



PRIMARY SEMI CONSTRAINED TOTAL ELBOW ARTHROPLASTY-SHORT TERM FOLLOW UP

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Abstract :

We present three patients who were treated by Primary semi constrained total elbow arthroplasty, two patients had post traumatic arthritis following chronic dislocations of the elbow with multiple failed surgeries and one patient with rheumatoid arthritis of elbow. The most dramatic improvement was seen in range of movements and pain relief. The mean American shoulder and elbow surgeon score were much better post operatively, and the mean total range of movement increased from 300 to 1200. Primary semi constrained total elbow arthroplasty provides a significant and a predictable functional improvement. Primary semi constrained total elbow arthroplasty should be considered as a viable treatment option for chronic dislocation of elbow in elderly patients.

Keyword : Baksi prosthesis, semi constrained, total elbow replacement, Mayo index,

INTRODUCTION:

Total elbow arthroplasty has become a more common procedure since Dee reported, approximately thirty years ago, on the use of stemmed metal implants fixed to bone with methylmethacrylate. [2] The early designs were true hinges allowing only one degree of freedom. Failure at the bone-cement interface in the humerus was common, with a prevalence of loosening of up to 33 percent at five years after the arthroplasty. Refinements in the design of total elbow prostheses have led to two major categories of implants today: linked, or semiconstrained, prostheses and unlinked or resurfacing prostheses. The semiconstrained prostheses are two-part or three-part prostheses that have a metal-to-high-density polyethylene articulation, which may be connected with a locking pin or with a snap-fit device. dissipation of forces. Semiconstrained implants with pin-stabilised, but loose hinges avoid the potential for dislocation or subluxation. We report

our short term follow up of 3 cases who had elbow replacement with semi constrained sloppy hinge baksi prosthesis.

MATERIALS AND METHODS:

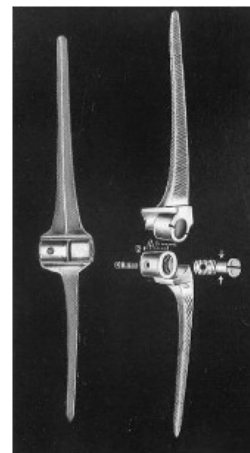
The indications for total elbow arthroplasty we considered are pain, the quality of bone, the level of activity, a history of rheumatoid arthritis, and failed attempts at reduction or fixation. Inclusion criteria were based on age, chronic dislocation with soft-tissue contracture, severe pain and loss of function. Patients excluded were those with active infection, an inability to participate in a post-operative programme of physiotherapy because of dementia, or an occupation requiring repetitive lifting of greater than 4.5 kg (10lb). Two patients were female and one patient is male. The mean follow-up was 16 months. The mean interval between dislocation and surgery was 18 weeks (5 to 52). Two patients had radiological evidence of post-traumatic arthritis. **one patient with rheumatoid arthritis had pre-existing active disease in the elbow, but quiescent at time of surgery.** Patients with active ongoing rheumatoid disease were not selected. Abbreviations: PTA-post traumatic arthritis. RA-rheumatoid arthritis .M-male .F-female R- Right, L-Left

CASE REPORTS: **Case one:** 55 year old male, labourer by occupation had sustained posterior dislocation, for which took native treatment and presented to us with pain and limitations of movements of left elbow for 12 months duration. He had FFD 10 degree and further flexion upto 40°. Pronation and supination was restricted. **Case two:** 55 year old female, house wife presented with us with three yrs duration of instability of right elbow following an unreduced posterior elbow dislocation, for which she underwent open reduction procedure elsewhere .her ROM lies between 0°-40°. **Case three:** 36 yr old female, house wife with pain and deformity in right elbow for 7 yrs duration. she had a fixed flexion deformity of 80 degrees. she had no active rheumatoid disease. she had rheumatoid arthritis

in remission at time of surgery.

BAKSI SLOPPY HINGE ELBOW PROSTHESIS

The new sloppy hinge redesigned in 1984, by Baksi. The prosthesis is simple, cost effective and made locally of stainless steel (SMO 316 LV). The current design has a humeral component with a stem of the same diameter as that of the ulnar component but shorter. The linking screw in the current design has a humeral component with a stem of the same diameter as that of the ulnar component but shorter. The linking screw provides a smooth bearing surface .This provides a gap between the bearing surfaces and only partial articular contact during elbow movement; there is 7° to 10° of laxity which allows some varus-valgus movement, but still limits axial rotation. Forces across the prosthesis are therefore dissipated primarily to the surrounding soft tissues, thus protecting the cement-to-bone interfaces.



The humeral stem is triangular and the ulnar stem quadrangular in cross-section; their lengths are 95 mm and 75 mm, respectively, and their curvatures conform to those of the medullary canals. They have cross-cut knurled surfaces. The only modifications since 1984 have been an increase in the length of the humeral stem and a change in the head of the small locking screw.

OPERATIVE PROCEDURE: The operations were performed with tourniquet control. Using the **extensile posterior approach (Bryan & Morrey)** posterior incision is followed by subfascial dissection, first medially then laterally. The ulnar nerve is isolated and mobilised with flexor carpi ulnaris from the proximal ulna. The continuity of triceps extensor mechanism is maintained. Radial head excision done in two patients, in **one patient we had not performed radial head excision as she had good range of supination and pronation.** The ulnar nerve was transposed or had been transposed during prior operations in all but one elbow. All components were fixed with polymethylmethacrylate. Cemented Baksi prosthesis implanted after adequate bone resection. Drains were placed deep to the extensor mechanism and in the subcutaneous layer. Antibiotics were given preoperatively and for twenty-four hours postoperatively. A splint was applied with the elbow in extension, and it was worn for one to two days. Active-assisted flexion and extension exercises were begun. A night time extension splint was worn for twelve weeks and adjusted as extension improved, and a daytime resting splint (with the elbow at 90 degrees of flexion) was worn for six weeks. Therapy was the same for all patients while they were in the hospital and after they had been discharged.

FOLLOW UP EVALUATION:

The Mayo elbow performance score was used to document subjective, objective, and functional characteristics

before and after the arthroplasty. The performance index consists of scores for pain (maximum score, 45 points), motion (maximum score, 20 points), stability (maximum score, 10 points), and activities of daily living (maximum score, 25 points). A postoperative score of 90 to 100 points indicates an excellent result; a score of 75 to 89 points, a good result; a score of 60 to 74 points, a fair result; and a score of less than 60 points, a poor result. Patients completed the Mayo elbow performance index, and ASES score. Clinical examination included measurement of the range of motion, assessment of varus-valgus rotational and longitudinal stability, and determination of flexor and extensor strength of the elbow, pronation and supination strength of the forearm, intrinsic muscle strength, and distal interphalangeal joint flexor strength. In addition, static two-point discrimination was tested on the volar autonomous zones of the small finger (ulnar nerve) and index finger (median nerve). Muscle strength was given a grade of 0 to 5, according to the Medical Research Council. Permanent dysfunction of the ulnar nerve was defined as weakness (grade 4 or less) of the intrinsic muscles of the hand and of flexion of the distal interphalangeal joint of the small finger and/or two-point discrimination of greater than ten millimeters on the volar surface of the small finger. If concomitant dysfunction of the peripheral nerve was evident, then we could not diagnose permanent dysfunction of the ulnar nerve clinically. Immediate postoperative and follow-up anteroposterior and lateral radiographs of the elbow were evaluated for

a radiolucent line less than one millimeter thick and involving less than 50 percent of the interface; type I, a radiolucent line at least one millimeter thick and involving less than 50 percent of the interface; type II, a radiolucent line more than one millimeter thick and involving more than 50 percent of the interface; type III, a radiolucent line more than two millimeters thick and around the entire interface; and type IV, gross loosening. Round lytic lesions that were more than two millimeters in diameter were considered to be type III. Progression of radiolucencies was evaluated, with mild progression defined as an increase of one type and moderate progression defined as an increase of two types or more. Incorporation of the bone graft beneath the anterior flange of the humeral prosthesis was also noted.

RESULTS:

The results were assessed on clinical and radiological grounds, with function of the replaced elbows recorded as the ability to feed, reach the perineum, dress, comb hair and perform light household activities. Two patients reported no pain and one patient reported mild pain. The mean total ROM improved from 30° to 110°. The mean ASES SCORE was two times better than preoperative score. One patient had a fixed flexion deformity of 80 degree. The Mayo elbow performance index average was 90, which was very excellent result. No ulnar nerve dysfunction.

A b b r e v i a t i o n s :
MAYO- Mayo elbow performance score. ASES- American shoulder and elbow score, ASES: American shoulder and elbow surgeons score. [5]

DISCUSSION:

The results of our medium-term study clearly show that primary elbow arthroplasty results in a significant decrease in pain and a dramatic increase in function

and Range of movement. The Baksi sloppy hinge-elbow prosthesis, although all metal, has provided satisfactory mid-term results for both ankylosed and unstable elbows in a developing country. The minimal contact area at the joint and the designed laxity are acceptable, because the elbow is non-weight-bearing except during extension against gravity and weight-lifting. The sloppy hinge replacement allowed effective elbow function during an active part of life. The common late development of fixed flexion deformity of 10° to 30° in the ankylosed elbows may have protected against stress occurring during extension of the elbow, but by contrast the early postoperative recovery and almost full range of stable movement achieved in previously unstable elbows may have overstressed the prosthesis.[4]. The Baksi sloppy hinge elbow replacement appears to be a viable proposition for post-traumatic ankylosis and instability in a developing country. While other treatments may also reduce pain, total elbow arthroplasty provides immediate stability, and allows patients greater functional recovery and a quicker return to activities of daily living. Notably, it was successful in patients with both post-traumatic and rheumatoid arthritis and should be considered as a treatment option to restore movement in patients with chronic dislocation and inflammatory or post-traumatic arthroplasty. A linked implant was strongly recommended, in order to compensate for incompetent collateral ligaments associated with chronic dislocation. Mighell et al demonstrates in their study that linked semi constrained total elbow arthroplasty is a predictable method for decreasing pain and restoring function to arthritic patients with chronic elbow dislocation or fracture-dislocation.

The functional improvement afforded by this procedure allowed patients to return to activities of daily living, a key factor to be considered in an analysis of surgical success.

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Case	Age in yr	Sex/side	Follow up	ROM	Initial treatment	Type of arthritis
1	55	M/L	2 yrs	10 ⁰ -40 ⁰	Native treatment,multiple failed procedures	PTA
2	55	F/R	1 yrs	0 ⁰ -40 ⁰	Multiple failed procedures	PTA
3	36	F/R	1 yrs	Fibrous ankylosis in 80 fixedflexion	—	RA

Case no	ASES pre op	ASES post op	MAYO pre op	MAYO post op	Rom Pre op	Rom post op
1	20	70	20	95	10 ⁰ -40 ⁰	30 ⁰ -110 ⁰
2	30	80	0	80	0 ⁰ -40 ⁰	0 ⁰ -110 ⁰
3	20	70	40	95	FFD-80 ⁰	20 ⁰ -110 ⁰

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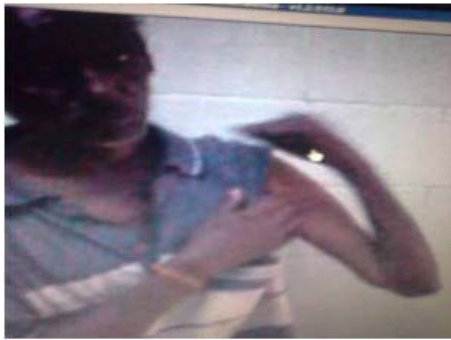
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search.Vol. 49, No. 5S, October 15, 2003, pp S50 –S58.CASE ILLUSTRATIONS Case 1 Case 1 post op





case 1 two year follow up
case 2 pre op CT Scan INTRA OP post op



