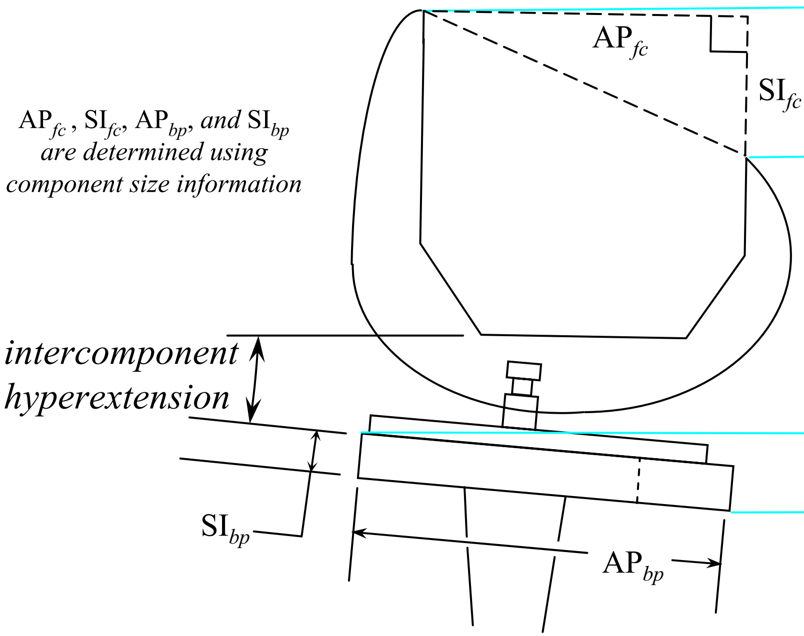
Table E1 Background Data and Radiographic Prevalences of Osteolysis at Five to Ten Years in the Three Hundred and Sixty-five Knees Treated with Primary Total Knee Arthroplasty

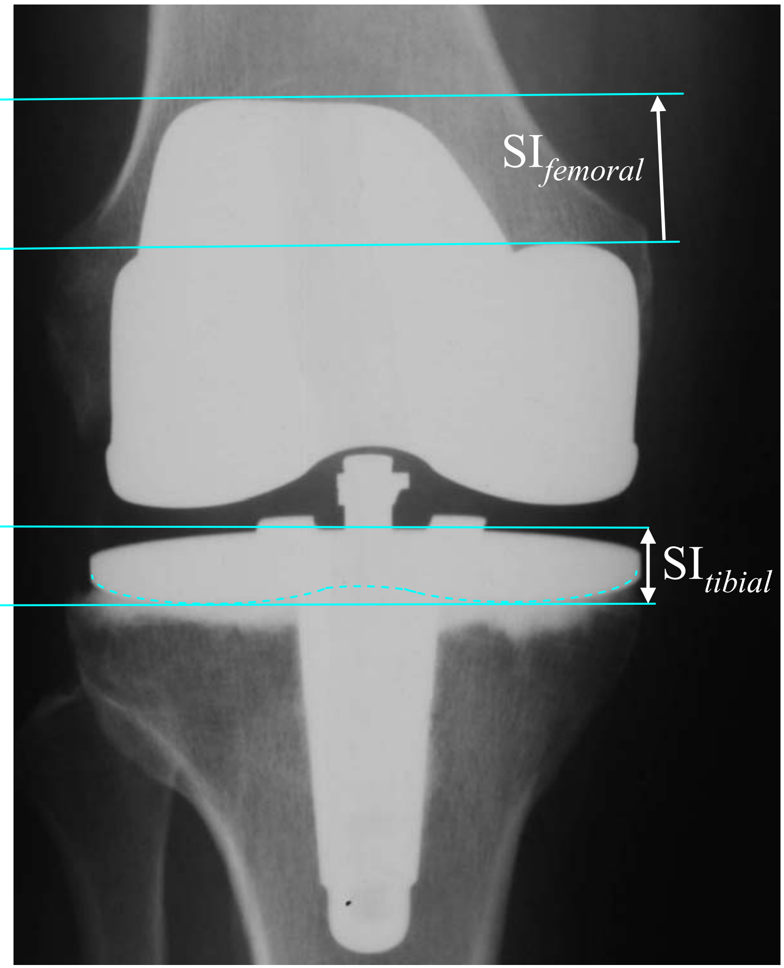
	Baseplate with Grit-Blasted Proximal Surface Finish (R_a = 1.0 µm*)		Baseplate with Polished Proximal Surface Finish (R_a < 0.1 µm*)		
	Insert Sterilized with Ethylene-Oxide	Insert Gamma-Irradiated in Air	Insert Gamma-Irradiated in Air	Insert Sterilized with Ethylene-Oxide	Insert Sterilized with Gas Plasma
Years of operations	1987	1987-1993	1992-1996	1993-1996	1996-1998
Number of knees	4	242	21	54	44
Patient gender	3 female 1 male	156 female 86 male	11 female 10 male	23 female 31 male	21 female 23 male
Patient age at arthroplasty†, years	65 ± 14 (50 to 83)	68 ± 8 (36 to 87)	67 ± 6 (59 to 80)	69 ± 15 (55 to 81)	64 ± 8 (45 to 79)
Patient weight†, kg	78 ± 19 (52 to 95)	83 ± 16 (48 to 136)	80 ± 11 (48 to 100)	85 ± 15 (45 to 118)	87 ± 16 (55 to 125)
Osteoarthritis type	4 varus	186 varus 56 valgus	18 varus 3 valgus	42 varus 12 valgus	35 varus 9 valgus
Insert-forming method, machined from:‡	4 CMS412	24 CMS1900 108 CMS412 1 REB412 56 CMS415 53 REB415	2 CMS1900 3 CMS412 4 CMS415 12 REB415	1 CMS415 53 REB415	40 REB415 4 REB1050
Insert shelf age, years	0.0	0.9 ± 0.9 (0.0 to 5.4)	2.6 ± 2.3 (0.1 to 7.1)	0.5 ± 0.5 (0.0 to 1.7)	0.5 ± 0.3 (0.1 to 1.8)
Insert initial thickness†, mm	6 ± 2 (4 to 8)	7 ± 2 (4 to 14)	8 ± 1 (6 to 10)	8 ± 1 (6 to 12)	9 ± 1 (6 to 12)
Tibial and femoral component fixation method§	2 hybrid 2 cementless	57 cemented 180 hybrid 5 cementless	13 cemented 8 hybrid	52 cemented 2 hybrid	44 cemented
Medialization of postoperative mechanical axis relative to center of tibial component†, mm	-6 ± 7 (-13 to +2)	1 ± 10 (-34 to +30)	-1 ± 12 (-29 to +26)	-1 ± 10 (-27 to +19)	2 ± 8 (-22 to +19)
Hyperextension of femoral component relative to tibial component†, °	2 ± 6 (-5 to +7)	3 ± 8 (-24 to +24)	6 ± 6 (-5 to +18)	5 ± 9 (-22 to +21)	11 ± 7 (-8 to +23)
Years from surgery to date when reviewed radiographs were made†	8 ± 2 (5 to 9)	8 ± 1 (5 to 10)	8 ± 1 (5 to 10)	8 ± 1 (5 to 9)	6 ± 1 (5 to 8)
Prevalence of osteolysis					
Positive	25% (1/4)	34% (82/242)	33% (7/21)	6% (3/54)	14% (6/44)
Questionable	50% (2/4)	20% (48/242)	10% (2/21)	15% (8/54)	14% (6/44)
Negative	25% (1/4)	46% (112/242)	57% (12/21)	80% (43/54)	73% (32/44)

*R_a = average roughness. †The data are presented as the mean and standard deviation, with the range in parentheses. ‡CMS1900 = compression molded sheet 1900 resin, CMS412 = compression molded sheet 412 resin, REB412 = ram-extruded bar 412 resin, CMS415 = compression molded sheet 415 resin, REB415 = ram-extruded bar 415 resin, REB1050 = ram-extruded bar 1050 resin. §Hybrid tibial and femoral component fixation connotes that only the tibial component was fixed with use of cement.

$$\textit{femoral component posterior tilt} = \sin^{-1}\left(\frac{\dfrac{SI_{femoral}}{magnification}}{\sqrt{AP_{fc}^{2} + SI_{fc}^{2}}}\right) - \tan^{-1}\left(\frac{SI_{fc}}{AP_{fc}}\right)$$

($SI_{femoral}$ is negative in sign when the axis illustrated through the component posterior condyles projects superior to the highest point on the trochlea)





$$\textit{baseplate posterior tilt} = \pm\sin^{-1}\left(\frac{\dfrac{SI_{tibial}}{magnification} - SI_{bp}}{AP_{bp}}\right)$$

(baseplate posterior tilt is negative in sign when the posterior cruciate cutout projects onto the upper half of the baseplate surface shadow)

intercomponent hyperextension = baseplate posterior tilt - femoral component posterior tilt

Fig. E-1

Method used to calculate the angle of hyperextension between the femoral component and the tibial component from the anteroposterior radiograph. As illustrated in the schematic at the left, the trigonometric method effectively determines how each implant is rotated relative to the tube and then relates the orientation of the two implants to each other. The radiographic magnification factor is determined with use of the projected and true diameters of the cylindrical insert locking pin. In this example, $SI_{femoral}$ and baseplate posterior tilt are each positive in sign. fc = femoral component and bp = baseplate.