

# CORE DECOMPRESSION FOR AVASCULAR NECROSIS OF THE FEMORAL HEAD

C. VAN LAERE, M. MULIER, J. P. SIMON, J. STUYCK, G. FABRY

**The results of core decompression as the sole treatment for Ficat stages 1, 2 and 3 avascular necrosis of 51 femoral heads in 39 patients were studied. The mean follow-up time was 24 months (6-47 months); 19 hips (38.8%) were good and 30 hips (61.2%) had failed (two hips were lost to follow-up). The good results as stated in the literature could not be obtained, but we believe core decompression can delay the need for total hip replacement in avascular necrosis of the femoral head.**

**Keywords :** hip ; avascular necrosis ; core decompression.

**Mots-clés :** hanche ; nécrose avasculaire ; forage.

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## INTRODUCTION

Avascular necrosis of the femoral head was first described in 1888, but up to 1962 just 22 cases were described in the English literature. The natural history of avascular necrosis of the femoral head is uncertain (5), but in most cases there is early collapse of the head with loss of joint congruity leading to joint destruction. We report the results of core decompression of the femoral head as a treatment for avascular necrosis in Ficat stage 1, 2 and 3 (4).

## PATIENTS AND METHODS

From May 1992 to June 1996, 51 core decompressions in 39 patients were performed for avascular necrosis of the femoral head. They were reviewed with a mean follow-up time of 24 months (range, 6 to 47 months). The mean age was 35.6 years (range, 14 to

65 years); there were 21 females and 18 males; 12 patients had bilateral involvement and two patients were lost to follow-up. Twenty were idiopathic osteonecroses; 26 were steroid-associated; 3 post-traumatic and 2 associated with alcohol abuse. The patients were classified following the stages of Ficat and Arlet (4) (Table I); 37 were graded as stage 1; 11 stage 2 and one was stage 3. All of our patients had standard radiographic examination of the pelvis and both hips as well as MRI investigation. Seven of the patients classified as stage 1 and four classified as stage 2 additionally had a bone scintigraphy. Three patients with stage 1 disease and six with stage 2 also had a CT-scan done. In stage 0 disease, no clinical or radiographic changes are found and in stage 1 disease the diagnosis can be made only on MRI imaging. In stage 1 disease the trabeculae appear normal or slightly porotic on MRI and progress to diffuse osteoporosis and sclerosis in stage 2. Pathologic specimens in these early stages show viable bone on necrotic bone with marrow spaces infiltrated by mononuclear cells and histiocytes; this explains the radiographic changes. Stage 3 disease is marked by the loss of spherical shape of the femoral head and the AP radiograph may appear normal, but the lateral view often reveals a crescent sign under the subchondral bone, which represents a fracture between the subchondral bone and the underlying femoral head. The necrotic area becomes radiodense as a result of mineral deposition in the marrow spaces. In stage 4 disease, the femoral head undergoes further collapse, leading to articular cartilage destruction and joint space narrowing.

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Table I. — Stages of AVN (Ficat and Arlet)


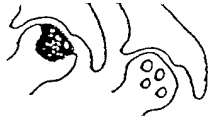


Stages	Joint Line	Contour	Trabeculae	Schema	Diagnosis
0 and I	N	N	N		Impossible
II	N	N	Diffuse porosis or sclerosis cysts (mixed)		Probable
III	N	Broken	Sequestrum		Certain
IV	Decreased	Flattened	Collapse		Arthrosis

Table II. — Clinical evaluation of the hip

	Points
<b>Pain</b>	
Severe and spontaneous	1
Severe on attempting to walk ; prevents activity	2
Tolerable ; permits limited activity	3
Only after some activity ; disappears quickly with rest	4
Slight or intermittent on starting to walk but decreases with normal activity	5
None	6
<b>Function</b>	
Bedridden or a few yards : 2 sticks or crutches	1
Time and distance very limited with or without sticks	2
Limited with one stick (less than 1 hour) ; difficult without a stick ; able to stand for long periods	
Long distances with one stick ; limited without a stick	4
No stick, but has a limp	5
Normal	6
<b>Functional grade : pain + function</b>	
Very good	11 or 12
Good	10
Medium	9
Fair	8
Poor	7 or less

A good result was defined as a hip that did not require further surgery, without radiographic progression and obtained more than 10 points using the first two parts of the Merle d'Aubigné-Postel scale as

modified by Charnley (1-2) (Table II). A failure was defined as inadequate relief of pain, progression to a secondary procedure, radiographic progression of the lesion or less than 10 points on our rating scale.

Table III

		number	good	poor
	stage 1	37	18	19
	stage 2	11	1	10
	stage 3	1	0	1
idiopathic		number	good	poor
		20		
	stage 1	14	8	5
	stage 2	6	0	6
steroid-associated		number	good	poor
		25		
	stage 1	21	9	12
	stage 2	4	1	3
	stage 3	1	0	1
post-traumatic		number	good	poor
		3		
	stage 1	2	1	1
	stage 2	1	0	1

## RESULTS

Overall, 19 hips were considered good, 30 were considered failures. At stage 1 : 18 hips were good, 19 failed ; at stage 2 : 1 was good, 10 failed and the one hip with stage 3 was a failure (Table III).

## DISCUSSION

Core decompression as a treatment for osteonecrosis of the femoral head has always been controversial. Theoretically, the core biopsy should decompress the diseased area of the head, decrease the intraosseous pressure, improve blood flow, prevent additional episodes of infarction. The overall results of core decompression (6) from 24 reports revealed a 63.5% (741 of 1166 hips) clinical success rate. Close to 63% (711 of 1039) of the hips showed no evidence of disease progression on radiographs. Twenty-three percent (341 of 1039) of the hips required total hip arthroplasty or another procedure during the follow-up period. The mean follow-up was 30 months. Femoral head survival rate was 84% (190 of 227 hips) for Ficat stage 1, 65% (155 of 239 hips) for stage 2, and 47% (40 of 86 hips) for stage 3.

We did not have such a good result as stated in the literature, which may be due to the high number of patients (51%) with steroid-associated osteonecrosis.

We believe that core decompression still has a role in the initial treatment of osteonecrosis of the femoral head and can delay the need for total hip replacement in the young patient.

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### SAMENVATTING

*C. VAN LAERE, M. MULIER, J. P. SIMON, J. STUYCK, G. FABRY. Resultaten van forage van de heupkop als behandeling van osteonecrose.*

Als behandeling voor osteonecrose van de femurkop werd in 51 gevallen bij 39 patiënten een forage uitgevoerd.

De gemiddelde follow-up was 24 maanden, 38,8% werden als goed bestempeld en 61,2% waren slecht. Toch geloven wij dat forage zijn plaats blijft behouden in de initiële behandeling van osteonecrose.

### RÉSUMÉ

*C. VAN LAERE, M. MULIER, J. P. SIMON, J. STUYCK, G. FABRY. Forage de la tête et du col du fémur pour ostéonécrose avasculaire de la tête fémorale.*

Les auteurs ont étudié les résultats d'une décompression par forage de la tête et du col du fémur utilisée comme traitement isolé dans 51 cas d'ostéonécrose avasculaire de la tête fémorale chez 39 patients (stade de Ficat I, II et III). Le suivi moyen était de 24 mois (6-47 mois). Le traitement a donné un résultat satisfaisant dans 19 hanches (38,8%) mais a échoué dans 30 hanches (61,2%); deux hanches ont été perdues de vue. Bien que le résultat ne soit pas aussi bon que certains rapportés dans la littérature, les auteurs estiment que la décompression par forage de tête peut retarder l'échéance d'un remplacement par prothèse totale pour ostéonécrose avasculaire de la tête fémorale.