

# Eclipse™ Stemless Implant Scientific Update

A Review of Existing Literature



Launched in 2005, the Eclipse stemless shoulder prosthesis offers unique fixation that consists of a compressive cage screw placed through a trunnion for full cortical support. As the longest-running prosthesis available in the marketplace, the Eclipse stemless shoulder has a rich clinical history.



Werner BC,  
Burrus MT,  
Denard PJ,  
Romeo AA,  
Lederman E,  
Griffin JW,  
Sears B

## Clinical Articles

[Stemless anatomic total shoulder arthroplasty is associated with less early postoperative pain. \*JSES Int.\* 2024;8\(1\):197-203. doi:10.1016/j.jseint.2023.10.012](#)

- 124 patients from the ShARC registry who had received an Eclipse stemless implant or Univers™ Apex short-stem anatomic total shoulder arthroplasty (aTSA) with a minimum of 2-year follow-up were identified and compared to each other, 62 in each group
- Improved pain control was reported by patients undergoing stemless aTSA
- Patients who underwent a stemless aTSA were significantly more likely to be able to sleep on the affected shoulder at 9 weeks postoperatively
- No differences were observed in the two groups after 26 weeks

### Takeaway

Patients receiving an Eclipse stemless aTSA procedure have decreased early postoperative pain, and are more likely to be able to sleep on the affected shoulder sooner when compared to stemmed aTSA.



Sears BW,  
Creighton RA,  
Denard PJ,  
Griffin JW,  
Lichtenberg S,  
Lederman ES,  
Werner BC

[Stemless components lead to improved radiographic restoration of humeral head anatomy compared with short-stemmed components in total shoulder arthroplasty. \*J Shoulder Elbow Surg.\* 2022;S1058-2746\(22\)00683-8. doi:10.1016/j.jse.2022.07.024](#)

- 229 patients; 89 short stems and 140 stemless components (136 Eclipse Implants)
- Mean center of rotation (COR) shift for short stems was 2.7 mm ( $\pm 1.4$  mm) compared with 2.1 mm ( $\pm 0.9$  mm) for stemless implants
- 66% of short-stem patients had a COR shift of greater than 2 mm, compared to 47.4% of stemless patients
- 17% of short-stem patients had a COR shift of greater than 4 mm, compared to 3% of stemless patients

### Takeaway

Patients who received stemless implants had improved restoration of humeral head COR compared to those who received a short-stem prosthesis.





Tracy ST,  
Werner BC,  
Steinbeck J,  
Smith MJ,  
Lin A,  
Sears BW,  
Hatzidakis AM,  
Cohen BS,  
Lichtenberg S,  
Lederman ES,  
Denard PJ

[Revision to reverse total shoulder arthroplasty: do short stem and stemless implants reduce the operative burden compared to convertible stems?](#) *Semin Arthroplasty*. 2021;31(2):248-254. doi:10.1053/j.sart.2020.11.019

- 279 patients; 70 convertible stems, 209 nonconvertible stems
- 70% of convertible stems were retained
- Overall operative time between the two groups was similar
- Intraoperative blood loss and fracture were higher in the nonconvertible group
- Stemless implants had a shorter operative time than convertible stems and a similarly low rate of fracture
- Stemless nonconvertible implants reduce the rate of fracture and operative time in revisions compared to short and standard-length nonconvertible stems
- Stemless nonconvertible implants have the shortest operative time of all implant types, and reduce fracture comparably to convertible stems

#### **Takeaway**

Convertible systems do not lead to shorter operative time compared to nonconvertible systems.

Magosch P,  
Lichtenberg S,  
Habermeyer P

[Survival of stemless humeral head replacement in anatomic shoulder arthroplasty. A prospective study.](#) *J Shoulder Elbow Surg*. 2020;S1058-2746(20)30830-2. doi.org/10.1016/j.jse.2020.09.034

- Prospective study examining clinical and radiographic outcomes of the Eclipse implant for TSA and hemiarthroplasty at a mean 11-year follow-up.
- Eclipse TSA showed no loosening, osteolysis, or need for implant-related revisions
- Improved clinical outcomes from preoperative pain and function scores
- 5- and 10-year survivorship >96%

#### **Takeaway**

Long-term Eclipse TSA and hemiarthroplasty survivorship demonstrates improved clinical outcomes without loosening, osteolysis, or need for implant-related revisions at a mean follow-up of 11 years.

Alikhah A,  
Imiolczyk JP,  
Krukenberg A,  
Scheibel M

[Screw fixation in stemless shoulder arthroplasty for the treatment of primary osteoarthritis leads to less osteolysis when compared to impaction fixation \[published correction appears in BMC Musculoskelet Disord. 2020 Jun 6;21\(1\):355\]. BMC Musculoskelet Disord. 2020;21\(1\):295. doi:10.1186/s12891-020-03277-3](#)

- Retrospective study examining clinical and radiographic outcomes of the Eclipse TSA and the Zimmer Sidus® TSA procedures at a minimum of 2 years follow-up
- Eclipse TSA follow-up mean was 42.2 months; Sidus TSA follow-up mean was 30.3 months
- Eclipse TSA showed no radiographic signs of loosening or osteolysis or need for implant-related revision
- 33% Sidus TSA medial calcar osteolysis, 0% loosening or implant-related revision
- No significant difference in clinical outcomes between Eclipse TSA and Sidus TSA

#### **Takeaway**

Eclipse TSA screw fixation prevents medial calcar osteolysis compared to Sidus impaction-type stemless TSA.

Habermeyer P,  
Lichtenberg S,  
Magosch P

[9-13 year results of stemless humeral head replacement. A prospective study. JSES Open Access. 2019;3\(4\):P234. doi:10.1016/j.jses.2019.10.013](#)

- 9- to 13-year clinical and radiographic outcomes of 87 Eclipse TSA and hemiarthroplasty procedures at a mean of 128 months
- Eclipse TSA showed no loosening, stress-shielding, or need for implant-related revisions; 7.9% had radiolucent lines that did not affect clinical outcomes
- Significant improvement in Constant score (pain, function, ROM, and strength)

#### **Takeaway**

Eclipse TSA improved clinical outcomes without loosening or implant-related revision at a mean follow-up of 10+ years.

Moursy M,  
Niks M,  
Kadavkolan A,  
Lehmann L

[Do the radiological changes seen at mid term follow up of stemless shoulder prosthesis affect outcome? BMC Musculoskelet Disord. 2019;20\(1\):490. doi:10.1186/s12891-019-2870-z](#)

- 6-year clinical and radiographic outcomes of 23 Eclipse TSA procedures
- Eclipse TSA implants reproduced offset, version, head angle, neck length, retroversion, and head diameter
- Eclipse TSA showed no TSA implant loosening or implant-related revisions
- Radiographic changes did not affect clinical outcomes
- Significant improvement in Constant score and ROM (flexion, extension, and external rotation) compared to preoperative scores

#### **Takeaway**

This independent study demonstrated Eclipse TSA provides improved clinical outcomes without loosening.



Gallacher S,  
Williams HLM,  
King A,  
Kitson J,  
Smith CD,  
Thomas WJ

[Clinical and radiologic outcomes following total shoulder arthroplasty using Arthrex Eclipse stemless humeral component with minimum 2 years' follow-up.](#) *J Shoulder Elbow Surg.* 2018;27(12):2191-2197. doi:10.1016/j.jse.2018.05.039

- 2-year clinical and radiographic outcomes of 100 Eclipse TSA procedures
- Eclipse TSA showed no loosening or need for implant-related revision
- Significant improvement in Oxford Shoulder Score and range of motion (elevation and external rotation)

#### **Takeaway**

This independent study demonstrated Eclipse TSA provides improved clinical outcomes and without loosening.

Heuberer PR,  
Brandl G,  
Pauzenberger L,  
Laky B,  
Kriegleder B,  
Anderl W

[Radiological changes do not influence clinical mid-term outcome in stemless humeral head replacements with hollow screw fixation: a prospective radiological and clinical evaluation.](#) *BMC Musculoskelet Disord.* 2018;19(1):28. doi:10.1186/s12891-018-1945-6

- Prospective study examining clinical and radiologic outcomes of 73 Eclipse TSA procedures at mean follow-up of 58 months
- Significantly shorter operative time for Eclipse procedures compared to stemmed procedures (stemless HSA [73.2 min] vs stemless TSA [95.1 min]; stemmed HSA [95.7 min] vs stemmed TSA [120.7 min])
- Eclipse TSA showed no implant loosening or need for implant-related revisions
- Radiologic changes did not affect clinical outcomes
- Clinical outcomes for TSA were significantly better than hemiarthroplasty

#### **Takeaway**

Eclipse TSA improved clinical outcomes with significantly shorter operative time compared to stemmed procedures without implant-related revisions.

Hawi N,  
Magosch P,  
Tauber M,  
Lichtenberg S,  
Habermeyer P

[Nine-year outcome after anatomic stemless shoulder prosthesis: clinical and radiologic results.](#) *J Shoulder Elbow Surg.* 2017;26(9):1609-1615. doi:10.1016/j.jse.2017.02.017

- Prospective study examining clinical and radiologic outcomes of 43 Eclipse TSA procedures at a mean follow-up of 9 years
- Eclipse TSA showed no need for implant-related revisions
- 1/43 implants demonstrated radiolucency with no effect on clinical outcomes
- Significant improvement in Constant Murley score and ROM (flexion, abduction, and external rotation) compared to preoperative scores

#### **Takeaway**

This study demonstrated long-term Eclipse TSA survivability with improved clinical outcomes without radiologic complications or need for implant-related revision.



Ushok S,  
Magosch P,  
Moe M,  
Lichtenberg S,  
Habermeier P

[Is the stemless humeral head replacement clinically and radiographically a secure equivalent to standard stem humeral head replacement in the long-term follow-up? A prospective randomized trial.](#) *J Shoulder Elbow Surg.* 2017;26(2):225-232. doi:10.1016/j.jse.2016.09.001

- Prospective study examining clinical and radiographic outcomes of Eclipse TSA procedures and 4th-generation stemmed procedures at follow-up of 2 and 5 years
- Eclipse TSA showed no radiographic signs of loosening or need for implant-related revisions
- Significantly fewer radiolucent lines in Eclipse TSA compared to stemmed procedures
- Radiographic changes did not affect clinical outcomes
- No significant difference in clinical outcomes (Constant score, ROM) between stemless and stemmed procedures

#### **Takeaway**

Eclipse TSA improved clinical outcomes without radiographic signs of loosening or implant-related revision and with significantly less radiographic changes compared to stemmed procedures.

Habermeier P,  
Lichtenberg S,  
Tauber M,  
Magosch P

[Midterm results of stemless shoulder arthroplasty: a prospective study.](#) *J Shoulder Elbow Surg.* 2015;24(9):1463-1472. doi:10.1016/j.jse.2015.02.023

- Prospective study examining clinical and radiographic outcomes of 78 Eclipse TSA procedures at a mean follow-up of 6 years
- Eclipse TSA showed no loosening or need for implant-related revisions
- Significant improvement in Constant score and ROM (flexion, abduction, and external rotation) compared to preoperative scores

#### **Takeaway**

This study demonstrated midterm Eclipse TSA survivability and improved clinical outcomes without radiologic complications or need for implant-related revisions.

### **International Articles**

Kellinghaus J,  
Jamali Narisi Y,  
Schneider T

[Design, biomechanics and medium-term results of a stem-free shoulder arthroplasty. The Eclipse prosthesis.](#) *OUP.* 2013;10:478-484. doi:10.3238/oup.2013.0478-0484

- Retrospective study examining the clinical and radiographic outcomes of 41 Eclipse hemiarthroplasty procedures with a mean follow-up of 19.4 months
- Eclipse TSA showed no loosening or need for implant-related revision
- 85% of patients experienced zero to mild pain and zero to mild limitation in activities of daily living
- Significant improvements in ROM (abduction, flexion, and external rotation)

#### **Takeaway**

This study demonstrated short-term Eclipse hemiarthroplasty survivability with improved clinical outcomes without radiologic complications or need for implant-related revision.



Magosch P,  
Habermeier P,  
Bachmaier S,  
Metcalfe N

[Biomechanics of metaphyseal fixed humeral head replacement.](#) *Obere Extremität.* 2012;7:11-16. doi:10.1007/s11678-011-0150-0

- Biomechanical finite element analysis of the Eclipse implant
- Minimal migration (0.2 mm) and stress distribution mimicked normal bone when the trunnion was placed at the inferiomedial edge of the humerus, supported by cortical bone

#### **Takeaway**

The combination of epiphyseal cortical support of the trunnion and metaphyseal cage-screw fixation led to minimal movement in bone-like foam blocks and resulted in load distribution similar to normal bone, theoretically mitigating implant-related bone adaptations.

Brunner UH,  
Fruth M,  
Rückl K,  
Magosch P,  
Tauber M,  
Resch H,  
Habermeier P

[The stemless Eclipse prosthesis – indications and mid-term results. A prospective multicenter study.](#) *Ober Extremität.* 2012;7:22-28. doi:10.1007/s11678-011-0152-y

- Prospective study examining clinical and radiologic outcomes of 233 Eclipse TSA procedures with a mean follow-up of 2 years
- 92.2% Eclipse implants showed no evidence of loosening; 7.2% showed radiolucency without clinical impact; 1/233 (0.4%) demonstrated osteolysis around the Eclipse implant with revision
- Significant improvement in Constant-Murley scores (pain and function) and ROM (abduction, flexion, and external rotation)

#### **Takeaway**

This study demonstrated short-term Eclipse TSA survivability with improved clinical outcomes and less than 0.4% implant-related revision for loosening.

### **Other Stemless aTSA Articles**

Churchill RS

[Comparison of intraoperative bone quality and bone quantity with 2-year radiographic results of the Simpliciti stemless total shoulder arthroplasty system.](#) *J Shoulder Elbow Surg.* 2020;29(4):E166-E167. doi:10.1016/j.jse.2020.01.052

- Retrospective study examining radiographic outcomes of 53 Simpliciti™ procedures (Wright) at 2-year follow-up
- 49% of patients demonstrated proximal humerus medial calcar resorption to the collar of the implant
- Calcar resorption occurred more commonly in males who initially had better bone quality

#### **Takeaway**

Bone adaptive changes occur in approximately 50% of patients with the Simpliciti shoulder at 2-year follow-up. This is more than any study on the Eclipse TSA implant.



Churchill RS,  
Chuinard C,  
Wiater JM,  
Friedman R,  
Freehill M,  
Jacobson S,  
Spencer E,  
Holloway GB,  
Wittstein J,  
Lassiter T,  
Smith M,  
Blaine T,  
Nicholson GP

[Clinical and radiographic outcomes of the Simpliciti canal-sparing shoulder arthroplasty system: a prospective two-year multicenter study.](#) *J Bone Joint Surg Am.* 2016;98(7):552-560. doi:10.2106/JBJS.15.00181

- FDA-regulated IDE study of 2-year clinical and radiographic outcomes for the Simpliciti shoulder (Wright)
- Significantly improved Constant, SST, ASES, and ROM (elevation and external rotation) outcomes
- 0% loosening, migration, and subsidence
- Clinical success rate of 89%
  - Simpliciti shoulder clinical success rate = 87%
  - Eclipse implant clinical success rate = 95.5%
  - Univers™ II implant clinical success rate = 89.7%

#### Takeaway

No implant-related revisions or loosening at 2 years. Clinical Success score was lower than the Eclipse implant and equivalent to the Univers II implant.

Athwal GS,  
Krupp RJ,  
Carlson G,  
Bicknell RT

[A multicenter, prospective 2-year analysis of the Sidus stem-free shoulder arthroplasty system.](#) *JSES Int.* 2019;4(1):120-126. doi:10.1016/j.jses.2019.10.005

- FDA-regulated IDE study of 2-year clinical and radiographic outcomes for the Sidus® shoulder (Zimmer Biomet)
- Significantly improved ASES pain/instability/ROM/overall, WOOS, SF-12 (physical, mental health), and ROM (elevation and external rotation) outcomes
- 0% loosening, migration, and subsidence
- 1 implant-related revision (humeral head/metaphyseal anchor disengaged)
  - 2 other implant revisions prior to 2-year visit were not included in study
  - 2 subjects did not meet radiographic success criteria and were not included
- Clinical success rate of 87%
  - Sidus shoulder clinical success rate = 89%
  - Eclipse implant clinical success rate = 95.5%
  - Univers II implant clinical success rate = 89.7%

#### Takeaway

No implant-related revisions or loosening at 2 years. Clinical Success Score was lower than the Eclipse implant and equivalent to the Univers II implant.



The Shoulder Arthroplasty Research Committee (ShARC) was established to collect clinical data on Arthrex arthroplasty implants for outcomes analysis that supports the advancement of patient care and quality of life, implant surveillance, and refinement of procedural techniques, and to increase generalized medical knowledge through peer-reviewed journal articles related to the advancement of shoulder arthroplasty.