Supplementary material

List of authors, included in the systematic search.

Author	Study (meniscal states, ligaments, interventions)	Test setup	Knee flexion angle	Motion	Load	Muscle simulation	Pressure measurement
1. Agneskirchen et al. (2007)	***H**igh**T**ibial**O**steotomy (HTO), valgus alignment*	*material testing machine*	*0°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
2. Ahmed et al. (1983)	*intact, meniscectomy*	*desktop machine*	*0°, 30°, 60°, 90°*	*N.A.*	*2668 N (axial)*	*N.A.*	*Transducer*
3. Alhalki et al. (2000)	*intact, meniscectomy, autograph, allograph*	*horizontal rig*	*0°, 15°, 30°, 45°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Fuji Film*
4. Allaire et al. (2008)	*intact, root tear, repair, meniscectomy*	*modified material testing machine*	*0°, 30°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Fuji film*
5. Amadi et al. (2008)	*meniscofemoral ligaments*	*material testing machine*	*0°*	*N.A.*	*700 N (4 DOF) + 5 Nm int. moment (3 DOF test)*	*N.A.*	*Fuji film*
6. Andrish et al. (2001)	*intact*	*modified material testing machine*	*N.A.*	*15° to 75°*	*N.A.*	*Quadriceps ,VL (45 N), VM (45 N), Hamstring (45 N)*	*Force Sensing Technology*
7. Arno et al. (2015)	*intact, posterior horn horizontal cleavage lesion*	*desktop machine*	*N.A.*	*−5° to 135°*	*500 N (axial), 100 N P shear, 2.5 Nm torque*	*Quadriceps*	*Tekscan*
8. Baratz et al. (1986)	*tear, repair, partial meniscectomy,*	*material testing machine*	*0°, 30°*	*N.A.*	*1800 N (axial)*	*N.A.*	*Fuji Film*
9. Beamer et al. (2017)	*intact, horizontal cleavage tear, repair, partial (subtotal) meniscectomy*	*modified material testing machine*	*0°, 10°, 20°*	*N.A.*	*2437 N (axial)*	*N.A.*	*Tekscan*
10. Becher et al. (2011)	*intact, with articular resurfacing device*	*Oxford Rig*	*N.A.*	*5° to 45°*	*700 N (GRF)*	*Quadriceps*	*Tekscan*

11. Becker et al. (2005)	repair of bucket-handle tear	modified material testing machine	N.A.	10° to 90°	1400 N (axial)	Quadriceps (2000 N)	Tekscan
12. Bedi et al. (2012)	intact, radial tear, repair, partial meniscectomy	wear simulator	N.A.	gait cycle	2100 N (axial), A-P force, rotation torque	N.A.	Tekscan
13. Beidokhti et al. (2017)	intact	horizontal rig	0°, 30°, 60°, 90°	N.A.	5.2 Nm torque, 12 Nm, 106 N (axial), 100 N A force	RF (20 N), VM (10 N), VL/VI (10N)	Tekscan
14. Bode et al. (2017)	CP after HTO and absorbing device	biomechanical simulator	N.A.	120° to 0°	31 Nm, physiological loading	Quadriceps Hamstring	Tekscan
15. Bretin et al. (2011)	neutral position, malrotation femur	experimental setup with entire lower limb	full ext. leg, malrotation 5°,10°,15°. 20°, 25°	N.A.	half-bodyweight force due to one leg	N.A.	Tekscan
16. Brial et al. (2019)	intact, bone plug meniscal allograft, fixation techniques, meniscectomy	multidirectional dynamic simulator	N.A.	gait cycle	physiological loads	N.A.	Tekscan
17. Brown et al. (2016)	horizontal tear, meniscectomy	material testing machine	0°	N.A.	1800 N (axial)	N.A.	Tekscan
18. Bruns et al. (1993)	meniscal repair, meniscectomy	experimental apparatus	0°	N.A.	500 N (axial)	N.A.	Fuji Prescale Film
19. Bryant et al. (2014)	TKA; normal and valgus	experimental apparatus	0°. 30°, 60°	N.A	450 N (muscle load)	Quadriceps	Fuji Prescale Film
20. Chen et al. (2016)	intact, tear, ACL rupture	wear simulator	N.A.	gait cycle	2100 N (axial), A-P force, rotation torque	N.A.	Tekscan
21. Chen et al. (2020)	intact, mattress suture repair	material testing machine	0°, 30°, 60°, 90°	N.A.	1000 N 5 N-int/ex rotation, 134 N-anterior tibial translation	N.A	Fuji film
22. Chen M. et al. (1996)	meniscectomy, transplantation (different horn fixations)	desktop machine	0°	N.A.	310 N (axial)	N.A.	Inteque Resources Corp.

23. Dienst et al. (2007)	*intact, meniscectomy, allografts*	*material testing machine*	*0°, 30°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Fuji film*
24. Du et al. (2017)	*osteochondral allograft (OCA)*	*test setup*	*N.A.*	*N.A*	*Extension moment 0 Nm, 4Nm, 6 Nm, 8 Nm*	*N.A.*	*Load cell*
25. Dugas et al. (2015)	*meniscocapsular separation, repair*	*modified material testing machine*	*0°*	*N.A.*	*1500 N (axial)*	*N.A.*	*Tekscan*
26. Flemming et al. (2008)	*intact, ACL-reconstruction*	*horizontal fixation test setup*	*0°*	*N.A*	*N.A. Passive motion*	*N.A.*	*Tekscan*
27. Forkel et al. (2014)	*lateral posterior root release, transection MFL, refixation posterior root (2 different techniques)*	*material testing machine*	*0°*	*N.A.*	*100 N (axial)*	*N.A.*	*Novel approach*
28. Fukubayashi et al. (1980)	*intact, meniscectomy*	*modified material testing machine*	*0°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Fuji film*
29. Geeslin et al. (2016)	*lateral posterior root avulsion, deficient MFLs, ACL tear, ACL reconstruction, root repair*	*material testing machine*	*0°, 30°, 45°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
30. Gilbert et al. (2014)	*intact*	*wear simulator*	*N.A.*	*gait cycle, stair climbing*	*2100 N (axial), A-P force, rotation torque*	*N.A.*	*Tekscan*
31. Goss et al. (1997)	*anterior cruciate ligament (ACL)*	*experimental apparatus*	*0°, 30°,60°, 90°, 120°*	*N.A.*	*0–200 N*	*N.A.*	*N.A.*
32. Goyal et al. (2014)	*short (extended) vertical tear, partial (subtotal) meniscectomy*	*modified material testing machine*	*0°, 30°, 60°*	*N.A.*	*350 N (axial)*	*Quadriceps (311 N),Hamstring (156 N)*	*Fuji film*
33. Guettler et al. (2007)	*normal, 3°, 6°, 9° varus direction, osteochondral defects*	*modified material testing machine*	*30°*	*N.A.*	*687 N (axial)*	*N.A.*	*Tekscan*
34. Hofer et al. (2012)	*kneeling on TKA*	*custom knee testing system*	*90°, 105°, 120°, 135°*	*N.A.*	*339 N / 678 N (single stand kneeling)*	*Quadriceps (300 N)*	*Tekscan*

35. Huang et al. (2002)	*autograft, allograft*	*horizontal Rig*	*0°; 15°, 30°, 45°*	*N.A.*	*1200 N (axial)*	*N.A.*	*Fuji film*
36. Ihn et al. (1993)	*intact, partial (total) meniscectomy*	*material testing machine*	*0°*	*N.A.*	*3000 N (axial)*	*N.A.*	*Sensor*
37. Inaba et al. (1990)	*varus-valgus instability*	*experimental apparatus*	*0°*	*N.A*	*2700 N*	*N.A.*	*pressure transducers, Bourdon tube*
38. Kdolsky et al. (2004)	*uninjured knee pressure pattern → intraoperative pressure*	*flexed and hanging, as in a leg holder*	*N.A.*	*90°– 0 ° – 90 °*	*N.A.*	*N.A.*	*Tekscan*
39. Kenawey et al. (2011)	*intact, rotational alignment*	*specimen lying on table + foot plate*	*0° flex + 10°- 40° int./ext. rot.*	*N.A.*	*350 N (axial)*	*N.A.*	*Tekscan*
40. Kim et al. (2013)	*root tear, repair, total meniscectomy, allograft, MCL release*	*modified material testing machine*	*0°, 30°, 60°, 90°*	*N.A.*	*300 N(axial)*	*N.A.*	*Novel approach*
41. Koh et al. (2016)	*intact, horizontal cleavage tear, repair, leaf resection, resection of both leaves*	*desktop machine*	*0°, 60°*	*N.A.*	*800 N (axial)*	*N.A.*	*Tekscan*
42. Kurosawa et al. (1980)	*total meniscectomy*	*desktop machine*	*0°, 30°, 60°, 90°*	*N.A.*	*1500 N (axial)*	*N.A.*	*Silicone rubber*
43. LaPrade et al. (2015)	*root tear, anatomical (nonanatomical) transtibial pull-out repair*	*modified material testing machine*	*0°, 30°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
44. Lee et al. (2006)	*radial tear, total meniscectomy*	*desktop machine*	*0°, 30°, 60°*	*N.A.*	*1800 N (axial)*	*N.A.*	*Tekscan*
45. Li et al. (2002)	*PCL deficiency*	*robotic machine*	*0–120°*	*N.A.*	*N.A.*	*Quadriceps 400 N Hamstring 200 N*	*N.A.*
46. Linder-Ganz et al. (2010)	*intact, total meniscectomy, implant*	*modified material testing machine*	*0°*	*N.A.*	*1200 N (axial)*	*N.A.*	*Tekscan*
47. Marchetti et al. (2017)	*intact, MCL tear and repair, bucket-handle tear, inside-out repair, all-inside repair*	*modified material testing machine*	*0°, 30°, 45°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
48. Marzo et al. (2009)	*meniscal horn tear, repair*	*material testing machine*	*0°*	*N.A.*	*1800 N (axial)*	*N.A.*	*Tekscan*

49. McCulloch et al. (2016)	*intact, transplant, autograft*	*Oxford-rig*	*0°, 30°, 90°, 115°*	*flexion-extension cycle*	*267 N (axial – GRF)*	*Quadriceps (218 N), Hamstring (80 N)*	*Tekscan*
50. McDermott et al. (2008)	*intact, meniscectomy, allograft (bone block, suture)*	*modified material testing machine*	*0°*	*N.A.*	*700 N (axial)*	*N.A.*	*Fuji film*
51. MacDonald et al. (1996)	*posterior cruciate deficient knee*	*material testing system machine*	*0°, 30°, 60°*	*N.A.*	*1500 N*	*Quadriceps*	*Fuji Prescale film*
52. Meyer et al. (2008)	*test to failure, ACl rupture due to ex compressive loading*	*modified material testing machine*	*30°*	*N.A.*	*up to 5.5 kN*	*N.A.*	*Fuji Prescale film*
53. Mina et al. (2008)	*HTO for unloading osteochondral defect*	*material testing machine*	*30° flexion + 12° valgus to 10° varus (stepwise 2°).*	*N.A.*	*200 N*	*N.A.*	*Tekscan*
54. Muriuki et al. (2011)	*intact, tear, medial meniscal tear, repair, total meniscectomy*	*modified material testing machine*	*0°, 30°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Fuji film*
55. Nakayama et al. (2005)	*diff. TKA designs by posterior force*	*parallel-link six-axis actuator*	*9°, 120°, 150°*	*N.A.*	*posterior load 500 N*	*N.A.*	*Tekscan*
56. Ode et al. (2012)	*intact, radial tear, repair, total meniscectomy*	*modified material testing machine*	*0°, 60°*	*N.A.*	*800 N (axial)*	*N.A.*	*Tekscan*
57. Ostermeier et al. (2006)	*TKA and tibiofemoral slope*	*knee simulator (isokinetic)*	*N.A.*	*120° – 0°*	*passive*	*Hamstring 200 N, Quadriceps 31 Nm*	*Tekscan*
58. Paci et al. (2009)	*intact, after release Anterior Intermeniscal Ligament*	*modified material testing machine*	*N.A.*	*0° to 60°*	*1000 N (axial)*	*N.A.*	*Tekscan*
59. Padalecki et al. (2014)	*root avulsion, repair, radial tear, in situ repair*	*modified material testing machine*	*0°, 30°, 45°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
60. Paletta et al. (1997)	*intact, meniscectomy, allograft, release of anterior/posterior horn attachments of allograft*	*material testing machine*	*0°, 30°, 60°*	*N.A.*	*1800 N (axial)*	*N.A.*	*Fuji film*
61. Perez-Blanca et al. (2016)	*posterior root avulsion, repair, total meniscectomy*	*desktop machine*	*0°, 30°, 60°, 90°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*

62. Poh et al. (2012)	*intact, after sectioning anterior intermeniscal ligament*	*modified material testing machine*	*0°*	*N.A.*	*1800 N (axial)*	*N.A.*	*Tekscan*
63. Prince et al. (2014)	*intact, lateral anterior horn tear, repair, meniscectomy*	*material testing machine*	*0°, 30°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
64. Rodner et al. (2006)	*HTO, tibial slope*	*material testing machine*	*0°, 30°*	*N.A.*	*500 N*	*N.A.*	*Tekscan*
65. Schall et al. (2019)	*Proof-of-Concept: Novel Knee Joint Simulator*	*knee joint simulator, Oxford rig*	*N.A.*	*gait cycle, exercises*	*GGF: over 800 N*	*Quadriceps Hamstring*	*Tekscan*
66. Schillhammer et al. (2012)	*posterior horn detachment, repair*	*modified material testing machine*	*N.A.*	*gait cycle*	*2000 N (axial), A-P force, rotation torque*	*N.A.*	*Tekscan*
67. Seitz et al. (2012)	*intact, partial (total) meniscectomy*	*modified material testing machine*	*0°, 30°, 60°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
68. Seitz et al. (2019)	*open-wedge high tibial osteotomy (5°, 10°)*	*load-application system*	*0°, 30°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
69. Sekaran et al. (2002)	*nonanatomic location (autolog. PCL)*	*load-application system*	*0°, 15°, 30°, 45°*	*N.A.*	*1200 N (axial)*	*N.A.*	*Fuji film*
70. Shimakawa et al. (2019)	*intact, ACL reconstruction, partial- + subtotal meniscectomy*	*load-application system*	*0°, 30°, 60°, 90°*	*N.A.*	*735 N*	*N.A.*	*Tekscan*
71. Shiramizu et al. (2009)	*high flexion knee designs*	*mechanical testing machine*	*0, 30, 60, 90, 110, 135, 155°*	*N.A.*	*3600 N*	*N.A.*	*Tekscan*
72. Stein et al. (2019)	*partial medial meniscectomy, partial meniscal replacement*	*mechanical testing machine*	*N.A.*	*flexion cycle, squat, 0° to 100°*	*200 N*	*N.A.*	*Tekscan*
73. Steinbruck et al. (2016)	*TKA posterior-stabilized vs. medial-stabilized design*	*Oxford rig*	*N.A*	*active deep knee flexion from 20° to 120°*	*N.A.*	*Quadriceps Hamstring*	*Tekscan*

74. Stukenborg-Colsman et al. (2000)	*intact, before and after total knee arthroplasty (TKA)*	*knee simulator (horizontal)*	*N.A*	*120° – 0°*	*N.A.*	*Quadriceps, 31 Nm ext. moment*	*Tekscan*
75. Stukenborg-Colsman et al. (2002)	*intact, before and after total knee arthroplasty (TKA)*	*knee simulator (horizontal)*	*N.A*	*120° – 0°*	*N.A.*	*Quadriceps, 31 Nm ext. moment*	*Tekscan*
76. Thambya et al. (2007)	*contact stresses at both compartments*	*6-DOF holding apparatus*	*15.5° flexion and slight varus angle 2°*	*N.A.*	*1144 N*	*N.A.*	*Tekscan*
77. Uquillas et al. (2017)	*intact, horizontal cleavage tear, flap removal*	*desktop machine*	*N.A.*	*−5° to 135°*	*500 N (axial) 100 N P shear 2.5 Nm torque*	*Quadriceps*	*Tekscan*
78. Van Egmond et al. (2017)	*HTO, MCL release*	*test setup*	*0°*	*N.A.*	*N.A.*	*N.A.*	*Tekscan*
79. Van Thiel et al. (2011)	*total meniscectomy, transplant*	*material testing machine*	*0°*	*N.A.*	*800 N (axial)*	*N.A.*	*Tekscan*
80. Verma et al. (2008)	*meniscectomy, transplant*	*material testing machine*	*0°, 30°*	*N.A.*	*1000 N (axial)*	*N.A.*	*Tekscan*
81. Vrancken et al. (2016)	*intact, implant, total meniscectomy, allograft*	*Horizontal Rig*	*N.A.*	*0° to 90°*	*1000 N (axial), 76 N (A-P force) 3.4 Nm (rotation torque)*	*Quadricep (190 N), RF (250 N)*	*Tekscan*
82. Walker et al. (1975)	*intact*	*test setup*	*0°, 30°, 60°, 90°*	*N.A.*	*0 N, 1000 N, 1500 N*	*N.A.*	*Miniature contact pressure transducer*
83. Walker et al. (2015)	*intact*	*Horizontal Rig*	*N.A.*	*−5° to 135°*	*500 N (axial) + 100 N a.-p. shear*	*N.A.*	*Tekscan*
84. Wang et al. (2015)	*intact, meniscectomy, autograft transplantation*	*modified load-controlled knee simulator*	*N.A.*	*gait cycle*	*N.A.*	*N.A.*	*Tekscan*
85. Willinger et al. (2019)	*neutral, varus/valgus malalignment*	*modified material testing machine*	*0° flexion 10%, 20% varus/valgus*	*N.A.*	*750 N*	*N.A.*	*Tekscan*

86. Willinger et al. (2020)	*sequential medial meniscus resection, intersect the tibia plateau at 30%, 40%, 50%, 60%, 70%*	*universal testing machine*	*0°*	*N.A.*	*750 N*	*N.A.*	*Tekscan*
87. Yazdi et al. (2014)	*intact, tibial rotation*	*lower limb loading apparatus*	*0°*	*N.A.*	*Half BW of each specimen*	*N.A.*	*Fuji film*
88. Yazdi et al. (2016)	*intact, partial fibulectomy*	*lower limb loading apparatus*	*0°*	*N.A.*	*Half BW of each specimen*	*N.A.*	*Fuji film*
89. Zhang et al. (2015)	*intact, repair, meniscectomy*	*modified material testing machine*	*0°, 8°, 15°, 30°*	*N.A.*	*250 N, 500 N, 1000 N*	*N.A.*	*Tekscan*

4