

Supplementary Table 1 Literature review of total femur replacement in tumor cases

No. Ref.	Author	Country	Tumors/Totals	Gender		Age (range/average, yrs)	Site	Diagnosis (n)	Surgical		Follow-up		
				M/F					Prosthetic approach	Complications (n)	Time (range/average, mo)	Function evaluation	Outcome
1	Buchman <i>et al</i> ^[5] , 1965	America	1/1	NA	NA	NA	NA	PD(1)	CTFP(1)	NA	NA	NA	NA
													CDF(8), AWD(5), NED(5), DOD(1)
2	Marcove <i>et al</i> ^[9] , 1977	America	19/19	8/11	11-65/20.3	7/12	OS(17), CS(2)	CTFP(19)	AA	IF(3), HD(1), LR(2), CN(3)	3-29/19.3	NA	5), NED(5), DOD(1)
3	Hu <i>et al</i> ^[15] , 1980	China	2/2	1/1	29-41/35	0/2	OFD(2)	CTFP(2)	BA, CA	NA	1-12/6.5	NA	CDF(2)
							MM(1), FS(1), GCTB(1), OFD(1), ES(1), CS(1), UMT(1)	CTFP(8), PTFP(1)	AA	ALBP(1)	3-84/37.7	NA	CDF(4), DOD(3)
5	Capanna <i>et al</i> ^[17] , 1986	Italy	2/2	1/1	52-61/56.5	1/1	CS(2)	CTFP(2)	AA	NC	24-48/36	NA	CDF(2), CDF(5), NED(2)
6	Nerubay <i>et al</i> ^[18] , 1988	Israel	19/19	13/6	11-55/20	N/A	CS(2), MHC(2), ES(2)	CTFP(19)	CA	IF(5), LR(5), ALBP(1), VC(1)	15-96/36.4	E(6), G(8), FA(3), P(2) ¹	NED(2), DOD(1)
7	Present <i>et al</i> ^[14] , 1990	America	1/1	0/1	-/22	1/0	CS(1)	CTFP(1)	NA	PST(1)	-/420	NA	NED(1), CDF(5), NED(1), DOD(1)
8	Morris <i>et al</i> ^[S1] , 1994	Italy	7/7	4/3	13-61/27.3	N/A	OS(2), ES(1), AS(1), FS(1), NA(2)	MTFP(7)	AA	PF(1), ALBP(2),	6-53/27	E(2), G(4), P(1) ¹	NED(1), DOD(1)

9	Ward <i>at el</i> ^[10] , 1995	America	18/21	12/6	11-65/33.7	-N A	OS(11), CS(2), MFH(2), MC(1), LM(1),	ES(1),), AA	CTFP(12), MTFP(3), PTFP(1), ETFP(2)	IF(1), HD(3), LR(2), PF(1), PFD(1), NP(1)	1-125/31.4	G(8), FA(6), P(4) ¹	NED(2), DOD(10)
10	Wu <i>at el</i> ^[52] , 1995	China	6/6	2/4	22-55/34.2	N A	NHL(1), MC(2), OFD(3)		CTFP(6) AA	NC	6-150/53	E(5), G(1) ¹	CDF(5), DOD(1)
11	Schindler <i>at el</i> ^[24] , 1998	England	6/6	4/2	2-12/8	4/2	OS(3), ES(3)	ETFP(6) NA		IF(1), HD(1), PF(1), ALBP(2)	11-107/52	E(5), G(1) ¹	CDF(5), DOD(1)
12	Bickels <i>at el</i> ^[53] , 2000	America	18/57	NA	NA	N A	NA		CTFP(6), MTFP(7), ETFP(5) AA	IF(1), LR(2), ALBP(1),	NA	E(8), G(4), FA(6) ¹	NA
13	Nakamura <i>at el</i> ^[21] , 2000	Japan	2/2	0/2	11-17/14	2/0	OS(1), ES(1)	CTFP(2) NA		CN(1), NP(1)	132-144/138	60-63%/61.5% ²	CDF(2)
14	Guo <i>at el</i> ^[11] , 2003	China	1/1	0/1	-/63	1/0	OS(1)	CTFP(1) AA		NA	-/9	NA	CDF(1)
15	Katrak <i>at el</i> ^[54] , 2003	Australia	2/2	1/1	53-70/61.5	2/0	CS(1), MC(1)	MTFP(2) NA		DVT(1)	24-30/28	NA	CDF(2)
16	Erler <i>at el</i> ^[55] , 2004	Turkey	2/2	2/0	20	1/1	OS(2)	MTFP(2) AA		NP(1), CN(1)	22-26/24	E(2) ¹	CDF(2),
17	Song <i>at el</i> ^[56] , 2004	China	1/1	1/0	-/32	1/0	OS(1)	CTFP(1) BA		NA	-/5	E(1) ¹	CDF(1)
18	Faisham <i>at el</i> ^[57] , 2005	Malaysia	4/4	3/1	16-32/21.7	N A	OS(3), GCTB(1)	MTFP(4) AA		NA	24-60/32.5	E(25), G(2) ¹ ; 70-86%/76% ²	CDF(3), AWD(1)
19	Jacob <i>at el</i> ^[58] , 2005	America	1/1	1/0	-/50	0/1	HP(1)	CTFP(1) AA		IF(1), HEM(1), APE(1)	-/24	NA	CDF(1)
20	Mankin <i>at el</i> ^[59] , 2005	America	14/15	8/6	16-82/52	N A	OS(4), CS(7), MC(2), PD(1)	CTFP(5), EFAP(9) NA		IF(1), LR(3), ALBP(4),	24-384/46.8	NA	CDF(6), DOD(8)

21	Niu <i>et al</i> ^[S10] , 2007	China	25/25	16/9	12-35/15	N A	OS(23), CS(1), SCM(1)	CTFP(2 5)	AA	HD(2), LR(3), NP(3)	3-132/61	41-91%/70% ²	CDF(1 3), NED(1), DOD(1 1)
22	Waikakul <i>et al</i> ^[S11] , 2007	Thailand	1/1	NA	-/23	1/ 0	OS(1)	CTFP(1)	AA	NC	NA	-/63.3% ²	NA
23	Natarajan <i>et al</i> ^[19] , 2009	India	17/17	14/3	12-73/30.9	N A	OS(12), MM(2), NHL(1), CS(1), ES(1)	CTFP(1 7)	AA	IF(2), HD(2), LR(1)	11-168/54	-/66.6% ²	CDF(1 3), NED(1), DOD(3)
24	Sewell <i>et al</i> ^[S12] , 2009	England	33/33	19/14	5-68/31	N A	OS(19), ES(4), MFH(3), CS(2), FS(1), MC(3), HAEM(1)	CTFP(NA), MTFP(NA), ETFP(N A)	AA	IF(1), HD(6), LR(3), PF(2), PAD(1), JC(1)	9-197/50	-/67% ²	CDF(7) , AWD(4), DOD(2 2)
25	Ahmed <i>et al</i> ^[20] , 2010	Egypt	9/9	4/5	10-74 /47	N A	OS(4), MFH(2), CS(1), SF(1), MSW(1)	MTFP(9)	AA	IF(2), LR(2), ALBP(1),	8-200/50	30-93%/72% ²	CDF(3) , AWD(1), DOD(5)
26	Kalra <i>et al</i> ^[S13] , 2010	England	26/26	14/12	(14-82)/40	N A	OS(10), CS(5), ES(2), MFH(1), LS(1), FS(2), MC(5)	CTFP(2 4), MTFP(2)	NA	IF(1), HD(4), LR(3), ALBP(1),	3-348/57	14-29/72.6% ²	CDF(9) , NED(2) , DOD(1 5)
27	Ruggieri <i>et al</i> ^[S14] , 2010	Italy	21/21	14/7	7-62/22.9	N A	OS(11), ES(6), AS(1), FS(1), CS(2)	MTFP(2 0), ETFP(1)	AA	IF(2), PF(1), ALBP(3),	1-204/48	-/66% ²	CDF(6) ,NED(1), AWD(1), DOD(1 3)
28	Jones <i>et al</i> ^[S15] , 2011	America	54/54	25/29	NA/40.6	N A	OS(19), CS(5), ES(4),STS(3),	MTFP(5 4)	NA	HD(5), TFRO(1)	1-252/48	-/69.3% ³	CDF(2 0), AWD(

								NSCS(10),									8),
								MC(12),									DOD(2
								HL(1)									6)
																	CDF(5
																	),
29	Puri <i>at ell</i> ^[S16] , 2012	India	8/8	4/4	13 72/32	-N A	OS(5), CS(2), ES(1)	MTFP(7 , NA ETFP(1)	IF(1), LR(1)	9-72/33	70- 83.3%/80% ² ,	LFU(1)					
																	DOD(2
																	)
																	CDF(1
																	),
							OS(2), ES(2),										AWD(
30	Yoshida <i>at ell</i> ^[S17] , 2012	Japan	7/7	2/5	12-68 /35.6	N A	CS(1), MFH(1), MC(1)	MTFP(7 NA)	IF(2), HD(1), PAF(2)	12- 216/75. 6	50- 70%/60.1% ²	1), NED(2					
																	),
																	DOD(3
																	)
																	CDF(2
																	),
31	Pan <i>at ell</i> ^[S18] , 2014	Malaysi a	9/9	6/3	9-17 /14	68N A	OS(6), CS(2), FS(1)	CTFP(1 , MTFP(6 DA , ETFP(2)	IF(1), LR(1)	6-56/27	90- 93%/91.5% ² ,	LFU(1)					
																	DOD(6
																	)
							OS(21), ES(9),										
							CS(6),										
							MFH(3),	MTFP(3	IF(7),								CDF(4
32	Sevelde <i>at ell</i> ^[22] , 2015	Austria	44/44	22/22	4- 81/28.3 2	N A	SCS(1), ABC(1), PD(1), STS(1), PNET(1)	4), ETFP(1 0) AA	HD(2), LR(1), ALBP(1), SFA(9), STF(14)	1- 289/83. 1	27- 97%/74% ²	1), DOD(3					
																	)
33	Liu <i>at ell</i> ^[S19] , 2016	China	21/21	13/8	15- 38/21.8	N A	OS(21)	CTFP(2 1) AA	IF(3), LR(1), ALBP(3), PAF(1)	37- 192/71. 2	43- 89%/72.5% ²	2), DOD(9					
																	)
							OS(9), CS(3),										
							ES(1), MC(4),										
34	Nakayama <i>at ell</i> ^[S20] , 2016	Japan	21/21	10/11	10- 79/45	N A	MFH(1), FS(1), MGCT(1), SF(1)	NA AA	NC	5- 336/61	16- 100%/74% ²	NA					

35	Gorter <i>et al</i> ^[23] , 2017	at Netherlands	7/10	2/5	25- 74/48.7	N A	OS(4), CS(1), FS(1), GCTB(1)	PTFP(7) BA	IF(2), ALBP(1), SFA(1)	13- 115/63	23- 93%/64% ² , 13- 90%/69% ³	CDF(7)	
36	Toepfer <i>et al</i> ^[521] , 2018	at Germany	9/22	3/6	36- 82/47	6/ 3	OS(6), CS(2), MC(1)	MTFP(9 NA)	IF(3), HD(3), ALBP(1), JC(1)	13- 152/59	10- 83%/63.7% ²	CDF(8) , AWD(1)	
37	Segal <i>et al</i> ^[522] , 2019	at Israel	1/1	0/1	-/3	0/ 1	ES(1)	CTFP(1)	AA	LLD(1)	-/30	NA	CDF(1)
38	Current case	China	1/1	1/0	-/15	0/ 1	OS(1)	CTFP(1)	AA	NC	-/216	-/67% ²	CDF(1)

¹Musculoskeletal Tumor Society Rating (MTSR)^[523];

²Musculoskeletal tumour society (MSTS)^[524];

³Toronto Extremity Salvage Score (TESS)^[525]

ALP: Alkaline phosphatase; M: Male; F: Female; yrs: Years; mo: Months; L: Left; R: Right; NA: Not available; PD: Paget disease; OS: Osteosarcoma; CS: Chondrosarcoma; OFD: Osteofibrous dysplasia; MM: Multiple myeloma; FS: Fibrosarcoma; GCTB: Giant cell tumor of bone; ES: Ewing's sarcoma; UMT: Unknown malignant tumor; MHC: Malignant histiocytoma; AS: Angiosarcoma; MFH: Malignant fibrous histiotoma; MC: Metastatic carcinoma; LM: Lymphoma; NHL: Non-hodgkin lymphoma; HP: Hemophilic pseudotumor; SCM: Small cell malignancy; HAEM: Hemangioendothelioma; SF: Solitary fibroma; MSW: Malignant schwannoma; :LS: leiomyosarcoma; NSCS: non-osteogenic spindle cell sarcomas of bone; HL: Hodgkin's lymphoma; ABC: aneurysmal bone cyst; SCS: Spindle cell sarcoma; STS: Soft tissue sarcoma; PNET: Primitive neuroectodermal tumor; MGCT: Malignant granular cell tumor; CTFP: Custom-made total femur prosthesis; PTFP/ITFP: Push-through total femoral prosthesis or intramedullary total femoral prosthesis; MTFP: Modular total femoral prosthesis; ETFP: Extendable total femoral prosthesis; EFAP: An entire femoral allograft with total hip and knee replacement prostheses; IF: Infection; HD: Hip dislocation; LR: Local recurrence; PF: Periprosthetic fractures; ALBP: Aseptic loosening and broken of the prosthesis; CN: Cutaneous necrosis; NC: No complications; VC: Volkman contracture; PST: Pain and sinus tract; PFD: Patellofemoral discomfort; NP: Neural paralysis; DVT: Deep venous thrombosis; HEM: Hematoma; APE: Acute pulmonary edema; PAD: Patellar dislocation; JC: Joint contracture; TFRO: Total femoral rotation; PAF: Patella fracture; SFA: Structural failure; STF: Soft tissue failure; LLD: Limb-length discrepancy; E: Excellent; G: Good; FA: Fair; P: Poor; CDF: Continuous disease free; DOD: Dead of disease; AWD: Alive with disease; NED: No evidence of disease after resection of local recurrence or metastases; LFU: Lost to follow up. AA: A approach; the Watson-Jones approach to the hip is used, with a long incision on the lateral side of the thigh; BA: B approach; the hip is approached via the posterolateral approach, which is extended along the femur, dorsal of the vastus lateralis muscle, and the knee approach is usually midline or anteromedial; CA: C approach; the hip joint is approached anteriorly by a Smith-Petersen anterior iliofemoral incision, and the knee is approached through a medial approach; DA: D approach; an anteromedial curvilinear incision from the greater trochanter laterally to the medial aspect of the tibial tuberosity.

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