

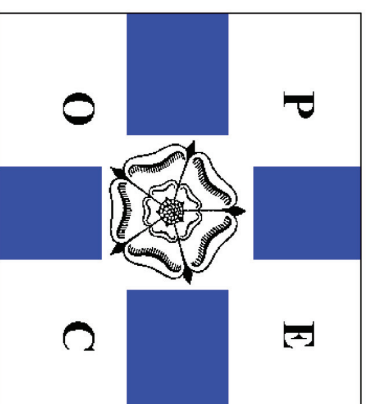
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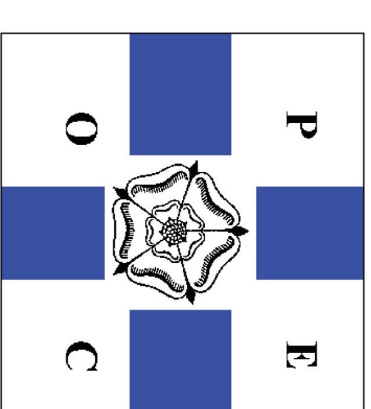
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# THE ORIGINAL EXETER POLISHED FEMORAL COMPONENT: A STUDY OF SURVIVORSHIP INTO THE 33rd YEAR OF FOLLOW-UP

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## INTRODUCTION:

The Exeter hip was developed in late 1969 and early 1970 jointly at the old Princess Elizabeth Orthopaedic Hospital and the School of Engineering Science at the University of Exeter.  
The stem was unique at the time in being entirely devoid of any form of neck collar and having a double taper configuration polished throughout its length. (Fig 1)

Original Exeter Stem and metal centraliser

## MATERIALS AND METHODS

For survivorship purposes, December 31, 2003 would mark the end of the survivorship study. All the initial clinical and operative data of the first 433 Exeter hips, inserted at the Princess Elizabeth Orthopaedic Hospital between November 1970 and the end of 1975 under the British National Health Service, were collected prospectively and the patients were reviewed at intervals over the years. 28 hips (6.46%) have been lost to follow-up. The mean age at operation was 66.8 years (30-84 years). Fifty-nine had undergone previous hip surgery, hence there were 374 primary interventions.

## Operative technique:

Cementation was crude by today's standard without formal cement pressurisation. The posterior approach to the hip was employed.

## Radiographic assessment:

AP and lateral radiographs were available for all the survivors and were examined jointly by two surgeons (Fig 2).<sup>50yr male who had previously undergone intertrochanteric that had failed</sup>

## RESULTS:

### Survivorship:

In this series, 14 cases have been revised for aseptic loosening of the stem. Unsurprisingly, the majority of patients have died (386 cases) leaving 33 survivors. Of the survivors, the average follow-up was 30.6 years, the maximum being 33 yrs. There were 41 cases at risk at the beginning of the 27th year.

However, as the nature of the entire cohort is known and there have been no failures beyond the 20th year and no cases lost to follow up since 1992, this can be confidently extended to the 33rd year where 7 cases remain at risk and the survivorship and confidence limits remain the same. Kaplan Meier survivorship curves and 95% confidence intervals have been generated with the end points as follows:

## RESULTS: Survivorship (cont)

- Revision for aseptic stem loosening. The survival rate is 93.5% with 95% CI of 90.0 to 97.0% (Fig 3)
- Revision for aseptic stem loosening or loss to follow-up. This is the 'worst case' scenario in which all cases lost to follow-up are regarded as failures. The survivorship rate with this endpoint is 85.8% with a 95% CI of 81.3 to 90.3% (Fig 3)
- Revision for aseptic cup loosening: The survivorship is 76.5% and the 95% CI 68.9 to 84.1% (Fig 4)
- Revision for aseptic cup loosening or loss to follow-up. Again, this is the 'worst case' scenario in which all cases lost to follow-up are regarded as failures. The survivorship is 71.3% with a 95% CI 63.9 to 78.7% (Fig 4)



Fig 1



Fig 2

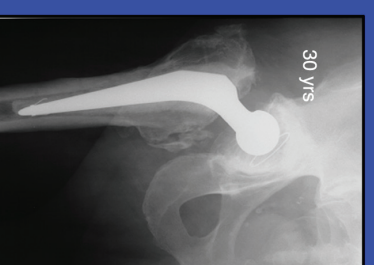


Fig 3

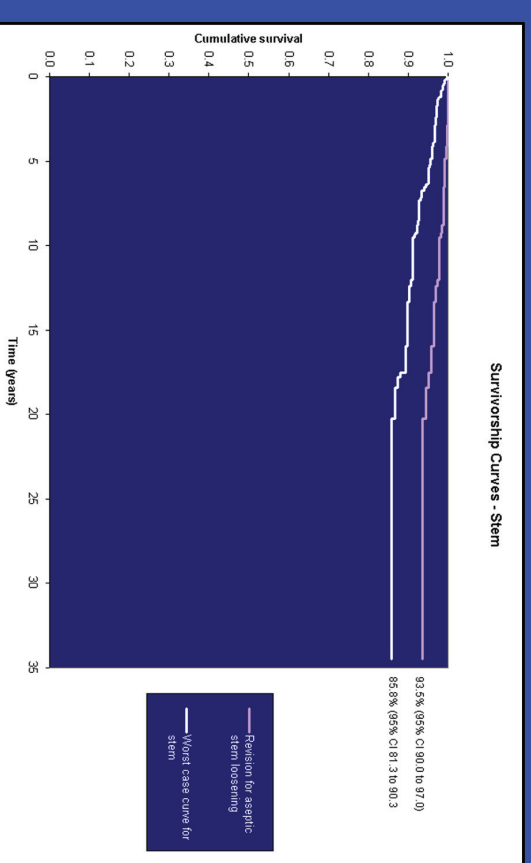


Fig 3

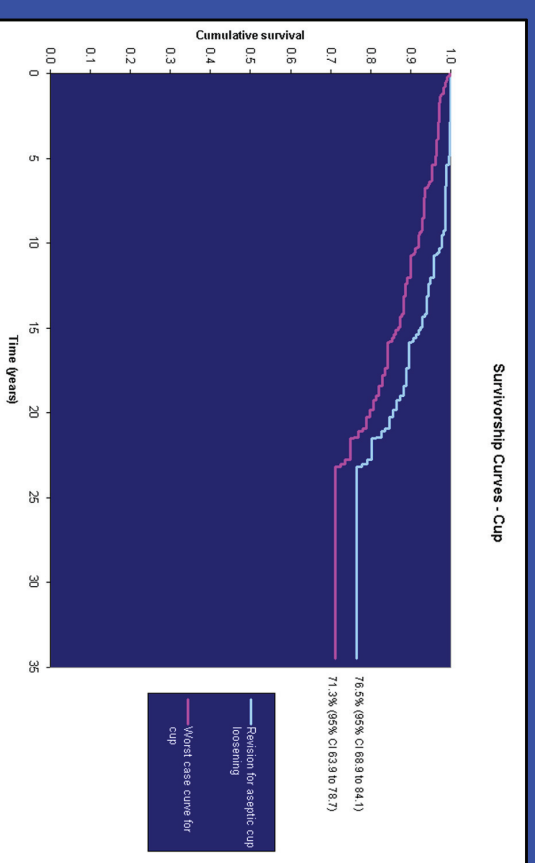


Fig 4

Pathology	Number of hips	Percentage incidence (%)
Neck fracture	15	3.46
Stem fracture	17	3.92
Aseptic cup loosening	37	8.54
Aseptic stem loosening	15	3.46
Deep infection	8	1.84
Recurrent dislocation	2	0.46
Peri-prosthetic fracture	2	0.46

Fig 5

## Complications and Failures: (Fig 5)

**Femoral stem neck fracture:**  
There was 15 neck fractures in a group of 95 stems that were incorrectly manufactured.

**Femoral stem fracture:**  
There have been to date 17 stem fractures (3.92%), but none since the 20th year of follow-up.

**Aseptic cup loosening:**  
There have been 37 revisions for aseptic cup loosening (8.54%). No cup has been revised for 'wear through'.

**Aseptic stem loosening:**  
14 stems have been revised for aseptic loosening (3.46%). 2 were re-revisions and 2 had previously undergone intertrochanteric osteotomies. None have been revised for aseptic loosening since the 20th year of the survivorship study and there has been no loss to follow-up since that time.

**Deep infection:**  
Revision for deep infection was necessary in 8 cases (1.84%).

**Recurrent dislocation:**  
15 hips dislocated (3.23%) and 2 (0.46%) required revision for recurrent dislocation.

**Periprosthetic fracture:**  
There have been 2 periprosthetic fractures in the whole series, one treated surgically and one conservatively.

## CONCLUSIONS:

The original polished Exeter stem was the first of what is now known as a 'taper-slip' or 'fore-closed' stem and has performed well over the long-term, rarely failing from aseptic loosening unless the cementing is grossly defective. The stem protects the cement firstly, because the polished surface does not damage the cement as the stem subsides and secondly, because the loading regime it so produces is dominated by compression and damaging tensile stresses are substantially reduced by stress relaxation. This series illustrates some interesting facets of both cemented femoral component design and function and the mechanical behaviour of acrylic cement *in vivo* that might never have emerged if this design had not reached clinical use.

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