is very reliable in primary and secondary

Fig. 5. Intraoperative picture showing totally worn-out liner and affected cup.

THA, as shown in previous studies as well as in this one. In our institution, it has been the basic implant for many years. It is our backup-system in cases of failure of spherical pressfit cups.

Conflicts of interest

All authors declare that they have no conflicts of interest concerning this article.

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Fig. 4. Radiograph showing totally worn-out liner after 25 years.

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