Total condylar arthroplasty for gonarthrosis

A prospective 10-year study of 138 primary cases

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The results of 138 consecutive primary Insall-Burstein arthroplasties with an average observation period of 10 (9–11) years were assessed. Mean age at surgery was 71 (30–81) years. The patients were evaluated clinically, using the Hospital for Special Surgery knee rating scale, and radiographically, according to the radiolucency score of the Knee Society.

At latest follow-up, the overall evaluation of the patients who completed the study was excellent or good in 86 percent, fair in 8 percent and poor in 6 percent. Residual functional pain was recorded in 12 percent of cases with prostheses in situ. An ability to walk more than 500 m was found in 62 percent. The median range of motion was 104°.

Arthrodesis was performed on 2 knees due to deep infection. There were 14 cases with substantial radiolucency around the prosthesis, but none of these patients had severe functional pain. The crude prosthetic survival rate was 98 percent. A correlation was found between the radiolucency score and both the total score and the intensity of the residual functional pain.

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The Insall-Burstein total condylar prosthesis was developed in 1973 (Insall et al. 1979). The prosthesis used in this study was a modified original Insall-Burstein prosthesis, with a 5° posterior slope of the tibial component, without metal backing, and of the semi-constrained, cruciate ligament-sacrificing, cemented type. We evaluated the long-term results of the prosthesis in patients with gonarthrosis.

Patients and methods

138 consecutive primary total condylar knee arthroplasties (TKA) were performed on 113 patients with arthrosis during the period October 1979 through May 1982 (Table 1). The observation period was 10 (9–11) years. There were 21 men (24 TKA) and 92 women (114 TKA) with a mean age of 71 (30–81) years at the time of surgery. 28 patients (31 TKA) died during the study period for other reasons. 13 patients (14 TKA) were lost to follow-up. These 41 patients were comparable to the patients followed for the whole period regarding age and sex distribution.

72 patients (93 TKA), 14 men (17 TKA) and 58 women (76 TKA) completed the study. The mean age at the time of surgery was 71 (51–80) years. The operating theater was equipped with laminar air-flow. First generation instrumentation was used for prosthesis implantation. Operative technical goals were to achieve a tibiofemoral alignment between 3° and 10° of valgus, a neutral position of the prosthetic components (a tilt of less than 5°), a range of motion greater than 95° and a stable knee (a maximum of 5° instability on full extension). The patella was resurfaced in all cases. Rehabilitation began on admission, when the patients were instructed in active muscle exercises, and in walking with crutches. Antibiotics and thrombosis prophylaxis were given to all patients. We used Methicillin from the time of operation until the third postoperative day (1 g 3 times daily), and Heparin (5000 IU subcutaneously twice daily) from the day before operation until the patient was well mobilized with supervised active exercises and compressive stockings.

All patients were examined prior to surgery, both clinically and radiographically. The follow-up was planned to be 3 months postoperatively, then once yearly. Standard anteroposterior and lateral radiographs were taken on the fifth postoperative day. Outpatient radiographic examinations, including a sky-line view of the patella, were obtained in a standardized way on short films during weight bearing. The arthrosis scale described by Ahlbäck (1968) was used preoperatively to grade the severity of the joint destruction. The Hospital for Special Surgery (HSS) knee-rating scale (Insall et al. 1976) was used in all clinical evaluations. The radiolucency score approved by the Knee Society (Ewald et al. 1989) was used to evaluate the radiolucency at the bone-cement interface beneath the

Table 1. Observations in 138 Insall-Burstein arthroplasties

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	D	7	62	W	3	46	5	10	6	4	2	91	15	15	11	12	6	8
2	C	11	64	W	3	63	5	10	11	10	–7	78	10	10	13	12	2	0
3	C	11	61	M	5	49	5	5	12	8	10	90	15	15	14	8	5	0
4	C	9	65	W	3	61	5	10	15	4	–6	87	15	10	12	12	5	2
5	C	11	62	W	3	66	5	10	15	4	–4	96	15	15	14	12	2	3
6	D	3	70	W	5	52	0	10	11	8	–6	86	15	15	13	8	0	2
7	C	11	78	W	5	58	5	10	15	4	–10	76	10	15	16	4	3	5
8	C	11	73	W	2	40	0	5	8	8	–2	77	15	15	9	8	0	5
9	C	11	72	W	4	72	10	15	15	8	–3	71	5	15	13	4	5	3
10	C	11	72	W	5	55	5	10	14	8	–8	82	15	15	13	8	5	3
11	C	11	71	W	4	53	5	15	10	8	–17	85	10	15	13	10	5	0
12	C	11	63	W	5	60	5	10	11	4	–13	90	15	15	18	12	–2	2
13	C	11	63	W	5	61	5	10	12	4	–14	90	15	15	15	12	–2	2
14	F	<1	65	W	5	57	5	5	13	8	0	0	0	0	0	0	0	?
15	C	11	68	W	5	64	5	5	14	10	–6	97	15	15	15	12	2	2
16	D	5	66	M	4	42	0	5	15	4	–2	96	15	15	16	12	5	2
17	L	4	69	W	5	61	5	15	11	4	–5	80	15	15	11	8	7	2
18	D	8	72	W	3	57	5	10	15	8	10	75	15	10	12	4	8	0
19	D	6	59	W	5	35	0	5	13	4	–25	88	15	15	16	10	5	3
20	C	10	68	W	3	62	10	5	12	4	3	90	15	15	18	8	6	0
21	C	10	68	W	3	47	5	0	10	4	2	90	15	15	18	8	6	4
22	C	11	73	W	4	62	0	10	15	10	–3	91	15	15	13	8	5	0
23	C	10	74	W	4	69	0	15	15	10	–2	82	5	15	14	8	4	0
24	C	10	60	W	5	44	0	5	12	8	–4	92	15	15	11	10	–2	1
25	C	10	73	W	3	61	0	5	17	4	0	80	10	15	16	10	1	0
26	L	8	68	W	5	43	0	5	11	4	2	75	10	10	14	8	4	0
27	D	6	67	M	5	50	0	5	12	10	–4	93	15	15	11	12	5	6
28	C	10	65	M	4	35	0	5	12	4	–11	79	15	10	12	12	–1	0
29	C	10	65	M	5	31	0	5	12	4	–13	81	15	10	14	12	–1	2
30	L	5	71	W	5	71	5	15	16	10	–5	84	10	15	14	10	3	2
31	C	10	73	W	3	56	0	5	11	8	8	71	5	15	14	8	4	5
32	C	10	68	W	3	68	5	5	15	8	0	92	15	15	15	10	4	3
33	C	9	69	W	3	45	5	0	13	10	–2	63	10	5	13	10	4	2
34	C	10	69	M	4	69	5	5	16	10	10	81	10	15	12	12	4	6
35	L	4	81	W	5	60	5	5	11	10	–2	90	15	15	12	10	3	4
36	C	10	73	W	4	51	0	10	13	4	7	85	15	15	13	10	3	4
37	D	<1	77	W	5	44	0	5	9	8	–8	?	?	?	?	?	?	?
38	D	4	76	W	5	66	0	15	13	8	–4	92	15	15	13	10	8	0
39	D	3	79	M	5	55	0	15	11	8	–3	97	15	15	15	12	2	2
40	C	10	72	W	5	61	5	0	9	10	15	89	15	15	16	12	9	0
41	C	9	74	W	1	75	5	10	14	10	5	89	15	15	16	12	9	0
42	D	2	77	W	3	61	5	15	10	8	–2	80	15	15	8	12	4	1
43	D	2	77	W	3	64	5	15	10	8	–4	83	15	15	11	12	6	2
44	C	10	73	W	3	49	5	5	13	8	15	87	15	15	14	10	5	4
45	L	3	30	M	4	61	5	5	9	10	9	85	10	15	10	12	7	2
46	F	8	63	W	5	34	0	5	8	8	6	0	0	0	0	0	0	?
47	D	2	66	W	3	49	0	0	15	4	2	74	10	10	12	10	4	3
48	D	3	65	W	5	57	5	0	14	8	–3	85	15	15	11	10	2	5
49	L	7	70	W	3	63	0	15	12	8	10	67	5	5	13	12	10	4
50	L	5	72	W	3	58	0	15	14	4	10	90	10	15	13	12	5	4
51	D	3	78	W	4	64	0	15	16	4	–3	96	15	15	14	12	4	0
52	C	10	57	W	3	29	0	0	13	8	13	67	10	5	14	8	5	1
53	C	10	73	M	5	69	5	15	12	10	–6	91	15	15	11	12	5	0
54	C	9	74	W	4	66	0	15	14	8	–10	54	5	5	9	8	5	3
55	C	10	72	W	3	57	0	15	11	8	–4	58	5	5	11	8	–1	6
56	D	6	73	W	5	64	10	15	13	4	10	67	15	15	11	0	6	3
57	D	8	70	W	3	67	5	10	15	8	–3	84	15	15	13	8	2	2
58	C	10	67	W	5	49	0	10	13	4	–9	70	10	15	12	4	3	0
59	D	5	71	W	5	58	5	15	11	8	–17	82	15	15	12	8	7	4
60	C	10	74	W	3	59	0	5	14	8	–3	85	15	15	13	12	2	0
61	D	3	65	W	5	51	0	0	13	8	2	67	10	10	14	8	5	3
62	D	5	65	W	3	53	0	5	17	4	10	77	15	15	14	4	10	5
63	D	4	61	W	3	58	0	10	16	4	–20	88	15	15	10	10	3	1
64	L	8	74	W	5	39	5	5	11	4	–4	85	15	15	11	12	3	2
65	C	10	74	M	3	59	0	5	15	8	–2	91	10	15	14	12	5	4
66	C	10	74	M	3	59	0	5	15	8	2	87	10	15	14	12	4	4
67	D	3	74	M	5	59	0	15	15	4	–6	92	15	15	12	12	9	2
68	C	10	65	W	5	44	5	5	5	4	–5	83	15	15	9	12	3	2
69	C	10	65	W	5	34	0	10	5	4	–4	82	15	15	10	12	3	4
70	C	10	76	W	5	59	5	10	10	8	6	95	15	15	12	12	4	0
71	L	5	70	W	5	41	0	10	10	4	–3	63	5	5	14	8	5	7

72	C	10	70	W	5	58	5	10	9	4	−5	62	10	15	8	4	6	6
73	C	10	70	W	4	51	5	10	7	8	−4	87	15	15	12	8	2	0
74	C	10	64	M	5	55	5	10	12	8	−9	93	15	15	15	10	5	4
75	C	10	74	W	5	43	0	5	13	4	12	81	10	15	11	8	5	5
76	C	10	61	W	5	54	10	5	9	4	−4	78	10	15	12	8	0	4
77	C	10	61	W	5	56	10	5	9	4	−6	61	5	15	10	8	−5	6
78	C	10	77	W	3	65	5	10	10	8	−6	87	15	15	12	10	5	0
79	C	10	73	M	5	49	0	10	11	4	−13	91	15	15	11	12	8	1
80	D	3	71	W	5	52	5	10	5	8	−5	82	15	15	11	10	−2	4
81	C	10	60	W	3	68	5	10	11	10	−5	83	15	15	11	12	−3	0
82	D	4	68	W	3	61	5	10	13	4	2	95	15	15	13	12	4	2
83	L	3	73	W	5	56	0	10	16	4	−4	91	15	15	11	12	5	4
84	D	5	80	M	4	67	5	15	13	8	3	91	15	15	14	12	3	0
85	C	9	80	W	5	57	0	10	15	8	−10	82	15	15	14	8	6	0
86	D	5	67	W	3	64	5	10	12	8	7	81	15	15	13	10	7	4
87	C	9	59	W	3	63	5	15	10	10	2	94	15	15	12	12	6	4
88	C	9	62	W	5	53	0	10	11	8	−10	80	15	15	11	8	3	1
89	C	9	68	W	5	44	0	5	13	4	−16	59	5	10	11	4	7	5
90	C	9	74	W	4	64	0	15	15	4	−5	82	10	15	15	8	5	5
91	C	9	74	W	4	65	0	15	15	4	−9	81	10	15	15	8	3	6
92	C	9	72	W	5	53	0	0	13	8	−5	75	15	15	8	10	5	0
93	C	9	63	M	5	77	5	15	18	8	−2	98	15	15	18	12	4	0
94	C	9	73	W	5	40	0	5	14	8	8	75	10	15	15	4	5	4
95	C	9	73	W	5	58	5	0	10	8	9	42	0	0	12	4	5	3
96	C	9	61	W	3	40	0	0	11	4	−6	92	15	15	15	10	2	0
97	C	9	71	W	5	60	0	10	15	8	−12	91	15	15	11	12	0	2
98	C	9	71	W	5	57	0	15	11	4	−21	91	15	15	11	12	5	0
99	C	9	71	W	3	50	0	5	16	4	3	87	15	15	16	12	4	3
100	C	9	72	W	3	64	5	10	15	4	−2	85	15	15	14	8	2	4
101	C	9	72	W	5	61	10	5	10	8	−7	83	15	15	11	10	5	0
102	C	9	72	W	5	62	10	5	11	8	−6	84	15	15	12	10	3	0
103	C	9	75	W	5	36	0	0	12	4	−14	85	15	15	14	8	6	0
104	C	9	51	M	3	62	5	5	12	8	−5	75	15	10	10	10	−1	3
105	C	9	69	M	2	57	0	10	14	4	−4	80	15	15	11	8	6	0
106	C	9	71	W	5	58	5	10	10	8	−4	88	15	15	11	10	−2	6
107	C	9	61	W	5	57	0	10	12	8	−6	94	15	15	16	10	2	2
108	C	9	61	W	3	61	0	10	12	8	1	94	15	15	16	10	10	1
109	C	9	64	M	3	47	0	0	15	4	4	92	15	5	12	12	6	1
110	C	9	64	M	3	24	0	0	11	4	7	82	15	15	12	12	4	2
111	D	4	66	W	5	53	5	10	7	8	−10	80	15	15	11	8	6	5
112	D	4	66	W	5	50	5	10	8	8	−12	80	15	15	11	8	2	5
113	D	1	74	W	5	65	5	10	12	8	−8	83	10	10	13	10	5	4
114	C	9	73	W	5	50	0	10	12	8	−15	81	15	15	12	10	2	1
115	F	<1	73	W	5	57	0	10	14	8	−13	0	0	0	0	0	0	?
116	C	9	72	W	5	54	0	10	10	8	−15	89	15	15	11	8	5	3
117	C	9	72	W	5	66	5	10	13	8	−12	84	15	15	11	8	7	2
118	C	9	57	W	3	47	0	5	13	4	−5	90	15	15	13	12	4	0
119	L	3	77	M	4	50	0	5	11	8	−5	88	15	15	11	12	4	0
120	D	<1	71	W	3	62	5	15	14	4	−2	?	?	?	?	?	?	?
121	C	9	75	W	3	47	0	10	13	4	−7	83	15	15	14	10	0	0
122	C	9	74	W	5	53	0	10	9	4	−12	86	15	15	14	10	1	0
123	C	9	58	M	5	66	5	10	14	10	21	98	15	15	16	12	6	4
124	L	3	73	W	5	61	5	5	13	8	−5	60	0	5	14	8	3	0
125	C	9	75	W	5	48	0	5	8	10	−13	81	15	15	12	8	8	0
126	C	9	71	W	3	66	5	5	16	8	−4	98	15	15	18	10	6	2
127	C	9	71	W	3	54	0	5	14	8	2	85	15	15	15	10	9	1
128	L	2	80	W	5	59	0	10	14	8	−5	78	10	15	11	10	2	4
129	C	9	75	W	5	51	0	5	13	8	−12	93	15	15	15	10	4	1
130	C	9	60	W	3	57	0	15	15	10	−7	67	5	10	15	10	4	0
131	C	9	60	W	3	78	5	0	18	8	−6	67	5	10	15	10	4	0
132	C	11	69	W	5	55	5	5	15	8	−5	84	15	10	11	10	4	5
133	C	9	55	M	3	56	5	5	10	4	2	92	15	15	10	12	7	4
134	C	9	76	W	4	42	0	5	10	4	−20	83	15	15	11	8	5	0
135	C	9	71	W	5	54	0	15	13	4	12	66	5	10	14	8	1	5
136	C	9	62	M	3	59	0	5	15	8	−1	81	15	15	15	10	4	0
137	D	<1	74	W	4	54	0	5	14	8	1	?	?	?	?	?	?	?
138	D	1	71	W	5	58	0	10	11	8	−3	81	15	15	12	10	3	4

A Case
B Termination reason
- C completed the study
- D died
- F failure
- L lost to follow-up

C Follow-up, years
D Age
E Sex: M man, W woman

Preoperatiavely
F Ahlbäck arthrosis stage
G Total score (HSS)
H Functional pain score (HSS)
I Pain at rest score (HSS)
J Range of motion (HSS)
K Walking ability (HSS)
L Joint alignment in degrees
- − varus
- + valgus

Latest follow-up
M Total score (HSS)
N Functional pain score (HSS)
O Pain at rest score (HSS)
P Range of motion (HSS)
Q Walking ability (HSS)
R Joint alignment in degrees
- − varus
- + valgus

S Radiolucency score
? Missing data

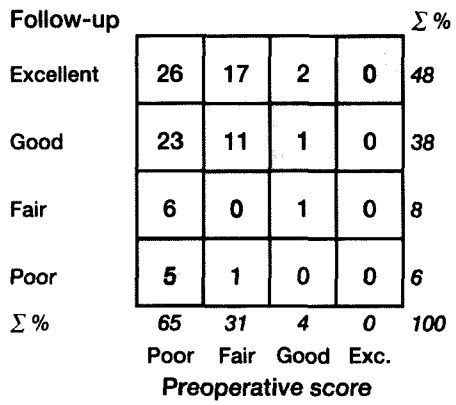

Figure 1. Distribution of the knees according to HSS total score subgroups preoperatively and at latest follow-up. The sum of the rows/columns are expressed as percentages of the total number of knees (N 93). Hatched area represents unchanged status.

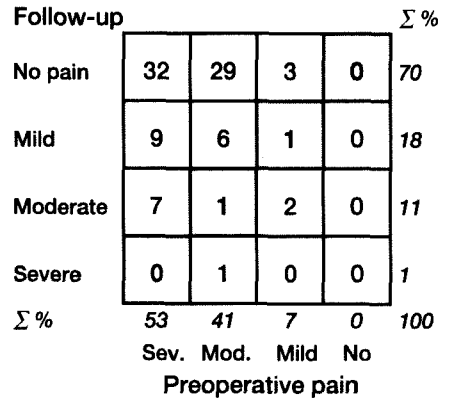

Figure 2. Distribution of the knees according to functional pain intensity preoperatively and at latest follow-up. The sum of the rows/columns are expressed as percentages of the total number of knees (N 91). Hatched area represents unchanged status.

tibial components; a radiolucency score higher than 4 was considered significant. Furthermore, the radiographs were analyzed for tibiofemoral alignment and tilting of the tibial component. All radiographs were analyzed by the same 2 surgeons from the investigating team, working together.

1 knee was Ahlbäck Grade I, 2 knees were Grade II, 46 knees were Grade III, 18 knees were Grade IV, and 71 knees were Grade V. Median preoperative HSS-score was 57 (24–78) points. Median range of motion preoperatively was 104° (40°–145°). Revised prostheses were rated poor and were withdrawn from the detailed evaluation. The median of the tibio-femoral alignment was 4° of varus (range 21° of valgus to 25° of varus). There were 6 knees in valgus deformity (> 10° of tibiofemoral valgus) of which 4 were in patients with coxarthrosis, 21 knees were within normal alignment (3°–10° tibiofemoral valgus), and the rest were in varus deformity.

Adiposity was considered as a potential factor in determining the outcome. The patients' body weight in kilograms (W) and height in meters (H) at the time of surgery were recorded, and a body mass index was defined as W/H2. Adiposity was defined as body mass index ≥ 28 (Quaade et al. 1986). Median body mass index was 28 (21–38).

Spearman's test was used for the correlation analysis, and analysis of variance (repeated measures) was performed on 1-, 5-, and 10-year's HSS-scores (including differentiated HSS-scores for pain, walking ability, and range of motion). A *P*-value less than 0.05 was considered significant.

Results

Cases that completed the study (9–11 years)

At the latest follow-up, 85 knees (91 percent) scored higher than before surgery (Figure 1). The poor group consisted of 4 knees where the patients had unexplained moderate functional pain, and of 2 knees that underwent arthrodesis because of deep infection. At the latest follow-up, the median HSS-score was 84 (0–98) points. No symptomatic mechanical loosenings were observed. The crude prosthetic survival rate was thus 98 percent. If we consider the prostheses rated poor as failures, then the survival rate was 94 percent. A lower total HSS-score was found at 10 years compared to at 1 and 5 years (Analysis of variance; *P* 0.004). The difference between the HSS-score at 1 and 10 years was significant (*P* 0.03), while the difference was not significant either between 1- and 5-year status or between 5- and 10-year status. No correlation was found between the total score and the body mass index.

At the latest follow-up, 93 percent of the patients had less functional pain compared to preoperatively (Figure 2) and 81 percent had less pain at rest (Figure 3).

62 percent of the patients were able to walk longer than 500 m at the latest follow-up (14 percent preoperatively). 16 of the 27 patients who could walk less than 500 m had reasons for walking limitation other than functional pain in the operated knee (e.g., cardiopulmonary disease, vertigo, or disease of other joints of the lower limbs). 8 patients had both moderate functional pain and other reasons for walking limitation. 1 patient had severe functional pain and no other reason for walking limitation. 2 cases had unexplained limited

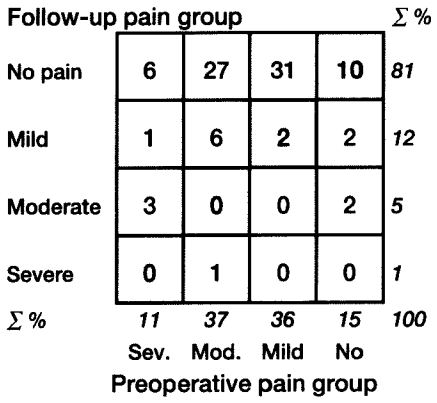

Figure 3. Distribution of the knees according to intensity of pain at rest preoperatively and at latest follow-up. The sum of the rows/columns are expressed as percentages of the total number of knees (N 91). Hatched area represents unchanged status.

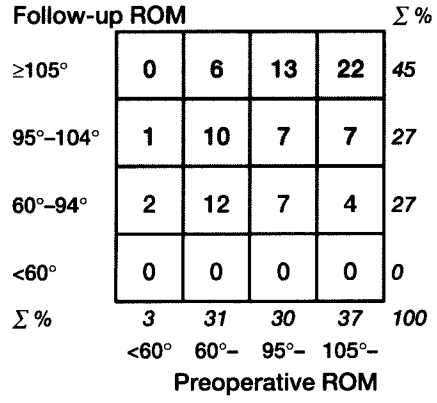

Figure 4. Distribution of the knees according to range of motion preoperatively and at latest follow-up. The sum of the rows/columns are expressed as percentages of the total number of knees (N 91). Hatched area represents acceptable range of motion.

walking ability. Analysis of variance showed a lower HSS-score for walking ability at the 10-year follow-up ($P < 0.0001$). The difference at 1 and 10 years was significant ($P < 0.0001$), while no difference was found either between 1- and 5-year status or between 5- and 10-year status.

A functionally acceptable range of motion (≥ 95°) was found in 73 percent (Figure 4). The remaining knees had a range of motion between 60° and 94°. The median range of motion at latest follow-up was 104° (65°–145°). Analysis of variance showed a lesser range of motion at 10 years ($P < 0.0001$). The difference between 1- and 10-year status was significant (P 0.02), while no difference was found between either 1- and 5-year status or between 5- and 10-year status. At the latest follow-up, 89 percent of the knees were stable. The remaining knees had a 6°–15° instability.

Radiographical analysis

The median of the tibiofemoral alignment was 4° of valgus (range 10° valgus to 5° varus). There were 65 cases hin normal alignment (3°–10° of valgus) and 26 knees were in varus alignment (< 3° of valgus). The median of the tilt of the tibial component was 2° medially in the frontal view (range 7° medially to 3° laterally) and 0° in the side view (range 5° posteriorly and 10° anteriorly).

Radiolucency scores > 4 points were found in 14 tibial components. None of these patients complained of severe functional pain. The total HSS-score had a significant negative correlation to the radiolucency score (r –0.28, $P < 0.01$). A positive correlation was found between the intensity of the residual functional pain and the radiolucency score measured beneath the tibial component (r 0.35, $P < 0.001$). No correlation was found between the radiolucency score and the pain score at rest. No correlation was found between the radiolucency score and the tibiofemoral alignment or the tilt of the tibial component, regardless of the direction of the tilt. The combination of malalignment and malpositioned tibial component had no influence on the occurrence of the radiolucency score beneath the tibial component (Fischer's test). No correlation was found between the total HSS-score and the tibial tilt or the tibiofemoral alignment. The radiolucency score did not correlate with the body mass index.

Latest follow-up status in the withdrawals

3 patients died within the first postoperative year, leaving 42 cases with an available HSS-score. Median follow-up time was 4 (0–8) years. Median HSS-score was 84 (0–97) points at the latest follow-up. 1 case was revised due to aseptic loosening 8 years postoperatively. 38 cases had no or mild functional pain, 2 cases had moderate functional pain and 1 case had severe functional pain. Corresponding figures for pain at rest were 38, 2, and 1. Median range of motion was 95° (65°–130°). 25 patients were able to walk over 500 m, 12 patients were able to walk 500 m or less, of whom 8 patients had other reasons for walking limitation. A normal tibiofemoral alignment was found in 33 cases, 7 cases were in slight varus, and 1 case was in valgus. Significant radiolucency score beneath the tibial component was found in 8 cases. None of these had severe residual pain (apart from the one which was revised).

Complications

A total of 9 serious complications was registered (7 percent), but none was fatal. There were 2 cases of pulmonary embolism and one case of prolonged Sudeck's atrophy. All 3 cases recovered completely. 2 cases of patellar fracture, 1 treated with patellectomy due to osteonecrosis and the other treated conservatively, were rated fair and excellent, respectively, at latest follow-up. 1 case of supracondylar femoral fracture treated with osteosynthesis, was rated fair at the latest follow-up. All fractures were due to relevant trauma; no femoral notching was present. Furthermore, in 2 cases arthrodesis was performed 3 and 4 months postoperatively due to deep infection, and in 1 case revision arthroplasty was performed 8 years postoperatively because of aseptic loosening.

Discussion

The overall results of our series of TKA at 9–11 years follow-up agree with those reported by several other authors (Goldberg et al. 1988, Vince et al. 1989, Gill and Mills 1991). The prosthesis achieved the main goal of knee reconstruction, viz., pain relief. A positive correlation between the intensity of the residual functional pain and the radiolucency score is rarely reported (Nafei et. al 1992). The finding suggests that a radiographic follow-up examination is only indicated only in patients complaining of functional pain, or else for research purposes.

The outcome of range of motion in our material was compared with those reported for other prosthetic designs (Insall et al. 1982, Insall 1988, Buechel and Pappas 1989, Whiteside 1989, Wright et al. 1990, Cloutier and Sabouret 1991) and was found to be slightly inferior to designs preserving or substituting for the cruciate ligaments. This finding can be explained by the fact that the prosthetic design used has a built-in anteroposterior stability at the expense of both cruciate ligaments. Therefore, the gain in range of motion will depend primarily on the preoperative status, i.e., knees with a severely impaired range of motion will gain considerably from the operation, while knees with a good range of motion may lose motion postoperatively.

Only a few papers have been published allowing comparison of the long-term survival of cemented and non-cemented knee prostheses (Albrektsson and Herberts 1988, Scuderi et al. 1989). These reports suggest a certain superiority of the cemented technique (Gill and Mills 1991).

Several authors (Lotke and Ecker 1977, Hvid and Nielsen 1984, Ecker et al. 1987, Kjærsgaard-Andersen et al. 1989) have suggested or proved a correlation between radiolucency score and varus malalignment and/or malposition of the tibial component. In our series, there was no correlation between these parameters. This may be explained by the fact that the above-mentioned parameters in our material were within or very close to the acceptable interval in the majority of the cases. However, the intensity of the residual functional pain correlated with the radiolucency score measured beneath the tibial components.

Hungerford and Krackow (1984) mentioned obesity as one of the important factors leading to mechanical loosening of the prosthesis. This is in conflict with the results of this study and with the findings by Scuderi et al. (1989), perhaps reflecting that body weight correlates positively with bone strength (Hvid 1988). The gradual deterioration of the outcome (HSS-score) with time was mainly due to decreasing walking ability and range of motion.

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