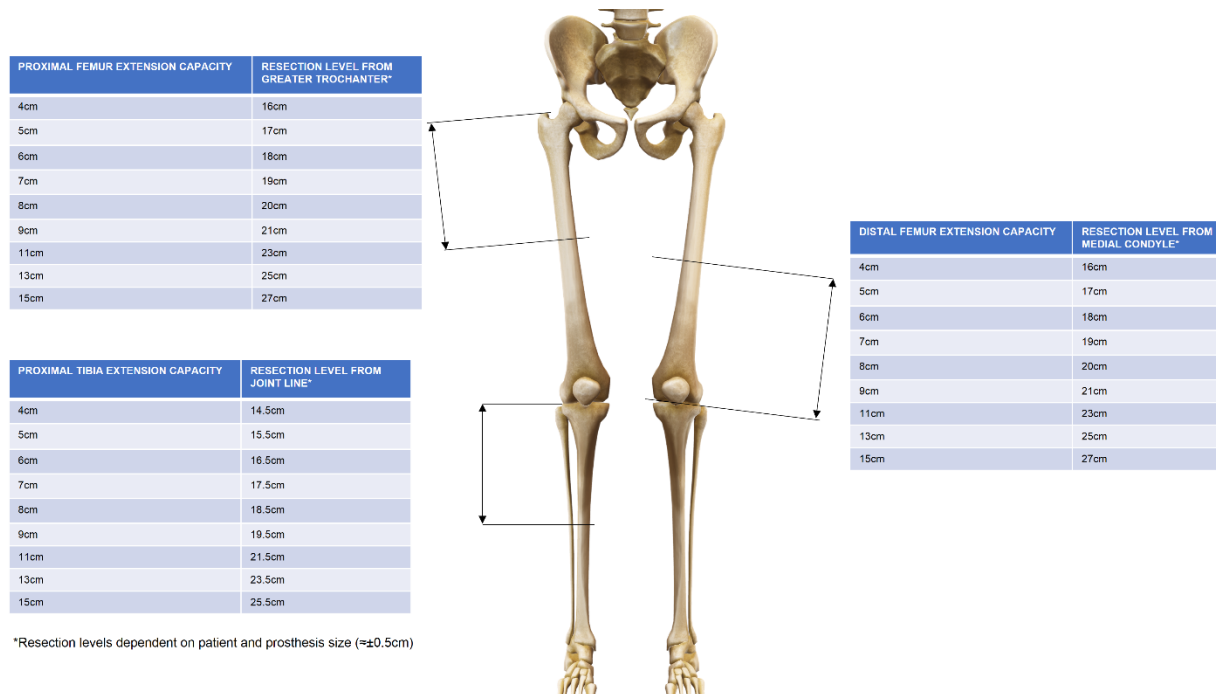


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Supplementary Figure 1 Minimal resections for achievable lengthening in non-invasive type prostheses

Supplementary Table 1. Details of Patients Who Required Revision Surgery\*

Patient #	Part	Sex	Age at EPR	Last Follow-up Status	Type of Prosthesis	Diagnosis	Met at Diagnosis	Surgical Margin	Follow-up Duration (years)	First Event in Revision-Free Survival	No. of Revision Surgeries	First Event in Endoprosthetic Failures-Free Survival	Amputation	Cause of Amputation
1	Distal femur	Male	12	CDF	Non-invasive	Osteosarcoma	No	Marginal	12	Aspheric loosening	1	Aspheric loosening	No	
2	Distal femur	Male	10	CDF	Non-invasive	Osteosarcoma	No	Wide	11	Extension mechanism jamming	1	Extension mechanism jamming	No	
3	Distal femur	Male	11	NED	Non-invasive	Osteosarcoma	Yes	Marginal	13	Prosthesis fracture and breakage	2	Prosthesis fracture and breakage	No	
4	Distal femur	Male	13	CDF	Non-invasive	Osteosarcoma	No	Marginal	12	Aspheric loosening	1	Aspheric loosening	No	
5	Distal femur	Female	13	NED	Non-invasive	Osteosarcoma	Yes	Marginal	13	Aspheric loosening	2	Aspheric loosening	No	
6	Distal femur	Male	11	CDF	Non-invasive	Osteosarcoma	No	Marginal	16	Infection	2	Infection	No	
7	Distal femur	Male	6	CDF	Minimally invasive	Osteosarcoma	No	Wide	11	Prosthesis fracture and breakage	2	Prosthesis fracture and breakage	No	
8	Distal femur	Male	9	CDF	Minimally invasive	Osteosarcoma	No	Marginal	13	Prosthesis fracture and breakage	4	Prosthesis fracture and breakage	No	
9	Distal femur	Female	11	CDF	Minimally invasive	Osteosarcoma	No	Wide	13	Bushing wear	1	Bushing wear	No	
10	Distal femur	Female	10	CDF	Minimally invasive	Osteosarcoma	No	Wide	15	Aspheric loosening	1	Aspheric loosening	No	
11	Distal femur	Male	7	CDF	Minimally invasive	Osteosarcoma	No	Marginal	7	Patellar subluxation and aspheric loosening	1	Patellar subluxation	No	
12	Distal femur	Male	8	CDF	Minimally invasive	Pleomorphic sarcoma	No	Wide	15	Prosthesis fracture and breakage	3	Prosthesis fracture and breakage	No	
13	Distal femur	Male	10	CDF	Minimally invasive	Osteosarcoma	No	Marginal	19	Extension mechanism jamming	1	Extension mechanism jamming	No	
14	Distal femur	Male	6	NED	Minimally invasive	Ewing sarcoma	No	Marginal	17	Aspheric loosening	1	Aspheric loosening	No	
15	Distal femur	Male	15	DOD	Minimally invasive	Osteosarcoma	No	Marginal	13	Local recurrence	3	Local recurrence	Yes	Local recurrence
16	Distal femur	Female	6	DOD	Minimally invasive	Ewing sarcoma	No	Wide	18	Extension mechanism jamming	3	Extension mechanism jamming	No	
17	Distal femur	Female	5	CDF	Minimally invasive	Osteosarcoma	No	Wide	14	Extension mechanism jamming	1	Extension mechanism jamming	No	
18	Distal femur	Female	7	NED	Minimally invasive	Osteosarcoma	No	Wide	15	Local recurrence	1	Local recurrence	Yes	Local recurrence
19	Distal femur	Male	11	CDF	Minimally invasive	Ewing sarcoma	No	Wide	15	Aspheric loosening	3	Aspheric loosening	No	
20	Distal femur	Female	7	DOD	Minimally invasive	Osteosarcoma	No	Wide	14	Aspheric loosening	1	Restricted range of motion	No	
21	Distal femur	Male	6	CDF	Minimally invasive	Osteosarcoma	No	Marginal	21	Periprosthetic fracture	2	Periprosthetic fracture	No	
22	Distal femur	Male	6	CDF	Minimally invasive	Osteosarcoma	No	Marginal	21	Infection	5	Infection	No	
23	Distal femur	Male	11	NED	Minimally invasive	Osteosarcoma	No	Wide	14	Infection	6	Infection	No	
24	Distal femur	Female	4	CDF	Minimally invasive	Osteosarcoma	No	Wide	24	Prosthesis fracture and breakage	3	Prosthesis fracture and breakage	No	
25	Distal femur	Male	11	NED	Minimally invasive	Osteosarcoma	No	Wide	18	Aspheric loosening	1	Aspheric loosening	No	
26	Distal femur	Female	6	NED	Minimally invasive	Osteosarcoma	No	Wide	17	Local recurrence	1	Local recurrence	Yes	Local recurrence
27	Distal femur	Male	8	NED	Minimally invasive	Osteosarcoma	No	Intralesional	25	Extension mechanism jamming	5	Extension mechanism jamming	No	
28	Distal femur	Male	11	CDF	Minimally invasive	Osteosarcoma	No	Marginal	24	Prosthesis fracture and breakage	2	Prosthesis fracture and breakage	No	
29	Distal femur	Female	7	CDF	Minimally invasive	Osteosarcoma	No	N/A	23	Maximum lengthening	1	Maximum lengthening	No	
30	Distal femur	Male	8	CDF	Minimally invasive	Osteosarcoma	No	Marginal	20	Bushing wear	3	Bushing wear	No	
31	Distal femur	Male	11	NED	C-collar	Osteosarcoma	No	Wide	20	Prosthesis fracture and breakage	1	Prosthesis fracture and breakage	No	
32	Distal femur	Female	8	CDF	C-collar	Osteosarcoma	No	Wide	20	Aspheric loosening	3	Aspheric loosening	No	
33	Distal femur	Female	11	CDF	C-collar	Osteosarcoma	No	Wide	15	Bushing wear	2	Bushing wear	No	
34	Distal femur	Male	13	CDF	C-collar	Osteosarcoma	No	Wide	27	Prosthesis fracture and breakage	3	Prosthesis fracture and breakage	No	
35	Distal femur	Male	5	CDF	C-collar	Osteosarcoma	No	Wide	24	Infection	6	Infection	No	
36	Distal femur	Male	10	CDF	C-collar	Osteosarcoma	No	Wide	26	Aspheric loosening	5	Aspheric loosening	No	
37	Distal femur	Female	7	CDF	C-collar	Osteosarcoma	No	Wide	29	Prosthesis fracture and breakage	3	Prosthesis fracture and breakage	No	
38	Distal femur	Male	12	CDF	C-collar	Osteosarcoma	No	Marginal	26	Prosthesis fracture and breakage	3	Prosthesis fracture and breakage	No	
39	Distal femur	Female	6	CDF	C-collar	Osteosarcoma	No	Marginal	30	Aspheric loosening	2	Aspheric loosening	No	
40	Distal femur	Male	7	CDF	C-collar	Ewing sarcoma	No	N/A	20	Prosthesis fracture and breakage	1	Restricted range of motion	No	
41	Distal femur	Female	11	CDF	C-collar	Osteosarcoma	No	Wide	30	Infection	3	Restricted range of motion	No	
42	Distal femur	Male	9	CDF	C-collar	Ewing sarcoma	No	Wide	31	Bushing wear	5	Bushing wear	No	
43	Distal femur	Male	7	CDF	C-collar	Osteosarcoma	No	Wide	16	Aspheric loosening	3	Aspheric loosening	No	
44	Distal femur	Male	10	CDF	C-collar	Osteosarcoma	No	Wide	31	Periprosthetic fracture	6	Periprosthetic fracture	No	
45	Distal femur	Male	12	CDF	C-collar	Osteosarcoma	No	Marginal	31	Aspheric loosening	3	Aspheric loosening	No	
46	Distal femur	Female	7	NED	Ball bearing	Osteosarcoma	No	Wide	25	Infection	1	Infection	Yes	Infection
47	Distal femur	Female	7	CDF	Ball bearing	Osteosarcoma	No	Wide	32	Aspheric loosening	3	Aspheric loosening	No	
48	Distal femur	Male	16	CDF	Ball bearing	Pleomorphic sarcoma	No	Wide	33	Aspheric loosening	5	Aspheric loosening	No	
49	Distal femur	Male	7	CDF	Ball bearing	Osteosarcoma	No	Wide	29	Aspheric loosening	1	Aspheric loosening	No	
50	Distal femur	Male	13	CDF	Ball bearing	Osteosarcoma	No	Wide	31	Aspheric loosening	3	Aspheric loosening	Yes	Infection
51	Distal femur	Male	11	CDF	Ball bearing	Osteosarcoma	No	Wide	32	Aspheric loosening	4	Aspheric loosening	No	
52	Distal femur	Male	11	CDF	Ball bearing	Osteosarcoma	No	Wide	34	Infection	6	Infection	No	
53	Distal femur	Male	12	CDF	Ball bearing	Osteosarcoma	No	Wide	34	Restricted range of motion and conversion to adult type	3	Restricted range of motion	No	
54	Distal femur	Male	12	CDF	Ball bearing	Osteosarcoma	No	Wide	30	Extension mechanism jamming	2	Extension mechanism jamming	No	
55	Distal femur	Male	9	CDF	Ball bearing	Ewing sarcoma	No	Wide	35	Aspheric loosening	3	Aspheric loosening	No	
56	Distal femur	Female	11	CDF	Ball bearing	Osteosarcoma	No	Wide	34	Aspheric loosening	3	Aspheric loosening	No	
57	Distal femur	Female	8	CDF	Ball bearing	Ewing sarcoma	No	Wide	35	Extension mechanism jamming	4	Extension mechanism jamming	No	
58	Distal femur	Male	11	CDF	Ball bearing	Osteosarcoma	No	Marginal	33	Aspheric loosening	4	Aspheric loosening	No	
59	Distal femur	Female	10	DOOD	Ball bearing	Osteosarcoma	No	Wide	36	Aspheric loosening	3	Aspheric loosening	No	
60	Proximal femur	Male	8	CDF	Non-invasive	Ewing sarcoma	No	Wide	14	Extension mechanism jamming	1	Subluxation of hip joint	No	
61	Proximal femur	Female	9	CDF	Minimally invasive	Ewing sarcoma	No	Wide	24	Aspheric loosening	2	Aspheric loosening	No	
62	Proximal femur	Female	6	CDF	Minimally invasive	Ewing sarcoma	No	Wide	23	Extension mechanism jamming	1	Subluxation of hip joint	No	
63	Proximal femur	Female	8	CDF	Minimally invasive	Ewing sarcoma	No	Wide	17	Maximum lengthening	2	Subluxation of hip joint	No	
64	Proximal femur	Female	5	AWD	Minimally invasive	Ewing sarcoma	Yes	Marginal	12	Maximum lengthening	2	Subluxation of hip joint	No	
65	Proximal femur	Female	5	CDF	Minimally invasive	Ewing sarcoma	No	Wide	10	Periprosthetic fracture	2	Subluxation of hip joint	No	
66	Proximal femur	Male	6	CDF	C-collar	Ewing sarcoma	No	N/A	32	Aspheric loosening	7	Aspheric loosening	No	
67	Proximal femur	Male	6	CDF	C-collar	Ewing sarcoma	No	N/A	28	Infection	4	Infection	Yes	Infection
68	Proximal femur	Female	2	CDF	C-collar	Ewing sarcoma	No	N/A	20	Infection	3	Subluxation of hip joint	No	
69	Proximal tibia	Male	11	CDF	Non-invasive	Ewing sarcoma	No	Wide	18	Bushing wear	2	Bushing wear	No	
70	Proximal tibia	Male	7	CDF	Minimally invasive	Osteosarcoma	No	Wide	21	Aspheric loosening	3	Aspheric loosening	No	
71	Proximal tibia	Male	13	CDF	Minimally invasive	Osteosarcoma	No	Wide	12	Extension mechanism jamming	3	Extension mechanism jamming	No	
72	Proximal tibia	Male	8	CDF	Minimally invasive	Osteosarcoma	No	Wide	11	Aspheric loosening	3	Aspheric loosening	No	
73	Proximal tibia	Female	9	CDF	Minimally invasive	Osteosarcoma	No	Wide	15	Extension mechanism jamming	6	Extension mechanism jamming	No	
74	Proximal tibia	Male	12	NED	Minimally invasive	Osteosarcoma	No	Wide	21	Infection	3	Infection	No	
75	Proximal tibia	Female	9	CDF	Minimally invasive	Osteosarcoma	No	Marginal	14	Extension mechanism jamming	1	Restricted range of motion	No	
76	Proximal tibia	Male	11	NED	Minimally invasive	Osteosarcoma	No	N/A	13	Aspheric loosening	2	Aspheric loosening	Yes	Local recurrence
77	Proximal tibia	Male	13	AED	Minimally invasive	Osteosarcoma	No	Marginal	14	Aspheric loosening	1	Aspheric loosening	No	
78	Proximal tibia	Male	13	CDF	Minimally invasive	Osteosarcoma	No	Wide	11	Infection	2	Infection	No	
79	Proximal tibia	Male	13	CDF	Minimally invasive	Osteosarcoma	No	N/A	13	Aspheric loosening	1	Anterior knee pain, patellar subluxation	No	

80	Proximal tibia	Female	6	CDF	Minimally invasive	Osteosarcoma	No	N/A	13	Maximum lengthening	1	Restricted range of motion	No	
81	Proximal tibia	Male	12	NED	Minimally invasive	Osteosarcoma	Yes	Marginal	12	Infection	3	Infection	Yes	Infection
82	Proximal tibia	Male	8	CDF	Minimally invasive	Ewing sarcoma	No	Wide	10	Extension mechanism jamming	4	Restricted range of motion	Yes	Infection
83	Proximal tibia	Female	5	NED	Minimally invasive	Osteosarcoma	No	Wide	26	Aseptic loosening	5	Aseptic loosening	No	
84	Proximal tibia	Male	13	CDF	C-collar	Osteosarcoma	No	Wide	21	Infection	4	Infection	No	
85	Proximal tibia	Male	9	CDF	C-collar	Ewing sarcoma	No	Wide	29	Infection	3	Infection	No	
86	Proximal tibia	Female	5	CDF	C-collar	Osteosarcoma	No	Wide	26	Aseptic loosening	2	Aseptic loosening	No	
87	Proximal tibia	Male	11	CDF	C-collar	Osteosarcoma	No	Wide	27	Bushing wear	3	Bushing wear	No	
88	Proximal tibia	Male	8	DOD	C-collar	Ewing sarcoma	No	Wide	10	Infection	2	Infection	Yes	Infection
89	Proximal tibia	Male	12	NED	C-collar	Osteosarcoma	No	Marginal	14	Local recurrence	1	Local recurrence	Yes	Local recurrence
90	Proximal tibia	Male	8	CDF	C-collar	Osteosarcoma	No	Wide	17	Aseptic loosening	1	Aseptic loosening	No	
91	Proximal tibia	Female	11	DOD	C-collar	Osteosarcoma	Yes	Wide	15	Aseptic loosening	2	Aseptic loosening	No	
92	Proximal tibia	Female	10	CDF	C-collar	Osteosarcoma	No	Wide	27	Prosthesis fracture and breakage	2	Prosthesis fracture and breakage	No	
93	Proximal tibia	Male	10	CDF	ball bearing	Osteosarcoma	No	Wide	35	Aseptic loosening	3	Aseptic loosening	No	
94	Proximal tibia	Male	12	CDF	ball bearing	Pleomorphic sarcoma	No	Wide	32	Infection	3	Infection	No	
95	Proximal tibia	Female	8	CDF	ball bearing	Osteosarcoma	No	Wide	32	Periprosthetic fracture	5	Periprosthetic fracture	No	
96	Proximal tibia	Female	6	CDF	ball bearing	Osteosarcoma	No	Wide	21	Aseptic loosening	1	Aseptic loosening	No	
97	Proximal humerus	Female	7	CDF	Minimally invasive	Ewing sarcoma	No	Intralesional	10	Aseptic loosening	2	Aseptic loosening	No	
98	Proximal humerus	Male	9	AWD	Minimally invasive	Osteosarcoma	No	Wide	21	Infection	2	Infection	No	
99	Proximal humerus	Male	10	CDF	Minimally invasive	Osteosarcoma	No	Wide	20	Periprosthetic fracture	1	Periprosthetic fracture	No	
100	Proximal humerus	Male	7	CDF	C-collar	Ewing sarcoma	No	Wide	10	Aseptic loosening	1	Aseptic loosening	No	
101	Proximal humerus	Male	10	DOOD	Ball bearing	Osteosarcoma	No	Wide	32	Aseptic loosening	2	Aseptic loosening	No	

\*NED = no evidence of disease, AWD = alive with disease, DOD = die of disease, DOOD = die of other disease, and N/A = not available.