J Shoulder Elbow Surg (2016) 25, 362–368

ELSEVIER

Journal of Shoulder and Elbow Surgery

www.elsevier.com/locate/ymse

The long-term outcome of the Gschwend-Scheier-Bähler III elbow replacement

Ewan Bigsby, FRCS (Tr, Orth)[a,*], Mark Kemp, FRCS (Tr, Orth)[a], Nashat Siddiqui, FRCS (Tr, Orth)[b], Neil Blewitt, FRCS (Tr, Orth)[a]

[a]*Trauma and Orthopaedic Department, Southmead Hospital, Bristol, UK*
[b]*Trauma and Orthopaedic Department, Kingston Hospital, Kingston upon Thames, UK*

Background: The Gschwend-Scheier-Bähler III (GSBIII) is a semiconstrained, sloppy-hinge total elbow replacement. We report the long-term functional and radiological outcome of a cohort of patients more than 10 years after surgery.

Methods: All GSBIII prostheses implanted from September 1996 to June 2004 were identified from our surgical database. Functional and radiological assessments were performed at routine patient clinic visits, using the Oxford Elbow Score, the 11-item version of the Disabilities of Arm, Shoulder and Hand score (QuickDASH), and plain radiographs.

Results: From 1996 to 2004, 52 elbows in 40 patients were implanted; of these, 18 patients (23 elbows) had died, leaving 22 patients with 29 elbows available for follow-up. Three patients (3 elbows) could not be contacted. Functional and radiological data were available for 19 patients with 26 elbows (90%). Overall survival was a mean of 13.1 years (range, 10.6-16.4 years). Mean age at operation was 63.0 years (range, 49.5-80.6 years). There were 5 male elbows and 21 female elbows. Five total elbow replacements were performed for osteoarthritis and 24 for rheumatoid arthritis. The mean Oxford Elbow Score was 26.9 (range, 18-48). The mean QuickDASH score was 42.6 (range, 2.5-93.2). Of the 52 elbows in 40 patients, 4 elbows (7.7%) required further surgery, 2 (3.8%) of which were revisions. In addition, there was 1 intraoperative complication and 2 postoperative complications not requiring further surgery. Kaplan-Meier 10-year survival shows a 95.9% implant survival with revision as the end point.

Conclusions: The GSBIII elbow replacement provides good long-term function with a low revision rate and few complications.

Level of evidence: Level IV; Case Series; Treatment Study

Keywords: Elbow; TER; arthroplasty; replacement; osteoarthritis; rheumatoid

Elbow replacements are used for a number of reasons, although most commonly for joint destruction from rheumatoid arthritis (RA). The modern era of total elbow arthroplasty is considered to have begun in the early 1970s when Dee[6] implanted constrained (rigid linked) hinged prostheses. However the loosening rates with these constrained prostheses were

This study was approved by the Quality Improvement and Clinical Audit Department at North Bristol National Health Service Trust, Bristol, UK.

*Reprint requests: Ewan Bigsby, FRCS (Tr, Orth), Trauma and Orthopaedic Department, Southmead Hospital, Southmead Way, Bristol BS10 5NB, UK.

E-mail address: ewan374@hotmail.com (E. Bigsby).

1058-2746/$ - see front matter © 2016 Journal of Shoulder and Elbow Surgery Board of Trustees
http://dx.doi.org/10.1016/j.jse.2015.10.013

as high as 50% at 5 years.[7] This prompted the development of the semiconstrained (linked) sloppy hinge (eg, Gschwend-Scheier-Bähler III [GSBIII; Zimmer, Warsaw, IN, USA], Coonrad-Morrey [Zimmer], Discovery [Biomet, Warsaw, IN, USA]) and unconstrained (unlinked; eg, Souter-Strathclyde [Stryker, (UK) Ltd, Newbury, Berkshire, UK]), Instrumented Bone Preserving Elbow System [Biomet]) prostheses.

Some varus/valgus movement is possible in the sloppy-hinge prostheses, thus reducing the stress transmitted to the prosthesis–cement interface. However, some stress remains transmitted, and so loosening is more likely than in an unlinked prosthesis design. The advantages, however, are that the joint is immediately stable and is less likely to dislocate, providing more predictable results that make it suitable for a wide array of pathologies.

The GSBIII (Fig. 1) is a semiconstrained, sloppy-hinge elbow replacement that allows the ulna component 5° of freedom in either direction within the humeral component. The articulating surfaces are polyethylene. The GSBI was first used in 1971 and went through a number of changes, with the GSBIII being introduced in 1978. It has large surfaces designed to support the condyles and a wide stem for transference of rotational stress.[9] Although small numbers of the GSBIII are still being implanted, most elbow replacements implanted in the United Kingdom are Coonrad-Morrey or Discovery, both of which allow 7° of varus/valgus laxity and have an anterior flange.

The manufacturer has recently made a commercial decision to withdraw the GSBIII from sale. However, the relevance of long-term data on the GSBIII remains of importance, both to those patients who already have the prosthesis in situ and to consideration of the sloppy-hinge elbow replacement in more general terms. Furthermore, although there is no present plan to bring the GSBIII back into production, this remains a possibility for the future.

Figure 1 Photograph of the Gschwend-Scheier-Bähler III prosthesis (with kind permission of Zimmer).

We report the long-term functional and radiological outcome of a cohort of patients more than 10 years after surgery. We have previously described medium-term follow-up for part of the cohort.[3]

Materials and methods

All GSBIII prostheses implanted from September 1, 1996, to June 1, 2004, were identified from our surgical database. Forty patients underwent 52 total elbow replacements (TERs; 12 bilateral). Patients were routinely followed up, and the Oxford Elbow Score (OES) and the 11-item version of the Disabilities of Arm, Shoulder and Hand (QuickDASH) questionnaires were administered and radiographs taken. Follow-up in 3 patients who were too infirm to attend the hospital in person was performed by a postal questionnaire with telephone follow-up.

Surgical technique

The surgery was performed directly by, or supervised by, the senior author (N.B.). The patient was placed in the lateral decubitus position and a tourniquet applied. Antibiotics were given at induction. A posterior midline incision was used, and fasciocutaneous flaps were raised. The ulnar nerve was released and left in its bed. The Newcastle surgical approach was used to gain access to the elbow. The elbow was dislocated and the radial head excised. The prosthesis was inserted with antibiotic-loaded cement.

The tissues were closed in a standard fashion, and a drain was inserted, which was removed at 24 hours. A backslab was applied in the operating theater and left in place for 2 weeks to protect wound healing. Physiotherapy to promote range of movement was commenced at 2 weeks.

Functional outcome

The OES is a short questionnaire specifically designed and developed for assessing outcomes of elbow surgery. Each of the 12 questions is scored 0 to 4, with 0 representing greater severity. This gives a range from 0 (worst function) to 48 (best function). There are 3 unidimensional domains—elbow pain, elbow function, and social-psychological—with each domain comprising 4 items (maximum score of 16 in each section).

The QuickDASH is a shortened version of the 30-item DASH outcome measure. The QuickDASH uses 11 items to measure physical function and symptoms. The QuickDASH is a score evaluating upper limb disability and symptoms and ranges from 0 (no disability) to 100 (greatest possible disability). The QuickDASH also has 2 optional modules intended to measure symptoms and function in athletes, performing