

# Total Hip Replacement. Results and Complications

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Between August 1967 and August 1970, 300 total hip replacements were carried out at the Hospital for Special Surgery. The etiological diagnosis of the operated cases was as follows:

Primary coxarthrosis:	1	63
Secondary coxarthrosis:		10
Rheumatoid arthritis:	7	5
Failure of earlier arthroplasties:		30
Idiopathic post/traumatic cases:		8
Idiopathic avascular necrosis:		8
Ankylopoietic spondylitis:		6

Minimum and maximum mean age in the different etiological groups was as follows:

Primary coxarthrosis: mean, sixty-six years and a half; maximum, eighty-five; minimum, fifty-one. Secondary coxarthrosis: mean, fifty years; maximum, sixty-one; minimum, forty-four. Rheumatoid arthritis: mean, fifty-four years and a half; maximum, seventy-six; minimum, twenty-six. Failure of earlier arthroplasties: mean, sixty-three years; maximum, seventy-seven; minimum, thirty-eight. Post-traumatic cases: mean, sixty-seven years and a half; maximum, eighty-one; minimum, forty-six. Idiopathic avascular necrosis: mean, fifty-two years; maximum, fifty-eight; minimum, forty-two. Ankylopoietic spondylitis: mean, thirty-eight years and a half; maximum, forty-seven; minimum, twenty-seven.

The prostheses used were the McKee-Farrar system in 180 cases and a Charnley implant in 120 cases. A lateral approach with a greater trochanter osteotomy was performed in the majority of patients. All prostheses were stabilized with methylmetacrylate.

## RESULT ASSESSMENT

Results were assessed on the basis of four parameters: pain, gait, joint movement and muscular strength and functional capacity. These parameters were classified in accordance with the following scheme (inspired in the classification by Merle d'Aubigné-Postel):

### Pain

0. Continuous unbearable pain. Frequent administration of powerful analgesia.

2. Continuous bearable pain. Occasional administration of powerful analgesia. Frequent administration of salicylates.

4. Mild occasional pain at rest. Moderate pain on movement and weight-bearing. Moderate use of salicylates.

6. Mild pain resulting from activity and weight-bearing. Occasional use of salicylates.

8. Pain felt occasionally or with climate changes.

10. No pain whatsoever

### Gait

0. Bedridden.

2. Patient confined to bed and to a wheelchair.

4. Needs crutches or of a walking-stick on both sides to cover a distance of under two blocks.

6. Can walk with a single walking-stick or crutch over a distance of more than five blocks.

8. Walks without a walking-stick or crutches at home. Outside home, the patient can walk unlimited distances with or without a walking-stick. Mild limp.

10. Normal gait.

### Joint movement and muscular strength

0. Ankylosed in a faulty position.

2. Ankylosed in a functional position.

4. Flexion lower than 70 degrees. Limited lateral and rotational movements. Poor to fair muscular strength.

6. Flexion up to 90 degrees. Regular lateral and rotational movements. Fair to good muscular strength.

8. Flexion higher than 90 degrees. Good lateral and rotational movements. Good to normal muscular strength.

10. Normal muscular movement and strength.

### Functional capacity

0. Fully dependent on others.

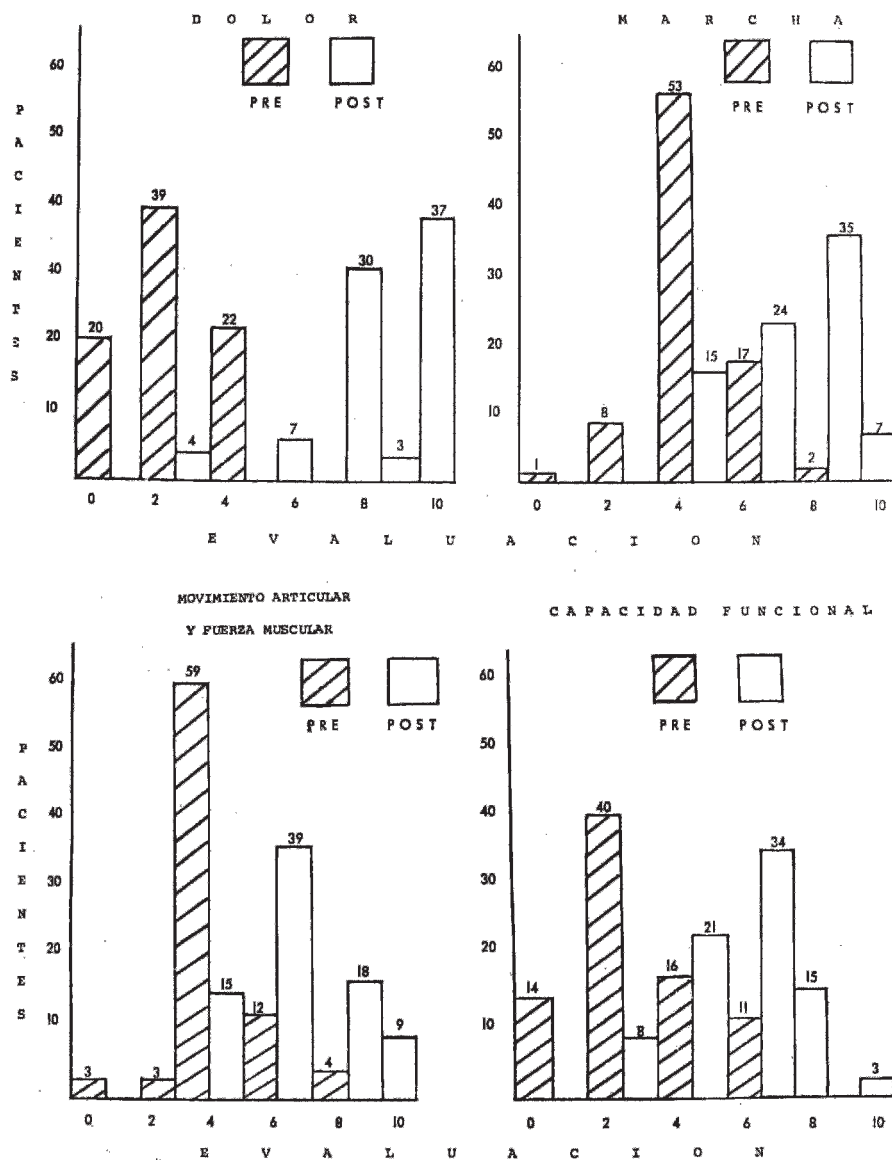
2. Partially dependent on others.

4. Independent. Light household chores.

6. Moderate household chores. Can do desk-bound work during a normal working day.

8. Can stand throughout a full working day.

10. Normal activities.



**Graph 1.** Schematic representation of the pre- and post-operative assessment of pain, gait, joint movement and muscular strength and functional capacity. Global results of 81 patients (19 failures were not included).

This classification makes it possible to use odd numbers for extreme cases, in which the intermediate degree more closely reflects the result.

## RESULTS

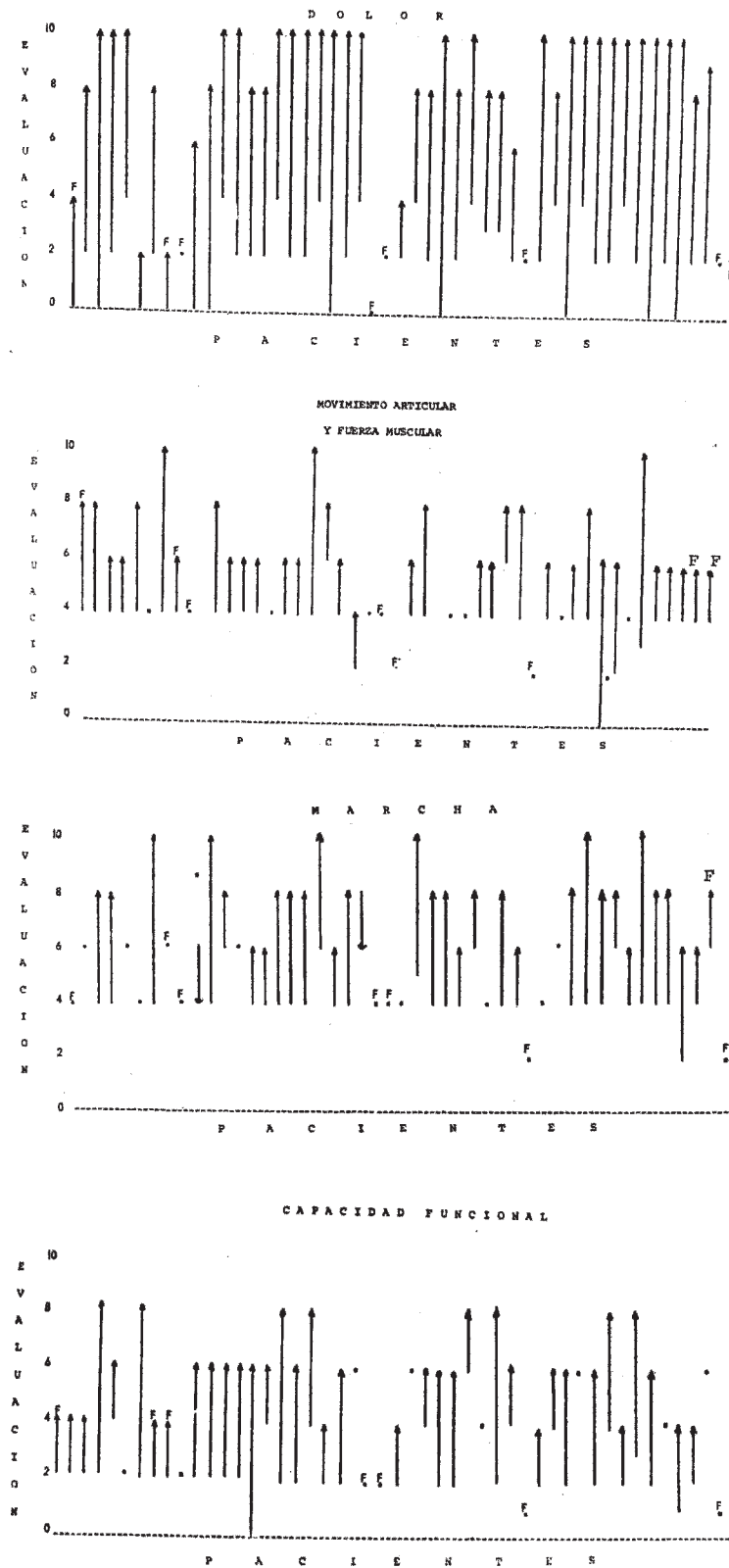
We hereby present the results obtained with the first 100 cases (96 McKee-Farrar and four Charnley implants), with a post-op of 14 months minimum and thirty-eight maximum (mean: 22 months). The clearest improvement was observed within the "pain" parameter. Sixty per cent of cases were classified as continuous pain before surgery. At the last post-op evaluation, nearly 90 per cent

either felt no pain whatsoever or had mild occasional pain.

Gait improved, albeit not so markedly, mainly due to the fact that at post/op assessment 70 per cent of patients had already been given a score 4 or 6. During the immediate post-op, 80% of patients had a score of 6 or more.

Joint movement and muscular strength showed an improvement similar to that seen with gait. The functional capacity data show that while during the pre/op 55% of patients were partially or entirely dependent on others, only 10% of them were dependent after surgery.

To sum up, in accordance with the analysis of the results obtained in total hip replacement surgery, we consider that pain is the most highly favored symptom, followed by



**Graph 2.** Schematic representation of the pre- and post-operative assessment of pain, gait, joint movement and muscular strength and functional capacity. Individual results for 49 patients with bilateral coxarthrosis. Failures (F) have been included. Each arrow represents one case. Upward-looking arrows indicate improvement; downward-looking ones indicate deterioration. Points denote patients that did not show changes between the pre- and post-operative evaluation.

**CHART 1**

Long-term evolution of local immediate complications

Complications	Number	Prophylactic use of		Infection	Loosening
		Antibiotics	Anticoagulants		
Positive pre-op culture	2	Yes	No	—	1
Positive intraoperative culture	4	No	No	1 25 per 100	
Hematoma	6	No	2	—	2 33 per 100
Drainage:					
Negative culture	8	No	7	1 12.5 per 100	
Positive culture	5	No	5	2 40 per 100	
None	75	No	37	8 10.6 per 100	
	100		51	12	4 5.3 per 100
					7

functional capacity, gait, joint movement and muscular strength. Graphs 1 and 2. These results do not include the complications discussed below.

## COMPLICATIONS

In the first 100 cases, the incidence of infections was 12%. These occurred: immediately after surgery (1 case), two months later (one case), six months later (two cases), nine months later (3 cases), 12 months later (three cases) and fourteen months later (two cases). In eight patients the prosthesis was extracted due to infection.

One case, in which the cultures performed showed signs of staphylococcus aureus, was reoperated under heavy antibiotic therapy; after both prosthetic components were extracted and a careful debridement was performed, a new prosthesis was implanted. Post-operative evolution was eight months and the result obtained to date has been satisfactory, without signs of recurrence of the infection.

Three cases were not reoperated: one of them due to the patient's poor health condition, i.e. for reasons unrelated to the local complications in the hip, and the other two because they were considered to have significantly improved with respect to their preoperative condition and because the patients did not accept the proposed reoperation.

Seven cases presented with loosening on the prosthetic acrylic and the bone. Of these, four were reoperations due to the failure of previous arthroplasties. This shows the technical difficulties inherent in obtaining stable fixation in this group. There were five instances of loosening in the acetabular portion, a femoral one and one involving both components. Symptoms appeared: immediately (three cases in which patients started to walk with no crutches and with full weight-bearing); at six months (one patient) and at twelve months (three patients, in two of whom pain coincided with low-intensity trauma and in one of whom there was, in addition, an upper limb fracture). The seven

**CHART 2**

Diagnosis/late complications ratio. 100 total hip replacements

Diagnosis	Infection	Loosening
65 coxarthroses	9 13.8 per 100	2 3 per 100
17 failure of previous arthroplasties	2 11.7 per 100	4 23.5 per 100
13 Rheumatoid arthritis	1 7.7 per 100	—
3 post-traumatic cases	—	—
2 ankylopoietic spondylitis	—	—
100	12	7

cases of prosthetic loosening were treated as follows: four patients were reoperated and their prostheses reimplanted. Of these, two have evolved satisfactorily to date with post-ops of two and twelve months respectively. Another patient still had pain on weight-bearing and the remaining one had to have his prosthesis extracted because of an infection that ensued reimplantation. The remaining three cases have not yet been reoperated (in two cases for personal reasons and in the third because the patient considers his symptoms moderate and tolerable). These cases have been carefully followed and their loosening, which at the beginning could only be diagnosed through arthrography is nowadays (a year later) marked and can be seen through radioscopy. This shows the importance of early reimplantation in cases of mild loosening, given its progressive evolution. Also, the process of loosening erodes and weakens the surrounding bone, minimizing the possibilities of a successful reimplantation.

The relationship between immediate and late local complications, as well as that between etiological diagnosis and long-term complications is summarized in Charts 1 and 2.

## RESUMEN

Se presenta el diagnóstico etiológico y la edad de los primeros 300 reemplazos totales de cadera, efectuados en el Hospital for Special Surgery. Se comentan los resultados y complicaciones de los 100 primeros casos, con una evolución mínima de catorce meses y máxima de treinta y ocho (promedio, veintidós meses).

## RÉSUMÉ

On presente le diagnostic etiologique et l'âge de les premiers 300 réformes compètes d'hanche, réalisées dans l'Hôpital de Chirurgie Spécial. On commente les resultats et les complications de les 100 premiers cases avec l'évolution la plus petite de 14 mois et l'évolution la plus grande de 38 (moyenne 22 mois).

## SUMMARY

The paper presents the etiological diagnosis and the mean age of the first 300 total hip replacements performed at the Hospital for Special Surgery. The complications and the results of the first 100 cases are studied with a minimum evolution of 14 months and a maximum post-op of 38 (mean: 22 months).

## REFERENCES

Charnley J. Acrylic cement in orthopaedic surgery. Edinburgh and London: E&S Livingstone; 1970.

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# Commentary

It is a pleasure to read Dr Salvati's paper published thirty-four years ago in the Journal of the Spanish Society of Orthopedic and Trauma Surgery. The article was written on the basis of the long experience that by then had been gained by the *Hospital for Special Surgery*. The author, who still practices in the same Centre, is nowadays Director of the Hip and Knee Unit as well as Professor of Orthopedic Surgery at Cornell University.

The Unit under Dr. Salvati's authority currently carries out 2,600 hip replacements a year, which makes it the most experienced centre in the U.S. for that type of procedure.

The *Hospital for Special Surgery* of New York is famous throughout the World for the diagnosis and treatment of knee joint problems, with more than 1800 prosthetic replacements a year, 40% more than the second busiest center in the U.S. dealing with knee prostheses. These figures added to the prestige of the surgeons that work and have worked at the Center give us an idea of the type of environment in which this paper was written.

It was undoubtedly a privilege for our Journal to publish in 1971 a paper by Eduardo A. Salvati and Philip D. Wilson Jr.

On reading this paper, a few aspects stand out. First of all, the fact that it was written in easily understandable language. At the beginning of the career, Eduardo Salvati was already a good communicator. He is very well-known in Spain since he has come to our country on many occasions

to give lectures; indeed, it is an asset to have him in our scientific meetings and congresses given his eloquence and his didactic style. Another striking factor is the aptness with which he chose his implants: in the 1960's he implanted 120 Charnley's prostheses in 3 years, a choice which seems to have been right since with very few modifications (i.e. the use of a slightly straighter stem and a slightly longer neck) remains the gold standard in hip surgery. Yet another noteworthy fact is his choice of an evaluation scale that took into consideration mobility, gait and functional capacity – a classification that was later on slightly modified by Merle d'Aubigné, who came up with a highly popular scale in the present time.

The reader may be surprised by the high infection rate at 12%, which was nevertheless fairly common in those days. Great strides have been taken since then to reduce the rate to the current 1.7% rate for hip prostheses (1.3% correspond to revisions of primary hips and 3.2% to revision surgeries). A significant part of the advances made should be credited to Eduardo Salvati, who devoted a great deal of energy to minimizing the risk of periprosthetic infections.

His work on antibiotic dispensing cement, on the review of 3175 arthroplasties performed with or without horizontal or vertical laminar flow and his many papers on periprosthetic infection have contributed to improving the hopes for success that most of our patients harbor.