Chapter 10
Results of Low-Friction Arthroplasty of the Hip Performed as a Primary Intervention

> "*The clinical material relates to the hips operated on from November 1962, when high density polyethylene replaced Teflon for the acetabular component, to December 1965.*" "*Any attempt to compare the state of the hip before and after operation by use of numbers has obvious limitations*." 1972.

Charnley's first publication on the results of the operation demands detailed study. It puts down foundations to so much of the subsequent work on the subject. The detailed clinical assessment, surgical technique, the post-operative care, complications and the results were documented. Uniformity of meaningful terminology is an essential part of scientific communication. Any attempt at pre-operative clinical assessment and documenting the results of surgery must be simple enough to collect and yet detailed to convey the essential information. Whatever the method used there will always be scope for improvement and modification, and above all for the need of "reading between the lines".

Surgical Technique

"*The essential mechanical details of the technique employed in this series*" – size of the head, the shape and size of the neck – were established from experience with Teflon. "… *Neutral anteversion* (of the cup) *is advised, with a maximum of 5 degrees of anteversion… The axis of the femoral prosthesis is neutral*." "*Both components are fixed with self-curing acrylic cement*".

"*Emphasis is laid on deepening the acetabulum until no more than two or three millimetres of bone is left in the floor*." This was to medialise the cup, thus reducing the medial lever and improving the mechanical advantage by reducing the load on the hip – while the trochanter is transferred laterally and distally. (Did this technique produce expected results?)

B.M. Wroblewski et al., *Charnley Low-Frictional Torque Arthroplasty of the Hip: Practice and Results*, DOI 10.1007/978-3-319-21320-0_10

Post-operative Rehabilitation

Post-operative rehabilitation was conducted more slowly in this series – patients being confined to bed for up to 3 weeks with legs separated by an abduction pillow.

Results

Clinical (Fig. 10.1)

Charnley adopted the grading method of d'Aubigne and Postel (1954) [1] with modifications [2] to record pain, function and movement in the hip both pre-operatively and at follow-up. The description of this grading is noted in the clinical assessment section of the book.

Relief of pain The average grade for pain, before surgery, was 2.7 Average post-operative grading was 5.9.

Activity level for Grade A patients improved from 2.5 to 4.8.

Range of movements Although varying greatly between patients and the underlying hip pathology; the increase averaged from 2.7 to 5.2.

Dislocation

There were 9 early dislocations in the series of 582 arthroplasties (1.5 %). All were treated by closed reduction and non re-dislocated. There were no revisions for dislocation.

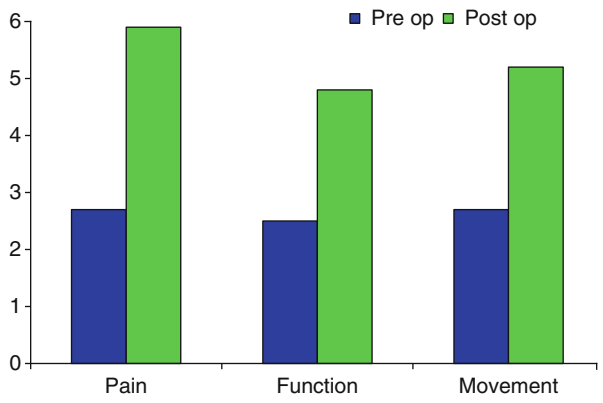

Fig. 10.1 Graph of clinical results – pain, function, movement. 1962–1965

Infection

Infection rate was 3.8 % of which 2.2 % were defined as "late".

Wear

Wear of the cup has shown considerable variations from 1 mm in 5 years to 0 at 7 years. Examination of explanted cups established the average penetration as 0.13 mm per year.

Charnley clearly appreciated the need for long-term follow-up: the minimum follow-up was 4 years (range 4–7 years), complications within the first year were included.

So what were the conclusions derived from this review of the 4–7 year results?

- As regards to pain relief and ability to walk, the average final rating was 90 % excellent and 10 % good.
- The average recovery of movement was influenced by the pre-operative range; it was improved though not spectacularly.
- There was no tendency to lose movement with the passage of time.
- When the socket was cemented the late mechanical failure from all causes was 1.3 % in 210 cases.
- The failure rate, excluding infection, was 3.8 %.

Comments

The question of histology of the bone cement interface in relation to any wear products would clearly have to await post-mortem specimens. In the context of assessment of functional results after hip replacement, popular press and commercial involvement, must also be mentioned. Single case patient satisfaction, can be visually demonstrated far better than a level of pain relief; it has a greater and longer lasting effect on the observer, hence the proliferation of advertising images. There is, however, a very important aspect of the practice of "single case success," anecdotal presentation; it is misleading.

Patient's activity level, **after total hip arthroplasty**, **is not a characteristic of a particular design**, **nor of a method of component fixation**, **provided it is relatively secure under load**: **it is a reflection of patient selection for the operation**.

These are invariably category **A** patients whose activity level was only temporarily restricted, and whose general condition allowed them to return to a high, even if only an early and temporary, level of activity. It is too obvious to point out that patients with multiple problems never feature as anecdotal single case successes.

The drawback of single case success is in the fact that it attracts patients with a high level of expectation of early benefit and has little understanding of the long-term commitment demanded by this form of treatment.

References

1. d'Aubigne RM, Postel M. Functional results of hip arthroplasty with acrylic prosthesis. J Bone Joint Surg (Am). 1954;36-A:451–75.
2. Charnley J. The long term results of low-friction arthroplasty of the hip as a primary intervention. J Bone Joint Surg (Br). 1972;84-B:61–76.