

Taperloc® Hip System

Clinical Paper Reference List

Introduction

Over the past 40 years, there have been numerous short-term,^{1,2} mid-term,³⁻⁵ and long-term⁶⁻⁸ published clinical studies and presentations that include: octogenarians,⁴ young patients,⁶ and immediate weight bearing,⁹ documenting the clinical utility of the Taperloc and Taperloc Complete implant systems. The following Taperloc and Taperloc Complete clinical summaries represent the results from National Joint Registries and published clinical articles from multiple authors, medical centers and patient groups.

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National Joint Registries

Taperloc Cementless Stem

Registry	Number of Patients	5 Year Survivorship*	10 Year Survivorship*	15 Year Survivorship*
National Joint Registry England and Wales. 19 th Annual Report, 2022. (Exceed™ ABT® Cup) ¹⁰	27,294	98.24% (98.08% to 98.4%)***	97.73% (97.52% to 97.92%)***	97.39% (96.98% to 97.74%)***
Australian Orthopaedic Association Joint Registry. Annual Report, 2022** (G7 Cup) ¹¹	4,194	97.1% (96.4% to 97.6%)***	N/A	N/A
National Joint Registry England and Wales. Industry Report, 2022. (Any Cup) ¹²	33,199	99% (98.9% to 99.1%)***	98.7% (98.5% to 98.8%)***	98.2% (97.8% to 98.5%)***
Australian Orthopaedic Association Joint Registry. Industry Report, 2023** (Any Cup) ¹³	3,821	98.5% (98.1% to 98.9%)***	97.7% (97.1% to 98.1%)***	96.8% (96.1% to 97.4%)***

* Survivorship has been calculated as 100% – CPR (cumulative percentage revision rate)

** See Appendix for details on AOA results

*** 95% Confidence Intervals (for longest duration)

National Joint Registries (cont.)

Taperloc Complete Cementless Stem

Registry	Number of Patients	5 Year Survivorship*	10 Year Survivorship*
National Joint Registry England and Wales. 19 th Annual Report, 2022. (Exceed™ ABT® Cup) ¹⁰	3,831	98.41% (97.94% to 98.77%)***	98.12% (97.56% to 98.55%)***
National Joint Registry England and Wales. Industry Report, 2023. (Any Cup) ¹⁴	11,288	99.2% (99% to 99.4%)***	98.7% (97.7% to 99.3%)***
Australian Orthopaedic Association Joint Registry. Industry Report, 2023** (Any Cup) ¹⁵	9,086	99.2% (99% to 99.4%)***	99.2% (98.9% to 99.4%)***

* Survivorship has been calculated as 100% – CPR (cumulative percentage revision rate)

** See Appendix for details on AOA results

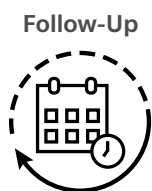
*** 95% Confidence Intervals (for longest duration)

Published Clinical Articles

Early Experience with a Short, Tapered Titanium Porous Plasma Sprayed Stem with Updated Design¹

Lombardi AV Jr, Manocchio AG, Berend KR, Morris MJ, Adams JB

Study Characteristics



Short-Term



Taperloc Complete
Microplasty



93 Hips in 92 Patients

Results

No Loosening

No Osteolysis

Low Incidence of
Complications and Revision

The study reviews the experience with a short, tapered titanium femoral component in a **mean follow-up of 4.5 years (range, 2 to 6)** and the mean patient age was 63.2 years. A total of 92 patients were treated in a single center with 93 Taperloc Complete Microplasty femoral components and were available for a review with a minimum two-year follow up. The Harris hip score improved from 52.5 to 84.7 post-operatively and there was no evidence of loosening, osteolysis, distal hypertrophy, or pedestal formation in any hip. **Radiographic assessment was excellent for all patients.**

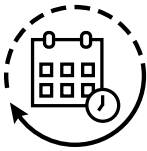
Published Clinical Articles (cont.)

Early Experience with a Tapered Titanium Porous Plasma Sprayed Stem with Updated Design²

Manocchio AG Jr, Berend KR, Morris MJ, Adams JB, Lombardi AV Jr.

Study Characteristics

Follow-Up



Short-Term

Stem Model



Taperloc Hip System

Patients



103 Hips in 97 Patients

Results

No Loosening

No Osteolysis

Low Rate of Revision

The aim of the study was to evaluate the early experience with an updated design. There were 107 hips in a **mean follow-up of 5.3 years (range, 2 to 7 years)** with a patients mean age of 61.8 years. The Harris hip score improved from 53.6 to 87.9.

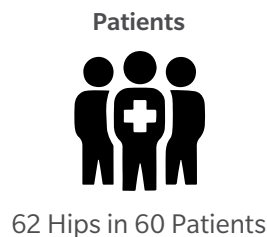
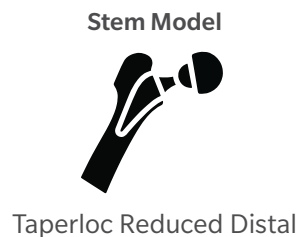
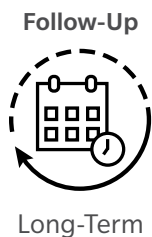
There were good results and low rate of revisions, radiographic findings were excellent in all hips and no aseptic loosening or osteolysis occurred.

Published Clinical Articles (cont.)

Second-Generation Uncemented Total Hip Arthroplasty: a Minimum 20-Year Follow-Up³

Jeffrey R. McLaughlin, MD; Kyla R. Lee, MD

Study Characteristics



Results

Low Revision Rate

No Revisions
for Aseptic Loosening

Femoral Component
Survival was 100%

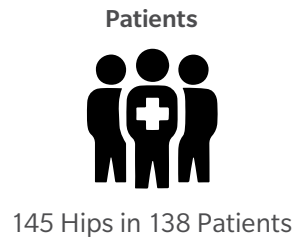
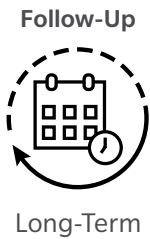
The authors reviewed 60 second-generation Taperloc Reduced Distal titanium uncemented femoral components, comparing clinical and radiological data to the first-generation Taperloc stem. The Taperloc Reduced Distal stem was implanted in **60 patients** between 1993 and 1994. Complete clinical and radiological follow-up was obtained for all **62 hips at a mean of 22 years (20 to 25)**. One femoral component was revised after a fracture, and one was revised for late sepsis, but no additional femoral components were loose by radiological criteria. Mild proximal femoral osteolysis was identified in two hips. These findings suggest that refinements in component design may be associated with excellent long-term fixation in cementless primary total hip replacement.

Published Clinical Articles (cont.)

Uncemented Total Hip Arthroplasty with a Tapered Titanium Femoral Component: A Minimum 30-Year Follow-Up¹⁶

Jeffrey R. McLaughlin, MD; Kyla R. Lee, MD

Study Characteristics



Results

Survival Rate of 80%
(Kaplan-Meier)

99% Survivorship for Aseptic
Loosening at 35 Years

The aim of the study was to report the updated results at a minimum follow-up of 30 years. The 145 THAs were implanted by a single surgeon on 138 patients, but only 40 of them survived a minimum of 30 years which are the focus of the review. The clinical follow-up at a minimum was obtained on every living patient while radiological follow-up was obtained on all but four.

The mean of the follow-up was **32 years (30 to 37 years)**. With regards to aseptic loosening, the Taperloc femoral component provides excellent fixation at a mean follow-up of 32 years.

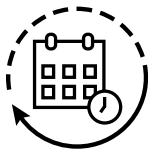
Published Clinical Articles (cont.)

Primary Total Hip Arthroplasty with an Uncemented Femoral Component: A Long-term Study of the Taperloc Stem¹⁷

Javad Parvizi, MS, FRCS; Kjell S. Keisu, MS; William J. Hozack, MD; Peter F. Sharkey, MD; Richard H. Rothman, MD, PhD

Study Characteristics

Follow-Up



Mid to Long-Term

Stem Model



Taperloc

Patients



129 Hips in 121 Patients

Results

No Evidence
of Subsidence

No Evidence
of Loosening

Low Revision Rate

The authors evaluated the long-term clinical outcome of the Taperloc stem. Clinical and radiographical records of **121 patients (129 hips)** who underwent primary THA were retrospectively reviewed. The average **follow-up period was 11 years (range, 6 to 15 years)**. One stem was revised for osteolysis, and 5 patients reported thigh pain. There was no evidence of subsidence or loosening. The authors concluded that the **mid to long-term outcome of the Taperloc stem is excellent**, with a low revision rate and high patient satisfaction.

Published Clinical Articles (cont.)

Primary Cementless Total Hip Arthroplasty in Octogenarians: Two to Eleven Year Follow-Up⁴

Kjell S. Keisu, MD; Fabio Orozco, MD; Peter F. Sharkey, MD; William J. Hozack, MD; Richard M. Rothman, MD, PhD

Study Characteristics

Follow-Up



Short Mid-Term Results

Stem Model



Taperloc

Patients



123 Hips in 114 Patients

Special Characteristic



Elderly Patients
Octogenarians

Results

100% Survivorship
(No Femoral
Component Revision)

No Evidence
of Mechanical Failure

All Femoral Implants
had Positive Bone Fixation

Although cementless procedures are common for younger populations, few prior studies have focused on this option for older patients. As the older population becomes more active, interest in cementless options for these individuals continues to grow.

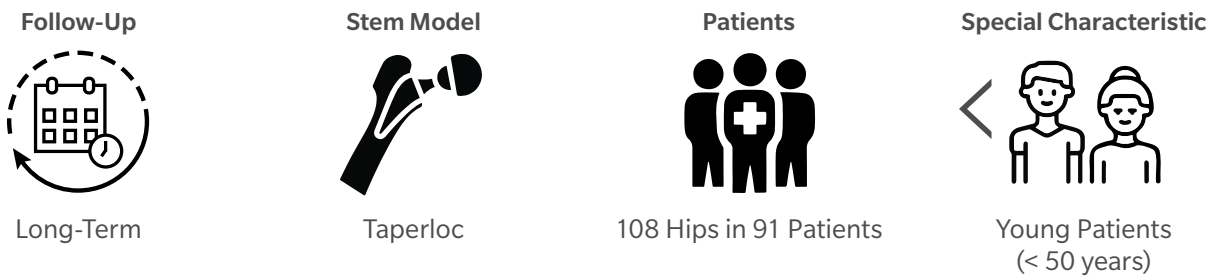
This study evaluated the clinical outcomes of cementless total hip replacements for patients between **80 and 89 years old**. There were 123 hips implanted on 114 patients, but only 69 hips were available for follow-up. Results showed radiographically stable femoral components and bone attachment with no femoral component revisions. After a minimum of **two years follow-up (range 2 to 11 years)**, no patients demonstrated component loosening. Based on this information, the authors concluded that **adequate stability and bone fixation can be achieved in the bone of elderly patients**. This is critical to implant success, as older patients continue to require longer survivorship from their implants. According to the results reported between two and eleven years, **cementless fixation for elderly patients is a viable treatment option**.

Published Clinical Articles (cont.)

Total Hip Arthroplasty With an Uncemented Tapered Femoral Component in Patients Younger than 50 Years Stem: A Minimum 20-Year Follow-Up Study⁶

Jeffrey R. McLaughlin, MD; Kyla R. Lee, MD

Study Characteristics



Results

No Revision for Aseptic
Loosening at 29 Years

90% Survivorship
at 29 Years
(any Revision in Stem)

The purpose of this study was to evaluate the clinical and radiographic results of the Taperloc femoral component in young patients at a **mean follow-up of 25 years (10 to 29 years)**.

No femoral component required revision for aseptic loosening and no femoral component was loose by radiographic criteria up to 29 years.





The authors believe that based on these results, **Taperloc is a reliable stem in young patients** requiring total hip arthroplasty.

Published Clinical Articles (cont.)

Cementless Femoral Fixation in the Rheumatoid Patient Undergoing Total Hip Arthroplasty: Minimum 5-year Results¹⁸

Kjell S. Keisu, MD; Fabio Orozco, MD; John D. McCallum, II, MD; Gina Bissett, BA; William J. Hozack, MD; Peter F. Sharkey, MD; Richard H. Rothman, MD, PhD

Study Characteristics

<p>Follow-Up</p>  <p>Short-Term</p>	<p>Stem Model</p>  <p>Taperloc</p>	<p>Patients</p>  <p>62 Hips in 49 Patients</p>	<p>Special Characteristic</p>  <p>Rheumatoid Patients</p>
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Results

No Revision
for Aseptic Loosening

99% Bone Fixation

Rheumatoid arthritis patients treated with total hip arthroplasty present unique circumstances when compared to those treated for osteoarthritis. Rheumatoid bone, which is often more osteoporotic, may be less likely to support cementless implants. However, this option offers greater potential for longevity in this younger population. There were 62 hips implanted in 49 patients with diagnosis of rheumatoid arthritis, but for different circumstances only 50 hips were available for review at a **minimum 5-year follow-up** after surgery (**mean, 8 years; range 5 to 12 years**).

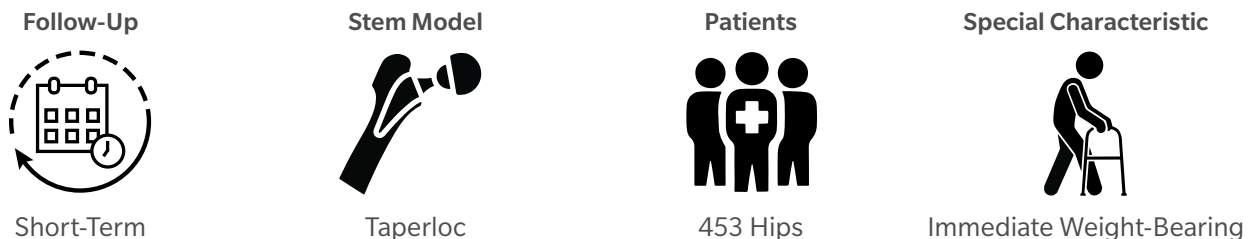
This study, using the Taperloc hip, represents one of the largest series specifically dedicated to uncemented total hip arthroplasty for rheumatoid arthritis patients. Patients were evaluated at a minimum of five years follow-up, after which all were observed to have substantial improvement in function, motion, and pain relief. There were no intra-operative femoral fractures with insertion of the device and no femoral failures due to aseptic loosening. The authors conclude that **this prosthesis design offers promising results** for cementless total hip arthroplasty in the **rheumatoid arthritis population**.

Published Clinical Articles (cont.)

Tapered Titanium Femoral Implant Allows Immediate Weight-Bearing⁹

Barry J. Waldman, MD

Study Characteristics



Results

No Revision
for Loosening

No Osteolysis

According to this author a main advantage to a wedge-shaped implant design is its ability to obtain immediate three-point fixation in the proximal portion of the femur. This provides initial fixation and resistance to rotation along with axial stability, making this stem design especially suited to early weight-bearing.

Taperloc implants were implanted in 453 consecutive degenerative hips using mini-incision posterior (52%), mini-anterolateral (37%) and anterolateral (11%) approaches, followed by immediate weight-bearing. **On the first post-operative day all patients were able to ambulate with assistive devices**, 2.8 days post-operative patients climbed stairs with assistance and after 38 days (range 7 to 62 days) patients could perform these activities with no assistance or assistive devices.

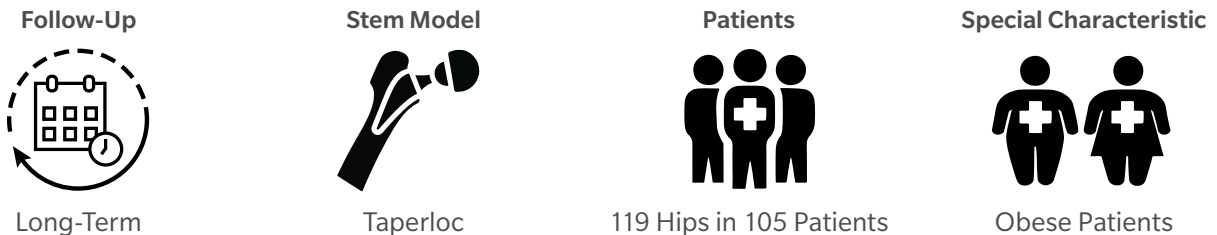
At two year follow-up (**mean 2.9 years**) no hips were revised for loosening, the HHS was 95 and only three hips showed subsidence greater than 2 mm, with one resulting in a revision for a shortened effective femoral neck. The author states that subsidence provides increased fixation, but significant subsidence is usually due to a grossly undersized implant. The author concludes that **the ability to allow immediate weight-bearing** after surgery **is a well-documented feature of wedge-shaped titanium implants**.

Published Clinical Articles (cont.)

Uncemented Total Hip Arthroplasty Using a Tapered Femoral Component in Obese Patients: An 18 to 27 Year Follow-Up Study⁷

Jeffrey R. McLaughlin, MD; Kyla R. Lee, MD, FACP

Study Characteristics



Results

99% Survivorship for
Aseptic Loosening
at 27 Years

Radiographic and clinical outcomes for Taperloc hip were reported from a consecutive cohort of obese and morbidly patients at a mean follow-up of 23 years.

Of the 105 patients (119 hips), 47 patients (**55 hips**) were alive at an average **follow-up of 23 years (range, 18 to 27 years)**. Fifty-two stems remained in situ and three (6%) had been revised, none for aseptic loosening. Two (4%) femoral components were removed during acetabular revision at 7 and 18 years. One (2%) stem was revised for sepsis at 12 years. All three of these stems were found to be well fixed at the time of revision surgery. The Harris hip score was available for all 52 hips that had not undergone revision of the femoral component. The average Harris hip score improved from 56 points (range, 35 to 66 points) pre-operatively to 87 points (range, 57 – 100 points) at the time of last follow-up and thigh pain was present in 2 hips (4%).

Based on this study the authors believe that the Taperloc femoral component can provide **durable long-term fixation in obese patients** undergoing primary total hip arthroplasty.

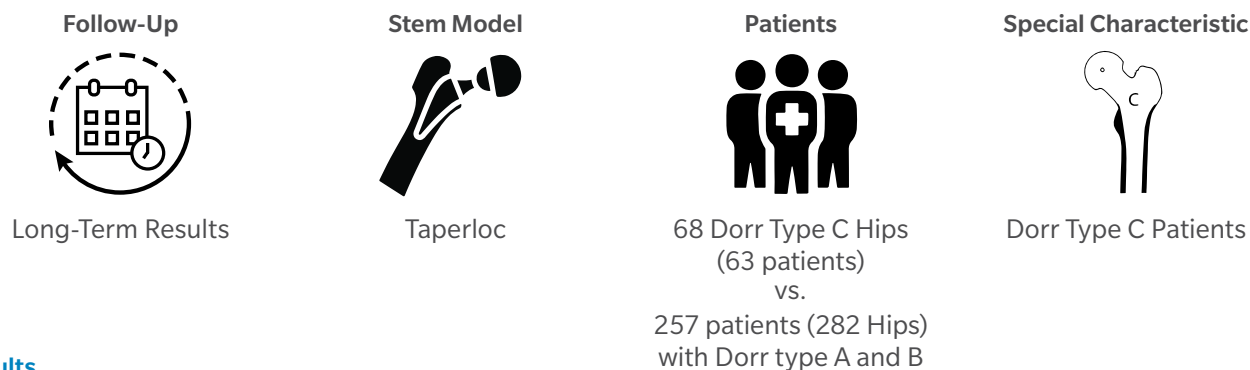
Published Clinical Articles (cont.)

Dorr Type C Femoral Morphology

Long-Term Results of Uncemented Total Hip Arthroplasty with the Taperloc Femoral Component in Patients with Dorr Type C Proximal Femoral Morphology⁸

Jeffrey R. McLaughlin, MD; Kyla R. Lee, MD, FACP

Study Characteristics



Results

No Loosening for
Dorr Type C at 20 Years

98% Survivorship
from Any Reason

The 63 patients (**68 hips**) with **Dorr type C** proximal femoral morphology were the focus of this review. As a comparator group, the survival and implant fixation in the remaining 257 patients (282 hips) with Dorr type A and B morphology were evaluated and the mean follow-up was **16.6 years (range, 10 to 29 years)**.

In the Dorr C patient group, the mean Harris hip score improved from 51 points (21 to 69 points) pre-operatively to 89 (74 to 100) at final follow-up. No femoral component was loose by radiological criteria. There was one revision (1.6%) of a well-fixed femoral component for sepsis at 11 years. The survival of the Taperloc femoral component at 20 years with revision for any reason as the endpoint was 98% (95% confidence interval; 87 to 99). A total of ten (3.5%) of the Dorr A and B patient group of 282 THAs required revision surgery. Only one was revised (0.4%) for aseptic loosening and two hips (1%) were loose by radiographic criteria.

This study demonstrates that excellent fixation can be achieved using the Taperloc stem in patients with Dorr type A and B, and Dorr type C bone.

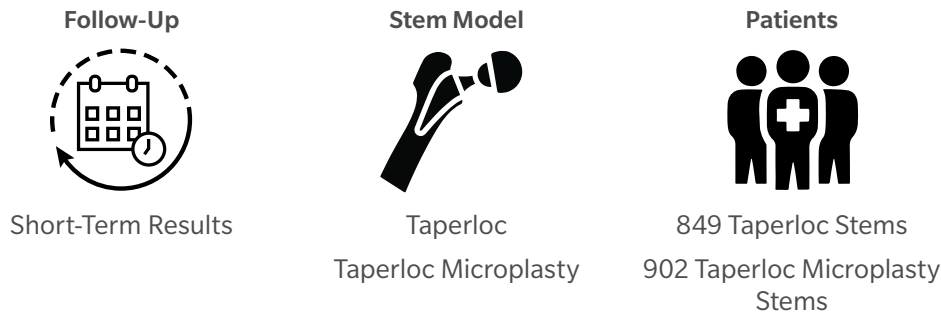
Published Clinical Articles (cont.)

Taperloc Microplasty Stem

The Short and “Shorter” of It: >1750 Tapered Titanium Stems at 6 to 88-Month Follow-Up¹⁹

John W. Barrington, MD; Roger H. Emerson Jr., MD

Study Characteristics



Results

99% Survivorship for Any Reason (Both Groups)

Taperloc (“short”) and Taperloc Microplasty (“shorter”) stems were prospectively followed and clinical (Harris Hip Score), radiographic, and survivorship (life-table analysis) data were analyzed at **a mean follow-up of 36 months**.

In the “Short” stem group, 4 (0.5%) of 849 stems were revised for subsidence/early loosening. Harris Hip Score (HHS) improved from a mean of 41.6 pre-operative to a mean of 88.9 post-operative; pain score mean improved from 12.6 (severe pain) pre-operative to a mean of 40.6 (minimal to no pain) post-operative. Survivorship of the “Short” stems, with revision of the stem for any reason, was 99% at 7 years.

In the “Shorter” group of 902 stems, none were revised for aseptic loosening. Harris Hip Scores improved from a mean of 43.7 pre-operative to a mean of 92.0 post-operative; pain score mean improved from 12.4 (severe pain) pre-operative to a mean of 42.1 (minimal to no pain) post-operative. Survivorship of the “Shorter” stems, with revision of the stem for any reason, was **99% at 7 years**.

This comparison study of Taperloc to Taperloc Microplasty stems confirmed similar > 99% survivorship in both cohorts, in >1750 THA stems at **6 to 88 (mean 36)-month follow-up**.

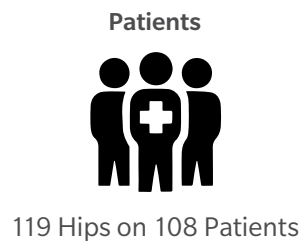
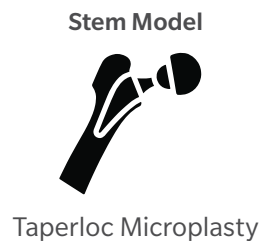
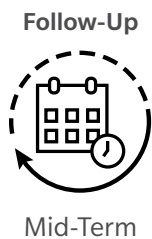
Published Clinical Articles (cont.)

Taperloc Microplasty Stem

Mid-Term Results of 119 Taperloc Microplasty Femoral Stems After a Mean 61 Months (50 to 82) of Follow-Up⁵

Saragaglia D, Orfeuvre B.

Study Characteristics



Results

100% Survivorship

The purpose of this single-surgeon study was to analyse the shortened stem, Taperloc Microplasty, after a **mean follow-up of 61 months**. The inclusion criteria were hip arthrosis or avascular necrosis excluding Dorr type C femurs. There were 108 patients under the age of 70 and from 119 hips, 9 were lost to follow-up so the results were from 110 hips only.

The Postel-Merle d'Aubigné score improved from 11 pre-surgery to 17.8 post-operative and there was no thigh pain related to the stem. In the femoral component the survivorship was of 100% and considering revision for any reason was 98.2% at 61 months. The study concludes that the **Taperloc Microplasty stem is equivalent to the best conventional cementless prostheses on the market.**

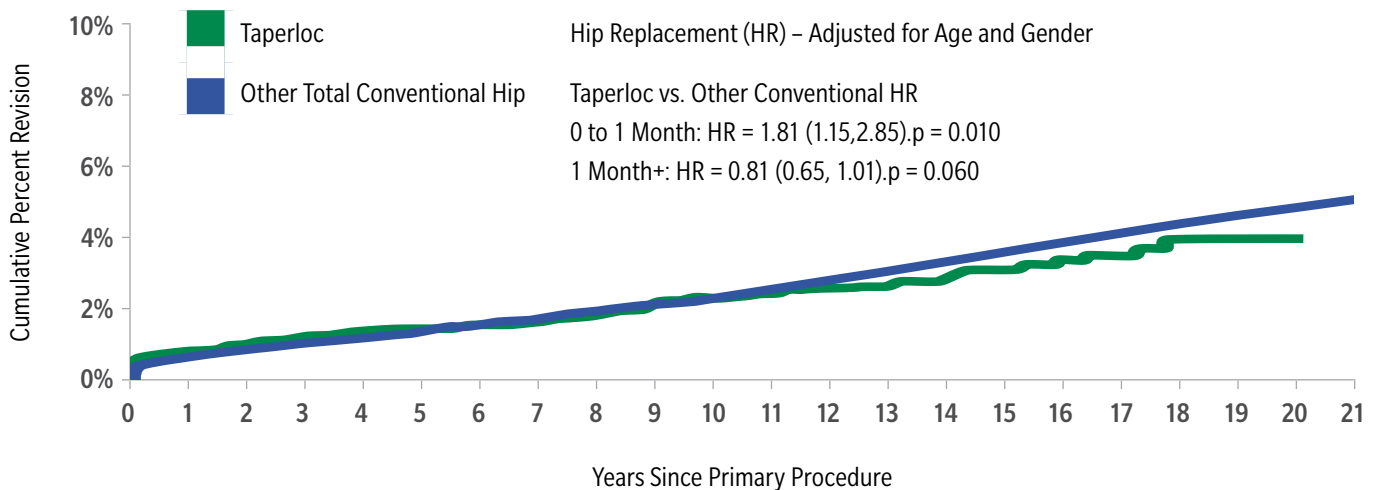
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Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Automated Industry Report System (AIRS), ID No. 9881 for Zimmer Biomet Australia, Taperloc Total Conventional Hip, (Procedures from 1 September 1999 to 30 March 2023), Accessed 30 March 2023, AOA, Adelaide.

AOANJRR is confident in the accuracy of the data included in this report, at the time it was provided. However, it was generated using an automated reporting system and has not been reviewed by the AOANJRR.

Taperloc Cementless Stem

Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Model (All Diagnoses, Femoral Stem Revisions)



Yearly Cumulative Percent

CPR	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
Taperloc	0.8 (0.6, 1.1)	1.0 (0.7, 1.4)	1.2 (0.9, 1.6)	1.4 (1.1, 1.8)	1.5 (1.1, 1.9)	1.5 (0.6, 0.7)	1.7 (1.3, 2.1)
Other Total Conventional Hip	0.7 (0.6, 0.7)	0.9 (0.8, 0.9)	1.0 (1.0, 1.1)	1.2 (1.2, 1.2)	1.4 (1.3, 1.4)	1.6 (1.5, 1.6)	1.7 (1.7, 1.8)

CPR	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years
Taperloc	1.9 (1.5, 2.4)	2.2 (1.8, 2.8)	2.3 (1.9, 2.9)	2.5 (2.0, 3.1)	2.6 (2.1, 3.3)	2.7 (2.2, 3.3)	2.9 (2.4, 3.6)
Other Total Conventional Hip	1.9 (1.9, 2.0)	2.1 (2.1, 2.2)	2.4 (2.3, 2.4)	2.6 (2.5, 2.7)	2.9 (2.8, 2.9)	3.1 (3.1, 3.2)	3.4 (3.3, 3.5)

CPR	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years	21 Years
Taperloc	3.2 (2.6, 3.9)	3.4 (2.7, 4.3)	3.6 (2.8, 4.5)	4.0 (3.1, 5.2)	4.0 (3.1, 5.2)	4.0 (3.1, 5.2)	N/A
Other Total Conventional Hip	3.7 (3.6, 3.8)	4.0 (3.9, 4.1)	4.2 (4.1, 4.3)	4.5 (4.4, 4.6)	4.7 (4.6, 4.9)	5.0 (4.9, 5.2)	5.2 (5.0, 5.4)

Femoral Stem Revision include both THR (removal/acetabular) and stem only revisions.

Procedures using metal/metal prostheses with head size larger than 32 mm are excluded from the comparator.

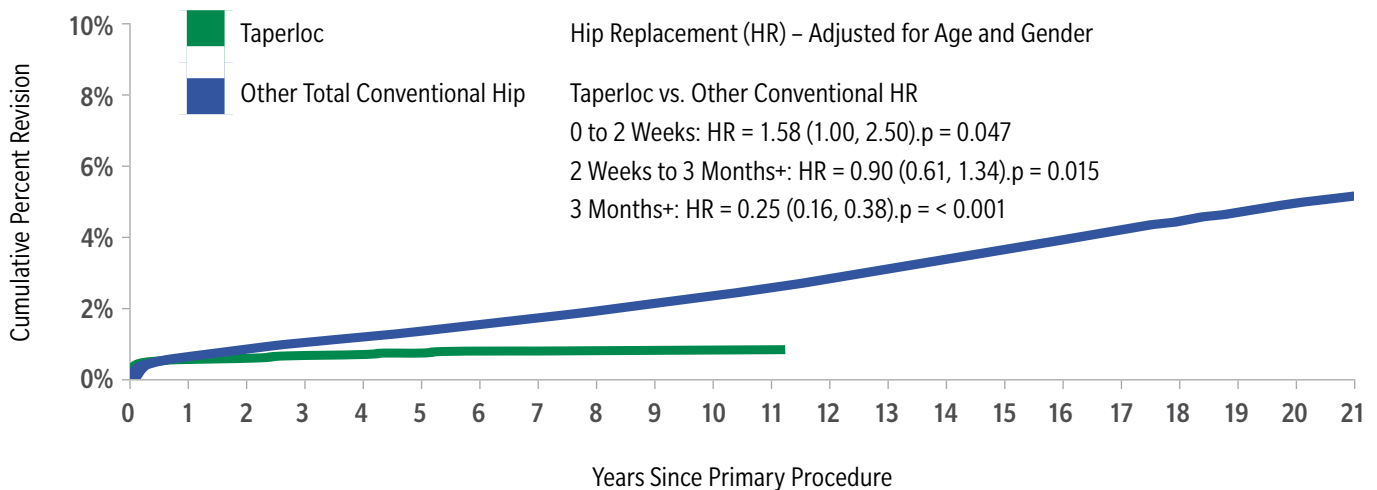
Appendix (cont.)

Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Automated Industry Report System (AIRS), ID No. 9880 for Zimmer Biomet Australia, Taperloc Total Conventional Hip, (Procedures from 1 September 1999 to 30 March 2023), Accessed 30 March 2023, AOA, Adelaide.

AOANJRR is confident in the accuracy of the data included in this report, at the time it was provided. However, it was generated using an automated reporting system and has not been reviewed by the AOANJRR.

Taperloc Cementless Stem

Cumulative Percent Revision of Primary Total Conventional Hip Replacement by Model (All Diagnoses, Femoral Stem Revisions)



Yearly Cumulative Percent

CPR	1 Year	2 Years	3 Years	4 Years	5 Years	6 Years	7 Years
Taperloc	0.6 (0.4, 0.7)	0.6 (0.5, 0.8)	0.7 (0.5, 0.9)	0.7 (0.5, 0.9)	0.8 (0.6, 1.0)	0.8 (0.6, 1.0)	0.8 (0.6, 1.1)
Other Total Conventional Hip	0.7 (0.6, 0.7)	0.9 (0.8, 0.9)	1.0 (1.0, 1.1)	1.2 (1.3, 1.4)	1.4 (1.3, 1.4)	1.6 (1.5, 1.6)	1.8 (1.7, 1.8)

CPR	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years
Taperloc	0.8 (0.6, 1.1)	0.8 (0.6, 1.1)	0.8 (0.6, 1.1)	0.8 (0.6, 1.1)	N/A	N/A	N/A
Other Total Conventional Hip	1.9 (1.9, 2.0)	2.2 (2.1, 2.2)	2.4 (2.3, 2.4)	2.6 (2.6, 2.7)	2.9 (2.8, 2.9)	3.1 (3.1, 3.2)	3.4 (3.3, 3.5)

CPR	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years	21 Years
Taperloc	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Other Total Conventional Hip	3.7 (3.6, 3.8)	4.0 (3.9, 4.1)	4.2 (4.1, 4.3)	4.5 (4.4, 4.6)	4.8 (4.6, 4.9)	5.0 (4.9, 5.2)	5.2 (5.0, 5.4)

Femoral Stem Revision include both THR (remoral/acetabular) and stem only revisions.

Procedures using metal/metal prostheses with head size larger than 32 mm are excluded from the comparator.

Appendix (cont.)

Australian Orthopaedic Association Joint Registry. Annual Report, 2022.

Femoral Component	Acetabular Component	N Revised	N Total	1 Year	3 Years	5 Years	10 Years	15 Years	20 Years
-	Trident (Shell)	23	711	1.6 (0.9, 2.8)	2.8 (1.8, 4.3)	3.5 (2.3, 5.4)	-	-	-
-	Versafitcup CC	340	9,849	1.8 (1.6, 2.1)	2.6 (2.3, 3.0)	3.2 (2.8, 3.6)	6.2 (5.2, 7.4)	-	-
-	Versafitcup DM	39	837	3.6 (2.5, 5.1)	5.3 (3.8, 7.1)	5.5 (4.0, 7.6)	-	-	-
S-Rom	PINNACLE	222	3,679	2.4 (2.0, 3.0)	4.0 (3.4, 4.7)	4.7 (4.0, 5.4)	6.2 (5.2, 7.1)	7.8 (6.7, 9.0)	-
SL-Plus	EP-Fit Plus	48	1,217	1.6 (1.0, 2.4)	2.1 (1.4, 3.1)	2.7 (1.9, 3.8)	3.8 (2.8, 5.1)	-	-
-	R3	107	1,805	2.6 (1.9, 3.4)	4.0 (3.2, 5.0)	4.4 (3.5, 5.4)	6.6 (5.4, 8.0)	-	-
Secur-Fit	Trident (Shell)	506	10,447	1.9 (1.7, 2.2)	2.9 (2.6, 3.3)	3.6 (3.3, 4.0)	4.8 (4.3, 5.2)	6.2 (5.7, 6.9)	7.8 (6.7, 9.0)
Secur-Fit Plus	Trident (Shell)	256	6,326	1.3 (1.0, 1.6)	2.0 (1.6, 2.3)	2.5 (2.1, 2.9)	3.5 (3.1, 4.1)	4.9 (4.2, 5.4)	5.9 (5.1, 6.9)
Summit	PINNACLE	178	5,719	1.5 (1.2, 1.8)	2.1 (1.8, 2.6)	2.4 (2.0, 2.8)	3.5 (3.0, 4.1)	5.6 (4.5, 7.0)	-
-	PINNACLE ^{MoM}	87	784	1.5 (0.9, 2.7)	2.2 (1.4, 3.5)	3.5 (2.4, 5.1)	8.7 (6.8, 11.0)	11.4 (9.2, 14.1)	-
Synergy	R3	177	5,636	1.8 (1.5, 2.2)	2.4 (2.0, 2.9)	2.8 (2.4, 3.3)	3.8 (3.3, 4.4)	-	-
-	Reflection (Shell)	422	7,878	1.5 (1.3, 1.8)	2.3 (2.0, 2.7)	2.7 (2.3, 3.1)	4.0 (3.5, 4.4)	5.8 (5.2, 6.4)	8.8 (7.7, 10.1)
Taperloc	Continuum	17	778	1.7 (1.0, 2.9)	2.3 (1.4, 3.7)	-	-	-	-
-	G7	109	4,194	2.2 (1.8, 2.7)	2.7 (2.2, 3.3)	2.9 (2.4, 3.6)	-	-	-
Taperloc Microplasty	Continuum	18	571	2.8 (1.7, 4.5)	3.3 (2.1, 5.1)	3.3 (2.1, 5.1)	-	-	-
-	G7	36	3,023	1.2 (0.9, 1.7)	1.3 (0.9, 1.8)	1.3 (0.9, 1.8)	-	-	-
Tri-Fit TS	Trinity	96	4,466	1.2 (0.9, 1.6)	2.0 (1.6, 2.5)	2.3 (1.8, 2.8)	-	-	-
Tri-Lock	PINNACLE	32	1,126	1.5 (1.0, 2.5)	2.4 (1.6, 3.5)	2.8 (1.9, 4.0)	3.3 (2.3, 4.9)	-	-
VerSys	Trilogy*	266	4,495	2.6 (2.2, 3.1)	3.4 (2.9, 4.0)	4.0 (3.5, 4.6)	5.3 (4.7, 6.1)	6.4 (5.7, 7.3)	7.2 (6.3, 8.1)
TwinSys (cless)	RM Cup	50	1,397	2.3 (1.6, 3.2)	3.1 (2.3, 4.2)	3.4 (2.6, 4.6)	-	-	-
Other (576)	-	854	19,102	2.6 (2.4, 2.9)	3.8 (3.5, 4.1)	4.4 (4.1, 4.7)	6.0 (5.6, 6.5)	7.6 (6.9, 8.5)	-
TOTALS		9,134	259,535						

* Denotes prosthesis combination with no reports use in primary total conventional hip procedures in 2021.

^{MoM} Denotes metal/metal prostheses with head size > 32 mm.

Restricted to modern prosthese.

Procedures using metal/metal prostheses have been included.

Only prostheses with > 500 procedures have been listed.

References

1. Lombardi AV Jr, Manocchio AG, Berend KR, Morris MJ, Adams JB. Early Experience with a Short, Tapered Titanium Porous Plasma Sprayed Stem with Updated Design. *Surg Technol Int*. 2018 Jun 1;32:233-238. PMID: 29529704.
2. Manocchio AG Jr, Berend KR, Morris MJ, Adams JB, Lombardi AV Jr. Early Experience with a Tapered Titanium Porous Plasma Sprayed Stem with Updated Design. *Surg Technol Int*. 2017 Dec 22;31:231-235. PMID: 29313319.
3. McLaughlin JR, Lee KR, Johnson MA. Second-generation uncemented total hip arthroplasty: a minimum 20-year follow-up. *Bone Jt Open*. 2021 Jan 13;2(1):33-39. doi: 10.1302/2633-1462.21.BJO-2020-0157.R1. PMID: 33537674; PMCID: PMC7842164.
4. Keisu, K. et al. Primary Cementless Total Hip Arthroplasty in Octogenarians: Two to Eleven-Year Follow-Up. *Journal of Bone and Joint Surgery (Am)*. 83: 359, 2001.
5. Saragaglia D, Orfeuvre B. Mid-term results of 119 Taperloc Microplasty™ femoral stems after a mean 61 months (50-82) of follow-up. *Orthop Traumatol Surg Res*. 2020 Dec;106(8):1501-1506. doi: 10.1016/j.otsr.2020.06.019. Epub 2020 Oct 22. PMID: 33268300.
6. McLaughlin JR, Lee KR. Total Hip Arthroplasty With an Uncemented Tapered Femoral Component in Patients Younger Than 50 Years of Age: A Minimum 20-Year Follow-Up Study. *J Arthroplasty*. 2016 Jun;31(6):1275-1278. doi: 10.1016/j.arth.2015.12.026. Epub 2015 Dec 20. PMID: 26781396.
7. McLaughlin, J. and Lee, K. Uncemented Total Hip Arthroplasty Using a Tapered Femoral Component in Obese Patients: An 18-27 Year Follow-Up Study. *Journal of Arthroplasty*. 29: 1365-68, 2014.
8. McLaughlin, J.R. and Lee, K.R. Long-Term Results of Uncemented Total Hip Arthroplasty with the Taperloc Femoral Component in Patients with Dorr Type C Proximal Femoral Morphology. *Bone & Joint Journal*. 98-B:595-600, 2016.
9. Waldman, B. Tapered titanium femoral implant allows immediate weight-bearing. *Orthopedics Today*. June 2006
10. National Joint Registry England and Wales. 19th Annual Report, 2022.
11. Australian Orthopaedic Association Joint Registry. Annual Report, 2022.
12. National Joint Registry for England, Wales, Northern Ireland and the Isle of Man. Summary.Report.HP_Stem_Taperloc Cementless Stem_All.21/02/2023.08:58 ©2023 NEC Software Solutions (UK) Limited.
13. Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Automated Industry Report System (AIRS), ID No. 9881 for Zimmer Biomet, <Taperloc Total Conventional Hip>, (Procedures from 1 September 1999 – 30 March 2023), Accessed 31 March 2023, AOA, Adelaide: 1-22.
14. National Joint Registry for England, Wales, Northern Ireland and the Isle of Man. Summary.Report.HP_Stem_Taperloc Complete Cementless Stem_All.21/02/2023.09:01 ©2023 NEC Software Solutions (UK) Limited.
15. Australian Orthopaedic Association National Joint Replacement Registry (AOANJRR), Automated Industry Report System (AIRS), ID No. 9880 for Zimmer Biomet, <Taperloc Total Conventional Hip>, (Procedures from 1 September 1999 – 30 March 2023), Accessed 31 March 2023, AOA, Adelaide: 1-23.
16. McLaughlin JR, Johnson MA, Lee KR. Uncemented total hip arthroplasty with a tapered titanium femoral component: a minimum 30-year follow-up. *Bone Jt Open*. 2023 Feb 10;4(2):79-86. doi: 10.1302/2633-1462.42.BJO-2022-0142.R1. PMID: 37051857; PMCID: PMC9999124.
17. Parvizi J, Keisu KS, Hozack WJ, Sharkey PF, Rothman RH. Primary total hip arthroplasty with an uncemented femoral component: a long-term study of the Taperloc stem. *J Arthroplasty*. 2004 Feb;19(2):151-6. doi: 10.1016/j.arth.2003.10.003. PMID: 14973856.
18. Keisu, K.S. et al. Cementless Femoral Fixation in the Rheumatoid Patient Undergoing Total Hip Arthroplasty. Minimum 5-Year Results. *Journal of Arthroplasty*. 16(4): 415–21, 2001.
19. Barrington, J W, Emmerson, RH. The Short and “Shorter” of It: > 1750 Tapered Titanium Stems at 6- to 88-Month Follow-Up. *The Journal of Arthroplasty*. 28 (Suppl 1): 38-40, 2013.

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