



## Acute Total Hip Arthroplasty in Acetabular Fractures in the Elderly Using the Octopus System Mid Term to Long Term Follow-Up

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### ABSTRACT

Patients older than 55 years presenting with acetabular fractures fulfilling the criteria for acute total hip arthroplasty (THA) were included. Cementless THA was done using the Octopus System and autologous bone grafting. 15 patients were available for latest follow up. The average follow-up was 81.5 months (62–122 months). Mean Harris Hip Score was 91.1. 10 patients were walking without any support while 5 were using a cane. There were no cases of acetabular or femoral component loosening. This method of treatment is promising in the older population as there is deficiency of bone stock which may lead to fixation failures. It is, therefore, worthwhile to recommend primary THA using the Octopus system in the successful management of selected types of acetabular fractures in the elderly.

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Open reduction and fixation are the treatment of choice for displaced acetabular fracture(s) following injury/trauma, while total hip arthroplasty (THA) in selected cases has a definite role. The major indications for THA are secondary arthritis and avascular necrosis of femoral head. Moreover, post-traumatic hip arthritis is known to occur even after the restoration of acetabular stock with minimal deformity [1,2]. Acute THA with or without fixation has been recommended in the elderly [3,4]. Poor bone stock and frequently associated comminution may warrant the use of cage in cementless primary THA in the elderly. The Octopus cage system, Depuy, Johnson and Johnson, USA, a widely acclaimed device, was used to evaluate the clinical and radiological results in displaced acetabular fractures in the elderly.

### Material and Methods

In all 18 elderly patients of acetabular fractures, from May 2000 to July 2005 fulfilling the criteria (Table 1) for acute THA [3–5] over the age of 55 were taken up for the study. The Octopus system and autologous bone graft were used. Those who had associated both

column, open fracture, unfit for surgery, and not ambulatory before the fracture, were excluded. The initial evaluation was done with antero-posterior, iliac and obturator oblique radiographs and supplemented by a computed tomographic scan.

Of the 18 patients only 15 were available for the follow-up. Their age group varied from 57 to 69 years with a mean age 64.5 years. The fractures were defined according to the Letournel classification, Table 2 [6]. Simple fall was the cause of fracture in 9, and motor vehicle collision in 6 patients. Thromboprophylaxis with low molecular weight heparin was started pre-operatively and was continued till full mobilization. Pre-anaesthetic check was an essential ingredient. It was considered mandatory to perform THA within 3 weeks of the injury.

### Operative Technique

The posterior approach was the mainstay for THA. The femoral head was dislocated in the first instance, after which the acetabular fracture was fixed with screws and/or 3.5-mm reconstruction plates. The femoral head was used as a structural graft in case of a major peripheral acetabular defect due to severe comminution. The reconstructed or grafted acetabulum was then reamed to produce a consistent hemispherical dome, and the trial acetabular ring was used to assess the ideal position of the three legs of the Octopus ring. The inferior leg was engaged in the obturator foramen using the hook positioner. The ring positioner was then used to orient the ring in 45°

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**Table 1**  
Indications for Acute THA in Acetabular Fractures [3–5].

	Absolute	Relative
Indications	<ul style="list-style-type: none"> <li>• Impaction of the femoral head or acetabulum</li> <li>• Extensive abrasion of femoral head</li> <li>• Fracture of the femoral head</li> <li>• Completely displaced femoral neck fracture</li> <li>• Severely comminuted fracture</li> <li>• Significant destruction of the articular surface</li> <li>• Pre-existing arthritis of the hip</li> <li>• Elderly patients with osteoporosis</li> </ul>	<ul style="list-style-type: none"> <li>• Delayed presentation</li> <li>• Medical comorbidities</li> <li>• Morbid obesity</li> <li>• Advanced age</li> </ul>

THA=Total Hip Arthroplasty.

of abduction and 15° of anteversion. The superior legs were contoured to match the patients' anatomy and to fit any reconstructed acetabular anatomy. After contouring the legs of the trial ring, the definitive acetabular ring was matched with it fully. The definitive ring was placed over the prepared acetabulum, and fixed with cancellous screws through the fixation holes. The morselized bone grafts, taken from the head of femur were impacted to fill any contained defects. The acetabular shell was fixed to the ring with four connecting screws. A trial liner – standard or lateral offset, which lateralizes the center of rotation of head by 2.8 mm, was inserted and soft tissue tension and joint stability through a full range of motion were tested with trial components. Finally, the chosen liner, the one which snap fits and locks into the shell, was inserted. Uncemented femoral stems were used in all cases. The Octopus system is provided only with the liners with 28-mm internal diameter, therefore only femoral heads with 28-mm diameter were used in all cases.

The patients were mobilized after 48 h of surgery with the help of walker. However, partial weight bearing was allowed after an interval of 3 weeks, and full weight bearing was started only after 6 weeks.

Oral Indomethacin 75 mg daily for two weeks was administered to prevent heterotopic ossification.

Post-operative complications were recorded. The patients were regularly evaluated clinically and radiologically after surgery at an interval of 6 weeks, 3 months, 6 months, and 1 year. Subsequently, the patient was advised to report for checkup every year. In the course of follow-up, Harris Hip Score [7] was determined. It was complemented by the walking ability of each patients, the radiographic assessment of fracture-healing, osteolysis around the implant as well as changes in the angular position or migration of the acetabular component [8]. Migration of the cup more than 4 mm or change in abduction angle more than 5° was deemed as the indicator for loosening of the acetabular component. Femoral components were evaluated for any loosening in the zones aptly defined by Gruen et al [9].

## Results

Of the 18, one patient was lost to follow-up, while 2 of them died of unrelated causes. The remaining 15 patients were evaluated for an average period of 81.5 months, the range being 62 to 122 months. There were 13 males and 2 females (Table 2). Average duration of surgery was 135 min with a range of 110 to 160 min and the average blood loss was 835 ml, the range being 450 to 1200 ml.

Two post-operative patients had superficial infections, which healed following administration of antibiotics. There were no post-operative neurological complications. One patient had a history of pre-operative sciatic nerve injury, which during the latest follow-up had shown only partial recovery. Moreover, sciatic nerve was found to be apparently intact during surgery. There was one case of post-operative dislocation, which had occurred after 6 months of the surgery due to a simple fall on the ground, and was treated by closed reduction.

**Table 2**  
Clinical Profile, Treatment Details and Follow Up of 15 Patients in the Study Group.

Case No.	Sex, Age (Yrs)	Mechanism of injury	Type of Fracture	Femoral Implant Used	Duration of Follow-Up (Months)	Harris Hip Score at Follow-Up	Walking Ability of Patient at Follow-Up	Complications
1	M, 58	Simple fall	Posterior column	Corail	74	97.0	Without cane	Heterotrophic ossification (Brooker II)
2	M, 62	MVC	Anterior + posterior hemitransverse	Corail	89	92.6	Without cane	None
3	M, 69	Simple fall	Transverse	Versys beaded midcoat	85	77.4	With cane	Dislocation × 1
4	F, 57	MVC	Transverse	Versys fiber metal taper	109	96.4	Without cane	None
5	M, 59	MVC	Anterior + posterior hemitransverse	Corail	99	95.2	Without cane	Post-operative Superficial infection
6	M, 66	Simple fall	Posterior column	Corail	122	96.8	Without cane	None
7	M, 68	Simple fall	Posterior column + posterior wall	Versys beaded midcoat	81	72.0	With cane	Post-operative Superficial infection
8	M, 66	Simple fall	Transverse + posterior wall	Corail	62	87.6	With cane	Heterotrophic ossification (Brooker II)
9	M, 67	Simple fall	Posterior wall	AML	67	86.3	With cane	None
10	M, 64	MVC	Posterior column + posterior wall	Corail	78	95.9	Without cane	None
11	F, 69	Simple fall	Posterior column	Versys beaded midcoat	72	95.2	Without cane	None
12	M, 68	MVC	Posterior wall	AML	63	88.9	Without cane	None
13	M, 67	Simple fall	Posterior wall	Versys fiber metal taper	69	91.6	Without cane	None
14	M, 65	Simple fall	Transverse + posterior wall	Corail	71	95.5	With cane	None
15	M, 63	MVC	Posterior column + posterior wall	Corail	82	98.3	Without cane	None

M=Male, F=Female, MVC=Motor Vehicle Collision, AML=Anatomic Medullary Locking. Corail, AML – DePuy Johnson and Johnson, USA; Versys – Zimmer, Warsaw.

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