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## RESULTS OF ARTHROPLASTY WITH VITALLIUM-CUP BECAUSE OF COXARTHROSIS

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The contribution to hip surgery by Smith-Petersen's introduction of cup arthroplasty (15) is universally acknowledged. A successful arthroplasty with abolition of pain and preservation of useful movement, is gratifying to the surgeon and a merciful relief to the patient. Though some good results have also been reported (1, 2, 4, 8, 12, 19, 21) the method has nowadays been widely abandoned and so for several reasons. First, the surgical technique is exacting and tedious (2, 15, 17, 18) and thereby places great demands on the patient's general condition. Second, it is difficult to predict the results in a given case, and third, less good results have also been reported (3, 5, 7, 14). Fourth, the patient must spend a fairly long time in hospital and fifth, the rehabilitation takes quite a long time (8). In addition, other surgical procedures have from time to time appeared, such as osteotomies and plastic operations with endoprostheses. But the use of these operations has later proved their limitations and, like arthrodesis, they can be used only for a narrow range of indications if good results are to be expected (9, 11, 20). This means that hip surgery still offers several difficult problems. In recent years arthroplasty employing the vitallium-cup has therefore been used more widely, especially in patients with bilateral coxarthrosis, at the Department of Orthopaedic Surgery in Härnösand,

### MATERIAL

The present material consists of patients operated upon because of primary idiopathic coxarthrosis at the Department of Orthopaedic Surgery in Härnösand between

Table 1

| Osteo-arthritis | Vitallium-cup arthroplasty |           |                            | Total |
|-----------------|----------------------------|-----------|----------------------------|-------|
|                 | One hip                    | Both hips | Other side<br>Other method |       |
| One hip         | 14                         | —         | —                          | 14    |
| Both hips       | 31                         | 2         | 3*                         | 36    |
| Total           | 45                         | 2         | 3                          | 50    |

\* Arthrodesis      Moore prosthesis      Varus osteotomy.

Table 2

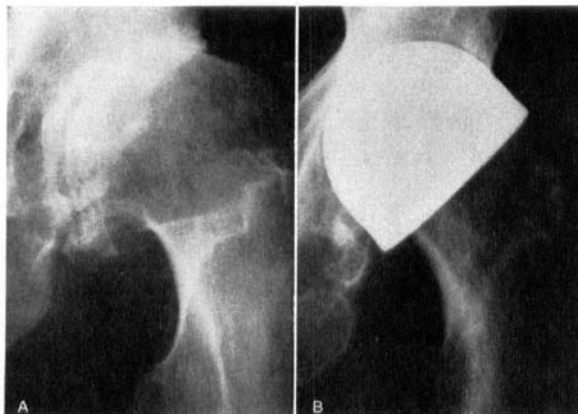
| Age<br>(yr.) | Males | Females | Total |
|--------------|-------|---------|-------|
| ≤ 60         | 2     | 13      | 15    |
| 61 ≤ 65      | 7     | 13      | 20    |
| ≥ 66         | 2     | 15      | 17    |
| Total        | 11    | 41      | 52    |

1960 and 1966. Fourteen patients with unilateral arthrosis and 31 with bilateral arthrosis were operated upon on one side, and two were operated upon on both sides. Three patients were operated with arthroplasty on one side and some other form of operation of the hip on the other (Table 1). Thus, all together 52 patients were subjected to operation but 3 had died from intercurrent diseases not related to the hip operation and one had left Sweden and was thus untraceable. So forty-eight patients submitted to 50 arthroplasties were after-examined by the author. The longest interval between the operation and the review was 6 years and the shortest 9 months (average 25 months). It is clear from Table 2 that women were almost 4 times as common as men (41:11) and that most of the patients were above 60 years of age.

## INDICATIONS AND OPERATIVE TECHNIQUE

The main indications for operation were pain on weight-bearing, pain at rest and obligatory use of a cane when walking. Moreover, in most of the patients osteotomy had been considered impossible because of the limited range of motion or because of marked contracture (20). In some other patients arthrodesis had been considered contraindicated because of advanced age or back pain (9) or the patient's refusal. In addition, most of the patients had bilateral arthrosis.

The operation was performed mainly by the technique described by *Smith-Petersen*



*Figure 1. a) Preoperative coxarthrosis. Observe tendency to subluxation.  
b) Postoperatively. Observe shaping of acetabulum.*

(17, 18). To avoid bone new-formation, the gluteal musculature was loosened by sharp dissection suprapariostally from the outer surface of ala ossis ilii (4, 6). In some cases the musculature was partly loosened also from the inner surface of the ala in order to get better access to the joint. In two cases iliopsoas-tenotomy was done because of severe contractures. In 20 cases the capsule was extirpated, but in 30 it was preserved and sutured at the end of the operation. The surgical luxation of the head sometimes, though only seldom, required small cheilectomy of the anterior acetabulum. The acetabulum was then drilled and care being taken to chisel the socket to adequate depth (12) and to remove all cartilage and sclerotic bone down to a healthy bleeding bony surface. The head was prepared in the same meticulous way. Cystic cavities were sometimes filled with bone-chips from the crest. The vitallium-cup was afterwards fitted in such a way that it could articulate with both the caput and the acetabulum. Attempts were made to get the depth of the cup such as to leave about 0.5 cm of the edge of the cup outside the acetabulum rim and the cup in a normal valgus position (8). See Figures 1 a-b.

*Postoperative care* consisted of 4 weeks rest in bed, the first 2 weeks with the legs held in abduction by a plough-like support and in a few cases with inward rotation traction to prevent luxation. After 2 weeks all the appliances were removed and the patient began to exercise abduction and adduction with the heels on roller skates against an increasingly inclined plane. Four weeks after the operation the patient was allowed to get up and systematic physiotherapy was started, including walking with canes. All patients spent at least 6 weeks in hospital (average 10 weeks). In 10 cases physiotherapy was continued at the outpatient department.

*Complications.* Delayed healing of the skin without infection occurred in 2 cases, thrombosis in 2, pneumonia in 2 and osteitis of the crest in one. All together 14 per cent had postoperative complications, which, however, never appreciably prolonged hospitalisation or caused permanent sequelae. Neither did luxation ever occur. In 2 cases where the cutaneous lateral femoral nerve had obviously grown in the operation scar meralgia paresthetica appeared as a late complication.

## RESULTS

In forty-three (86 per cent) of the hips reported patients said that they were satisfied with the operation. Another 5 were content with some reservations, 2 because the good result did not appear until 3 years after the operation, 2 because they still had pain on weight-bearing and 1 because the range of motion was smaller than before the operation, though the hip was painless. Only 2 patients were dissatisfied with the therapy because the symptoms were practically the same as before operation. In these 2 patients treatment must be regarded as unsuccessful. For the sake of simplicity the indexes devised by *Gade and Shephard* (6, 13) are used in the further description of the results.

According to this calculated pain-index the result was good in 86 per cent of the operations, thus the same number as were satisfied with the treatment. In 14 per cent the hips were fairly painless and in no case was the result poor, thus not even in the 2 who were dissatisfied with the operation.

Table 3

|           |      |
|-----------|------|
| Excellent | 54 % |
| Good      | 32 % |
| Fair      | 14 % |
| Poor      | 0 %  |

Pain (Index according to *Gade*).

By partial analysis of the figures given in Table 3, 42 per cent were completely relieved of pain both in weight-bearing and during rest. 34 per cent had negligible pain in weight-bearing and 2 per cent had only pain during rest, but not sufficient to disturb sleep. 22 per cent had persistent but often milder pain in both weight-bearing and during rest.

Table 4

|          |      |
|----------|------|
| Mild     | 14 % |
| Moderate | 62 % |
| Severe   | 24 % |

Restriction of functional activity (Index of *Gade*).

Functionability, *i.e.* ability to manage the activity of daily living, is given in Table 4. There was little or no impairment in 14 per cent, moderate impairment in 62 per cent, while 24 per cent still did not manage themselves properly. Analysis of the functions of the above index showed that 34 patients could put on their socks and shoes with-

out difficulty and 47 could manage stairs properly—activities which none of the patients could manage before the operation. All the patients walked with some limp but 8 did not use any cane while 18 needed one cane. 21 patients used two canes, most of them with severe untreated arthrosis also of the other hip. One patient was chair-ridden because of destruction of the other hip after sepsis.

*Table 5*

|            |      |
|------------|------|
| None       | 36 % |
| Clerical   | 8 %  |
| Housework  | 54 % |
| Industrial | 2 %  |

Working ability.

Another partial function included in the index showed in Table 4 is working capacity. 54 per cent could manage household work, a figure which is influenced by the fact that most of the patients operated upon were women, most of them house-wives. 8 per cent had returned to previous sedentary occupations, while only 2 per cent (one patient) had returned to industrial work and none to heavy work. 36 per cent were not able to work but they could largely manage the daily activity of taking care of themselves. In the evaluation of the number of retired patients it should be borne in mind that all, except one, were above 60 years of age.

Before the operation there were severe flexion contractures in 27 hips, compared with only 4 at the after-examination. Considerable outward malrotation had been noted in 25 patients before treatment, compared with 13 at the after-examination. To reduce the postoperative severity of such malrotation the surgical technique has been somewhat modified: instead of chiseling out the acetabulum cranially-centrally, attempts are made to chisel it out backwardly-upwardly and the primary results in this respect appear promising. Before the operation 17 hips showed considerable abduction and adduction contractures. At the after-examination time these abnormalities persisted in 6 but were much less than before the operation. The mobility index according to Gade is given in Table 6, where all movements are included. Before the operation 10 hips had poor mobility against 2 at the time of after-examination. The preoperative mobility in another 10 was moderate and somewhat better after operation in 4 of them. Good mobility was noted before the operation in 30 cases, compared with 42 at the after-examination.

Table 6

| Before operation | After operation |      |      |      | Total |
|------------------|-----------------|------|------|------|-------|
|                  | Excellent       | Good | Fair | Poor |       |
| Excellent        | 5               | 0    | 0    | 0    | 5     |
| Good             | 7               | 16   | 2    | 0    | 25    |
| Fair             | 0               | 10   | 0    | 0    | 10    |
| Poor             | 2               | 2    | 4    | 2    | 10    |
| Total            | 14              | 28   | 6    | 2    | 50    |

Mobility (In index of Gade).

The mobility had thus increased, but one should not expect the operation to improve the mobility so very much (11). The mean Gade index was 24 before the operation and 39 at the after-examination, thus an increase by 15 units which is statistically significant. However, this increase of the mobility of the hip does not mean that the range of motion was anything like normal, but it does mean a functional improvement enabling the patient better to manage the activities of daily living.

Roentgenologically, the acetabulum had migrated towards the lamina interna in 10 per cent and some shortening of the neck was seen in 12 per cent. These figures showed no correlation with the interval between the operation and the after-examination. Despite loosening of the gluteus musculature outside the periosteum, bone new-formation occurred in 7 cases. But it was always a question of small exostoses from the ala and in no instance of deposits situated close to the joint and thereby reducing the range of movement. In none of the patients had myositis ossificans occurred.

#### SUMMARY

From the Department of Orthopaedic Surgery in Härnösand, fifty hips subjected to arthroplasty with the vitallium-cup were reviewed and the results described. The mean interval between the operation and the after-examination was 25 months. The patients were 63 years old as an average.

86 per cent were satisfied with the operation and an equally large percentage were practically free of pain. Functionally, the results were good in 14 per cent and fairly good in 62 per cent. On the other hand, working capacity was not so good, but 64 per cent were at work, mostly women in householding work.

A certain increase of mobility was achieved but not so large as had originally been expected of the operation.

Migration of the acetabulum occurred in 10 per cent and some resorption of the neck in 12 per cent.

Before the operation all the patients had had severe disabling arthritis, often bilaterally, and most of them were old. The results were nevertheless relatively good and show that the reported method still has a place in the surgery of the hip.

#### RESUME

50 hanches opérées à la Clinique orthopédique de Härnösand ont été réexaminées et il est rendu compte des résultats constatés. La durée d'observation a été en moyenne de 25 mois et l'âge des malades est en moyenne de 63 ans.

86 pour cent satisfaits des résultats de l'opération et un pourcentage semblable des malades sont sans douleur. Au point de vue fonctionnel, on constate un bon résultat dans 14 pour cent et un résultat relativement bon dans 62 pour cent des cas. En revanche, la capacité de travail chez les malades n'est pas aussi élevée. 64 pour cent toutefois capables de travailler, la plupart des femmes dans leur foyer. Une augmentation de la mobilité a été obtenue, mais à moindre degré que celle que l'on escomptait au début. Il y a eu un glissement de la tête dans 10 pour cent des cas et une certaine résorption du col dans 12 pour cent.

Tous les malades opérés et réexaminés présentaient avant l'intervention chirurgicale des arthroses graves prononcées, souvent bilatérales et étaient le plus souvent des personnes âgées. Malgré cela les résultats sont relativement bons et montrent en quelque sorte la position de cette méthode opératoire dans la chirurgie de la hanche.

#### ZUSAMMENFASSUNG

50 an der orthopädischen Klinik in Wärnösund operierte Hüften wurden nachuntersucht und das Ergebnis wird vorgelegt. Die Beobachtungszeit war durchschnittlich 25 Monate und das Durchschnittsalter der Patienten war 63 Jahre.

86 Prozent sind mit der Operation zufrieden und ein ebensogrosser Prozentsatz ist so zu sagen schmerzfrei. Funktionell findet man ein gutes Ergebnis in 14 Prozent und ein ziemlich gutes in 62 Prozent. Dagegen ist die Arbeitsfähigkeit der Patienten nicht so hoch, aber 64

Prozent sind jedenfalls arbeitsfähig. Die meisten sind Frauen mit Hausarbeit. Eine gewisse Zunahme der Beweglichkeit wurde erreicht, jedoch in einem geringeren Ausmasse als man sich anfänglich von der Operation erhoffte. Pfannenwanderung liegt in 10 Prozent vor und ein gewisse Collumresorption in 12 Prozent.

Sämtliche operierten und nachuntersuchten Fälle hatten vor der Operation ausgesprochene, schwere Arthrosen, oft bilateral und es drehte sich zumeist um alte Patienten. Trotzdem findet man ein relativ gutes Resultat, das Platz der Operationsmethode innerhalb der Hüftchirurgie gut aufrechterhält.

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