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NOT EVERY CASE OF JUDET'S ARTHROPLASTY GIVES BAD LONG TERM RESULTS![1]

Follow-up investigation of 34 cases from 2 to 8 years after operation

By

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With the introduction of intramedullary prosthesis (Moor, Thompson) in the treatment of the diseased or injured hip, the indications for Judet's arthroplasty have become less numerous. Judet's prosthesis is nowadays almost completely abandoned. It is pointed out that the good results observed in the first year after Judet's arthroplasty are of short duration. In some cases the intensity of the pain often some time was such that the Judet's prosthesis had to be removed and replaced by an intramedullary prosthesis usually about 12 to 24 months after operation. For the evaluation of Judet's arthroplasty the period of observation must be long enough.

REVIEW OF LITERATURE

Kiær (1952) reports very good results with the use of Judet's arthroplasty. The follow-up of his patients was, however, less than 2 years.

Westerborn (1953) also thinks that with the use of Judet's prosthesis good results can be achieved, even with recent fractures and pseudoarthrosis of the neck of femur. Later, however, *Alsen* and *Olsen* (1956) from Westerborn's department after a follow-up of many years made on the patients in whom Judet's arthroplasty was performed made some remarks on Judet's arthroplasty. In some cases the prosthesis became less stabile, looser and even broke, with ensuing renewed complaints by the patients.

Some other authors (*d'Aubigné & Postel* 1954, *Stinchfield, Copper-*

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man & Shea 1957, *Chistiansen & Follander* 1958) report on cases in whom complications and renewed complaints ensued for 2 years or longer after the operation. These late complaints were found particularly in patients who were operated on for a recent fracture or pseudoarthrosis of the neck of femur.

Gregan (1954) reports on a series of 65 recent fractures of the neck of femur, where Judet's prosthesis was used, and in whom the results within the first year after the operation were satisfactory. When the same patients were seen 2–3 years later a deterioration was noticed in 85 % of them. The X-ray pictures showed shortening of neck of femur in 79 %. All these cases had to be reoperated. In this opinion, Judet's prosthesis is not indicated in recent fractures of the neck of femur. Other authors (*Guilleminet & Judet, Movin, Christiansen & Felländer, Hiertonn & Morscher*) agree that the application of Judet's prosthesis gave better results in arthrosis, necrosis of the head of femur and pseudoarthrosis of the neck of femur (where the line of the fracture is subcapital), than in recent fractures of the neck of femur, but do not give such unsatisfactory results as *Gregan* reported.

Guilleminet & Judet R. (1955) give the results of arthroplasty of the hip with Judet's prosthesis. In 63 psedoarthroses, the result was satisfactory in 66.3 %. In 27 avascular necroses of the head of femur the result was even better, i.e. good in 78 %. In 29 cases wih recent fractures of the neck where Judet's prosthesis was also used, good results were achieved in 65 %.

Hiertonn & Morscher (1958) report the results of Judet's arthroplasty in 62 cases, in whom the operation was performed 2½–8 years previously. Of 7 recent fractures of the neck of femur, in no single case was there an excellent result, but good results were reported in 5 cases, satisfactory, and poor. In 14 cases of the necrosis of the head of femur, the results were as follows: 4 excellent, 6 good, 2 satisfactry, and 2 poor. In 32 pseudoarthroses of the neck of femur the results were, excellent 4, good 16, fair 4, and poor 8. Of 9 traumatic arthrites, there was only 1 good, 5 fair, and 3 poor results.

M. M. Shepherd (1954) gives the results of 74 cases with Judet's arthroplasty of the hip. (48 cases of arthrosis, 12 cases of pseudoarthrosis and 19 cases of other conditions). The follow-up period was 3 years. A control examination gave the following results: in only 27 % was the result excellent, good or satisfactory, in 21 % fair or doubtful and in 52 % poor.

At the end of this review we mention the analysis and statistical data

on the arthroplasty of the hip made by *R. & J. Judet* (1952), where their own prosthesis was used. Out of 219 patients with osteoarthritis, in 17 % their results were excellent, in 47 % good, in 19 % poor, and in 17 % bad. In 7 cases of posttraumatic arthritis as in 11 cases of long-lasting septic arthritis where a dislocation occurred, good results were reported. They state that great caution and reservation should be exercised when using Judet's prosthesis for the congenital luxation of the hip, though they used it 108 times, in several cases with good results. As for recent fractures of the neck of femur, their indications are very narrow. They suggest the use of their prosthesis only in cases of fractures possessing great predisposition for the formation of pseudoarthrosis. They are the cases where the fracture is subcapital and the head of the femur is porous. In these cases the authors had good results. Their indications for pseudoarthrosis of the neck of femur are the same as for recent fractures.

OUR MATERIAL

Our main and preferable treatment of hip joint diseases has ever been Smith-Petersen's arthroplasty and most of our patients are operated upon according to his method. In the period 1–1–1952 to 17–1–1956 in our hospital 34 arthroplasties of the hip were performed according to Judet's method.

TABLE 1

Diagnosis, sex, and age of 34 patients treated with Judet's arthroplasty.

	to 21		21-30		31-40		41-50		51-60		61-70		More than 70		Total number	
	m	f	m	f	m	f	m	f	m	f	m	f	m	f	m	f
Arthrosis coxae							1	2	2	3	4	4	2	1	9	10
Pseudoarthrosis colli femoris						1		1		5	1	3		1	1	11
Coxitis t.b.c		2				1										3
Total number		2				2	1	3	2	8	5	7	2	2		34

Our youngest patient was 17 years old, and the oldest 76 at operation.

We must underline that many of our patients' general health was also impaired, because of the long-lasting disease.

Our postoperative treatment was carried out as suggested by the Judet

Brothers. We have taught our patients the necessary exercises and advised them to pursue them at home as long as possible. We are convinced that the success of the operation itself depends also to a certain degree on the exercises being continued correctly.We are not convinced that correctly pursued, complete and prolonged exercises favour loosening of the prosthesis, thus making it less stabile, though this may be suggested from a theoritical point of view.

Complications from using Judet's prosthesis:

1. Fracture of femur under operation.

Once the fracture occurred during the operation. Ostheosynthesis with a wire was performed. The fracture healed up well, it was of no significance in the final result of the arthroplasty itself.

2. Formation of haematoma and wound infection.

Haematoma occurred only twice; after evacuation by aspiration, this disappeared leaving no serious sequelae. Infection of the wound occurred also twice. The intensity of infection was not, however, such as would necessitate reoperation or discarding of prosthesis. The infection involved only skin and subcutaneous tissue, necrosis of the skin being only of mild degree.

Local and systemic antibiotics were always sufficiently administered.

3. Mortality.

There was one fatal case in the first year after the operation.

4. Dislocation of the prosthesis.

There was no early dislocation of the prosthesis, i.e. dislocation which occurs in the first days after operation.

As for late dislocation, we think that important factors leading to its development are errors during the operation (the neck of femur too short or a shallow acetabulum), and late resorption of the neck of femur and acetabulum. Late dislocation occurred in 5 cases. All these cases were reoperated, and Judet's prosthesis was replaced by Moor's or Thompson's prosthesis.

5. Resorption of the neck of femur.

In connection with Judet's arthroplasty, this complication is often mentioned. As the neck of femur is not well vascularized, trauma is easily inflicted on it. If damaged, no matter how, it is liable to be resorbed. If Judet's prosthesis is inserted into the neck of a femur, which has already sustained trauma, there is great probability that a considerable resorption of the neck will ensue.

Consequently this complication frequently occurs with pseudo-

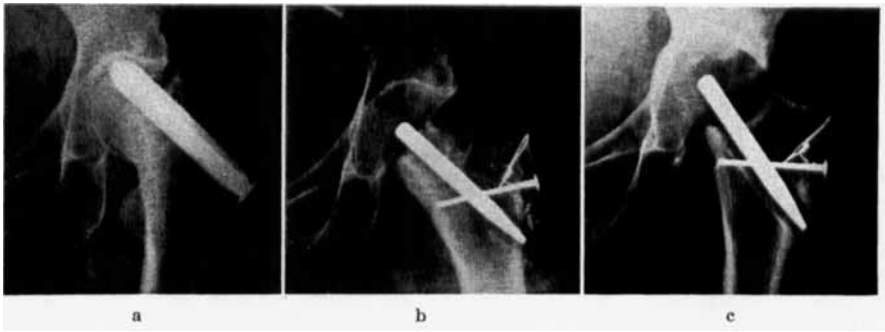

Fig. 1.
a. Pseudoarthrosis of the neck of femur. The line of the fracture is situated rather low. Osteosynthesis with a nail had been performed earlier. *b.* Because of the rather low-situated line of fracture, the neck is, at operation, left rather short (20–3–1952). *c.* After one year of satisfactory condition, considerable resorption of the neck, together with loosening and weakening of the stability of the prosthesis occurred (skiagram 17–9–1954).

arthrosis, recent fractures and posttraumatic arthritis. Even microtrauma and other microscopic processes in the neck of femur, can have a significant role in the development of its resorption. Even the slightest sign of resorption of the femur found during the operation contraindicates using the Judet's prosthesis. On the basis of the relatively long follow-up period of our patients the following conclusion can be made: resorption of the neck is insignificant and of no influence on the final result of the operation, if Judet's prosthesis is implanted in unchanged and sufficiently long neck of femur.

This complication was met in 4 cases of pseudoarthrosis. The line of fracture in these cases was not subcapital, but rather low, so that we were obliged to leave a rather short neck during the operation. 3 years after the operation resorption of the neck of femur occurred to a high degree. (See Fig. 1). Resorption of the bone round the stem of the prosthesis occurred also at the same time, which favoured even more loosening and weakening of the stability of the prosthesis. The difficulties of these patients were of such an intensity that all had to be reoperated and Judet's prosthesis replaced by Moor's or Thompson's.

6. Resorption of the bone around the stem of the prosthesis.

Judet's prosthesis is also vcery often attached for this complication. It is unavoidable that the stem of the prosthesis implanted in the neck of femur will reactively produce a certain resorption of the bone around itself. We have found that this resorption occurs in the first months

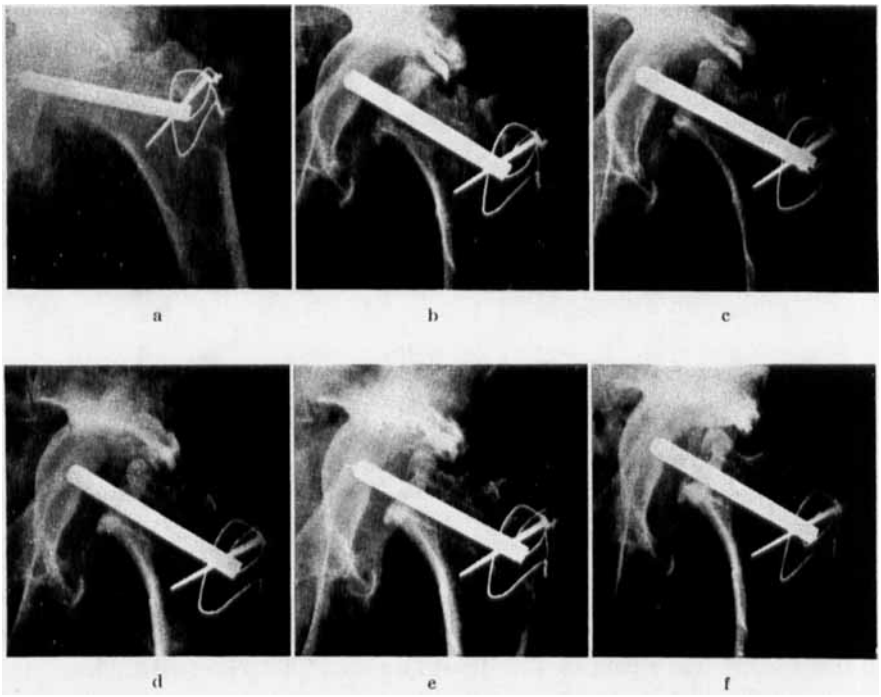

Fig. 2.

A series of skiagrams within 5 years after Judet's arthroplasty. *a.* Immediately after the operation. *b.* Two months later. The beginning of the resorption round the stem of the prosthesis is visible. *c.* The skiagrams one year later. *d., e.* The skiagrams some years later. *f.* Five years after operation. Resorption round the stem of the prosthesis has not advanced. There is no loosening of the prosthesis, nor weakening of its stability. Prosthesis is introduced in a sufficiently long, unimpaired and sound neck.

after operation. The resorption stops at a certain degree, does not progress and has no considerable influence on the stability of the prosthesis, provided that it is introduced in a healthy, untraumatized and sufficiently long neck. (See Fig. 2).

On the contrary, the resorption around the stem of the prosthesis is progressive.

7. Mechanical accidents.

There was no fracture of the stem or head of the prosthesis. As for the mechanical changes of the prosthesis, itself only minor erosions on the head of the prosthesis were found in all reoperated cases. In no single instance could these erosions be connected with the complaints which necessitated reoperation.

RESULTS

According to the results the following 4 groups were formed: excellent, good, fair, and poor results. Such a classification was made on the basis of M. M. Shepherd's system. This system is based on the 4 main criteria for the evaluation of the results of arthroplasty of the hip, and are as follows: the degree of pain, active mobility, function by performance and the patient's own assessment of the result of the operation. Tables 2 and 3 show our results of Judet's arthroplasties.

TABLE 2

Results of 34 Judet arthroplasties observed for more than two years.

Number of cases							
	Years since operations						Total number
	to 2	2-3	3-4	4-5	5-6	6-8	
Excellent			2	1	1	3	7
Good		1	2	2	2	2	9
Fair		1	2	1		2	6
Poor		5	3	2	1		11
Dead	1						1
Total number	1	7	9	6	4	7	34

TABLE 3

Long term results of 34 Judet arthroplasties according to diagnosis.

Number of cases				
	Diagnosis			Total number
	Arthrosis coxale	Pseudo-arth. colli fem.	Coxitis t. b. c.	
Excellent	4	1	2	7
Good	5	3	1	9
Fair	4	2		6
Poor	5	6		11
Dead	1			1*
Total number	19	12	3	34

As can be seen from Table 2, the worst results fall in the period 2–3 years after the operation. The reason for this is the reoperation

* Died of intercurrent disease two years after operation.

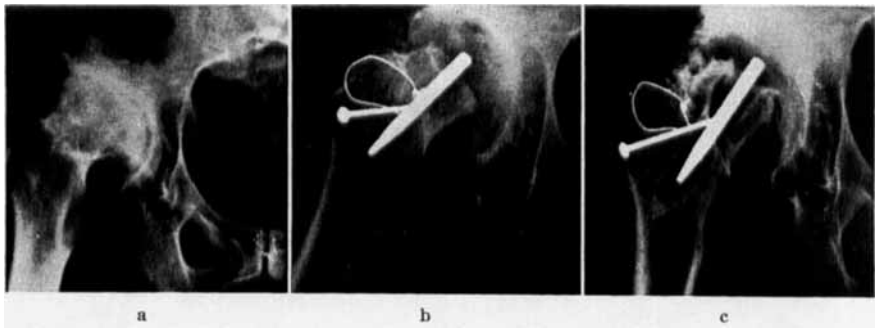

Fig. 3.

a. Severe arthrosis of the right hip. *b*. Immediately after the introduction of Judet's prosthesis. *c*. Six and half years after the operation. Though considerable resorption round the stem of the prosthesis exists, there is no loosening and weakening of the stability and function of the extremity. (See Fig. 4). There is no resorption of the neck of femur.

of these patients in the same period of time, i.e. 2–3 years after arthroplasty.

We come to the conclusion that the most critical time for Judet's arthroplasty are 2–3 years after the operation. Late complications and complaints and difficulties usually occur in this period. Recurring complication and difficulties in our patients which in Table 2 are represented as "poor" after the 3rd year, have also appeared within the first 3 years following the operation. They have been classified in the year when they were reoperated, or when the last examination was carried out. We have not observed that an apparent deterioration or onset of late complications ensues after 3 years of a satisfactory state with Judet's arthroplasty.

Expressed in percentage, long term results of our patients with Judet's arthroplasty are:

excellent and good	48.5 %
fair	18.2 %
poor	33.3 %

It can be seen from Table 3 that the poorest rate results were achieved in pseudoarthrosis of the neck of femur. The result was poor (50 %).

Judet arthroplasty of the hip was performed in 3 cases of coxitis t.b.c. The long term results in all of them were very good.

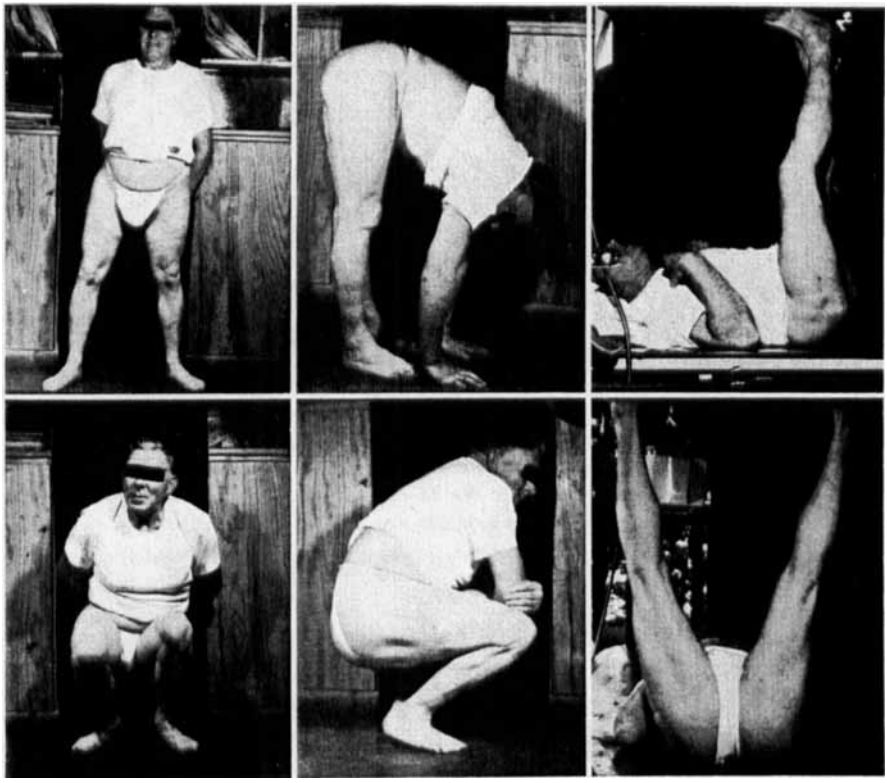

Fig. 4.
Clinical findings in a patient 7 years after Judet's arthroplasty. (Fig. 3 shows skiagram of this case). All movements of the hip are possible. Stability of the extremity, moving and working capacity of the patient are excellent.

CONCLUSION

On analysis the first thing to be noted is that 48.2 % of our patients in whom Judet's arthroplasty was performed, have excellent or good long term results. In some cases these results were good beyond any expectation. The function and stability of the extremity, personal satisfaction of the patients with the result of the operation, as well as their walking and working ability are excellent, though 3 to 7 years have elapsed since the operation. (Figs. 4, 5, 6).

When such good results are found after a rather long observation time, we must ask ourselves whether such a method deserves to be labelled as bad and be completely abandoned. We have already pointed

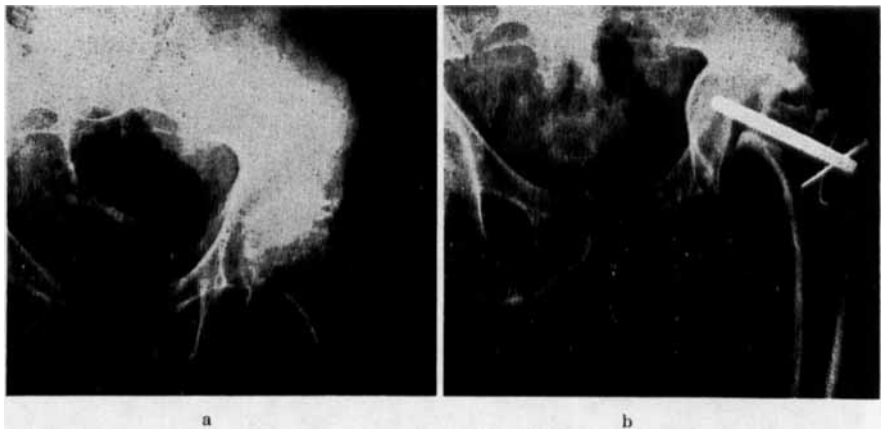

Fig. 5.

a. Arthrosis of the left hip. *b.* Five years after Judet's arthroplasty. (Cup arthroplasty had been previously done, but without success), *c.* Clinical findings in the patient, 8 years after Judet's arthroplasty. Moving and working capacity of the patient, stability and function of the extremity are excellent.

out that one of the main indications for Judet's arthroplasty is a sufficiently long and intact neck of the femur.

Angiography of the neck of femur, might be helpful, to demonstrate the vitality of the neck. We have not carried out this method of investigation.

Using any of the prosthesis which are at our disposal, for "resection-reconstruction" of the hip, the late result can not be predicted (even if we adhere to indications, operative technic and postoperative treatment), because each prosthesis has its "pros and cons" and none are ideal. Each of them represents a foreign body, and can not become part of the patient. That is the reason why the achievement of an ideal reconstruction of the diseased or injured hip, is beyond our scope.

SUMMARY

Long term results in 34 patients with Judet's arthroplasty, with a follow-up period from 2 to 8 years, are reported. The fist 3 years after the operation are "most critical" for the late result. Patients who in the first 3 years after the operation showed a satisfactory condition did not exhibit any subsequent deterioration. The main condition for a long term good result with Judet's prosthesis, is its implantation in a sufficiently long, unimpaired and undiseased neck of femur. The late

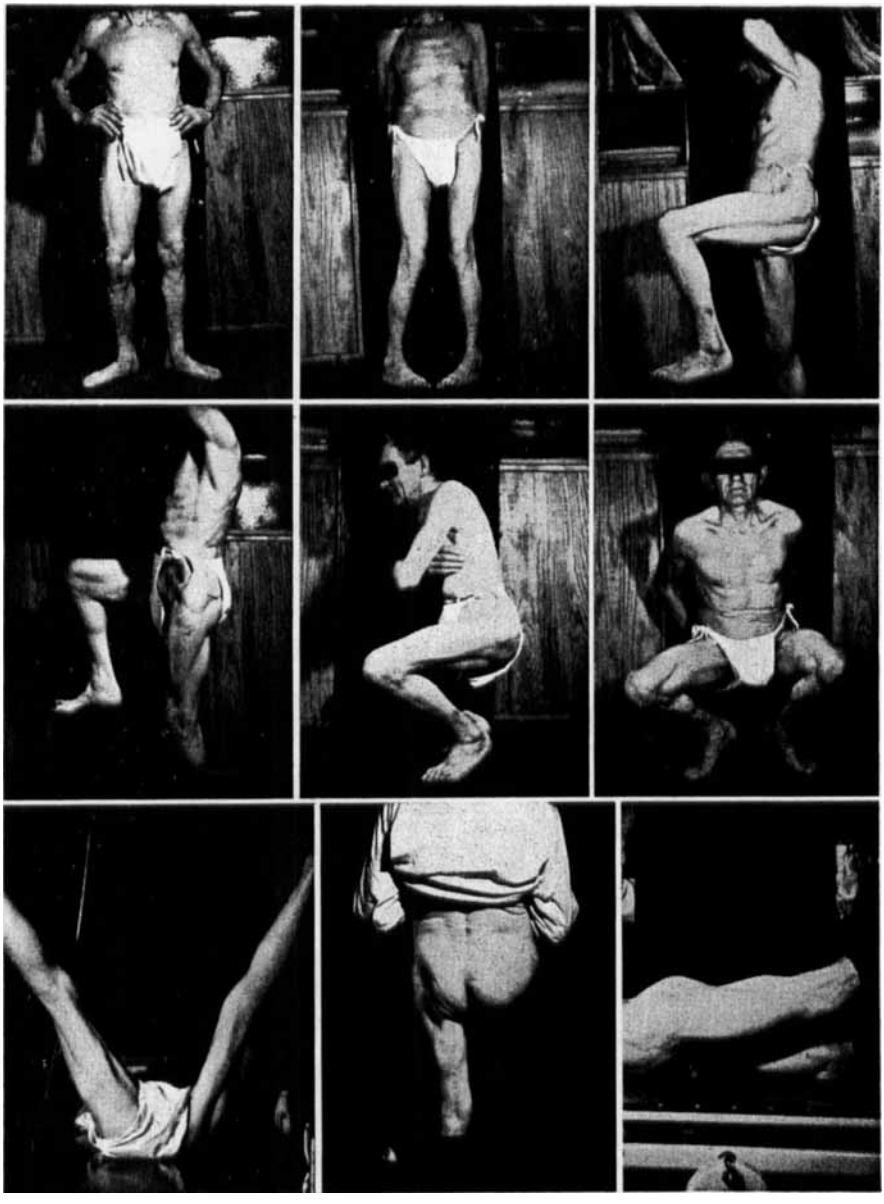

Fig. 5 c.

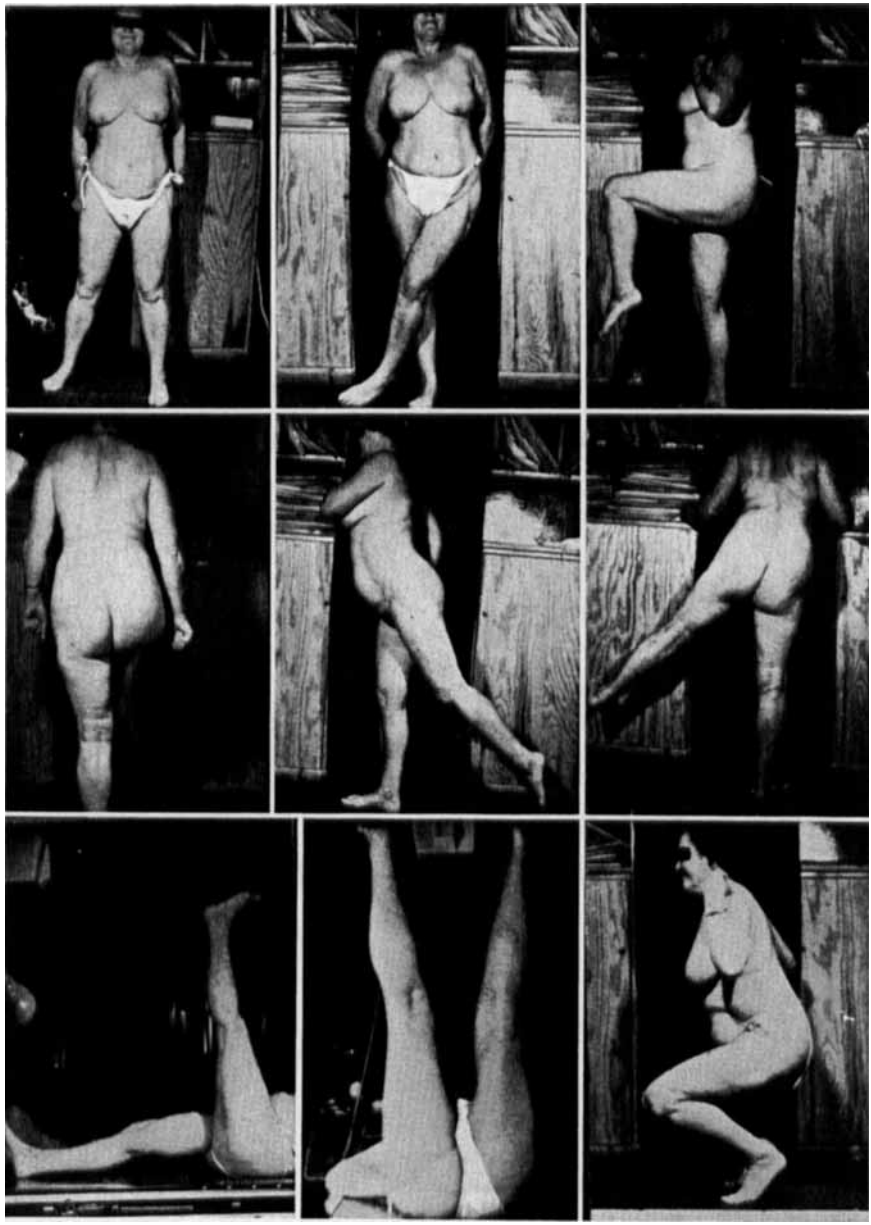

Fig. 6.

Clinical findings from 23–4–1959 in the patient in whom Judet's arthroplasty was performed on 2–10–1952, because of pseudoarthrosis of the neck of femur. As can be seen, the result 7½ years after operation is excellent.

results with pseudoarthrosis of the neck of femur were in 50 % poor. In arthrosis, the late results were better: 50 % excellent and good, 22.2 % fair and 27.8 % poor. The author remarks that poor results were found in severe forms of arthrosis, in which considerable resorption of the neck of femur and acetabulum occurred soon after the arthroplasty, and in pseudoarthrosis where the line of fracture was not subcapital, but rather low. In 3 patients with coxitis t.b.c. the late results were very good.

RESUME

Les résultats à long terme chez 34 malades chez lesquels a été pratiquée l'arthroplastie de Judet, avec une période d'observation de 2 à 7 ans sont rapportés. Les trois années qui suivent l'opération sont les "plus" critiques pour les résultat finaux. Les malades chez lesquels dans les trois années qui suivent l'operation on constate un état satisfaisant n'ont manifesté aucune détérioration subséquente. La principale condition pour obtenir un bon résultat à long terme avec la prothèse Judet est que son implantation ait lieu sur un col de fémur suffisamment long, intact et non malade. Le résultat final dans la pseudarthrose du col du fémur a été piètre dans 50 % des cas. Dans les cas d'arthrose, les résultats finaux ont été meilleurs: 50 % excellents et bons, 22,2 % relativement bons et 27,8 % piètres. L'auteur fait observer que les mauvais résultats ont été trouvés dans les formes graves d'arthrose chez lesquelles il y avait une résorption considérable du col du fémur et de la cavité cotyloïde, apparue rapidement après l'arthroplastie et dans les pseudarthroses lorsque la ligne de la fracture n'était pas subcapitale, mais relativement basse. Chez 3 malades avec coxite tuberculeuse, les résultats finaux furent excellents.

ZUSAMMENFASSUNG

Spätergebnisse in 34 Patienten mit Judets Arthroplastik und einer Beobachtungszeit von 2–7 Jahren werden berichtet. Die ersten drei Jahre nach der Operation sind die kritischsten hinsichtlich des Spätergebnisses. Patienten, die in den ersten drei Jahren nach der Operation einen zufriedenstellenden Zustand zeigten, weisen keine spätere Verschlechterung auf. Die wesentliche Bedingung für ein langdauerndes gutes Ergebnis mit der Judet Prothese ist ihre Einpflanzung in einen ungeschädigten und gesunden Schenkelhals. Die Spätergebnisse in Pseudarthrosen des Schenkelhalses waren in 50 % schlecht. Arthrosen

gaben bessere Spätresultate: 50 % ausgezeichnete und gute, 22,2 % annehmbare ud 27,8 % schlechte. Der Verfasser bemerkt, dass schlechte Ergebnisse in schweren Fällen von Arthrose in denen bedeutende Resorption des Schenkelhalses und des Acetabulum bald nach der Arthroplastik auftrat und in Pseudarthrosen in denen die Bruchlinie nicht subcapital sondern ziemlich distal lag, gefunden wurden. Bei drei Patienten mit Coxitis tbc waren die Ergebnisse sehr gut.

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