

## **Osteoarthritis and recurrences after Putti-Platt and Eden-Hybbinette operations for recurrent dislocation of the shoulder**

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**Summary.** *Thirty-five patients who had operations for recurrent anterior dislocation of the shoulder were reviewed, with a further 26 answering a questionnaire; the results were not as good as reported by others. The mean follow up was 26.9 years. Ten out of 43 patients had recurrent dislocations after the Putti-Platt and 6 out of 18 after the Eden-Hybbinette operation. Osteoarthritis developed in 15 shoulders of 26 patients who were followed-up after the former procedure and in 8 out of 9 shoulders after the latter. These sequelae depend on the age at the first dislocation rather than the number of dislocations. The overall satisfaction rate was acceptable for both procedures.*

**Résumé.** *Notre étude à long terme (sur 61 patients, 35 suivis avec une moyenne de 26,9 ans) montre que les résultats des opérations de Putti-Platt et Eden-Hybbinette pour luxation récidivante de l'épaule ne sont pas, en considérant les récidives et le développement de l'arthrose, aussi bons que ceux rapportés dans la littérature [5, 8, 14, 18]. Dans notre série, 10 patients sur 43 ont eu une luxation récidivante après une intervention de Putti-Platt et 6 sur 18 après une opération de Eden-Hybbinette. Une omarthrose était présente chez 8 sur 9 patients du groupe Eden-Hybbinette et chez 15 sur 26 patients du groupe Putti-Platt. Nous pensons que le développement de l'omarthrose dépend plus de l'âge du patient lors de la première luxation que du nombre de luxation avant l'inter-*

*vention. Cependant, le taux de succès après une période d'observation moyenne de 26,9 ans était acceptable pour les 2 types de traitement.*

### **Introduction**

Redislocation is reported in from 1% to 20% of patients after the Putti-Platt operation for recurrent dislocation of the shoulder (Table 1). Osteoarthritis is also a late complication [7] and using CT scanning an incidence of 21% at an average of 8 years after operation has been reported [13]. An incidence of redislocation between 6% and 18% and of osteoarthritis between 65% and 79% is reported after the Eden-Hybbinette operation (Table 2).

### **Patients and methods**

One hundred and ninety-one patients were operated on for recurrent anterior dislocation between 1945 and 1971 and the addresses of 98 were found. Sixty-one answered a questionnaire and 35 attended for review.

The average length of follow-up was 26.9 years. We were concerned with the rate of redislocation and the development of osteoarthritis.

We asked questions about the patients' satisfaction with the operation and the function of their shoulders. Clinical examination was followed by radiography and ultrasound scanning of both shoulders.

The data were analysed by the Carter Rowe [20] and the Caroit scores [1] as modified by Cyprien [2]. Rowe's method gives 25% points for stability, with movement 25%, function 25%, pain 15% and strength 10%. In Cyprien's modification of Caroit's score pain, limitation of lateral rotation, functional

**Table 1.** Literature review: Putti-Platt

Author	Follow-up (yrs.)	Recurrence rate (%)	Osteo-arthritits (%)
Zenker (1975) <i>n</i> = 59	1–7	1.5	–
Morrey (1976) <i>n</i> = 176	10.2	11	–
Leach (1982) <i>n</i> = 78	2–15	5	–
Sillár (1983) <i>n</i> = 156	2–20	1	–
Keyl (1984) <i>n</i> = 64	1–14	14	–
Hawkins (1990)	13.2	–	10 cases
Fredericksson (1991) <i>n</i> = 101	5–14	20	–
Forwick (1992) <i>n</i> = 18	5/12–6.5	4.3	–
Lehmann (1993) <i>n</i> = 48	8	8	21
König (1996) <i>n</i> = 26	26.9	23.3 (10/43) <i>n</i> = 43	57.7 (15/26)

**Table 2.** Literature review: Eden-Hybbinette

Author	Follow-up (%)	Recurrence rate (%)	Osteo-arthritits (%)
Palmer (1948) <i>n</i> = 60	1.5–12	6.7	–
Hindmarsh (1967) <i>n</i> = 120	8.5	9.2	70
Oster (1969) <i>n</i> = 78	0.5–27	18	–
Müller (1978) <i>n</i> = 38	2–5	10.5	–
Vastamäki (1991) <i>n</i> = 100	11–46	11	56
Wildner (1994) <i>n</i> = 60	10–23	–	79
König (1996) <i>n</i> = 9	26.9	33.3 (6/18) <i>n</i> = 18	88,9 (8/9)

disability and the patients' satisfaction are rated equally at 25%. The result is rated as poor, regardless of the points awarded, if the patient has a recurrent dislocation.

Radiographic evidence of osteoarthritis is graded as mild, moderate or severe [21].

The number of preoperative dislocations was from 7 to 30 in the Putti-Platt group and 11 to 30 in the Eden-Hybbinette.

The average age at the time of operation in the Putti-Platt group was 24 years (range 17 to 29 years). Operation was carried out on average 4 years after the initial dislocation.

The average age in the Eden-Hybbinette group was 27.3 years (range 21 to 33 years). The interval between the first dislocation and operation was 6.3 years.

**Table 3.** Patient's satisfaction

	Putti-Platt	Eden-Hybbinette
Excellent	14	2
Good	5	4
Satisfied	5	1
Poor	2	2

**Table 4.** Clinical results: Rowe score

	Putti-Platt	Eden-Hybbinette
Excellent	13	2
Good	3	2
Satisfactory	7	1
Poor	3	4

**Table 5.** Clinical results: Caroit-Cyprien score

	Putti-Platt	Eden-Hybbinette
Excellent	11	0
Good	6	4
Satisfactory	6	2
Poor	3	3

At the time of review the median age in the Putti-Platt group was 56.5 years (range 54 to 74 years) and 55 years (range 41 to 74 years) in the Eden-Hybbinette group.

Forty-three patients who had the Putti-Platt operation answered the questionnaire and 26 were reviewed; one patient had both shoulders operated on. The corresponding figures for the Eden-Hybbinette operation were 18 and 9.

### Operative technique

The Putti-Platt procedure was performed according to the technique described by Osmond-Clarke [16] and was carried out when there was no bony abnormality. The Eden-Hybbinette procedure was undertaken as described by its originators [3]; a tibial bone graft was wedged subperiosteally at the inferior part of the glenoid under the labrum. This procedure was carried out in patients with a bony defect and those with a dysplastic glenoid fossa.

The patients included in our results were those who answered the questionnaire and then attended for examination: 26 had the Putti-Platt and 9 the Eden-Hybbinette operation.

## Results

The patients' satisfaction after the two operations is shown in Table 3. Tables 4 and 5 give the Rowe and Caroit scores respectively.

Ten out of 43 shoulders redislocated after the Putti-Platt operation. Three were caused by trauma, 5 were not traumatic and the cause was not verified in 2. The average interval between operation and recurrence was 4 years (range 1 to 9 years), but 6 patients were not able to provide reliable information.

**Table 6.** Radiological results

	Putti-Platt	Eden-Hybbinette
Osteoarthritis: mild	11	3
moderate	2	2
severe	2	3
Hill-Sachs defect:	9	5

**Table 7.** Correlation between osteoarthritis, age at the time of the first dislocation, preoperative and postoperative number of dislocations

Osteoarthritis	Putti-Platt ( <i>n</i> = 26)		
	Age (years) (median)	Preop dislocations (number of dislocations) (median)	Postop dislocations (number of patients)
None ( <i>n</i> = 11)	20	10	1
Mild ( <i>n</i> = 11)	23	11.5	1
Moderate ( <i>n</i> = 2)	26.5 (average)	30 (average)	0
Severe ( <i>n</i> = 2)	25.5 (average)	8 (average)	1

**Table 8.** Correlation between osteoarthritis, age at the time of the first dislocation, preoperative and postoperative number of dislocations

Osteoarthritis	Eden-Hybbinette ( <i>n</i> = 9)		
	Age (years) (median)	Preop dislocations (number of dislocations) (median)	Postop dislocations (number of patients)
None ( <i>n</i> = 1)	15	33	0
Mild ( <i>n</i> = 3)	20	20	0
Moderate ( <i>n</i> = 2)	19.5	9	1
Severe ( <i>n</i> = 3)	18	18	1

There were 6 recurrences in 18 shoulders after the Eden-Hybbinette operation; 3 were traumatic, 1 nontraumatic and 2 were uncertain. Recurrence took place at an average of 6 years (range 2 to 12 years) after operation.

The anterior apprehension test was positive in 12 of the 26 patients after the Putti-Platt operation at either 60°, 90° or 120° of abduction, but only 3 had a recurrence. After the Eden-Hybbinette operation, 2 patients were excluded because of restricted abduction and external rotation; of the remaining 7, 2 had a positive test.

### Radiographic results

Preoperative radiographs confirmed that all the Eden-Hybbinette patients had a defect of the anterior glenoid rim.

At review, standard radiographs were taken of both shoulders. Fifteen patients showed signs of osteoarthritis after the Putti-Platt operation and eight after the Eden-Hybbinette. The results indicating the severity of the changes and the incidence of the Hill-Sachs defect are given in Table 6. The changes were mild after the Putti-Platt, but moderate or severe after the Eden-Hybbinette.

Tables 7 and 8 relate the incidence of osteoarthritis to age, the number of preoperative dislocations and the number of recurrences in each group of operations. After the Putti-Platt, those with mild osteoarthritis had a median age of 23 years at the time of the first operation, those with moderate changes 26.5 years and in those with severe changes the median age was 25.5 years. Those with the Eden-Hybbinette operation had osteoarthritis of the whole joint and not only at the site of the bone block.

Limitation of lateral rotation did not influence the degree of osteoarthritis, except in those with severe changes.

An example of the development of osteoarthritis between 1963 and 1992 is given in Fig. 1. Figure 2 shows the radiographs of a man who had the Putti-Platt operation and who developed moderate osteoarthritis.

### Ultrasonography

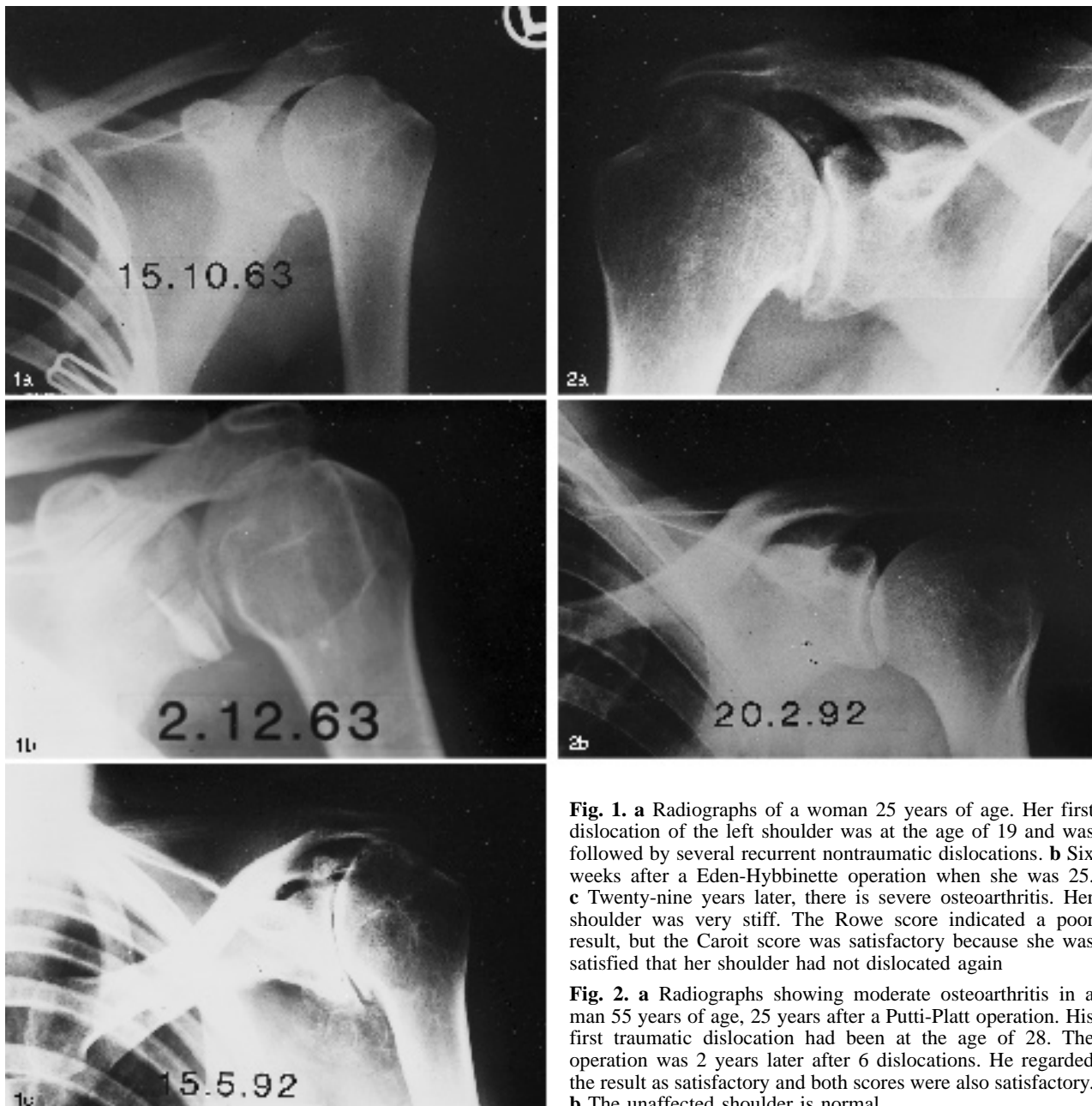
A 5 mHz Siemens Sonoline scanner was used in 4 planes: anterior oblique in medial rotation; anterior oblique in lateral rotation; supraspinatus sagittal, and posterior. Patients with stiff shoulders could not be scanned. No ruptures of the rotator cuff were seen. After the Putti-Platt operation, thickening of the subscapularis was demonstrated. The posterior view showed the Hill-Sachs when it was present in radiographs.

### Discussion

Although our patients were followed for a long time, the numbers are small and our conclusions must be tentative. We believe that recurrences after the Putti-Platt operation (20%) are greater than previously reported, especially since many patients have a positive apprehension test although the shoulder has not redislocated.

Our incidence of osteoarthritis is also greater than that reported by others [4, 5, 11, 12, 14, 22, 25].

Nevertheless, the patients' subjective results are better after the Putti-Platt operation. The mild os-



**Fig. 1. a** Radiographs of a woman 25 years of age. Her first dislocation of the left shoulder was at the age of 19 and was followed by several recurrent nontraumatic dislocations. **b** Six weeks after a Eden-Hybbinette operation when she was 25. **c** Twenty-nine years later, there is severe osteoarthritis. Her shoulder was very stiff. The Rowe score indicated a poor result, but the Caroit score was satisfactory because she was satisfied that her shoulder had not dislocated again

**Fig. 2. a** Radiographs showing moderate osteoarthritis in a man 55 years of age, 25 years after a Putti-Platt operation. His first traumatic dislocation had been at the age of 28. The operation was 2 years later after 6 dislocations. He regarded the result as satisfactory and both scores were also satisfactory. **b** The unaffected shoulder is normal

teoarthritis which follows this operation is of no clinical significance. The finding that too tight a repair leads to osteoarthritis [7] has to be confirmed in a larger number of cases. The suggestion that patients who are older at the time of the first dislocation are more likely to develop osteoarthritis [21] is confirmed by our results. We tried to eliminate the possibility of the changes being due to the recurrent dislocations by comparing preoperative radiographs with those taken at review.

We believe that osteoarthritis does not depend on the number of preoperative dislocations.

Although the number of Eden-Hybbinette operations is small, our findings support the view that this procedure has an unacceptably high incidence of postoperative osteoarthritis [23, 24]. Patients with no signs of osteoarthritis before operation had defects of the glenoid rim which may partly explain the development of the changes, but does not explain the more widespread changes in the joint.

Our recurrence rate is higher than that reported by others [8, 15, 17, 23, 24], but the patients are more satisfied than the scores would suggest. This may be because those with a painless stiff shoulder which does not dislocate are satisfied, even though their function is limited.

Soft tissue repair for recurrent anterior dislocation of the shoulder has a higher redislocation rate compared to bone block operations which have the disadvantage of producing severe osteoarthritic changes. We did not see the severe changes after the Putti-Platt operation which others have reported [7].

Patients with no bony defect are now treated by arthroscopically guided anterior suture, but those who take part in competitive sports have the Bankart open repair because the recurrence is lower with this technique compared with arthroscopic methods. In the presence of a bony defect, we use a J-wedge bone block [19] rather than the Eden-Hybinette operation.

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