NANOS◇
Clinical Literature

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14194 V1 05/18

NANOS® Clinical Literature

Performance

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Year of publication	Title/Reference	Author/s	Number of revision	Survival Rate	Average Age	Follow-up	HH preop	HH postop	Type
2017	Short stem total hip arthroplasty for osteonecrosis of the femoral head in patients 60 years or younger: a 3- to 10-year follow up study. BMC Musculoskeletal Disorders (2017) 18:301 DOI 10.1186/s12891-017-1662-6	Capone, A., Bienati, F., Torchia, S., Podda, D., & Marongiu, G.	0	100%	51.5 years	37 caeses **5.6 year**	53	90	Performance
2016	Prospective mid-term results of a consecutive series of a short stem. Acta Orthopædica Belgica, Vol. 82 - 2 - 2016	Stadler, N., Lehner, J., & Trieb, K.	0	100%	61.6 years	84 cases 27.7 months ± 5.7)	36.6	94.5	Performance
2015	Total hip arthroplasty using a short-stem prosthesis: restoration of hip anatomy. J Orthop Surg (Hong Kong). 2015;23(1):90)94.	Amenabar, T., Marimuthu, K., Hawdon, G., Gildone, A., & McMahon, S.	0	100%	63 years (25-92)	147 cases 1 year	53	91	Performance
2013	CCD and offset after Nanos short stem in total hip arthroplasty. Technol Health Care. 2013;21(2):149)155.	Ettinger,M.,Ettinger, P., Ezechieli M., Büermann, S. , Budde, S., Calließ, T., Petri, M., & Thorey F.	1 stem 2 cups	99%	57.9 years	202 hips 35.03 ± 12 months	n/a	n/a	Performance
2011	The new stemless hip implants: our experiences with the ultra short stem. Journal of Orthopaedics and Traumatology 12/2011 (Suppl 1):S125–S164	Logroscino,G., Magliocchetti, G., Ciriello, V., Santagada, D.A.,& Fabbriciani, C.	0	100%	55.5 years	136 cases 2.5 years	n/a	98	Performance
2011	The NANOS short stem in total hip arthroplasty: a mid term follow-up. Hip Int 2011; 21 (05): 583 - 586	Ettinger, M., Ettinger, P., 2,Lerch, M., Radtke, K., Budde, S., Ezechieli, M., Becher, C., & Thorey F.	0	100%	63 years	72 cases **5.2 years**	47.3	97.6	Performance

This is not an extensive list of data published about NANOS®, not all data has been presented.

NANOS® Clinical Literature

Performance

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Year of publication	Title/Reference	Author/s	Number of revision	Survival Rate	Average Age	Follow-up	HH preop	HH postop	Type
2011	Indications and implantation of a short femoral stem preserving the femoral neck: early outcomes and special cases treated with the NANOS stem. J Bone Joint Surg Br. 2011;93)B(SUPP IV):524.	Kuhn, H., & Vossmann, C.	n/a	n/a	57.4 years	1 - 3 years	47.8	96.62	Performance
2007	Keep it short and simple – Ergebnisse einer Multicenter-Studie. Orthopädie im Profil, 2007	Reinhardt A.	0	100%	55.4 years	52 cases 2 years	47.1	95.8	Performance

NANOS◇ Clinical Literature

DEXA, EBRA and RSA

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Year of publication	Title/Reference	Author/s	Number of revision	Survival Rate	Average Age	Follow-up	HH preop	HH postop	Type
2015	A prospective randomized radiographic and dual energy X-ray absorptiometric study of migration and bone remodeling after implantation of two modern short stemmed femoral prostheses. J Orthop Traumatol. 2015 Feb 11.	Brinkmann V, Radetzki F, Delank KS, Wohlrab D, & Zeh A.	0	100%	59.7 years	26 cases 1 year	n/a	96.5	DEXA
2015	Migration characteristics and early clinical results of the NANOS short)stem hip arthroplasty. Wien Klin Wochenschr. Mar 5 2015.	Kaipel,M., Grabowiecki, P., Sinz. K., Farr. S., & Sinz, G.	0	100%	64 years (40-81)	49 cases 2 years	47.9	98.1	EBRA
2015	Analysis of migration of the Nanos® short-stem hip implant within two years after surgery. International Orthopaedics (SICOT) 2015 # SICOT aisbl 2015	Budde, S., Seehaus, F., Schwarze, M., HurschlerC., Floerkemeier, T., Windhagen, H., Noll, Y., Ettinger, M., & Thorey, F.	n/a	n/a	53.6 years	14 cases 2 years	55.9	97.3	RSA
2013	A prospective dual-energy X-ray absorptiometry study of bone remodeling after implantation of the Nanos® short-stemmed prosthesis. Acta Orthop. Belg., 2013, 79, 174-180	Zeh, A., Pankow, F., Röllinhoff, M., Delank, S., & Wohlrab D.	0	100%	59.9 years	1 year	47	94	DEXA
2011	Bone integration of new stemless hip implants (Proxima vs. NANOS). A DXA study: preliminary results. Int J Immunopathol Pharmacol. 2011 Jan-Mar;24(1 Suppl 2):113)116.	Logroscino, G., Ciriello, V., D'Antonio,E., De Tullio, V., Piciocco, P., Magliocchetti Lombi, G., Santori, F.S., & Albanese, C.V.	0	100%	59.6 years	12 cases 1 year	n/a	n/a	DEXA
2010	Is there a bone preserving bone remodelling in short stem prosthesis? DEXA analysis with the Nanos total hip arthroplasty. Z Orthop Unfall. 2010;148(4):398)405.	Götze,C., Ehrenbrink, J., & Ehrenbrink, H.	0	100%	54.2 years	36 NANOS◇ 1 year	43.1	96.5	DEXA

NANOS® Clinical Literature

Others

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Year of publication	Title/Reference	Author/s	Number of revision	Survival Rate	Average Age	Follow-up	HH preop	HH postop	Type
2014	Revision rate after short stem total hip arthroplasty: a systematic review of 49 studies. Acta Orthop. 2014;85(3):250)258.	van Oldenrijk, J., Molleman, J., Klaver, M., Poolman, R.W., & Haverkamp, D.	n/a	n/a	n/a	120 cases 3.6 years	n/a	n/a	Lit. review
2015	The Influence of Hip Rotation on Femoral Offset Following Short Stem Total Hip Arthroplasty. The Journal of Arthroplasty 2015	Boese, C.K. , Bredow, J., Ettinger, M., Eysel, P., Thorey, F., Lechler, P., & Budde, S.	n/a	n/a	n/a	37 patients 48 radiographs 6 month	n/a	n/a	Hip Rotation
2013	Anatomic Reconstruction of Hip Joint Biomechanics with the Bone Preserving Silent Micro Hip (TM) Prosthesis. 2013 Zeitschrift fur Orthopadie und Unfallchirurgie. 151. 497-502. 10.1055/s-0033-1350862.	Ries, Christian & Schopf, Wolfgang & Dietrich, F & Franke, S & Jakubowitz, Eike & Sobau, Christian & Heisel, Christian.	n/a	n/a	n/a	50 cases 11.9 months	n/a	n/a	Comparison of 3 different types on anatomic reconstruction
2016	A new anterolateral surgical approach for total hip replacement. Joints 2016;4(3):148-152	Grano, G.F., Pavlidou M., Todesco, A., Palermo, A., Molfetta, L.	n/a	n/a	69.4 years	35 NANOS 1 year	n/a	n/a	Approach
2012	Minimal invasive (MIS) posterior approach in short stem total hip arthroplasty)Short term resuts. J Bone Joint Surg Br. 2012;94)B(SUPP XXV):156.	Moussa, K.	3 cups	97%	53 years	113 cases 0.5 - 4.5 years	53	94	Appraoch

NANOS® Clinical Literature Performance

Clincal Studies - Performance

NANOS® Neck Preserving Hip Stem

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Short stem total hip arthroplasty for osteonecrosis of the femoral head in patients 60 years or younger: a 3- to 10-year follow-up study

2017; BMC Musculoskeletal Disorders 18:301 DOI 10.1186/s12891-017-1662-6

Capone, A., Bienati, F., Torchia, S., Podda, D., & Marongiu, G.

Study Type	Review of prospectively collected data
Number of hips	37 cases
HHS	HHS Preop. 53, Postop 90
Survivalrate	100%
Follow up	5.6 years
Mean Age	51.5 years
Aim of study	In young patients with osteonecrosis of the femoral head (ONFH), short-stem total hip arthroplasty (THA) could allow a potential advantage in preserving metaphyseal bone-stock, when revision surgery might become necessary. However, only a few studies have evaluated the outcome of short-stem THAs in ONFH.
Key findings	• **Clinical and functional results improved significantly** • **Excellent clinical results and fixation pattern** at mean 5.6 years' follow-up reveal this implant as a reliable option in advanced stage of ONFH either • The diameter of the femoral head did not influence the clinical outcome • **All hips showed bone ingrowth fixation** of the acetabular and femoral components • **No patients showed osteolysis** • **No revision** for any reason was performed during the study period

Prospective mid-term results of a consecutive series of a short stem

Acta Orthopædica Belgica, Vol. 82 - 2 - 2016
Stadler, N., Lehner, J., & Trieb, K.

Study Type	Prospective study
Number of hips	84 cases
HHS	HHS Preop. 36.6, Postop 94.5
Survivalrate	100%
Folow up	27.7 months
Mean Age	61.6 years (range 41-78)
Aim of study	Although there are already a large number of short stems available, we still know so little about the survival rates. That is why our purpose was to collect prospective data about Nanos® short stems.
Key findings	• Short stems in hip arthroplasty usher in a new era by **conserving the bone stock**, and by using **minimally invasive** approaches, it is possible to provide a protection of the soft tissues and therefore enable a rapid recovery • We conclude that our mid-term results **encourage us to continue to use short stems** in order to **preserve the proximal bone stock and to make recovery faster** • The titanium plasma coating allows for increasing the surface area ad ensuring **superior primary stability**

Total hip arthroplasty using a short stem prosthesis: restoration of hip anatomy

J Orthop Surg (Hong Kong). 2015;23(1):90)94
Amenabar, T., Marimuthu, K., Hawdon, G., Gildone, A., & McMahon, S.

Study Type	Retrospective
Number of hips	147 hips
HHS	HHS Preop. 53, Postop 91
Survivalrate	100%
Folow up	1 year
Mean Age	63 years (range 25-92)
Aim of study	Evaluate hip parameters such as vertical centre of rotation (VCR), horizontal centre of rotation (HCR), femoral offset, and leg length after total hip arthroplasty (THA) using the Nanos short-stem prosthesis.
Key findings	• Cup: R3 with ceramic on ceramic or VERILAST • **NANOS enabled restoration of hip anatomy** (VCR, HCR, femoral offset, and leg length)

CCD and offset after Nanos short stem in total hip arthroplasty

Technol Health Care. 2013;21(2):149)155.
Ettinger,M.,Ettinger, P., Ezechieli M., Büermann, S. , Budde, S., Calließ, T., Petri, M.,& Thorey F.

Study Type	Case series
Number of hips	202
HHS	n/a
Survivalrate	99% (revisions: 1 stem , 2 cup)
Folow up	2.9 years
Mean Age	57.9 years
Aim of study	Provide comprehensive data about the mid-term radiologic results, the neck-shaft-angle and the offset after implantation of this device.
Key findings	• This study shows that a **correct anatomical reconstruction** is possible with a device of this design • Two stems showed radiolucent lines at the implant-bone-interface at the last follow-up • The **subsidence measured in our study (1.9%) is comparable to other short stem implants** Schmidutz et al. presented a subsidence of 3.9% after two years for the Metha stem • **Increase of bone density** could be detected in 18 hips, since an increase in bone density indicates proximal femoral remodeling, this **could be recognized as a favorable outcome**

Clincal Studies - Performance

NANOS® Neck Preserving Hip Stem

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The new stemless hip implants: our experiences with the ultra short stem

Journal of Orthopaedics and Traumatology 12/2011 (Suppl 1):S125–S164
Logroscino,G., Magliocchetti, G., Ciriello, V., Santagada, D.A.,& Fabbriciani, C.

Study Type	Case study
Number of hips	136 cases
HHS	HHS Postop 98
Survival	100%
Folow up	2.5 years
Mean Age	55.5 years
Aim of study	The aim of this study is to assess the effectiveness of a new “stemless” hip implant.
Key findings	• The rate of implant failure (MFR) was 0%, with a percentage of osseointegrated implants of 100% and **consistent improvement in recover from pain, in joint function and in the quality of life** • Some complications were observed: 1 metaphyseal crack, 2 perforations of the diaphyseal cortical bone, 2 dislocations, 4 leg length discrepancies (>1 cm., but <2 cm.) and one cup aseptic loosening • Some limitations were observed in the correction of leg length. Nevertheless the **clinical results were certainly better, at early follow-up., than of the traditional stems** • The new stemless implant showed to be **well indicated in young patients or in case of well preserved proximal bone quality**

Clincal Studies - Performance

NANOS® Neck Preserving Hip Stem

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The NANOS short stem in total hip arthroplasty: a mid term follow-up

Hip Int 2011; 21 (05): 583 - 586
Ettinger, M., Ettinger, P., 2,Lerch, M., Radtke, K., Budde, S., Ezechieli, M., Becher, C., & Thorey F.

Study Type	Retrospective analysis
Number of hips	72 cases
HHS	Preop 47.3; Postop 97.6
Survivalrate	100% stem survival
Folow up	5.2 years
Mean Age	63 years
Aim of study	Describe experience with the NANOS prosthesis
Key findings	• **60 patients were «very satisfied»,** four «satisfied.» Only 1 patient was «not satisfied» due to the aspetic cup loosening • In 4 patients leg lenthening was reported, but none of these exceeded 10mm • **Good to excellent clinical results** after a follow-up of 5.2 years • The clinical and **radiological results support to the principle of metaphyseal anchorage**

Indications and implantation of a short femoral stem preserving the femoral neck: early outcomes and special cases treated with the NANOS stem

J Bone Joint Surg Br. 2011;93)B(SUPP IV):524.Journal
Kuhn, H., & Vossmann, C.

Study Type	Multisite study, 5 hospitals
Number of hips	205 patients
HSS	Preop 47.8; Postop 96.62
Survivalrate	n/a
Folow up	1-3 years (1 year 77 patients and 24- 36 months for 50 patients)
Mean Age	57.4 years (range 33-80 years)
Key findings	• Distribution indications in this study: **primary degenerative disease** (n=110, 51.4%) **dysplasia** (N=57, 26.5%), **necrosis of the femoral head** (n=32, 15%) other cuases includint **perthes disease, epiphysiolysis, posttaruamatic osteoarthritis, protrusion** • The fine neck of NANOS avoids impingement and increases joint range of motion • No dislocation • No stem migration • Early results indicate a **high level of patient satisfaction** • Clinical and radiographic findings suggest **good long-term outcome can be expected**

Clincal Studies - Performance

NANOS® Neck Preserving Hip Stem

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Keep it short and simple

Orthopädie im Profil, 2007
Reinhardt A.

Study Type	Multicenter study
Number of hips	Follow up 52 cases / total implanted 183 hips
HSS	Preop 47.1; Postop 95.8
Survivalrate	100%
Folow up	2 years
Mean Age	55.4 years
Aim of study	Collect clinical resutls of the NANOS short stem
Key findings	• No migration • No stem loosening • No revision • The bone and soft tissue sparing procedure as well as the reconstruction of the physioligcal load transmission provide some advantages for mobilisation and future revisions • Offset reconstruction of the proximal femur can be achieved • Due to the orientation along the Adam´s arch **modularity is not needed to achieve offset reconstruction** • A **good implant for biological young and active patients**

Paper published in German

NANOS® Clinical Literature
DEXA, EBRA and RSA Studies

Clincal Studies - DEXA

NANOS® Neck Preserving Hip Stem

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A prospective randomized radiographic and dual energy X-ray absorptiometric study of migration and bone remodeling after implantation of two modern short stemmed femoral prostheses

J Orthop Traumatol. 2015 Feb 11.
Brinkmann V, Radetzki F, Delank KS, Wohlrab D, & Zeh A.

Study Type	DEXA Study
Number of hips	26 NANOS® / 24 Metha
HHS	Nanos/Metha: 96.5/96.2 postop
Survivalrate	100%
Folow up	1 year
Aim of study	Analyze migration and strain transmission of the Metha and Nanos® femoral prostheses
Key findings	• No significant change of varus- valgus alignment or clinically relevant migration of the Metha or Nanos prostheses during postoperative follow-up • Center of rotation or offset did not change signifiantly after surgery • DEXA demonstrated proximally located load transfer with only moderate proximal stress shielding • No substantial or clinically relevant differences regarding the reduction or loss of bone in the proximal aspect of the femur • Both stems show **excellent clinical results** and **reliable osseointegration** over a short follow-up period

Migration characteristics and early clinical results of the NANOS short)stem hip arthroplasty.

DOI 10.1007/s00508-015-0756-0, Wien Klin Wochenschr. Mar 5 2015

Kaipel,M., Grabowiecki, P., Sinz. K., Farr. S., & Sinz, G.

Study Type	Prospective, EBRA (computer-assisted Einzel-Bild-Roentgen-Analyse)
Number of hips	49 cases
HSS	Preop 47.9; Postop 98.1
Survivalrate	100%
Folow up	2 years
Mean Age	64 years (40-81 years)
Aim of study	Assess migration patterns and clinical outcome 2 years after hip replacement by a metaphyseal anchored cementless short stem.
Key findings	• This study shows **beneficial migration data** • No radigraphic sign of stem loosening could be detected on the X-rays • In one case, distinctive subsidence could be monitored in conventional X-rays and was probably caused by undersizing the femoral implant • Migration patterns strongly suggest that **short-stem arthroplasty is not only an innovative but also a reliable strategy** in total hip replacement • Results of this **study confirm the excellent clinical data** of previous works

Analysis of migration of the NANOS◇ short-stem hip implant within two years after surgery

International Orthopaedics (SICOT) 2015 # SICOT aisbl 201
Budde, S., Seehaus, F., Schwarze, M., HurschlerC., Floerkemeier, T., Windhagen, H., Noll, Y., Ettinger, M., & Thorey, F.

Study Type	RSA
Number of hips	14 cases (of the inital 18 patients 2 did not present themselves and 2 were excluded)
HHS	HHS Preop. 55.9, Postop 97.3
Survivalrate	n/a
Folow up	2 years
Mean Age	53.6 years
Aim of study	Short-stem implants provide a bone-preserving alternative in total hip arthroplasty. However, some evidence exists that the smaller implant-bone contact surface may compromise primary stability and impair osseointegration. The aim of this study was to investigate the stability of fixation of the Nanos hip replacement device.
Key findings	• A **good clinical outcome** was observed, corresponding well to previously published clinical data on the Nanos implant • The Nanos short-stem hip implant showed only a **slight initial migration** within three months after implantation, followed by secondary stabilization • The results suggest both **good primary stability** and **osseointegration**, suggesting a **low risk of aseptic loosening**

Clincal Studies - DEXA

NANOS® Neck Preserving Hip Stem

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A prospective dual-energy X-ray absorptiometry study of bone remodeling after implantation of the Nanos® short-stemmed prosthesis

Acta Orthop. Belg., 2013, 79, 174-180
Zeh, A., Pankow, F., Röllinhoff, M., Delank, S., & Wohlrab D.

Study Type	DEXA, prospective
Number of hips	23
HHS	HHS Preop. 47, Postop 94
Survivalrate	100%
Folow up	1 year
Mean age	59.9 years
Aim of study	Analyze the bone remodeling around the Nanos® stem after primary total hip arthroplasty for coxarthrosis
Key findings	• Assessment of the preoperative and postoperative **offset and center of rotation did not show a significant difference** • **Significant improvement of HHS** from 47 points to 94 points reflects the very good clinical result. • No clinically relevant migration or tilting • The Nanos® prosthesis **can reduce loss of BMD of the proximal aspect of the femur** compared with conventional stems and other short-stemmed implants. However, a complete prevention of stress shielding of the calcar region and the major trochanter is not achieved • In contrast to others, we found no evidence for a substantial distal load transfer

Clincal Studies - DEXA

NANOS◇ Neck Preserving Hip Stem

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Bone integration of new stemless hip implants (PROXIMA vs. NANOS◇). A DXA Study: preliminary results

Int J Immunopathol Pharmacol. 2011 Jan-Mar;24(1 Suppl 2):113)116
Logroscino, G., Ciriello, V., D'Antonio,E., De Tullio, V., Piciocco, P., Magliocchetti Lombi, G., Santori, F.S., & Albanese, C.V.

Study Type	DXA Study
Number of hips	12 NANOS/ 19 PROXIMA
HHS	n/a
Survivalrate	100%
Folow up	1 year
Mean Age	59.6 years
Aim of study	Evaluate the osseointegration of two different partial neck retaining stemless hip prosthesis at one year after surgery
Key findings	• No signs of radiographic subsidience or radiolucent lines; all stems bony stable osseointegrated • Both implants **preserve metaphyseal bone stock** and **increase periprosthetic BMD** • NANOS showed significant higher BMD values in region 3 and 4 • **No signs of stress shielding** • This preliminary DXA analysis showed a physiological integration of both the stems that reproduces the biomechanical stress of proximal femur • New designed short stem implants showed optimal osseointegration after one year, and therefore appears an **excellent alternative to traditional long stem hip prostheses**

Clincal Studies - DEXA

NANOS® Neck Preserving Hip Stem

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Is there a bone preserving bone remodelling in short stem prosthesis? DEXA analysis with the Nanos total hip arthroplasty

Z Orthop Unfall. 2010;148(4):398)405.
Götze,C., Ehrenbrink, J., & Ehrenbrink, H.

Study Type	DEXA Analysis
Number of hips	36 NANOS / 36 Alloclassic (standard prothesis)
HSS	Preop 43.1; Postop NANOS 96.5 / Alloclassic Postop 91.3
Survivalrate	100%
Folow up	1 year
Mean Age	Short stem 54.2 years (range 29-74) / conventional stem 61.1 years (range 39-71)
Aim of study	It has been suggested that the use of a short-stem prosthesis could conserve proximal bone by proximal load transfer. Proximal stress shielding should be reduced, a phenomenon that has been associated with bone resorption around traditional stems. Bone remodeling of a metaphyseal fixed stem (Nanos®, Smith & Nephew Int.) was analyzed by the dual-energy x-ray absorptiometry.
Key findings	• The desired proximal load transfer of a short stemmed implant in the metaphyseal region of the proximal femur could not be reached with this device • No loosening or migration • **On the basis of the excellent clinical results** of the patients operated with the Nanos® short-stem prosthesis we conclude that **the component induces bone ingrowth in the lateral/distal region of the proximal femur**

Paper published in German, abstract in English

NANOS® Clinical Literature
Others

Clincal Studies – Literature review short stems

NANOS® Neck Preserving Hip Stem

Revision rate after short stem total hip arthroplasty: a systematic review of 49 studies.

Acta Orthop. 2014;85(3):250)258
van Oldenrijk, J., Molleman, J., Klaver, M., Poolman, R.W., & Haverkamp, D.

Study Type	Literature review (systematic review of English, French, German, and Dutch literature)
Number of hips	Total 6,495 hips , 120 NANOS®
Aim of study	Evaluate if survival rates of short-stem hips match current standards. Systematic summary of reported overall survival after short-stem total hip arthroplasty.
Key findings	• 49 studies were found (51 cohorts) involving 19 different stems. The majority of studies included had a follow-up of less than 5 years. Total 6,495 patients. • A large number of observational studies on **"partial collum" and "trochanter-sparing" stems, demonstrated adequate survival rates** at medium-term follow-up. • Clinical evidence from "**collum stem"** studies was limited to a small number of studies with a medium-term follow-up period. These studies **did not show a satisfactory overall survival rate**.

Table 2. Mean revisions per 100 observed component years for each stem category and stem type individually

	Revisions/100 component years	SD	95% CI	n	Years of follow-up mean (range)
Collum					
Total	2.0	2.1	1.8–2.2	540	4.4 (2.0–6.0)
CUT	2.5	2.3	2.3–2.7	486	4.6 (3.1–6.0)
CUT without outlier	1.6	1.0	1.5–1.7	404	4.4 (3.1–5.4)
GOT	0			20	2.0
Spiron	1.5			34	2.0
Partial collum					
Total	0.64	1.0	0.60–0.68	2,357	4.0 (0.5–11.2)
CFP	0.21	0.2	0.32–0.36	1,001	5.1 (2.0–11.2)
Metha	1.20	1.4	1.1–1.3	724	3.7 (0.9–5.0)
Nanos	0.18	0.3	0.12–0.24	120	3.6 (1.0–5.2)
Biodynamic	0.38			153	3.5
Optimys	3.17			63	0.5
Delphi-M	0.00			15	3.1
COLLO-MIS	0.50			100	2.0
MiniHip	0.55			181	3.0
Trochanter-sparing					
Total	0.8	1.0	0.77–0.83	3,628	3.4 (0.3–12.0)
Mayo	0.9	1.2	0.86–0.95	1,853	5.0 (0.3–7.0)
Proxima	0.0	0.0		125	1.7 (1.0–2.2)
Profile	1.0			25	12.0
Profile HA	0.3			25	12.0
TaperLoc microplasty	0.8	1.0	0.74–0.86	909	1.1 (0.6–2.4)
Citation	0.0			156	2.9
Fitmore	0.5			500	1.3
Aida	2.3			35	1.3

Clincal Studies – Hip rotation on femoral offset

NANOS® Neck Preserving Hip Stem

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The Influence of Hip Rotation on Femoral Offset Following Short Stem Total Hip Arthroplasty

The Journal of Arthroplasty 2015
Boese, C.K. , Bredow, J., Ettinger, M., Eysel, P., Thorey, F., Lechler, P., & Budde, S.

Study Type	Prospective case series Preoperative and postoperative radiographs were compared. Repeatedmeasurements were performed 6 months after the first measurement.
Number of hips	37 patients; 48 radiographs
HSS	n/a
Survivalrate	n/a
Folow up	6 months
Mean Age	n/a
Aim of study	Analyze the reliability of the method for radiological rotation-analysis and the calculation of rotation-corrected femoral offset following short stem total hip arthroplasty
Key findings	• Based on this study, the application of rotation-correction is of highest relevance for the correct assessment of femoral offset in future studies. Conclusions drawn from non-corrected FO should be interpreted critically.

Anatomic Reconstruction of Hip Joint Biomechanics with the Bone Preserving Silent Micro Hip (TM) Prosthesis

2013 Zeitschrift für Orthopädie und Unfallchirurgie. 151. 497-502. 10.1055/s-0033-1350862.
Ries, C.; Schopf, W.; Dietrich, F.; Franke, S.; Jakubowitz, E.; Sobau, C.; Heisel, C.

Study Type	Case Series; X-Ray analysis; retrospective
Number of hips	50 NANOS◇; 50 Silent Micro Hip; 50 SL-PLUS MIA◇
HSS	n/a
Survivalrate	n/a
Folow up	11.9 months
Mean Age	54.5 (NANOS); 47,5 (Silent Micro Hip); 64.5 (SL-PLUS MIA)
Aim of study	Evaluate hip joint biomechanics of the Silent Micro Hip in comparison to other implnats.
Key findings	• The horizontal **femoral offset and the limb length showed no significant difference** between the Silent Micro Hip, and the NANOS or SL-PLUS MIA at the reconstructed hip • An **almost anatomic reconstruction of the hip joint biomechnaics was reachd with all three implant types**

Paper published in German, abstract in English

Clincal Studies - Approach

NANOS® Neck Preserving Hip Stem

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A new anterolateral surgical approach for total hip replacement

Joints 2016;4(3):148-152
Grano, G.F., Pavlidou M., Todesco, A., Palermo, A., Molfetta, L.

Study Type	Retrospective review
Number of hips	200 caese / 35 NANOS; 15 SMF; 150 C2 Stem
HSS	excellent in 95% of the cases and good in 5%
Survivalrate	n/a
Folow up	12 months
Mean Age	69.4 years
Aim of study	The purpose of the present paper is to present the short-term results of a “detachment-free” (DF) anterolateral approach for primary total hip replacement (tHR) performed in a large series of patients.
Key findings	• No heterotopic ossification • No mobilization of the prosthetic components • No hip dislocation • No infections • No deep vein thrombosis • No failure of the gluteal muscles • Like all surgical techniques, the DF anterolateral approach in total hip replacement has a learning curve that depends directly on the surgeon’s experience with the standard surgical approaches • Correct patient selection and precise execution of the incision and anesthetic relaxation are indispensable for correct execution of the DF surgical approach

Minimal invasive (MIS) posterior approach in short stem total hip arthroplasty - Short term results

J Bone Joint Surg Br. 2012;94)B(SUPP XXV):156
Moussa, K.

Study Type	n/a
Number of hips	113 cases
HSS	Preop 53; Postop 94
Survivalrate	Stem 100% ; cup 97% (3 revised, malposition)
Folow up	2.5years (range 0.5 - 4.5 years)
Mean Age	53 years (average age 33-73)
Aim of study	Assessment of the advantages of the minimal invasive posterior approach in short stems (NANOS®) THA
Key findings	• No prothesis specific complications were discovered during study period • **No evidence of any loosing or migration** • No luxation • The NANOS® stem prothesis allowed a **metaphyseal intertrochnateric multipoint primary fixation** • The surgical technique posterior appraoch gave a good access to the femur and acetabulum

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