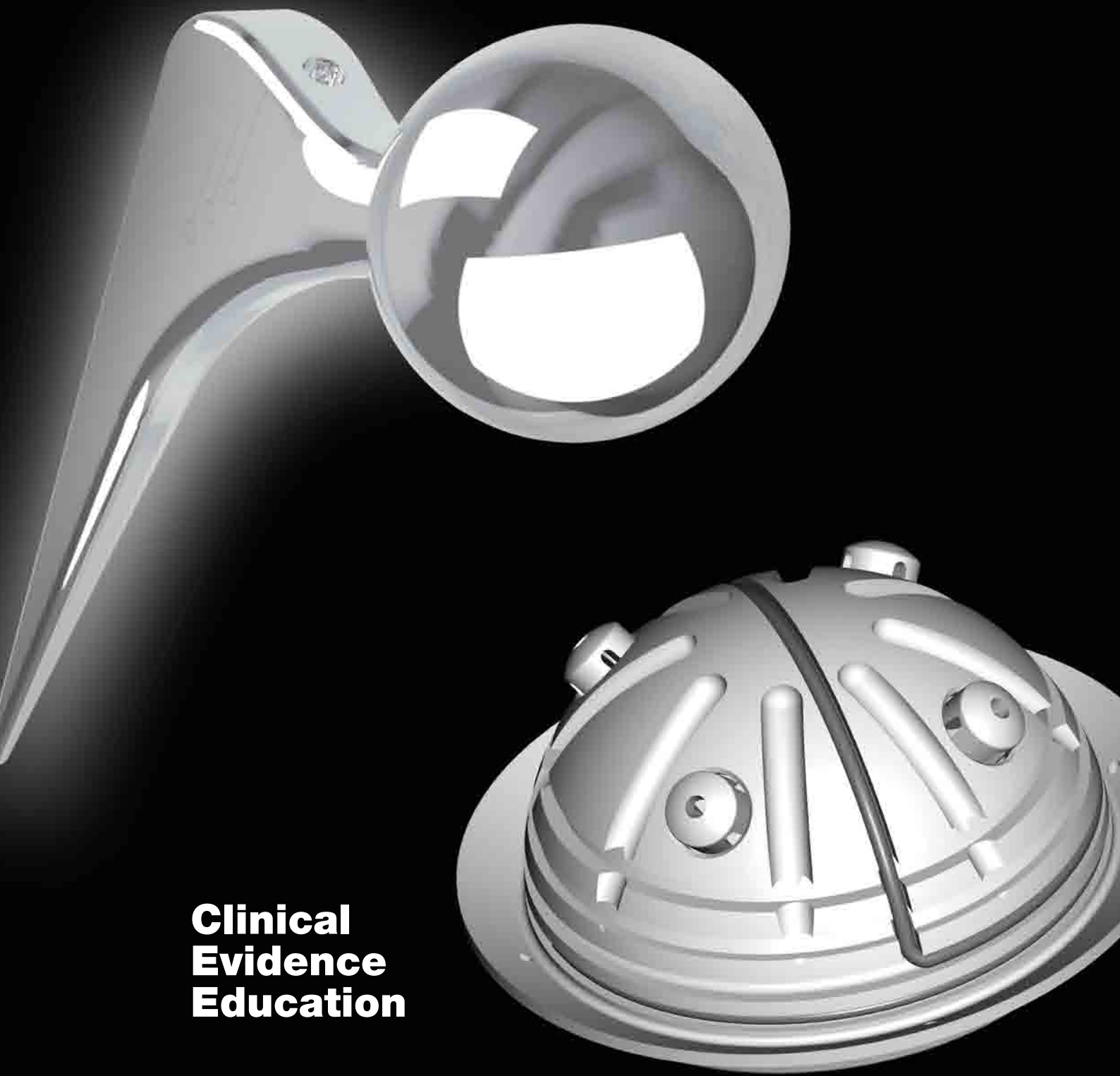
stryker®

Exeter®

Designed for Anatomic Restoration



Clinical
Evidence
Education

Anatomic Restoration

Exeter – re-creating biomechanics

In hip replacement, the smallest adjustment can make a big difference. Stryker and the Exeter team are committed to providing a range of options for restoring biomechanics and optimal implant positioning.

The Exeter hip offers:

- Enduring innovation[1]
- Long-term survivorship[2]
- 30-year published data results[2]

A fit for every patient

- Leg length, offset and version can be independently controlled[3]
- Taper slip design[4]
- Available in seven offsets with a range of body sizes, allowing multiple adjustments

Exeter - Clinical Evidence

Implant design is just one part of the Exeter story. The Exeter hip has both long and short-term clinical evidence.

Results from the UK 7th National Joint Registry report of England and Wales 2010

At 5 Years Cemented Stems have the highest survival rates in the register

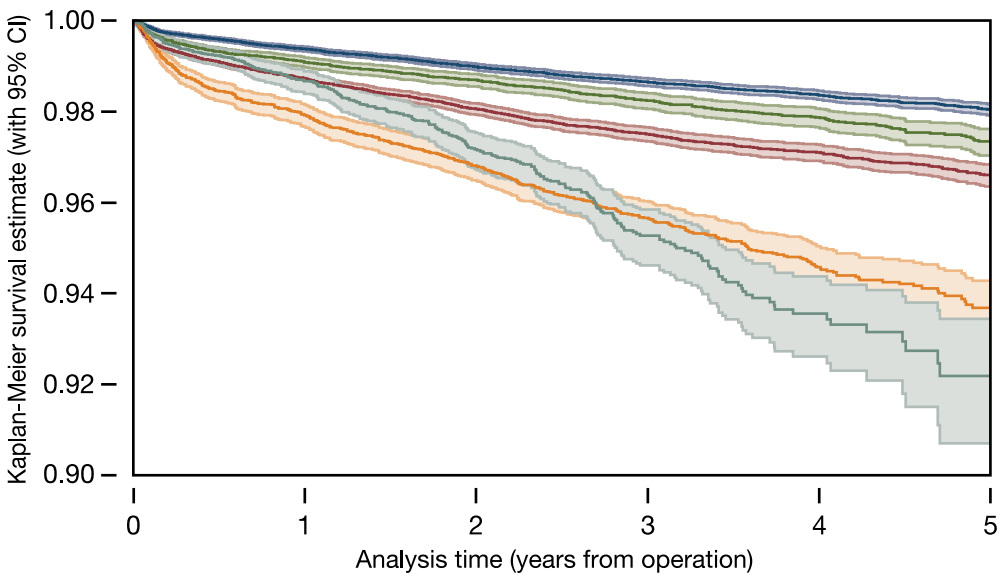


Figure 3.2

Implant survival of NJR-HES/PEDW linked primary hip replacements, by prosthesis type.

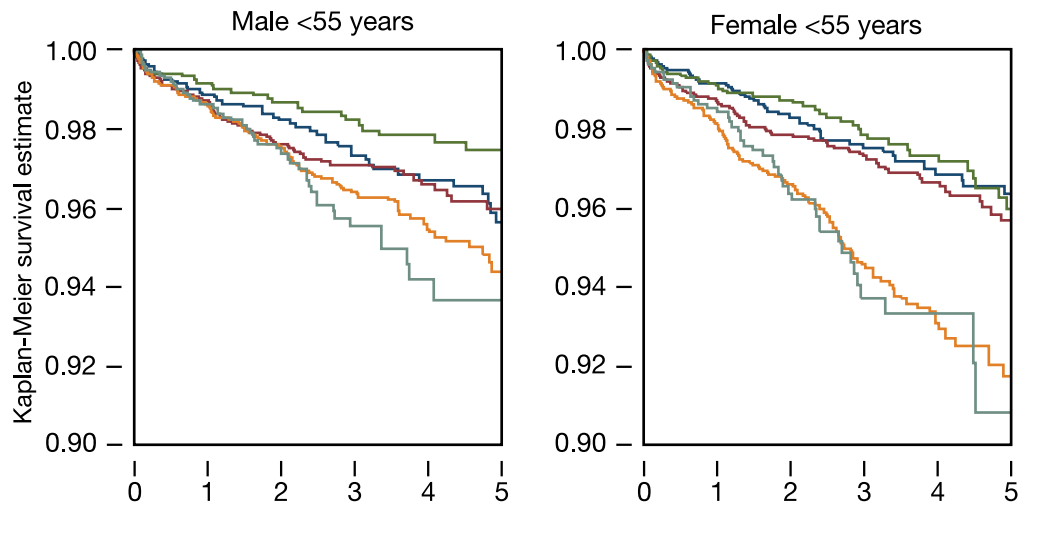


Figure 3.3

Implant survival of NJR-HES/PEDW linked primary hip replacements, by prosthesis type, gender and age.

- CORR 2008 Feb " The Exeter Universal stem performed well, even in young, high demand patients."[5]

2010 National Joint Registry

National Joint Registry revision rates by implant type

- Cemented stems show the lowest overall revision rates of all stems at 5 years in the NJR of England and Wales
- Exeter is one of the best performing stems in the NJR report of England and Wales
- Exeter shows 1.9% revision at 5 years; Corail 3.8%

Brand	Number of patients	Revision rate at three years[23] (95% CI)	Revision rate at five years[23] (95% CI)
Cemented stems			
Exeter V40	67,015	1.3% (1.2% to 1.4%)	1.9% (1.7% to 2.0%)
Charnley	13,565	1.3% (1.1% to 1.5%)	2.1% (1.8% to 2.4%)
CPT	10,226	1.8% (1.5% to 2.1%)	2.5% (2.1% to 3.0%)
C-stem	8,372	1.3% (1.1% to 1.6%)	1.6% (1.3% to 1.9%)
Stanmore modular	2,938	1.0% (0.6% to 1.6%)	1.4% (0.9% to 2.3%)
C-stem AMT	2,260	1.0% (0.6% to 1.7%)	N/A
CPS Plus	1,474	1.4% (0.8% to 2.3%)	2.3% (1.2% to 4.3%)
Muller-Biomet	1,469	2.4% (1.5% to 3.5%)	3.3% (1.8% to 6.0%)
MS-30	1,425	0.9% (0.4% to 1.7%)	1.3% (0.6% to 2.6%)
SP II	1,271	2.4% (1.7% to 3.5%)	2.9% (2.0% to 4.1%)
Elite Plus	1,188	1.2% (0.7% to 2.0%)	1.8% (1.1% to 2.8%)
Muller STR	1,177	1.4% (0.9% to 2.4%)	2.6% (1.6% to 4.3%)
Omnifit	1,078	1.5% (0.9% to 2.5%)	3.0% (1.9% to 4.7%)
All	**113,458**	**1.3% (1.3% to 1.4%)**	**2.0% (1.9% to 2.1%)**
Cementless stems			
Corail	30,093	2.6% (2.4% to 2.9%)	3.8% (3.3% to 4.3%)
Furlong HAC	13,977	2.5% (2.2% to 2.8%)	3.1% (2.7% to 3.5%)
Accolade	4,184	2.5% (1.8% to 3.4%)	2.8% (2.0% to 4.0%)
SL-plus	4,161	3.3% (2.7% to 4.0%)	4.4% (3.6% to 5.5%)
Taperloc	3,689	2.3% (1.8% to 3.1%)	3.4% (2.1% to 5.6%)
CLS	2,332	3.1% (2.3% to 4.1%)	5.9% (3.8% to 9.0%)
Synergy	2,156	2.1% (1.5% to 3.0%)	3.7% (2.2% to 6.1%)
Bimetric	1,834	2.8% (2.0% to 3.8%)	3.4% (2.5% to 4.6%)
ABG II	1,565	2.9% (2.1% to 3.9%)	3.8% (2.8% to 5.0%)
Versys	1,064	3.5% (2.5% to 5.0%)	4.8% (3.4% to 6.8%)
S-ROM	1,018	4.0% (2.8% to 5.7%)	5.5% (4.0% to 7.7%)
Profemur	1,004	3.1% (2.0% to 4.6%)	3.1% (2.0% to 4.6%)
All	**67,077**	**2.6% (2.5% to 2.8%)**	**3.6% (2.4% to 3.8%)**

Exeter - Innovation that stands the test of time

2010 Australian Joint Replacement Registry Results

This registry shows that Exeter performs well as a hybrid as well as a total cemented THR.

Femoral Component	Acetabular Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
C-Stem	Duraloc	41	1040	5199	0.79 (0.57, 1.07)
C-Stem	Pinnacle	13	665	1701	0.76 (0.41, 1.31)
CPCS	R3	8	589	536	1.49 (0.64, 2.94)
CPCS	Reflection	28	1915	6323	0.44 (0.29, 0.64)
CPT	Trabecular Metal Shell	15	669	1277	1.17 (0.66, 1.94)
CPT	Trilogy	96	3876	14204	0.68 (0.55, 0.83)
Elite Plus	Duraloc	70	1078	6732	1.04 (0.81, 1.31)
Exeter	Vitalock	45	1218	9354	0.48 (0.35, 0.64)
Exeter V40	ABGII	29	999	5904	0.49 (0.33, 0.71)
Exeter V40	Trident	416	20325	62687	0.66 (0.60, 0.73)
Exeter V40	Vitalock	47	1959	11233	0.42 (0.31, 0.56)
MS 30	Allofit	23	1041	4421	0.52 (0.33, 0.78)
Omnifit	Trident	52	1648	7407	0.70 (0.52, 0.92)
Spectron EF	BHR	5	433	1045	0.48 (0.16, 1.12)
Spectron EF	Reflection	143	4373	19366	0.74 (0.62, 0.87)
VerSys	Trilogy	12	713	3545	0.34 (0.17, 0.59)
Other (403)		403	11855	52586	0.77 (0.69, 0.84)
TOTAL		**1477**	**56156**	**219941**	**0.67 (0.64, 0.71)**

Note: Only prostheses with over 400 procedures have been listed.

And compared to a commonly used cementless stem in Australian registry 2010.

Corail	ASR	142	2888	6509	2.18 (1.84, 2.57)
Corail	Duraloc	30	1247	4725	0.63 (0.43, 0.91)
Corail	Pinnacle	138	7575	13277	1.04 (0.87, 1.23)

In the 2010 Australian Joint Registry, Exeter is one of the best performing of the cemented stems and has the highest number of observed component years in the category of cement fixation.

Table HT51: Revision Rates of Primary Total Conventional Hip Replacement with Cement Fixation

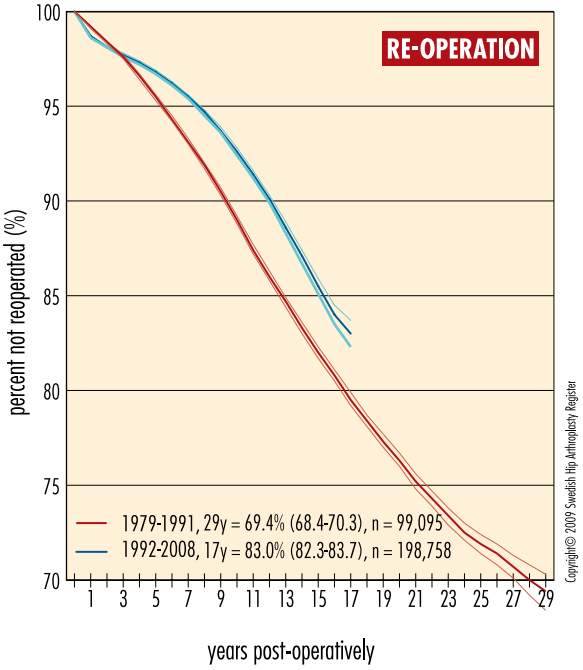
Femoral Component	Acetabular Component	N Revised	N Total	Obs. Years	Revisions/100 Obs. Yrs (95% CI)
CPCS	Reflection	18	626	2298	0.78 (0.46, 1.24)
CPT	ZCA	14	537	2694	0.52 (0.28, 0.87)
Charnley	Charnley	14	590	2692	0.52 (0.28, 0.87)
Charnley	Charnley Ogee	33	709	3588	0.92 (0.63, 1.29)
Exeter	Contemporary	26	494	3390	0.77 (0.50, 1.12)
Exeter	Exeter	16	420	3133	0.51 (0.29, 0.83)
Exeter V40	Contemporary	95	3903	15320	0.62 (0.50, 0.76)
Exeter V40	Exeter	48	1588	7352	0.65 (0.48, 0.87)
Exeter V40	Exeter Contemporary	58	2296	7334	0.79 (0.60, 1.02)
MS 30	Low Profile Cup	6	640	3641	0.16 (0.06, 0.36)
Spectron EF	Reflection	51	1482	6996	0.73 (0.54, 0.96)
Other (296)		195	5683	26839	0.73 (0.63, 0.84)
TOTAL		**574**	**18968**	**85278**	**0.67 (0.62, 0.73)**

Note: Some cementless components have been cemented.
Only prostheses with over 400 procedures have been listed.

2008 Swedish Hip Arthroplasty Register

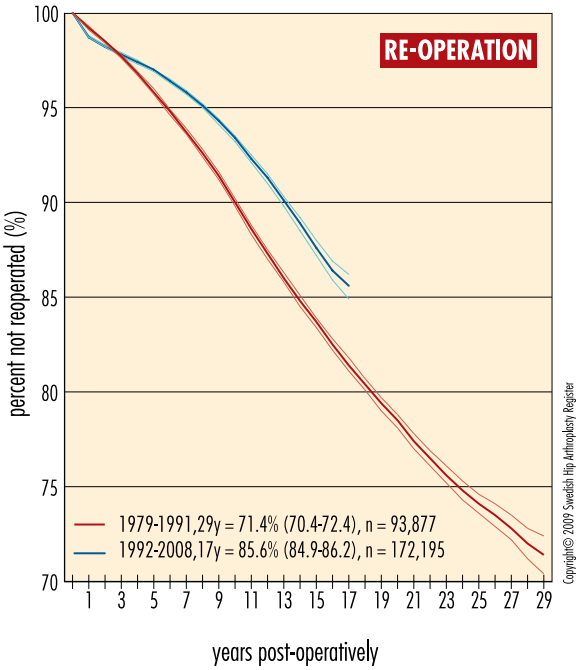
All implants

All diagnoses and all reasons



All cemented implants

All diagnoses and all reasons



- The risk of early revision (within 2 years) is almost or more than doubled for all-uncemented implants compared with all-cemented

- Implant Survival per type at 5 years – all diagnoses and all reasons for revision Exeter/Cont 96.2%

Revision Burden

Registers show the revision rates of various implants

Across the registers, Cemented outperform Cementless and Exeter is one of the best in the Cemented category (NJR England and Wales and Australian report 2010).

Cemented	Cementless	Exeter	Registry
2	3.6	1.9	NJR
3.1	3.7	2.7	AOA
2.55	3.65	2.3	average

The cost of a revision is $16,000 (Acta Orthopaedica 1996;67(2):115-121)£10,400.10

If a hospital carries out 100 primary hip replacements the graph below shows the cost in Pounds of the primary stems

100 Cemented primary stems	51,598
100 Cementless primary stems	84,050

The cost of revision based on the average registry data above is

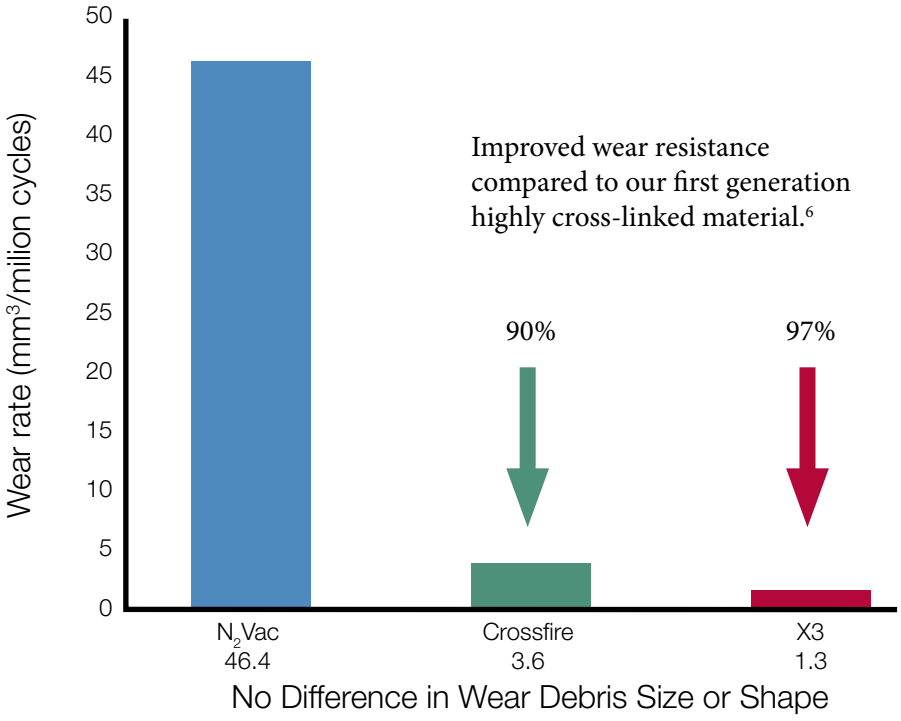
Cost of revision of Exeter	23,920
Cost of revision of Cementless	37,960

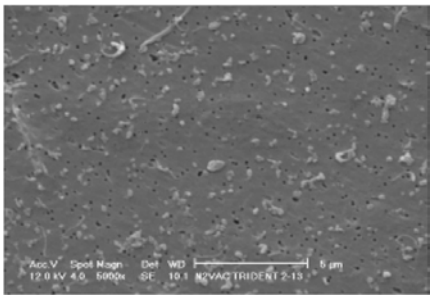
Therefore the overall cost of treating those 100 patients would be as shown below

Total Cost of Exeter stems	75,518
Total Cost of Cementless stems	122,010

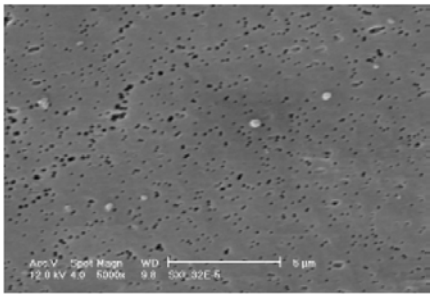
These average costs are from Eucomed 2009HY.

Hip wear performance of next generation cross-linked and annealed polyethylene[6]





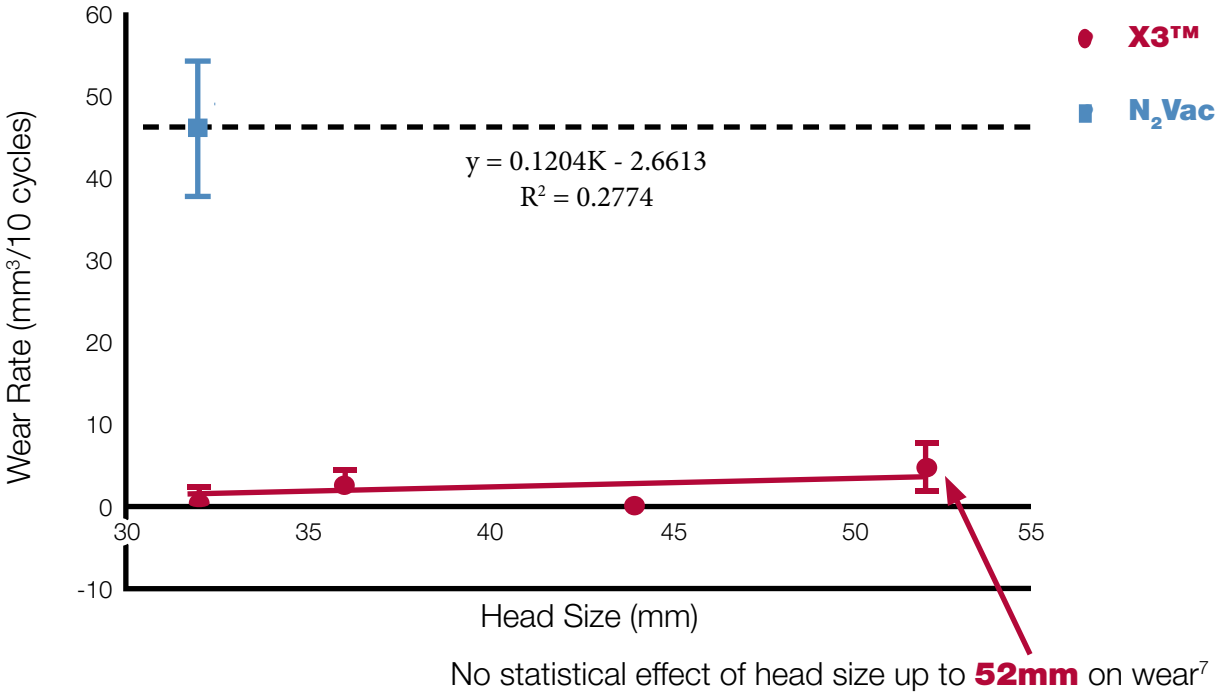
N_2Vac



X3™

No statistical difference (p>0.19) in wear debris size

Wear rate Trident X3 and Trident N_2Vac vs. head diameter at 5mc[7]



No statistical effect of head size up to **52mm** on wear[7]

X3 Technology

X3 Polyethelyne[8] is the first highly cross-linked polyethylene to offer:

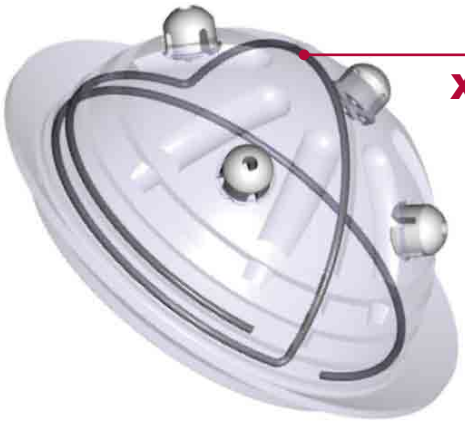
- Structural fatigue strength better than conventional polyethylene[9, 10]
- 97% wear reduction; greater than first generation highly cross-linked polyethylene[11]
- Oxidation resistance similar to virgin polyethylene[12, 13]

All this allows the use of Anatomic femoral heads which provide greater range of motion, reducing the risk of dislocation and enhance joint stability.[14]

Rim Cutter[15]

Although the Exeter X3 RimFit cup can be implanted without the Rim Cutter we recommend its use. The Rim Cutter allows an even rim to be cut in the acetabulum. There is clinical evidence that the use of the Rim Cutter improves socket positioning, cement penetration and mantle thickness[16] as well as reducing the incidence of radiolucent lines in zone 1.[17]

All sizes not currently available.



X-Ray Wire

The X-Ray Wire on an Exeter X3 RimFit cup is designed to suit surgeons familiar with equatorial wire and surgeons familiar with a ½ polar and ½ equatorial wire. Providing both wires on the same cup (with a single wire), allows any surgeon to look at what he prefers when he perform a post-op X-Ray analysis.

PMMA Spacers

- Promote an even cement mantle if Rim cutter is not used.
- An even cement mantle potentially reduces the risk of bottoming out.[18]

Size Availability

Inner Diameter	Outer Diameter											
	40									■	■	■
	36							■	■	■	■	■
	32					■	■	■	■	■	■	■
	28			■	■	■	■	■	■	■	■	■
	22.2	■	■	■								
		40	42	44	46	48	50	52	54	56	58	60

■ Available Sizes

Exeter - Leading the way in research

Exeter stem survivors from independent centres

The Exeter Universal Stem: A minimum ten year review from an independent centre.
(Bannister et al ; JBJS 2006)
Avon Orthopaedic Centre, Bristol
98.9% Stem survival for Aseptic Loosening at 10 years

The use of the cemented Exeter Universal femoral stem in a District General Hospital.
A MINIMUM TEN-YEAR FOLLOW-UP
(Young et al ; JBJS 2009)
West Suffolk Hospital, Bury St. Edmunds
100% Stem survival for Aseptic Loosening at 10 years

Exeter stem survivors in the young patients

The Exeter Universal hip in patients 50 years or younger at 10-17 years' followup.
(Lewthwaite et al: CORR2008)
100% survivorship 17 years for aseptic loosening

The medium-term results of the cemented Exeter femoral component in patients under 40 years of age.
(DCJ. De Kam et al: JBJS 2008)
100% survivorship at 7 years for aseptic loosening

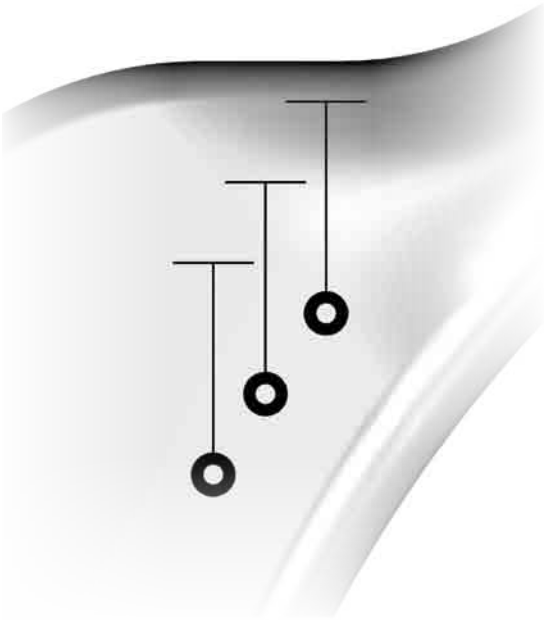
Exeter stem survivors long-term results

The Exeter universal cemented femoral component at 15 to 17 years. A study of the first 325 hips.
(N Carrington et al JBJS 2009)
100% survivorship at 17 years for aseptic loosening, 99% survivorship with revision for any reason as end-point

Cemented total hip replacement for primary OA in patients 55 or older.
(Makela et al JBJS 2008)
Only two designs of femoral component, the Exeter Universal and the Müller Straight femoral component had a survivorship of over 95% at ten years

Education

Exeter has always had an excellent education program and this continues to evolve. We now have educational meetings throughout the world for all levels of surgeon experience.



These include:

- **Principals of Cemented Hip Arthroplasty Course**
  This course is aimed at junior trainees and is a very practical course teaching the basics of a cemented hip arthroplasty. All delegates will leave the course having carried out the femoral and acetabular components of a cemented THR on sawbones.

- **Primary Exeter Symposium**
  This course has been running in Exeter now for a number of years and is aimed at senior trainee surgeons. The day and a half course covers the clinical history of the Exeter Stem, how the Exeter Stem works, live surgery and has an introduction to revision.

- **Complex Primary and Revision Exeter Symposium**
  This course is a very interactive course and is aimed at consultants dealing with complex primary hips and revision hip surgery. It covers Impaction bone grafting, bearing materials and the young patient.

Notes

Notes

Notes

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References

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10. Essner, A., et al., "Acetabular Liner Function Fatigue Performance of Crosslinked UHMWPE," 51st. Annual ORS paper No. 0245, Washington, DC 2005.
11. Stryker Orthopaedics Test Report: RD-03-082.
12. X3 UHMWPE maintains mechanical properties after accelerated oxidative aging. No statistical difference was found for Tensile Yield Strength, Ultimate Tensile Strength and Elongation as measured per ASTM D638 before and after exposure to ASTM F2003 accelerated aging (5 Atmospheres (ATM of oxygen at 70˚C for 14 days). Tensile Yield Strength was 23.5 ± 0.3 MPa and 23.6 ± 0.2 MPa, Ultimate Tensile Strength was 56.7 ± 2.1 MPa and 56.3 ± 2.3 MPa and Elongation was 267 ± 7% and 266 ± 9% before and after accelerated oxidative aging, respectively.
13. X3 UHMWPE resists the effects of oxidation. No statistical difference was found for Tensile Yield Strength, Ultimate Tensile Strength, Elongation, Crystallinity and Density as measured per ASTM D638, D3417 and D1505 before and after ASTM F2003 accelerated aging (5 ATM of oxygen at 70˚C for 14 days). Tensile Yield Strength was 23.5 ± 0.3 MPa and 23.6 ± 0.2 MPa, Ultimate Tensile Strength was 56.7 ± 2.1 MPa and 56.3 ± 2.3 MPa, Elongation was 267 ± 7% and 266 ± 9%, Crystallinity was 61.7 ± 0.6% and 61.0 ± 0.5% and Density was 939.2 ± 0.1 kg/m^3 before and after accelerated oxidative aging, respectively.
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