

# การรักษากระดูกต้นขาหัก โดยใช้มัวร์พรอสทีส ในผู้ป่วยสูงอายุ โรงพยาบาลระยอง

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## ABSTRACT :

**Tang-yingyong P. Unipolar Hemiarthroplasty for Displaced Fracture of Femoral Neck in the Elderly at Rayong Hospital.** (Region 4 Medical Journal 1999 ; 1 : 1-8).

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Between 1994-1998, 32 cases of displaced fracture of femoral neck were treated with primary unipolar hemiarthroplasty (Moore type) on the basis of limited life expectancy and low demand of functional level. They were 20 women and 12 men. Neither immediate postop. complication e.g. death, pneumonia, nor bed sore was noted. The average age was 72.6 years (range 55-89 years) and the length of follow up was from 3 months to 4 years. Two cases were lost of follow up and among those remained 2 cases of superficial infection and 1 case of dislocation was found without any cases of acetabular erosion. Twenty-four cases out of 30 cases could regain functional activity as that before surgery. In this study we found that these patients had relatively low body weight with average of 50.1 kg. (range 42-61.5 kg.). We suggested that Moore hemiarthroplasty had a place in the treatment of displaced fracture of femoral neck of the elderly especially in cost-benefit implication.

**บทคัดย่อ :**

**ไพโรจน์ ตั้งยิ่งยง.** การรักษาคอกระดูกต้นขาหักโดยใช้มัวร์พรอสทีสิสในผู้ป่วยสูงอายุ โรงพยาบาลระยอง.  
(วารสารแพทย์เขต 4 ๒๕๔๒ ; ๑ : ๑-๘).

กลุ่มงานศัลยกรรมออร์โธปิดิกส์, รพ. ระยอง.

ในระหว่างปี พ.ศ. ๒๕๓๗-๒๕๔๑ ได้ทำการรักษาผู้ป่วย ๓๒ ราย ที่มีคอกระดูกต้นขาหัก โดยการใช้ Moore prosthesis ในผู้ป่วยที่คาดว่าจะมีอายุไม่ยืนยาวต่อไปนัก และไม่คาดหวังการใช้งานไว้สูง ไม่พบภาวะแทรกซ้อนหลังการผ่าตัด เช่น ตาย ปอดบวม หรือแผลกดทับ อายุเฉลี่ย ๗๒.๖ ปี (๕๕-๘๙ ปี) และเวลาในการติดตามผลการรักษาจาก ๓ เดือน ถึง ๔ ปี ขาดหายไปจากการติดตามผล ๒ ราย และที่เหลือ ๓๐ รายนั้นพบว่า มีการติดเชื้อในชั้นต้น ๑ ราย และสะโพกที่ผ่าตัดหลุด ๑ ราย ไม่พบว่ามีกระดูกอ่อนของ acetabulum ผู้ป่วย ๒๔ ใน ๓๐ ราย สามารถมีการฟื้นกลับของการทำงานของร่างกายส่วนล่างได้เท่ากับก่อนผ่าตัด ในการศึกษานี้ พบว่าผู้ป่วยไทยเหล่านี้ค่อนข้างจะมีน้ำหนักตัวน้อย คือ เฉลี่ย ๕๐.๑ กิโลกรัม (๔๒ ถึง ๖๑.๕ กิโลกรัม) สรุปได้ว่า การเปลี่ยนข้อสะโพกโดยใช้ Moore prosthesis ยังมีที่ใช้ในการรักษาการหักของกระดูกต้นขาบริเวณคอกระดูกในผู้ป่วยสูงอายุ และเมื่อเทียบกับราคาวัสดุและผลที่ได้ก็นับว่าคุ้มค่าทีเดียว

## Introduction

In 1948, the Judet brothers designed a vitallium prosthesis to serve as a replacement of proximal femur with giant cell tumour. This prosthesis served as prototype of Moore self locking prosthesis.<sup>1</sup> Eicher introduced a stainless steel endoprosthesis in 1950 and Thompson developed a vitallium prosthesis in 1954. Bateman<sup>2</sup> and Gilbert<sup>3</sup> reported on the development of a bipolar femoral head prosthesis to reduce the rate of acetabular erosion and dislocation. Nowadays total hip replacement gain increasing popularity because many authors found that those treated with unipolar hemiarthroplasty had problems of acetabulum erosion and stem loosening.

The management of fractures of femoral neck remains major challenge to the orthopaedics surgeon. Despite greater knowledge about biomechanics, equipment, vascular supply of the hip joint, no universally accepted treatment currently exists. The choices are :

1. Internal fixation and preservation of the femoral head
2. Unipolar hemiarthroplasty or bipolar hemiarthroplasty
3. Primary total hip arthroplasty

Kwok and Cruess<sup>4</sup> reviewed 599 cases of Moore & Thompson hemiarthroplasty in 1982 and concluded that meticulous surgical technique was the key to the success of the procedure. These important points are :

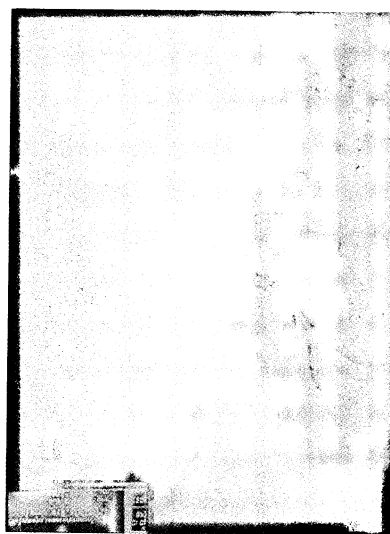
1. Proper head size
2. Proper neck length
3. Prosthesis stem shaft angle

## 4. Calcar seating of the prosthesis

We would like to study the efficacy of Moore unipolar hemiarthroplasty in selected group of patients in Rayong area.

## Materials and Methods

Thirty-two cases of displaced fracture of femoral neck treated by Moore prosthesis were reviewed. These cases were operated between 1994-1998. There were 20 women and 12 men, with an average age of 72.6 years (range 55-89 years). The shortest follow up was 3 months and the longest was 4 years. Only those patients who returned to follow up for both clinical and radiographic evaluation were participated in this study. The other patients treated with internal fixation and total hip replacement were excluded from this study. 28 out of 32 patients were typical displaced femoral fracture, and were caused by fall from a



**Fig. 1** Preoperative film of displaced fracture of femoral neck.

height with only 4 cases from road accident.

One aspect that we paid attention to was relatively low body weight in these patients (average 50.1 kg.) compared with high body weight found in only the study of Gilbert.<sup>5</sup> The main medical illnesses found in these 32 patients were 6 with diabetes, 4 with myocardial disease and 2 with hypertension.

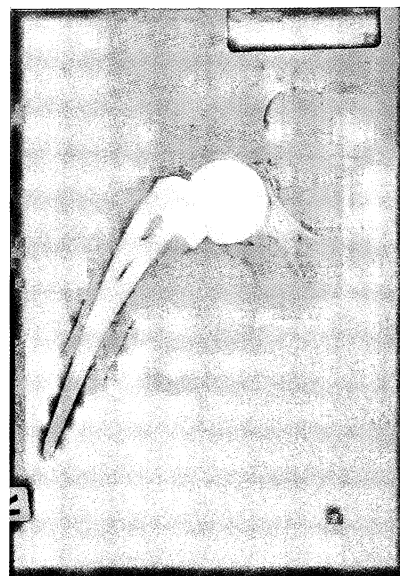
After the assessment and resuscitation of these patients was performed, a planning to do hemiarthroplasty with Moore type began within 2-5 days after admission. Every cases recieved 1.5 grams of cefuroxime, followed by 750 mg. at 8 and 16 hours later (for a total of one day of antibiotic treatment) as recommended by Mauerhan and Nelson.<sup>6</sup>

### ***Operative Technique***

With the patients lying on the lateral position, we used the posterior approach advocated by Osborne<sup>7</sup> in every cases. Piriformis muscle was identified and act as a landmark to approach the posterior part of the hip capsule. With staysuture, the external rotators were excised and retracted medially to protect sciatic nerve from injury. After exposure of posterior capsule without resection of greater trochanter, dislocate the hip posteriorly. Remove the head from the acetabulum with the trial to preserve the acetabular cartilage, and isolate the stump of the femoral neck into the wound. With a rasp, open and reshape the medullary canal for the stem to be in 10 degrees anteversion and press fit. Preserve the calcar (posteromedial cortex of the neck) and obtain correct neck length of about one-half to three-quarters

of an inch. A flat weight bearing surface without bone spike protuding superiorly and proper prosthetic stem-shaft angle was necessary. A difference of greater than 5 degrees results in a varus position. These things were recommended by Kwok.<sup>4</sup> Now measure the femoral head using the caliper and trial fit into the acetabulum was usually attempted prior to insertion into the femoral shaft. Cementing or non-cementing of the stem is controversy. In our series, about 8 cases with press fit did not need cementing and the remaining cases used acrylic cement for firm fixation.

After reducing the prosthesis into the acetabulum, we had firm suturing of the posterior capsule with suture of external rotator muscle as a reinforcement and closed the wound as usual manner. The average operating time was 55 minutes.



**Fig. 2** Postoperative film showed displaced fracture of femoral neck after insertion of Moore prosthesis.

### **Postoperative Care**

Skin traction of the limb in abduction and external rotation was recommended in the first 3 days. Early motion was started when general condition permitted

### **Result**

After discharged from hospital, we had a follow up program at 1, 3, 6 and 12 months postoperatively. All 30 cases were evaluated by both physical and radiographic examination. An arbitrary rating system was established consisting of pain, degree of joint mobility and ambulating compared to preinjury level, and the last was radiographic result.

After 3 months, 24 patients (80 percent) rated as good had no pain, moderate joint mobility and could maintain their previous activity level. Only 6 patients rated as fair in our study had mild discomfort and used assistive devices eg. canes and walkers which they had not needed before.

As for the complication, two cases of superficial wound infection were revealed and responded well to antibiotic therapy. No case of perioperative death, pneumonia and bed sore was found. One case of dislocation was found on the 6th postoperative day and could be reduced by closed method under general anesthesia without stem breakage. No case of acetabular erosion and deep wound infection was found.

### **Discussion**

The displaced fracture of femoral neck continues to be difficult to manage. Successful union

of fracture by internal fixation without avascular necrosis achieves the best goal. Here are some factors concerning the complicated treatment of those fracture.

### **Vascular Anatomy**

Trueta and Harrison<sup>8</sup> by using injection technique studied the vascular anatomy of the proximal aspect of the femur and concluded that :

A. Lateral epiphyseal artery (branch of medial femoral circumflex) supplies most of femoral head.

B. Inferior metaphyseal vessel (terminal artery of the ascending branch of lateral femoral circumflex) supplies more distal metaphyseal bone anteriorly and inferiorly.

C. Artery of ligamentum teres from obturator system is the third source of blood supply.

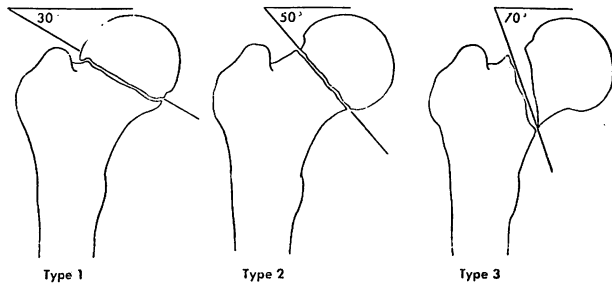
Fracture of the femoral neck diminishes the blood supply to the femoral head and correlates with the severity of the displacement of the bones. Some vessels may be torn or intracapsular hematoma may elevate the pressure enough to occlude the venous system or limit arteriolar flow in reticular reflection of femoral neck.

### **Classification**

The two most common classifications of displaced femoral neck patients are those of Pauwels (fig. 3) and Garden (fig. 4)

### **Choices of Treatment**

Swiontkowski<sup>9</sup> recommended that patients who are less than 65 years old and do not have a



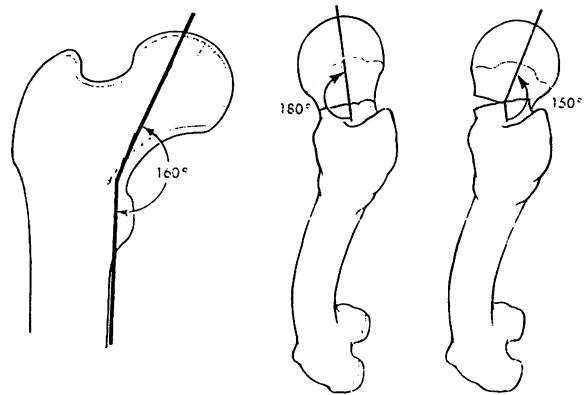
**Fig. 3** Pauwels' classification of fractures of neck of femur according to angle of inclination.

chronic illness should be managed with immediate reduction and internal fixation. Patients who are more than 75 years old should be managed with prosthetic replacement. But in this study, we used the criteria of old physiologic age which was arbitrary selected at 60 years old.

Bipolar hemiarthroplasty was designed to produce less acetabular erosion and dislocation but it has not been proved conclusively. Although dislocations of bipolar prosthesis are less frequent than unipolar devices, most dislocations of bipolar prosthesis have to be treated with an open reduction. So bipolar procedure is suitable for the elderly but moderately active patient.

#### **Prosthetic Replacement Compared with Internal Fixation**

There has been much controversy about whether prosthetic replacement or internal fixation is preferable for patients who are more than 65 years old. Hunter<sup>10</sup> reviewed the literature on prosthetic replacement and reported that the rate of clinically poor results was 28 percent ; that of dislocation 0.3 to 11 percent ; that of infection 2-42 percent ; and that of six months mortality 14-39 percent. All of



**Fig. 4** Garden's alignment index. (From DeLee JC : Fractures and dislocations of the hip. In : Rockwood CA, Jr, Green DP, eds. Fractures in adults. 2nd ed. Philadelphia : JB Lippincott, 1984.)

those percentages were substantially higher than those after internal fixation. But Holmbergs reported that the rate of complications was lower after prosthetic replacement (15 percent) than after internal fixation (37 percent).<sup>11</sup>

However the findings of the most carefully analysed case series revealed that :

1. At 6 months, 16 percent with internal fixation had failure of fixation but only 2-3 percent of those with hemiarthroplasty had a dislocation of the prosthesis.

2. At an average of two year follow up, 32 percent with internal fixation had a non-union and 16 percent had avascular necrosis.

The need for reoperation after internal fixation was 35 percent at two years ; rate that was substantially higher than that after unipolar hemiarthroplasty at 3-6 years postoperatively (16 percent).

### ***Cemented Versus Non-cemented Prosthesis***

6.1 percent of cemented prosthesis became loose as compared with 11.7 percent of those without cement. Gingras<sup>12</sup> concluded that methylmethacrylate was helpful in anchoring intramedullary stem prosthesis but its use should not be routinely.

Four major objections to the routinely use of cement are :

1. Increased acetabular wear.
2. Infection : cement would complicate eradication of infection.
3. Fracture below prosthetic stem.
4. Reoperation : cement would make revision more difficult.

### ***Contraindication for the Use of Moore Hemiarthroplasty***

1. Active hip infection
- 2 Advanced osteoarthritis involving acetabulum

3. Rheumatoid arthritis
4. Young patients

We found Moore Unipolar Hemiarthroplasty very useful in the treatment of displaced fracture of femoral neck in the elderly at Rayong hospital in properly selected group of patients. With meticulous surgical technique and probably low body weight in our patients make the use of Moore last longer and fewer complications and even better in cost-benefit implication.

### **Summary**

A retrospective study of Unipolar Hemiarthroplasty was done in 32 cases of displaced fracture

of femoral neck in the elderly at Rayong hospital. They were groups of people with limited life expectancy and had not high demand of functional level. No serious postoperative complication was found and 80 percent of these patients could regain ambulation as before surgery. With meticulous surgical technique, we found that Unipolar Hemiarthroplasty had a place in the treatment of displaced fracture of femoral neck in the elderly especially in cost-benefit implication

### **Reference**

1. Moore AT. Metal hip joint. A new self-locking vitallium prosthesis. Southern Med J 1952 ; 45 : 1015-9.
2. Bateman JE. Single-assembly total hip prosthesis. Preliminary report. Orthop Dig 1974 ; 2 : 15-22.
3. Gilberty RP. Hemiarthroplasty of the hip using a low-friction bipolar endoprosthesis. Clin Orthop 1983 ; 175 : 86-92.
4. Kwok DC, Cruess RL. A Retrospective study of Moore and Thompson hemiarthroplasty. Clin Orthop 1982 ; 169 : 179-85.
5. Gilbert JL, Buckley CA. Intergranular corrosion-fatigue failure of cobolt alloy femoral stems. J Bone Joint Surg (Am) 1994 ; 76A : 110-5.
6. Mauerhan DR, Nelson CL. Prophylaxis against infection in total joint arthroplasty. J Bone Joint Surg (Am) 1994 ; 76A : 39-45.
7. Sisk TD. Fracture of hip and pelvis. Delayed union and nonunion of fractures. In : Campbell's Operative orthopaedics edited by Crenshaw AH, Vol 3 7th ed. St. Louis, Missouri : The CV Mosby, 1987 : 1748-850, 2088-91.
8. Trueta J, Harrison MHM. The normal vascular

- anatomy of the femoral head in adult man. J Bone Joint Surg (Br) 1953 ; 35B(3) : 442-61.
9. Swiontkowski MF. Current concepts review : intracapsular fractures of the hip. J Bone Joint Surg (Am) 1994 ; 76A : 129-38.
10. Hunter GA. Should we abandon primary prosthetic replacement for fresh displaced fractures of the neck of femur ?. Clin Orthop 1980 ; 152 : 158-61.
11. Holmberg S, Kalen R, Thorngren KG. Treatment and outcome of femoral neck fractures. An analysis of 2418 patients admitted from their own homes. Clin Orthop. 1987 ; 218 : 48-52.
12. Gingras MB, Clarke J. Prosthetic replacement in femoral neck fractures. Clin Orthop 1980 ; 152 : 147-56.

**อภิธาน์นทาการ**

**จาก**

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