

Chapter 16

Dislocation

The fear of dislocation is undoubtedly the main reason why the small femoral head has not become universally popular (1978)

It was 15 years from the introduction of the operation and over 13,000 LFAs before Etienne, Cupic and Charnley [1] turned their attention to a detailed review of the incidence and causes of post-operative dislocation. The very low incidence was attributed to full exposure of the hip, preservation of the capsule, correct alignment of the components, secure re-attachment of the greater trochanter and the use of the abduction pillow post-operatively.

Monitoring of the results was routine. In an attempt to reduce the incidence of dislocation still further two changes were introduced: transverse reaming of the acetabulum and the change of the cup design to the long posterior wall (LPW) model. What was the clinical benefit of the changes? What was the effect on the already very low incidence of post-operative dislocation?

Transverse Reaming of the Acetabulum

Preparation of the acetabulum was a well defined sequence of steps; centering for the pilot hole, perforator then deepening and expanding reamers used alternatively. The acetabulum was reamed in cranial direction (Fig. 16.1).

The new cavity prepared matched the shape of the cup reasonably well and this allowed some degree of cement containment and pressurisation. With the cup placed more cranially, however, some limb shortening or at least inability to restore leg length, was probably inevitable, and was considered to be one factor that could contribute to post-operative dislocation. This was the technique until November 1970 when transverse reaming of the acetabulum was established. The detail of the technique was to use the same set of instruments but directing them transversely in line with anterior superior iliac spines (Fig. 16.2).

Fig. 16.1 Reaming the acetabulum in proximal direction – guideline was the patient’s opposite shoulder

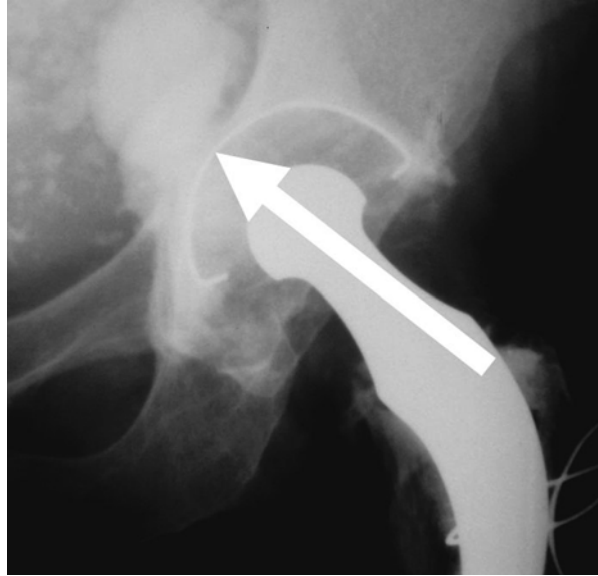
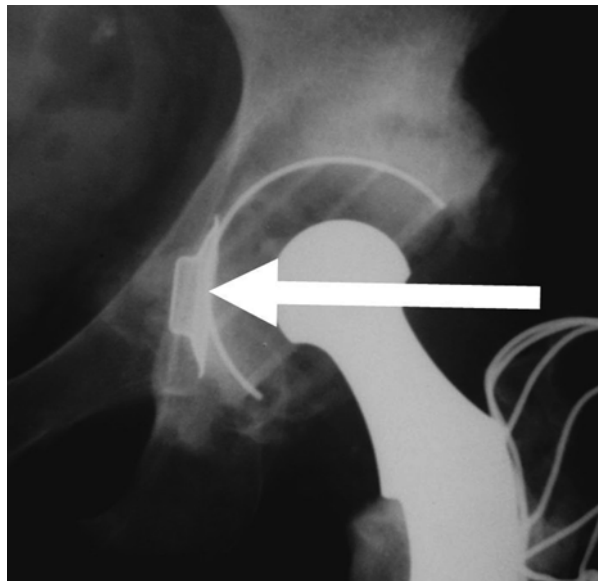


Fig. 16.2 Transverse reaming of the acetabulum – guideline was the anterior superior iliac spines



The centering ring and the reamers had their lower margin at the level of the “teardrop” the junction between the obturator foramen and the acetabulum. The centre of rotation was thus brought distally, the cup could be placed at the more anatomical level and thus contribute to leg length equalization.

Long Posterior Wall (LPW) Cup

The long posterior wall cup (LPW) (Fig. 16.3) was introduced in May 1972.

It was reasoned that the extension of the posterior wall of the cup, to the face of the hemisphere before the chamfer is machined, would allow a greater range of hip flexion and thus avoid dislocation even when the neck of the stem impinged on the anterior rim of the cup. Charnley was aware that the tendency; away from his Unit in Wrightington Hospital, was to antevert the cup. Anteverting the LPW cup would lead to impingement, posteriorly, and anterior dislocation. With the design went a warning: *“In accordance with previous teaching these sockets were inserted without anteversion.”*

The incidence of post-operative dislocation was studied over three consecutive periods. The results are summarised in Tables 16.1 and 16.2.

The very low dislocation rate is truly a remarkable record which continues to be questioned. Some explanation is essential.

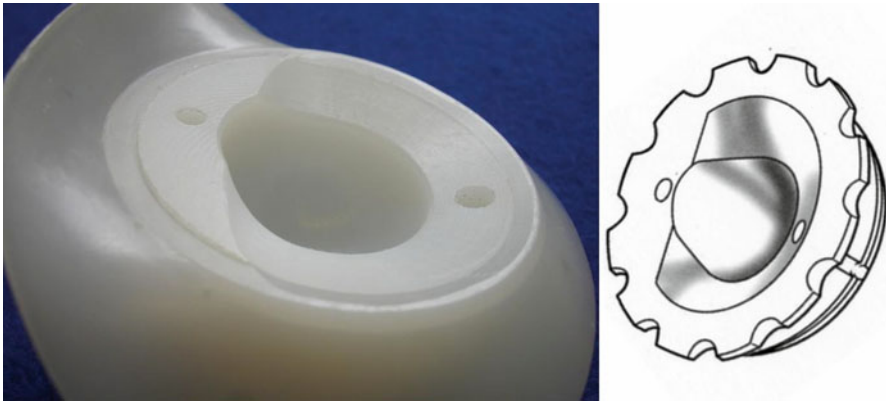


Fig. 16.3 The long posterior wall cup introduced in May 1972

Table 16.1 Incidence of post-operative dislocation 1966–1975

Period	Technique design	Number of LFAs	Number of dislocations	Dislocation %
1966/1969	Proximal reaming Standard cup	2825	25	0.9
Nov 1970 May 1972	Transverse reaming Standard cup	3495	18	0.5
1973/1975	Transverse reaming LPW cup	3495	13	0.4

Table 16.2 Recurrent dislocation and revision for dislocation

	Number of LFAs	Recurrent dislocation		Revision	
		No	%	No	%
Prior to 1971	3928	11	(0.3)	6	(0.2)
After 1971	4706	4	(0.08)	1	(0.02)

1971 data is excluded because of the overlap of both the technique of acetabular reaming and the introduction of the long posterior wall cup

Caution was the watchword in the early stages of the introduction of the operation into routine clinical practice. It was not unusual for patients to remain in hospital longer than the present routine; 2 or even 3 weeks was common.

- Early complications were recorded as part of the immediate post-operative care.
- Use of support – elbow crutches – for 3 months was the recommendation.
- Recording of complication at discharge was routine.
- Any complication noted after discharge or reported at follow-up was recorded on a separate pro-forma (as well as in the patients records), which were delivered to Charnley.
- Monitoring of complications in general and the individual surgeon's performance in particular, was maintained regularly.

Despite this routine it is probably inevitable that the complication remains under-reported as episodes of subluxation have never been the subject of a publication. The same cannot be true of recurrent dislocation. Recurrent episodes undermine patient's confidence and bring the problem to the attention of the surgeon.

The review identified factors which were considered to contribute to post-operative dislocations.

Limb Shortening

The tear drop is used as the landmark. Higher than anatomical level of the cup was found in 50 % of dislocations but only in 16 % when the cup was placed at the anatomical level.

Stability

Instability of the arthroplasty, as determined at trial reduction, and before closure, was recorded in 21 % of dislocations but only 16.7 % when dislocation was not the complication.

Trochanteric Non-union

The results suggest, “*non-union of the greater trochanter would appear to be an important factor causing dislocation.*”

It should come as no surprise that loss of abductor mechanism in general and trochanteric non-union in particular may play a role in dislocation after THA. The interpretation, however, may not be that simple. With the cup at the anatomical level the limb is lengthened. If the stem is placed in a valgus position, as was the practice before 1969 (though still advised in 1975), not only will the limb be lengthened further, but the stem may now encroach onto the trochanteric bed reducing the area of cancellous bed of the femur. The trochanter may have to be re-attached under tension, with the hip in an abducted position, increasing the likelihood of trochanteric non-union. Before 1971 trochanteric non-union was considered to be a contributory factor in 26 % of dislocations. After 1971 the incidence of post-operative dislocation was reduced, however, trochanteric non-union was the contributory factor in 33 %.

It is likely that the non-union of the greater trochanter should be viewed not as a radiographic finding but its effect on the hip stability. The separation of the trochanter need not result in dislocation if the abductors function, with the trochanteric fragment, as a “sesamoid”. Hence, it is not merely non-union but the origin – insertion distance of the abductors – that is of interest.

Reference

1. Etienne A, Cupic Z, Charnley J. Post operative dislocation after Charnley low-friction arthroplasty. Clin Orthop Rel Res. 1979;193:19–23.