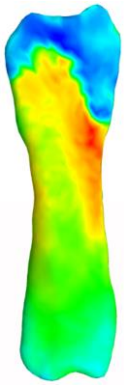
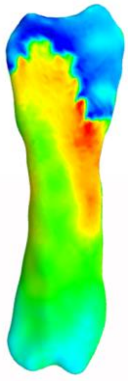
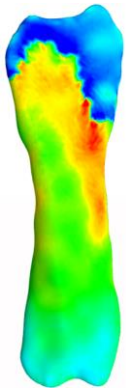
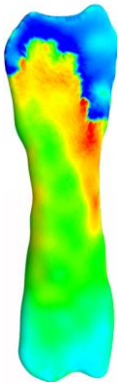
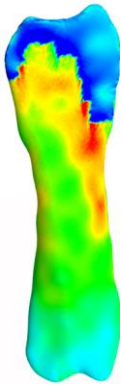
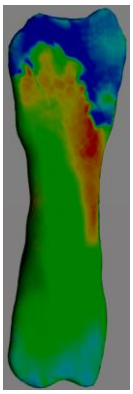
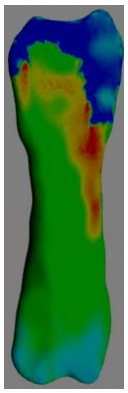
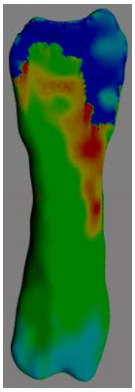
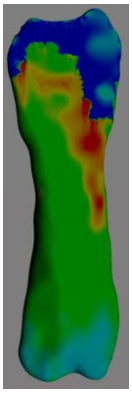
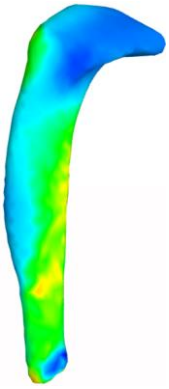
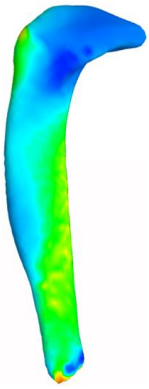
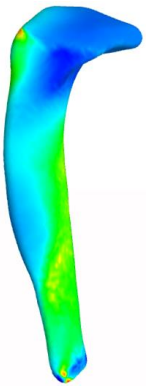
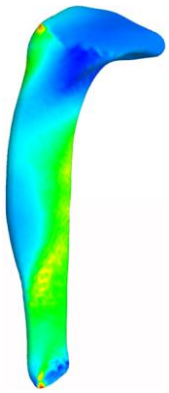
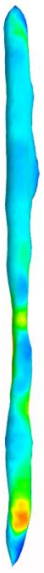
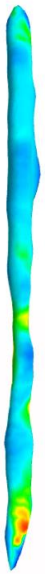
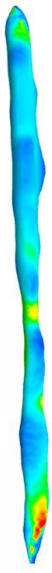
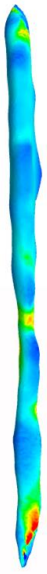
Mesh Convergence Results:

	ACL_IP4	ACL_IP6	ACL_IP8	ACL_IP10	ACL_IP12
# of Elements	16573	88090	147796	341708	649038
# of Nodes	3247	16010	27399	61222	116462
Computation time (sec)	41	95	150	364	685
Reaction Force (N)	264	205	191	188	178
Force change %		-22.3	6.8	-1.6	-5.3
Mesh					
Linear Tetrahedral Elements Fiber Stretch Colormap Range (0.89-1.19) (Anterior side)					

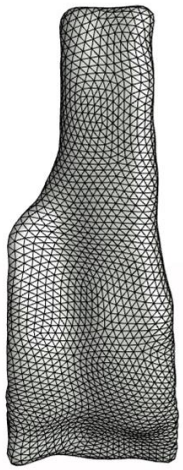
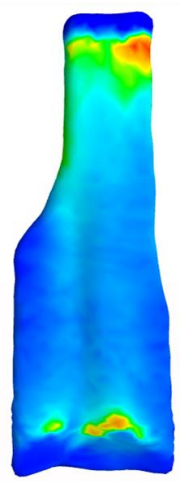
	ACL_IP4_quad*	ACL_IP6_quad	ACL_IP8_quad	ACL_IP10_quad
# of Elements	16573	88090	147796	341708
# of Nodes	20852	13959	190540	444226
Computation time (sec)	80	924	2067	10697
Reaction Force (N)	188	161	160	165
Force change %		-14	-0.6	3
Mesh				
Linear Tetrahedral Elements Fiber Stretch Colormap Range (0.89-1.19) (Anterior side)				

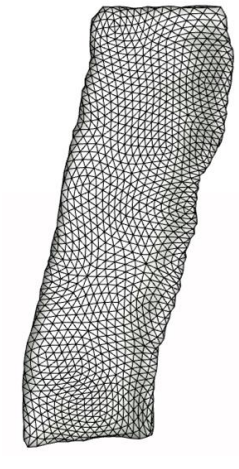
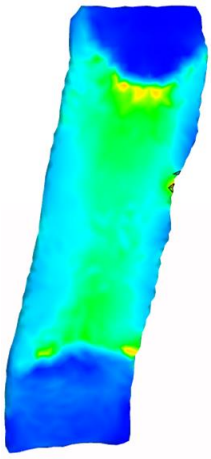
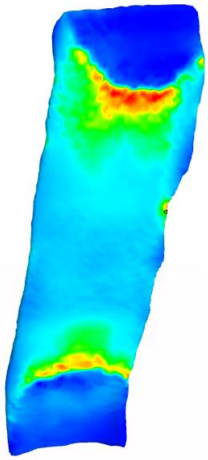
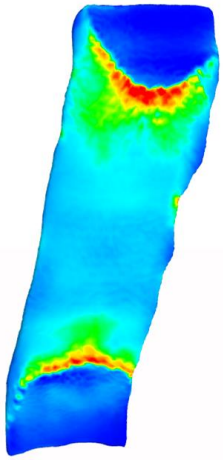
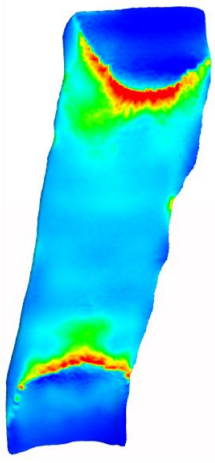
*For ACL, quadratic tetrahedral elements were investigated as well.

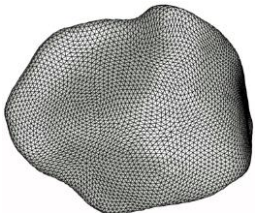
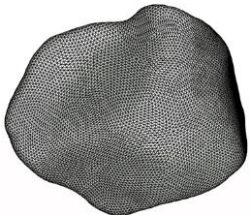
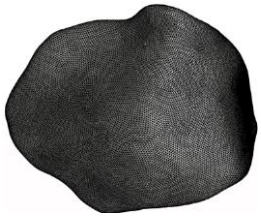
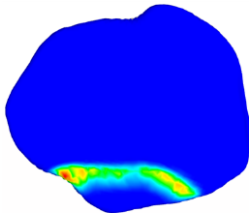
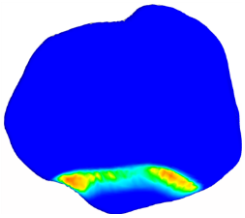
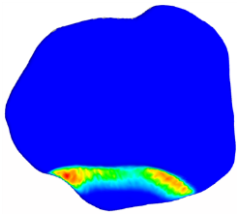
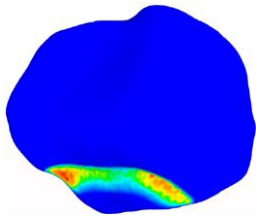
	PCL_IP3	PCL_IP4	PCL_IP6	PCL_IP8
# of Elements	6759	19282	112994	234766
# of Nodes	1383	3763	20336	39967
Computation time (sec)	33	42	111	236
Reaction Force (N)	57.1	46.8	42.7	44.5
Force change %		-18	-8.7	4.2
Mesh				
Fiber Stretch Colormap Range (0.97-1.12)				

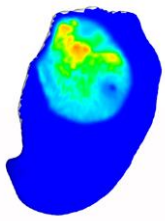
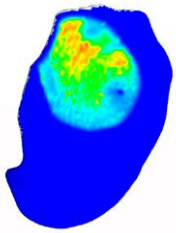
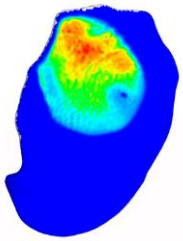
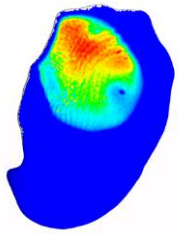
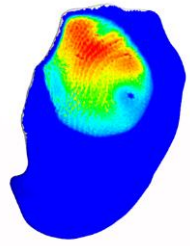
	LCL_IP3	LCL_IP4	LCL_IP6	LCL_IP8
# of Elements	5990	13632	66975	131661
# of Nodes	1273	2843	12653	24677
Computation time (sec)	24	30	59	97
Reaction Force (N)	57.9	55.5	52.7	51.7
Force change %		-4.1	-5.0	-1.9
Mesh				
Fiber Stretch Colormap Range (0.98-1.2)				

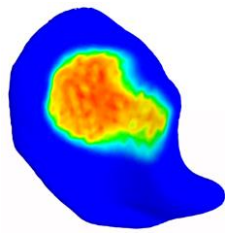
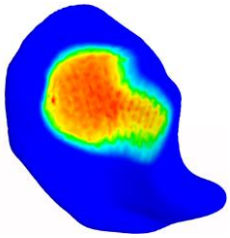
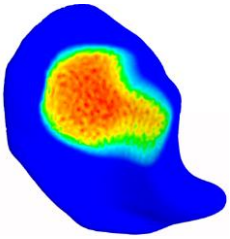
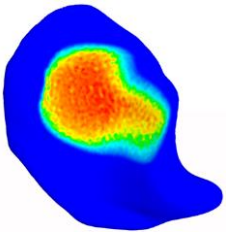
	MCL_IP5	MCL_IP7	MCL_IP9	MCL_IP11
# of Elements	30177	130419	215206	306412
# of Nodes	6023	23004	39873	57448
Computation time (sec)	52	113	175	251
Reaction Force (N)	150	129	123	121
Force change %		-14	-4.6	-1.6
Mesh				
Fiber Stretch Colormap Range (0.96-1.25)				

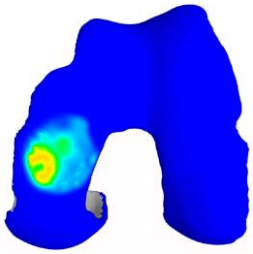
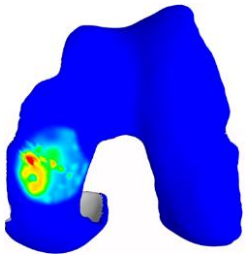
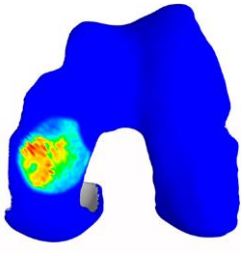
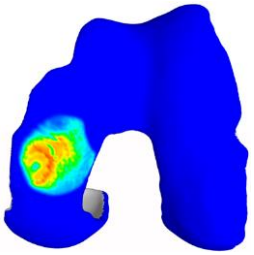
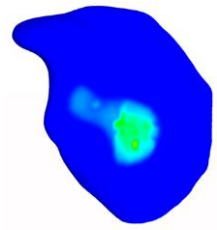
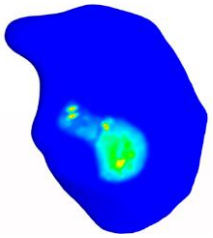
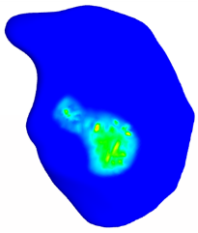
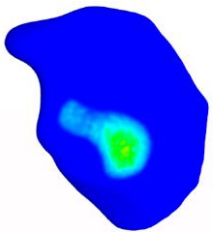
	QAT_IP4	QAT_IP6	QAT_IP8	QAT_IP10
# of Elements	18074	91965	175604	479530
# of Nodes	3600	16984	32351	85397
Computation time (sec)	10	51	111	304
Reaction Force (N)	1240	1170	1170	1140
Force change %		-5.6	0	-2.5
Mesh				
Fiber Stretch Colormap Range (1-1.15)				

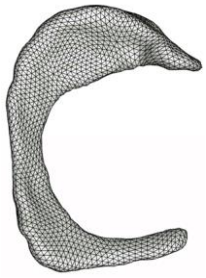
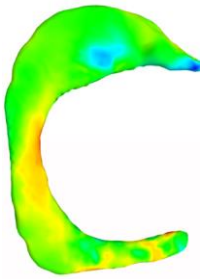
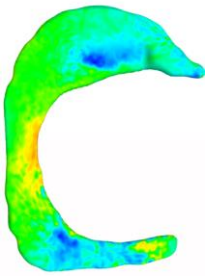
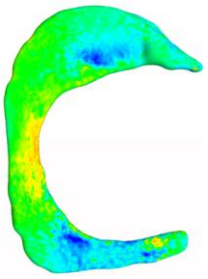
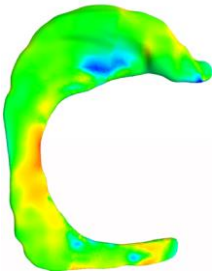
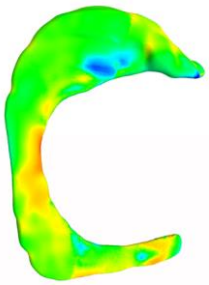
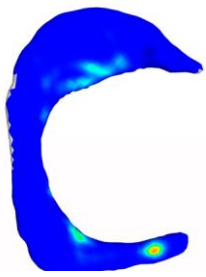
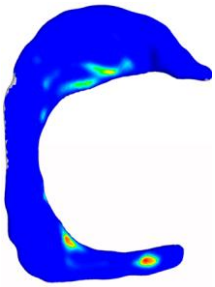
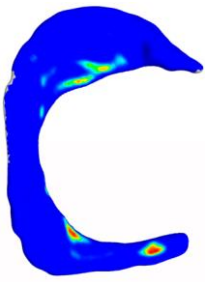
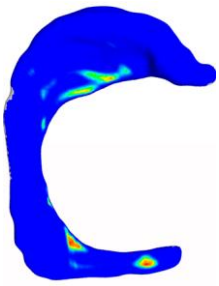
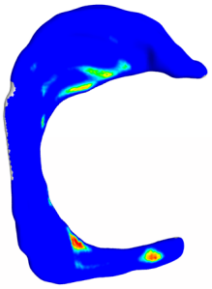
	PTL_IP4	PTL_IP6	PTL_IP8	PTL_IP10
# of Elements	11775	47024	85579	220028
# of Nodes	2409	9051	16721	40686
Computation time (sec)	23	36	53	84
Reaction Force (N)	1000	841	841	803
Force change %		-15.9	0	-4.5
Mesh				
Fiber Stretch Colormap Range (1-1.15)				

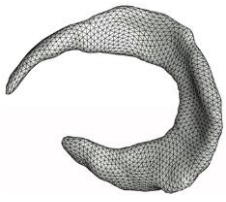
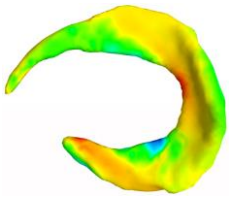
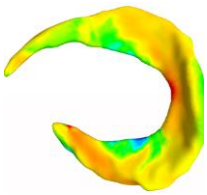
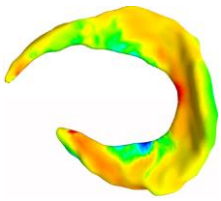
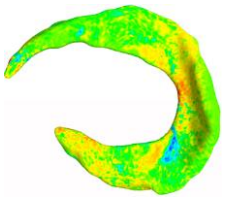
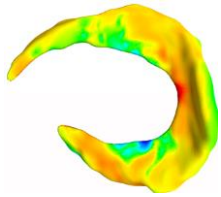
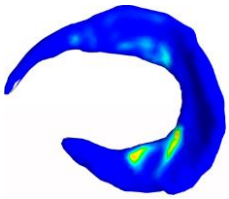
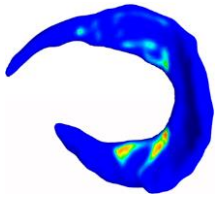
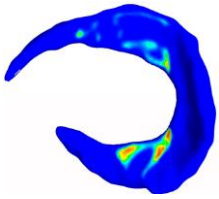
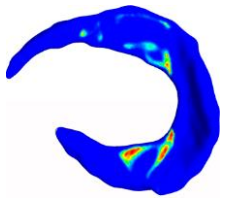
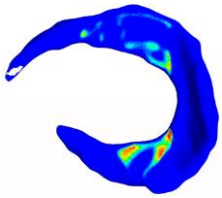
	PTC_IP6	PTC_IP8	PTC_IP10	PTC_IP12
# of Elements	41985	137778	189982	346785
# of Nodes	8163	25275	35462	63450
Computation time (sec)	54	153	222	285
Reaction Force (N)	1020	1070	1110	1140
Force change %		4.5	-5.1	2.7
Mesh				
Contact Pressure colormap range (0-24)				

	TBC-M_IP6	TBC-M_IP8	TBC-M_IP10	TBC-M_IP12	TBC-M_IP15
# of Elements	68293	148593	263770	761638	1143688
# of Nodes	12842	26774	48749	128406	197765
Computation time (sec)	75	131	247	1108	1585
Reaction Force (N)	959	1030	1170	1260	1290
Force change %		7.4	13.5	7.6	2.3
Mesh					
Contact Pressure colormap range (0-9)					

	TBC-L_IP6	TBC-L_IP8	TBC-L_IP10	TBC-L_IP12
# of Elements	45388	240296	251611	348149
# of Nodes	8666	40692	45871	63586
Computation time (sec)	48	202	223	320
Reaction Force (N)	1680	1730	1740	1780
Force change %		2.9	0.5	2.3
Mesh				
Contact Pressure colormap range (0-15)				

	FMC_IP8	FMC_IP10	FMC_IP12	FMC_IP15
# of Elements	73462	135008	263865	498482
# of Nodes	15678	26330	48643	93107
Computation time (sec)	122	137	239	271
Reaction Force (N)	1110	1200	1440	1450
Force change %		8.1	20	0.7
Mesh				
Contact Pressure colormap range (0-10) (Medial Side)				
Contact Pressure colormap range (0-10) (Lateral Side – displayed on TBC-L)				

	MNS-M_IP4	MNS-M_IP6	MNS-M_IP8	MNS-M_IP10	MNS-M_IP12
# of Elements	15943	75192	133475	300310	779277
# of Nodes	3202	13987	25158	54780	138786
Computation time (sec)	94	174	256	471	1473
Reaction Force (N)	168	163	170	164	171
Force change %		-2.9	4.3	-3.5	4.3
Mesh					
Fiber stretch colormap range (0.94-1.07) (Superior side)					
Contact Pressure colormap range (0-11) (Superior side)					

	MNS-L_IP4	MNS-L_IP6	MNS-L_IP8	MNS-L_IP10	MNS-L_IP12
# of Elements	18020	68672	170678	355323	608920
# of Nodes	3531	12858	31433	59277	109340
Computation time (sec)	77	128	217	397	745
Reaction Force (N)	211	214	223	204	225
Force change %		1.4	4.2	-8.5	10
Mesh					
Fiber Stretch colormap range (0.93-1.06) (Superior side)					
Contact Pressure colormap range (0-9.9) (Superior side)					

Material Properties convergence results:

Ligaments

Tissue	Displacement in fiber direction [mm]	Desired Linear Stiffness Range [N/mm]	Initial guess c5	Measured linear stiffness [N/mm]	Final guess c5	Measured Linear stiffness [N/mm]
ACL_IP8	3	242±28	535	125	5000	195
LCL_IP6	5	59±12	467	25	2000	66
MCL_IP7	5	63±14	467	56	467	56
PCL_IP6	5	258±62	431	26	8000	159

Tendons:

Tissue	Displacement in fiber direction [mm]	Desired Modulus Range [MPa]	Reference length [mm], cross sectional area [mm^2]	Initial guess c5	Measured linear stiffness K [N/mm], Modulus E [MPa]	Final guess c5 *	Measured linear stiffness K [N/mm], Modulus E [MPa]
PTL_IP6	5	337.8.±67.7	L=61.3502 A=32.2555	777.56	K=420.6347 E =800.05	337.8	K=252.873 E=480.96
QAT_IP6	5	255.3±64.1	L=72.9695 A=66.1315	777.56	K =578.8028 E =638.651	255.3	K= 318.736 E= 351.69

* when c5 was set to the average modulus in the range, measured modulus fell within 2 standard deviations, which is a good sanity check.

Cartilage:

Tissue	Desired Linear Stiffness Range [N/mm]	Initial guess C1, K	Measured linear stiffness [N/mm]	Final guess C1, K	Measured linear stiffness [N/mm]
TBC-L_IP6	20.38±5.32	C1 = 2.54 K=100	45.56	C1 = 1.25 K*=50	23.5

*C1 was adjusted and K was chosen to maintain the same ration C1:K as the initial guess

Meniscus:

c5 will be set to 92 Mpa as it fall within the range of reported values.