Revision of cemented hip arthroplasties

101 hips followed for 5 (4–9) years

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101 hips were revised with cemented Lubinus prostheses after failed primary cemented arthroplasty, and followed for 5 (4–9) years. Radiographically, 41 hips (36 femoral stems and 13 acetabular components) had become loose. The use of an intramedullary plug at the revision did not prevent sinking of the prosthesis. No difference was found between conventional or pressure-injection cementation techniques. In cases where the stem was inserted in varus or the acetabular component was in malposition there was increased loosening. Patients below 50 years of age had oftener more than 5 mm sinking of the stem and more prosthesis loosenings.

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The overall rate of revision for THR prosthesis loosening within 10 years is about 10 percent and long-term survival of the hips tends to be poor (Herberts 1992). We report our results of cemented revision arthroplasty after loose primary-cemented THR.

Patients and methods

During 1979–1984 we performed 159 cemented total hip revisions in 147 patients using the Lubinus prosthesis. We could follow up 101 revised hips clinically and radiographically for on average 5.5 (4–9) years (Table 1).

Among the original 159 hips, the prosthesis had been permanently removed due to infection in 3 hips, 21 hips had been rerevised, 20 hips were not examined because the patients did report to the clinic and these hips were not included, and 14 patients had died during the follow-up.

The primary operation had been performed in 74 cases for primary arthrosis, in 13 cases for posttraumatic arthrosis, in 5 cases for congenital dysplasia, in 5 cases for rheumatoid arthritis, in 2 cases for coxa vara, in 1 case for aseptic necrosis, and in 1 case for arthrosis secondary to chondrodystrophy. The prostheses used in the primary THR were in 48 hips Brunswik, in 20 Lubinus, in 16 McKee-Farrar, in 4 Christiansen, in 3 Lagrange-Letournel, in 2 Zimmer, in 1 Minneapolis, in 1 Wagner, in 1 Judet and in 5 cases of unknown type (primary treatment elsewhere).

The mean age of the patients at the time of the primary operation was 60 (25–82) years, at the revision 66 (32–88) years, and at the follow-up 72 (39–93) years. The revision was performed for aseptic prosthetic loosening in 92 hips, femoral fracture around/below the prosthetic stem in 3 hips, infection in 2 hips, unclarified severe pain in 3 hips, and 1 hip was revised due to dislocation. 17 of the 74 arthrosis hips were revised due to large granulomas. In the revision, the anterolateral approach was used in 93 cases, including a trochanteric osteotomy in 16 hips, and the posterior approach was used in 8 revisions. To remove the cement, fenestration of the femoral shaft was done in 61 cases.

Due to severe loss of acetabular bone, a reinforcement net or the Müller ring was used in 27 hips, and 7 hips had cancellous grafting of the acetabulum due to severe protrusio. Cement pressure injection was used in 52 revisions, and an intramedullary plug was used in 26 of these cases. In each case, gentamycin-impregnated methylmethacrylate was used, and all patients had short-term antibiotic prophylaxis. The average operation time at the revision was 189 (65–365) min. The average blood loss was 3530 (500–10500) mL, and the average blood replacement was 8 units. In the evaluation, we used the Charnley (1972) scale.

The radiographic analysis of the femoral component recorded periprosthetic radiolucency, sinking of the prosthesis, and varus/valgus angle of the stem. With the acetabulum, radiolucency, the angle and migration upwards or medially were studied. The femoral component was considered loose if there was a progres-

Table 1. Presentation of 101 hips which were treated with revision arthroplasty with a cemented Lubinus prosthesis for previously failed cemented total hip replacement

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1	1	53	57	oa	l	61	b	3	3	5	a	b	a	p	–	–	–	–	–	44	–3	.73	.72	4	–	–	–
2	0	56	66	ra	m	72	c	2	3	4	a	b	a	p	–	+	–	+	f	45	0	.62	.69	0	–	–	–
3	0	49	61	p	a	69	b	3	3	1	a	b	a	c	–	–	–	–	–	36	2	.48	.55	16	+	+	–
4	1	68	69	p	t	75	a	2	2	4	a	b	a	c	–	+	–	–	–	54	0	.79	.56	11	+	+	–
5	1	72	76	oa	la	82	a	3	3	5	a	b	a	c	–	–	–	–	–	48	–2	.77	.76	0	–	–	–
6	1	61	63	p	c	69	a	2	2	5	a	b	a	c	–	+	–	–	–	37	–4	.54	.63	9	+	+	–
7	1	55	61	oa	b	66	a	3	3	4	a	b	t	p	–	+	–	–	–	38	0	.72	.68	0	–	–	–
8	0	45	50	oa	m	59	a	2	2	3	a	b	t	c	–	+	–	+	–	56	–2	.83	.70	8	+	+	–
9	0	58	64	oa	b	69	b	3	2	4	a	s	a	c	–	+	–	–	–	48	0	.70	.74	4	–	–	–
10	0	77	77	oa	l	84	c	1	1	1	f	s	a	c	–	+	–	–	–	48	0	.86	.76	0	–	–	–
11	1	53	57	cd	c	62	c	1	1	5	a	b	a	c	–	–	–	–	–	53	0	.49	.46	0	–	–	–
12	0	68	74	oa	b	80	c	3	3	4	g	s	t	c	–	+	–	–	–	44	0	.62	.58	0	–	–	–
13	0	68	78	oa	b	82	c	2	2	4	g	s	p	c	–	+	–	–	–	33	0	.68	.67	8	+	+	–
14	0	68	69	oa	b	75	b	2	3	5	a	b	a	p	+	+	–	+	–	40	0	.75	.77	14	+	+	+
15	1	56	66	oa	b	70	a	3	3	5	a	s	a	p	–	+	+	–	–	45	0	.83	.76	8	+	+	–
16	0	54	62	oa	m	66	c	2	1	1	g	b	t	p	–	–	+	+	–	59	0	.60	.63	0	–	–	–
17	1	49	52	p	l	59	c	3	2	4	a	s	a	c	–	+	–	–	f	51	2	.58	.57	10	+	+	–
18	1	62	65	p	mi	71	a	2	2	4	p	s	t	c	–	–	–	–	–	55	0	.67	.68	2	–	–	–
19	0	48	55	oa	m	59	b	3	3	4	a	b	a	p	–	–	+	–	–	35	0	.90	.86	0	+	+	–
20	1	69	73	ra		77	c	3	3	5	a	b	a	p	–	–	+	–	–	42	–5	.61	.66	2	–	–	–
21	1	73	74	oa	b	80	b	3	3	3	a	s	a	p	–	–	+	–	–	48	0	.75	.76	4	–	–	–
22	0	47	54	oa	b	59	a	3	3	4	a	b	a	p	+	+	+	+	–	58	0	.79	.73	11	+	+	+
23	1	56	65	oa	b	70	c	2	3	4	g	s	a	p	–	+	–	–	c	48	0	.55	.54	2	+	–	–
24	0	57	59	oa	b	66	b	2	3	4	a	b	a	c	–	+	–	–	t	50	0	.71	.70	7	+	+	–
25	1	64	72	oa	b	78	c	3	3	5	g	b	a	p	–	+	–	–	–	53	0	.71	.71	0	–	–	–
26	0	68	74	oa	b	80	b	3	3	4	a	b	a	p	–	–	+	+	–	51	0	.69	.71	4	–	–	–
27	1	68	70	oa	l	76	b	2	2	4	a	s	a	c	–	+	–	–	–	45	0	.56	.58	4	–	–	–
28	0	67	71	oa	l	76	a	2	2	4	g	b	t	p	–	–	+	+	–	67	0	.62	.63	11	+	+	–
29	0	57	66	oa	b	72	a	2	3	5	a	b	t	p	–	–	–	–	f	nd	nd	nd	nd	nd	–	–	–
30	0	61	69	oa	b	74	b	3	3	4	a	s	a	c	–	+	–	–	–	34	0	.61	.60	9	+	+	–
31	0	77	90	oa	m	96	c	2	2	3	g	b	a	p	–	+	–	+	–	45	–3	.68	.68	0	+	+	–
32	1	58	60	p	l	64	a	2	2	6	a	s	a	c	–	–	–	–	–	29	0	.80	.85	4	–	–	+
33	0	65	73	oa	b	78	c	2	2	4	a	b	a	p	–	+	–	+	f	54	0	.84	.84	10	+	+	–
34	0	59	64	cd	la	68	a	2	3	4	a	b	t	p	–	+	–	+	–	48	0	.71	.69	0	–	–	–
35	1	54	60	cv	b	65	b	3	3	3	a	b	p	p	–	–	–	+	h	40	0	.56	.53	0	–	–	–
36	1	49	60	cv	m	65	b	3	2	3	a	b	p	p	+	+	–	–	–	64	0	.76	.71	0	–	–	–
37	0	50	65	cd	m	69	b	3	3	3	a	b	a	p	–	+	+	–	l	44	0	.81	.85	0	–	–	–
38	0	72	78	oa	b	82	a	3	3	4	a	s	a	c	–	+	–	–	f	48	–2	.61	.64	5	–	–	–
39	1	68	74	oa	m	81	b	3	3	3	a	b	a	c	–	+	–	–	–	45	0	.58	.60	6	+	+	–
40	0	60	72	p	m	78	a	3	3	4	a	a	p	c	–	–	–	–	–	38	nd	nd	nd	nd	–	–	–
41	0	73	81	oa	m	87	a	2	2	4	a	b	a	c	–	+	–	–	1	nd	nd	nd	.52	nd	–	–	–
42	0	82	88	oa	b	93	c	2	2	5	a	b	t	p	–	+	+	–	–	45	0	.71	.70	10	+	+	–
43	1	53	57	p	l	62	c	3	3	4	a	s	a	p	–	–	–	–	–	45	0	.79	.81	5	–	–	–
44	0	57	65	oa	b	70	b	3	3	5	a	b	a	c	–	+	–	–	–	65	0	.68	.71	5	–	–	–
45	1	67	74	oa	b	81	b	2	2	3	g	b	a	p	–	+	–	–	–	49	0	.67	.65	4	–	–	–
46	1	65	69	oa	b	76	a	1	1	1	g	b	a	c	–	+	–	+	–	41	0	.61	.55	3	–	–	–
47	1	62	71	oa	b	76	b	3	4	4	a	b	a	p	–	–	+	–	–	50	–2	.59	.56	0	–	–	–
48	0	54	62	oa	b	65	b	3	3	5	a	b	a	p	–	–	–	–	–	70	0	.78	.76	4	–	–	–
49	0	60	67	oa	b	72	a	3	3	4	a	b	a	p	–	–	+	–	–	54	0	.65	.57	14	+	+	+
50	1	57	66	oa	b	70	b	2	3	4	g	b	a	c	–	+	–	+	f	52	0	.76	.71	14	+	+	–
51	0	64	68	oa	b	74	b	3	3	4	a	b	a	c	–	–	+	–	i	50	0	.64	.62	6	+	+	+
52	1	52	62	oa	b	66	b	3	4	3	g	b	p	p	–	–	+	+	–	60	–2	.65	.66	0	–	–	–
53	1	53	62	oa	b	66	b	3	4	4	g	b	a	p	–	–	+	–	f	39	0	.55	.54	0	–	–	–
54	0	49	53	cd	m	60	b	2	2	3	a	b	a	p	+	+	–	–	–	40	0	.67	.67	4	–	–	–
55	1	64	70	oa	b	76	c	2	3	3	g	b	a	p	–	–	+	+	–	54	0	.55	.45	7	+	+	–
56	1	57	67	p	m	73	b	3	3	4	a	b	a	c	–	+	–	–	–	55	0	.55	.59	8	+	+	–
57	0	54	57	p	l	63	a	2	3	3	a	s	a	p	–	+	+	–	–	36	0	.75	.72	5	–	–	–
58	0	65	71	oa	la	76	a	2	2	5	a	b	a	p	–	–	+	–	–	35	0	.67	.64	7	+	+	–
59	0	77	81	p	t	87	b	2	2	3	a	b	a	p	–	+	–	–	–	45	–5	.69	.58	5	+	+	–
60	1	57	63	p	m	71	a	3	3	3	a	b	a	c	–	+	–	–	f	58	0	.45	.47	4	–	–	–
61	1	47	48	oa	c	54	b	1	2	3	f	b	a	c	–	–	–	–	–	30	0	.67	.75	4	+	–	+
62	1	46	48	oa	c	54	b	3	2	5	a	b	a	p	–	+	–	–	–	45	0	.70	.58	7	+	+	–
63	0	53	61	oa	b	66	a	2	3	4	g	b	p	p	–	–	+	–	–	40	0	.73	.79	2	–	–	–
64	1	70	74	oa	l	80	a	3	4	5	a	b	a	p	–	–	+	–	–	48	–5	.55	.58	0	–	–	–
65	1	64	67	oa	z	74	b	3	3	4	a	b	a	c	–	+	–	–	–	nd	nd	nd	nd	nd	–	–	–
66	0	71	73	oa	b	79	b	2	3	3	a	s	a	p	–	+	–	–	–	38	0	.68	.68	4	–	–	–
67	1	60	80	oa	j	84	a	2	3	3	a	b	a	c	–	–	–	–	–	43	0	.78	.67	3	–	–	–
68	1	68	69	oa	l	75	c	2	2	1	a	b	a	c	–	–	–	+	–	30	0	.58	.51	8	+	+	–
69	0	64	68	oa	b	76	b	3	3	4	a	s	a	c	–	+	–	–	–	60	0	.75	.79	7	+	+	–

Table 1. continued.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
70	1	55	60	oa	z	65	c	3	3	4	a	s	t	p	–	–	+	–	–	38	0	.73	.70	1	–	–	–
71	0	67	72	oa	b	76	b	3	3	4	a	b	t	p	–	–	+	–	–	40	0	.68	.66	0	–	–	–
72	0	61	64	oa	b	70	c	3	2	5	a	b	a	c	–	–	–	+	l	36	0	.86	.87	0	–	–	–
73	1	56	62	oa	b	70	a	2	2	1	a	b	a	p	–	–	–	–	h	36	0	.44	.43	10	+	+	–
74	0	69	83	ra	b	87	c	2	2	2	a	b	a	p	–	–	+	+	–	45	0	.68	.70	0	–	–	–
75	1	64	70	oa	b	76	b	2	2	5	a	b	t	c	–	–	–	–	–	40	0	.49	nd	0	–	–	–
76	0	57	64	oa	b	69	a	2	2	3	a	s	a	p	–	+	–	–	f	25	0	.63	.65	6	+	+	+
77	1	73	80	oa	b	85	b	2	2	4	a	s	t	p	–	–	–	+	–	30	0	.43	.52	15	+	+	+
78	1	72	80	oa	b	85	b	2	2	3	a	b	t	c	–	–	–	+	–	43	0	.53	.58	5	+	–	+
79	0	52	57	ra	b	62	c	2	3	4	a	s	a	p	–	+	–	–	f	nd	nd	nd	nd	nd	+	+	+
80	0	66	66	oa	l	71	b	2	2	2	f	s	a	c	–	–	–	–	–	71	–2	nd	nd	0	–	–	–
81	0	55	65	oa	m	70	a	3	3	5	a	b	t	p	–	–	+	+	t	45	0	.73	.80	5	+	–	+
82	1	62	62	oa	l	67	c	2	2	4	p	s	a	p	–	+	–	+	–	45	0	.67	.67	0	–	–	–
83	1	53	56	oa	b	62	b	2	2	3	i	b	a	c	–	–	–	–	f	39	0	.67	.74	3	+	–	+
84	0	50	53	oa	b	59	b	3	5	4	a	s	a	c	–	+	–	–	–	48	–2	.58	.56	5	–	–	–
85	1	42	56	ra	m	61	b	3	3	3	a	b	p	p	–	+	–	–	–	57	0	.60	.49	0	–	–	–
86	0	25	34	ch	la	39	c	2	3	4	a	b	a	c	–	–	–	–	–	nd	nd	nd	nd	nd	–	–	–
87	0	52	58	oa	b	66	a	2	3	4	a	b	a	p	–	–	–	+	–	43	4	.62	.57	10	+	+	+
88	0	54	57	oa	w	64	c	3	3	4	a	b	a	c	–	–	–	–	–	50	0	.61	.62	4	–	–	–
89	0	66	72	as	b	81	a	2	2	4	a	b	a	c	–	–	–	+	–	65	0	.50	.53	15	+	+	+
90	0	58	62	oa	b	67	a	3	3	4	a	b	a	p	–	+	–	–	–	51	0	.59	.60	4	–	–	–
91	1	61	70	oa	b	74	a	2	3	3	g	b	a	p	–	–	–	–	–	56	0	.81	.77	10	+	+	–
92	1	69	73	oa	b	80	b	3	2	4	g	b	a	p	–	+	–	–	f	45	0	.73	.74	10	+	+	+
93	0	67	73	oa	b	79	c	2	3	5	a	b	a	p	–	+	–	–	–	41	0	.57	.60	7	+	+	–
94	0	57	59	oa	b	66	b	2	3	4	a	b	a	p	–	+	–	+	–	43	0	.56	.67	4	–	–	–
95	1	64	65	oa	l	70	b	2	2	3	a	b	a	p	–	–	–	+	–	43	0	.59	.65	0	–	–	–
96	0	72	76	oa	l	81	a	3	3	5	a	b	a	p	–	+	+	–	–	38	0	.59	.58	4	–	–	–
97	0	67	69	p	t	77	c	2	2	3	p	b	a	c	–	–	–	–	–	40	–3	.67	.67	0	–	–	–
98	0	52	58	cd	la	62	b	3	3	4	a	b	p	p	–	+	+	+	–	65	0	.73	.71	0	–	–	–
99	0	73	76	oa	l	81	a	3	2	3	a	s	t	p	–	+	–	–	–	54	0	.69	.76	10	+	+	–
100	0	63	70	oa	m	74	b	2	3	4	a	b	a	c	–	+	–	–	–	33	0	.58	nd	53	+	+	–
101	1	65	75	oa	b	80	a	2	2	4	g	b	t	p	–	+	–	–	–	29	0	.60	.64	0	–	–	–

1 Patient
2 Sex
3 Age at primary arthroplasty (years)
4 Age at revision (years)
5 Diagnosis/reason for primary arthroplasty
  - oa primary osteoarthrosis
  - p posttraumatic arthrosis
  - cd congenitally dysplastic hip
  - ra rheumatoid arthritis
  - cv coxa vara
  - as aseptic necrosis
  - ch chondrodystrophy

6 Type of the primary prosthesis which was revised
  - l Lubinus
  - m McKee-Farrar
  - la Lagrange-Letournel
  - c Christiansen
  - b Brunswik
  - mi Minneapolis
  - j Judet
  - w Wagner
  - z Zimmer
  - u unknown

7 Duration of follow-up after revision (years)
8 Charnley ABC-classification
  - a only one hip affected
  - b both hips affected
  - c also other reasons which affect the patient's mobility

9 Charnley class for pain preoperatively
10 Charnley class for gait preoperatively
11 Charnley class for range of motion of the hip joint
12 Reason for revision
  - a common aseptic loosening
  - f fracture
  - g granuloma
  - p pain
  - i infection
  - l luxation

13 Components revised
  - a acetubular component only
  - s femoral stem only
  - b both components

14 Surgical approach at revision
  - a anterolateral
  - p posterior
  - t anterolateral and trochanteric osteotomy

15 Cementation technique
  - c conventional
  - p pressure injection

16 Bone transplantation in the acetabulum
  - \+ yes
  - – no

17 Fenestration to remove femoral cement
  - \+ yes
  - – no

18 Intramedullar plug
  - \+ yes
  - – no

19 Reinforcement ring/net for acetabulum
  - \+ yes
  - – no

20 Complications
  - – none
  - f peroperative fracture of the proximal femur
  - c cardiac infarction
  - t thromboembolism
  - h wound hematoma
  - l luxation
  - i infection

21 Radiographic position of the acetabular component primarily after revision (degrees)
  - nd not defined

22 Radiographic varus angle of the femoral stem primarily after revision (degrees)
  - nd not defined

23 Radiographic index of prosthesis stem/femoral channel measured just below the lesser trochanter directly after revision
24 Stem/femoral channel index at follow-up
25 Sinking of the femoral stem at follow-up in mm
  - nd not defined

26 Radiographic loosening of the prosthesis at follow-up
  - \+ yes
  - – no

27 Radiographic loosening of the stem
  - \+ yes
  - – no

28 Radiographic loosening of the acetabular component
  - \+ yes
  - – no

sively growing, continuous more than 1 mm radiolucent line and/or more than 5 mm sinking of the stem (Harris et al. 1982). The acetabulum was considered loose, if the continuous periprosthetic radiolucent line was more than 1 mm, and the acetabular component angle had changed 4 degrees or more, and if there was more than 5 mm migration upwards or medially (Harris and Penenberg 1987). The data were analyzed using BMDP statistical software package. In the analyses the Chi-square test was applied.

Results

Before revision, all patients complained of pain classified as Charnley Class 3 or worse (average 2.0), while the postoperative average pain (101 hips analyzed) was 4.6. Excellent or good results concerning pain (Classes 6–5) were found in 54 hips, satisfactory (Class 4) in 28 hips, and poor (Class 3 or below) in 19 hips.

The average range of motion increased from 3.8 before revision to 4.8 at the follow-up. Excellent or good range of motion (Classes 6–5) was found in 66 hips, satisfactory in 27 and poor in 8 hips. In 92 hips, the range of motion had improved or had not changed from before revision, and in 9 hips it was poorer. After revision the average walking improved from 2.5 to 4.6 (21 patients had only 1 hip with disease, Charnley subclass A). In the radiographical analysis, 41 hips of the 101 had become loose; 36 femoral stems were loose and 13 acetabular components were loose. Moreover, from the original 159 hips, 21 had been revised for a second time.

In 12 hips, there was a fracture of the proximal femur during the revision operation; 10 of the fractures were not particularly treated, 2 fractures were treated with cerclage fixation, and 1 patient (Case 38 in Table 1) had pelvic-femoral plaster cast for 4 months. All the fractures healed. Cases 35 and 73 had a large wound hematoma postoperatively, which was revised in another operation during the first week. Case 51 had infection of the revised THR, which was treated with continuous administration of antibiotics. 5/7 hips where acetabular bone grafting was used became loose. 11/26 hips with intramedullary plugs became loose; the intramedullary plug did not prevent sinking of the stem. 29/61 fenestrated cases showed loosening. Regarding the cementation techniques, no difference in the outcome was found between conventional or pressure-injection techniques. Excess varus of the femoral stem increased the loosening rate. Primary malposition (here the inclination of 35°–55° was considered acceptable) of the acetabular cup increased the loosening rate (P 0.06). 17/74 osteoarthrotic hips developed granulomas. Patients below 50 years of age had more often a more than 5 mm sinking of the stem and more often prosthesis loosening.

Discussion

The number of revision THR in Finland is slightly more than 15 percent of all THR operations, and currently the proportion of hip revisions for mechanical prosthetic failures is increasing (Suominen 1991). In Sweden, loosening is the cause of 73 percent of the revisions (Herberts et al. 1989), and up to 9 percent of the patients will probably have multiple hip revisions (Kavanagh et al. 1987). Up to date, it has not yet been shown that cementless THR revisions have fewer loosenings or a better clinical outcome. While conventional primary revision gives on average good short-term results (Amstutz et al. 1982, Pellicci et al. 1982, Arajärvi and Santavirta 1987), in 5–10 years more one third of all the revised THR will probably become loose (Echeverri et al. 1988, Engelbrecht et al. 1990, Herberts 1992, Strömberg et al. 1992). Strömberg et al. (1992) reported 38 percent loosening after 7 years. Especially worrying is the fact that younger patients seem to be at higher risk of loosening even during the early years after THR revision.

Amstutz et al. (1982) reported major complications in 14 percent of their THR revisions, while the risk of infection is only slightly higher than in primary THR (Amstutz et al. 1982, Callaghan et al. 1985, Ejsted and Olsen 1987, Echeverri et al. 1988). Fenestration of the stem for cement removal did not impair our loosening or complication rate. Sydney and Mallory (1990) used multiple 9 mm perforations of the anterior cortex and had proximal femoral fractures in only 4 percent. The use of intramedullary plugs did not prevent prosthesis-stem sinking. Further, we did not find differences between conventional or pressure-injection cementation techniques. Our results confirm that correct positioning of the components in revision is probably the most important factor for a good long-term outcome.

For many years, it was thought that massive autologous or homologous bone grafts in the acetabular revision would give good results (Harris et al. 1977), but quite recently Mulroy and Harris (1990) have abandoned this technique due to resorption of the grafts and high long-term complication rates. In our series, 5 of 7 hips where acetabular bone grafting was used became loose.

We conclude that cemented revision hip arthroplasties tend to have poor long-term outcome; about one half of the prostheses were loose after 5 years.

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