

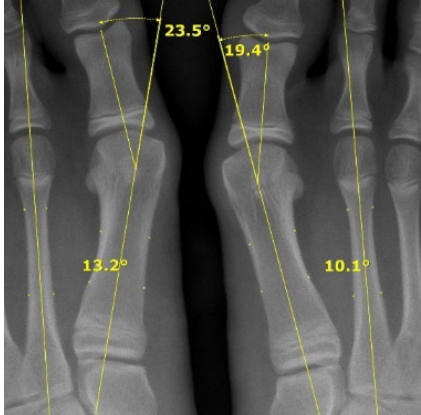
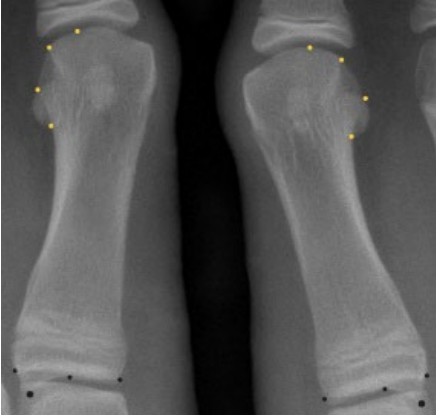
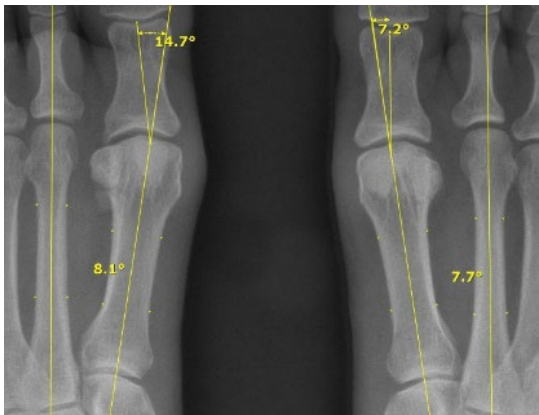
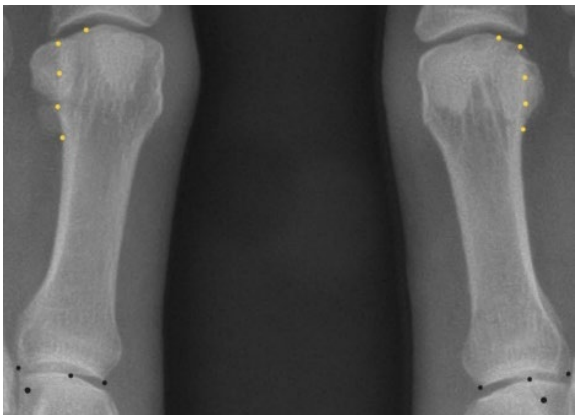
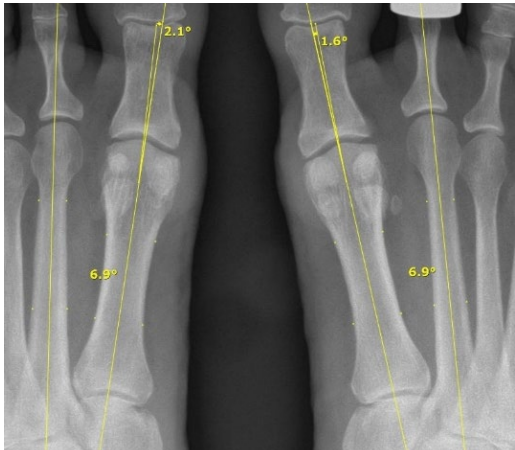
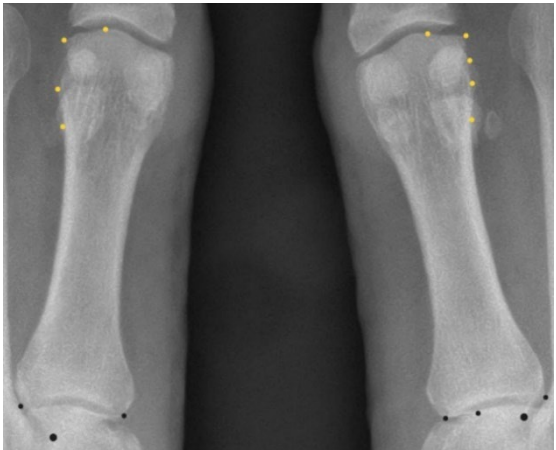


Bone & Joint Open

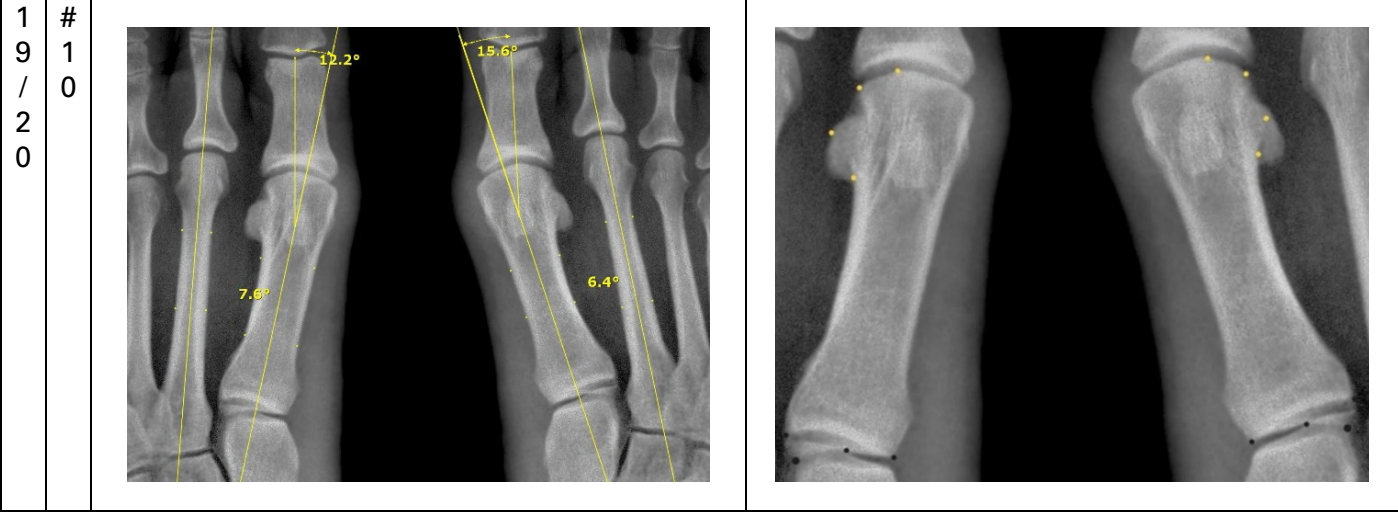
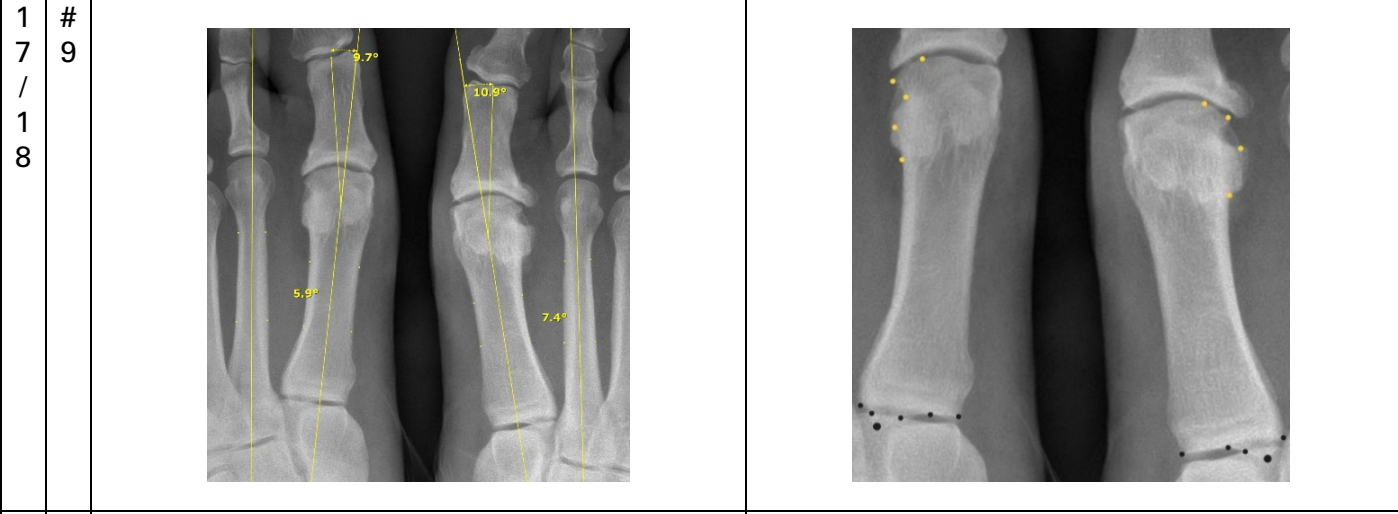
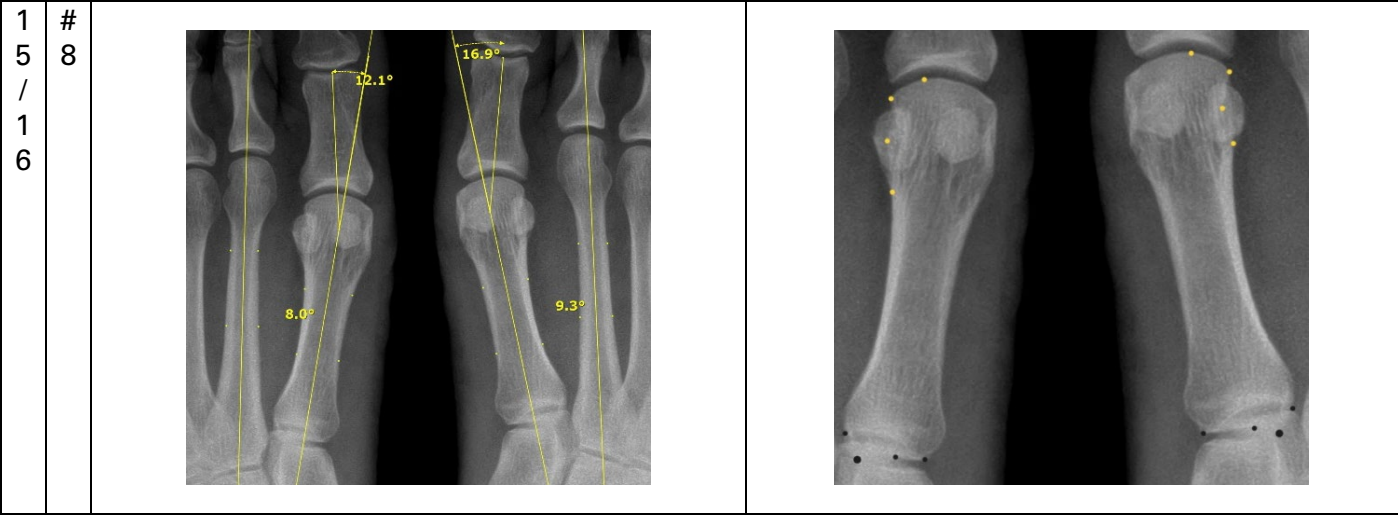
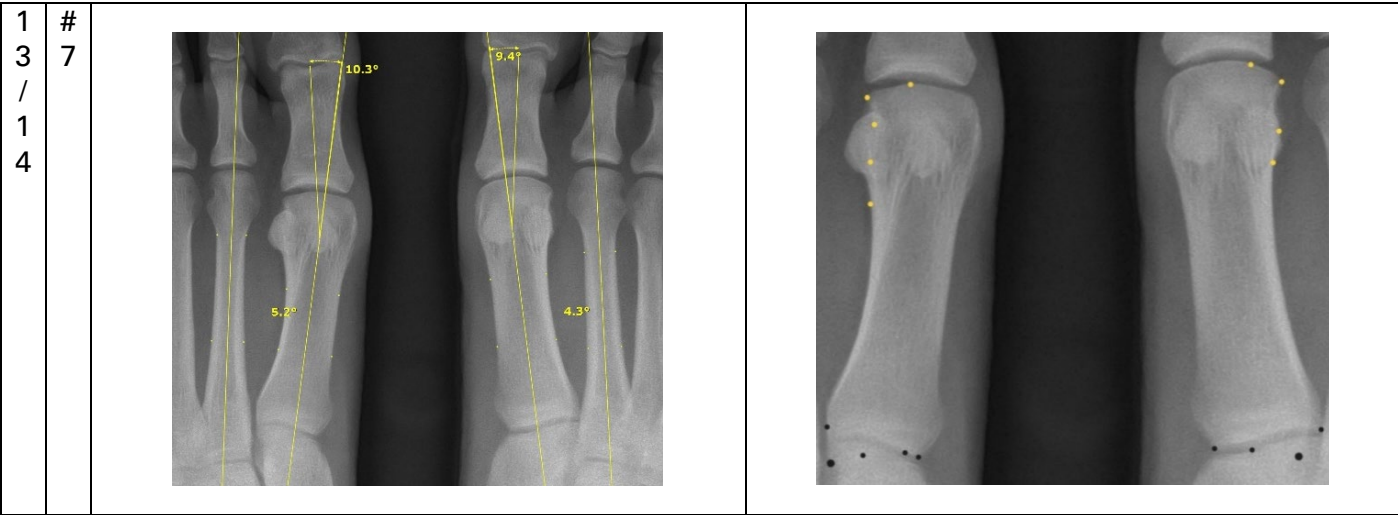
Supplementary Material


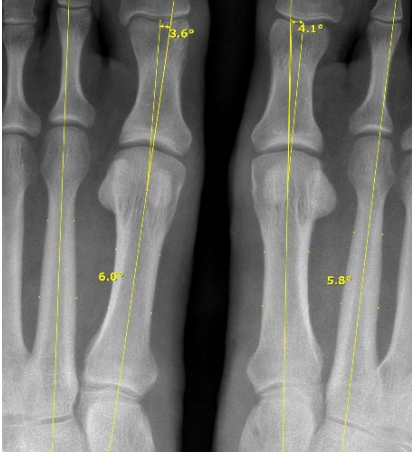

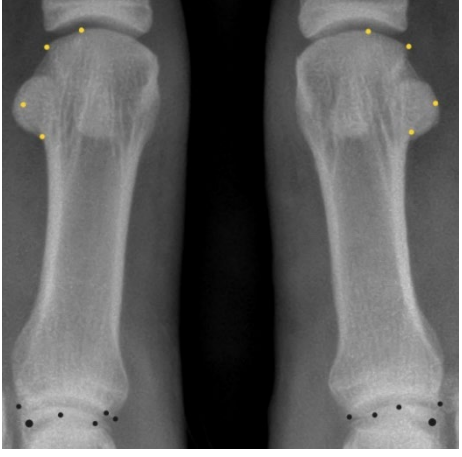
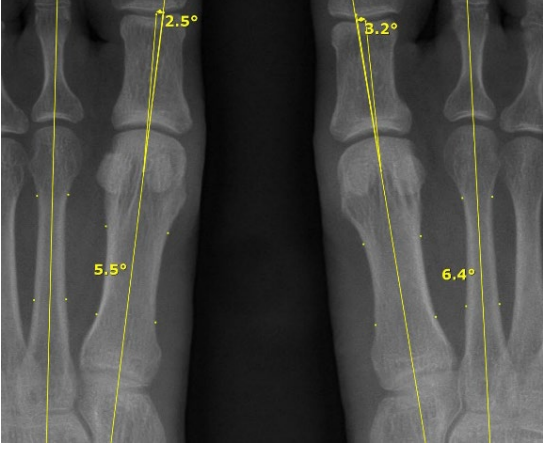
10.1302/2633-1462.511.BJO-2024-0116.R1

Table i. Radiograph gallery of each foot's metatarsophalangeal angle, intermetatarsal angle, round head, and inferior tuberosity position outlines.

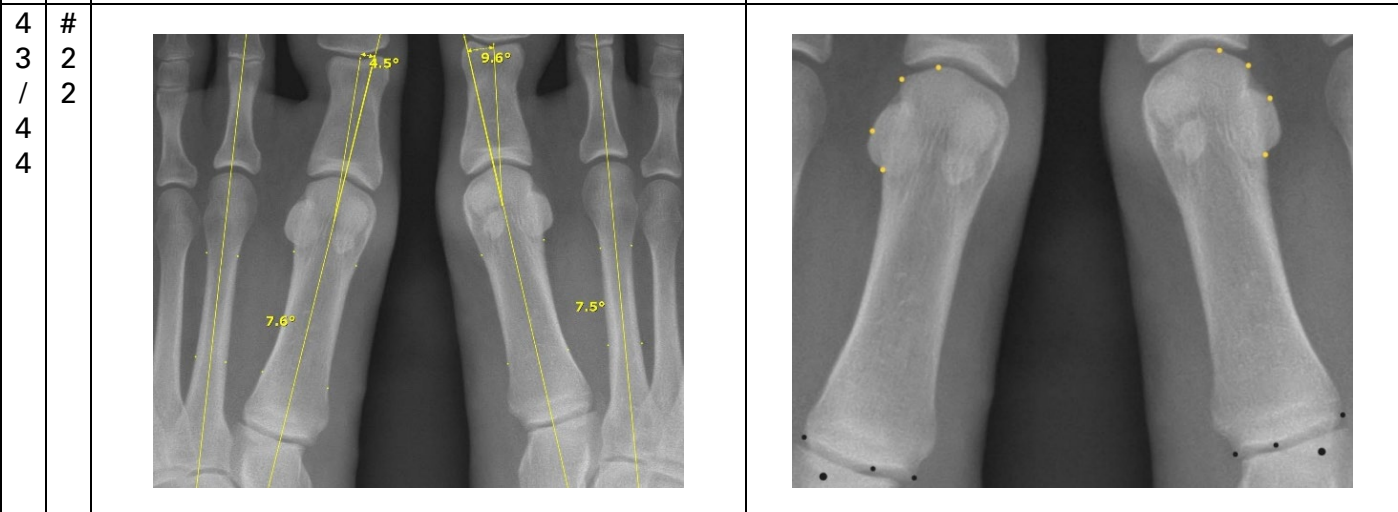
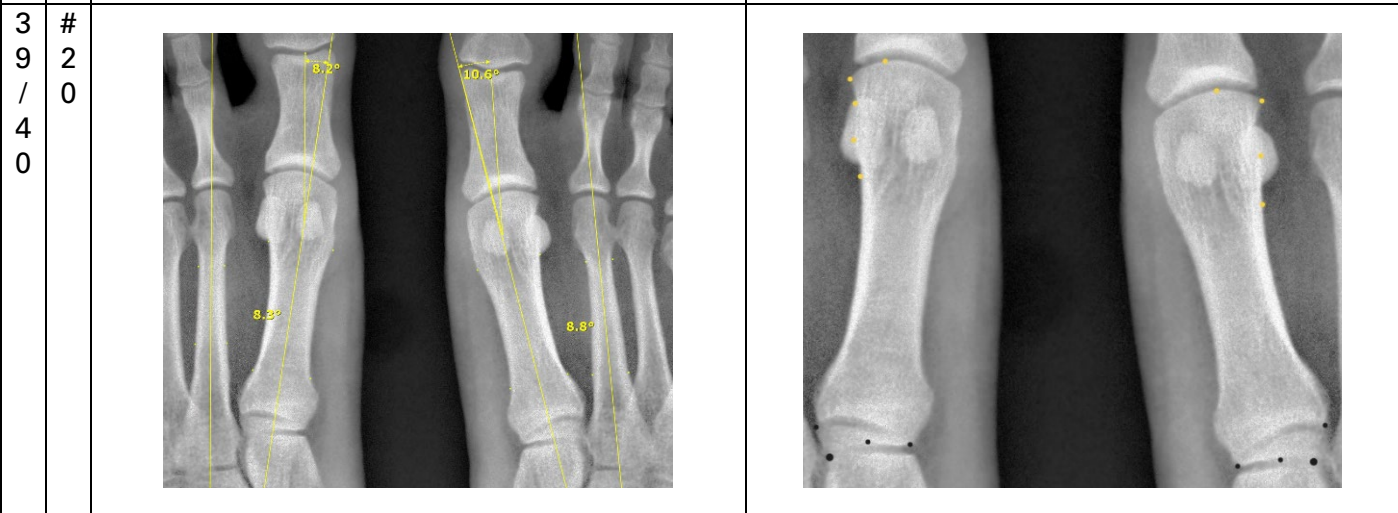
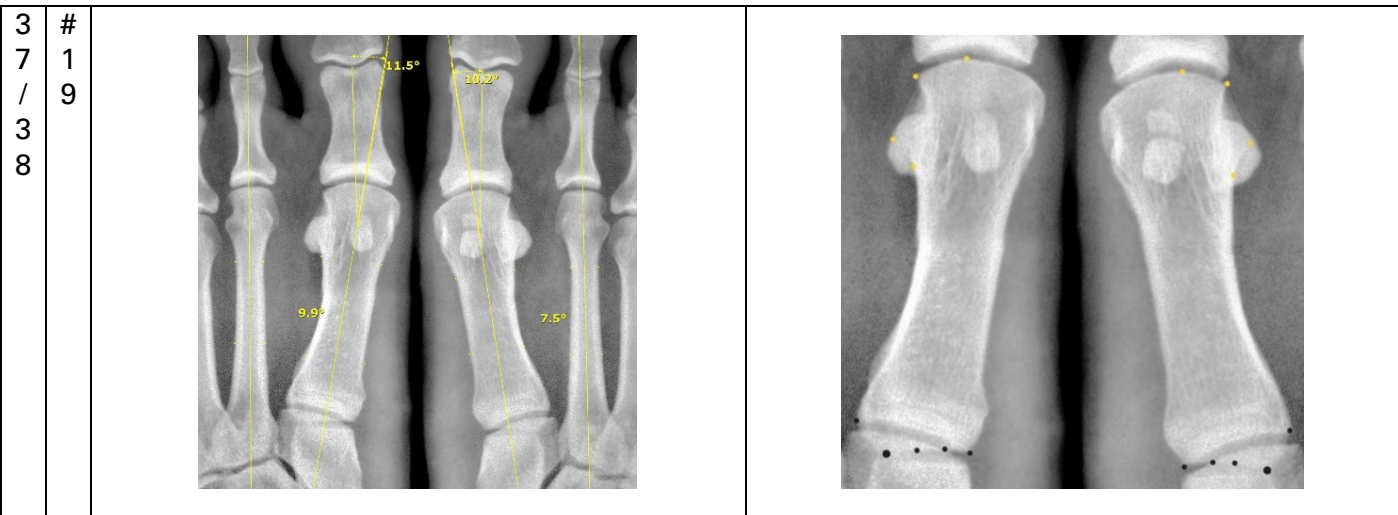
		Normal (preop)	
		With angle	With head shape
1 / 2	# 1		
3 / 4	# 2		

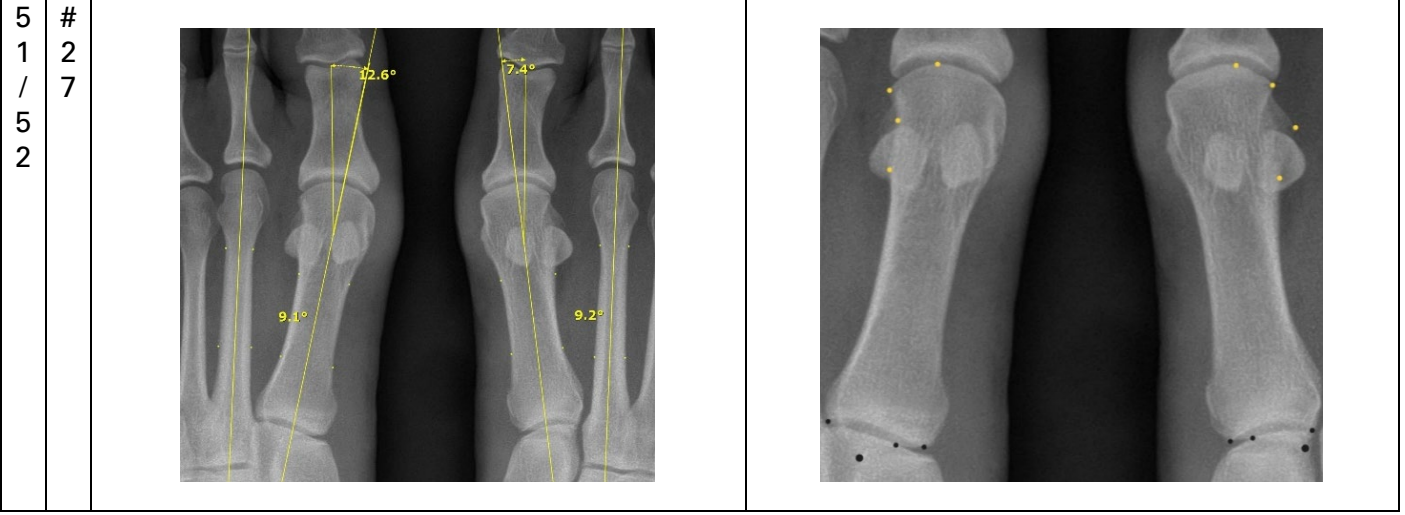
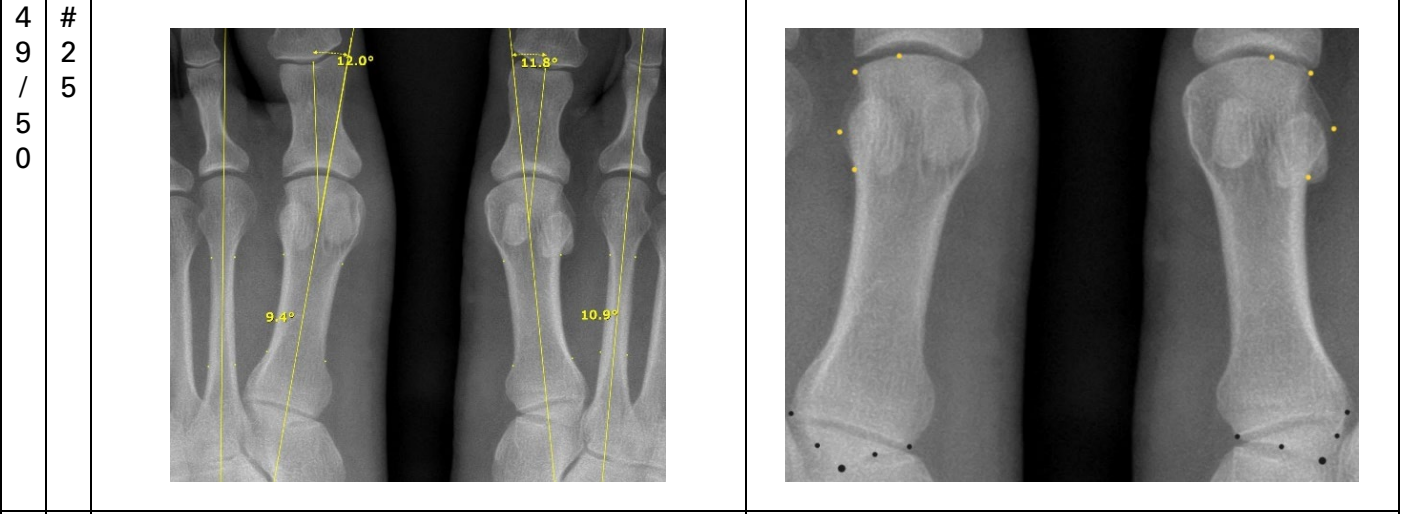
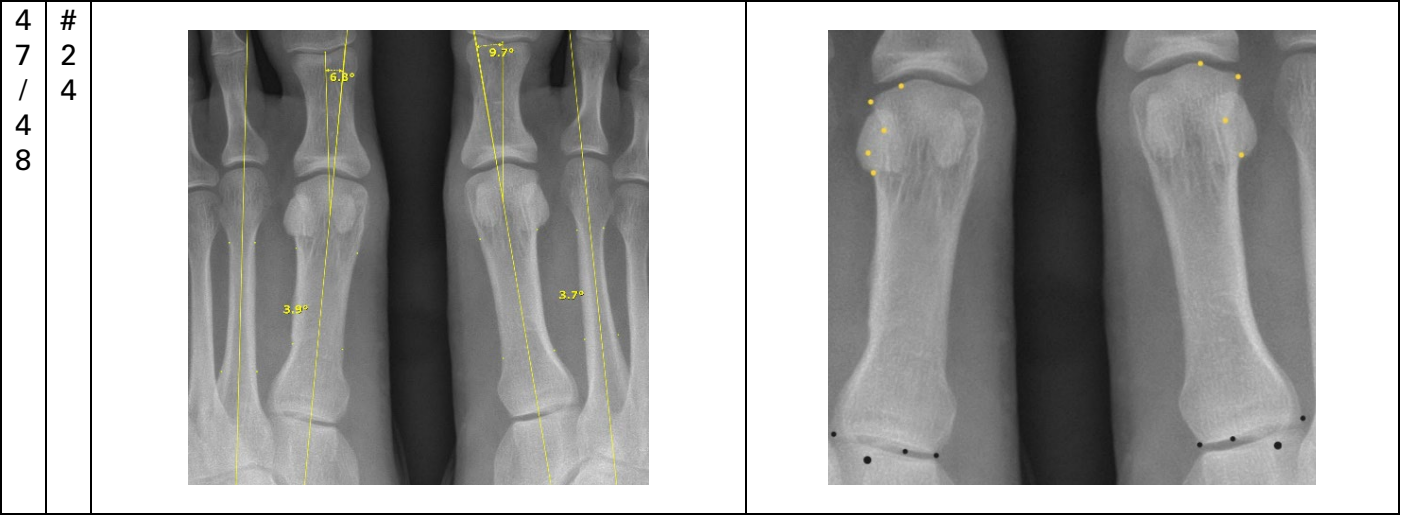
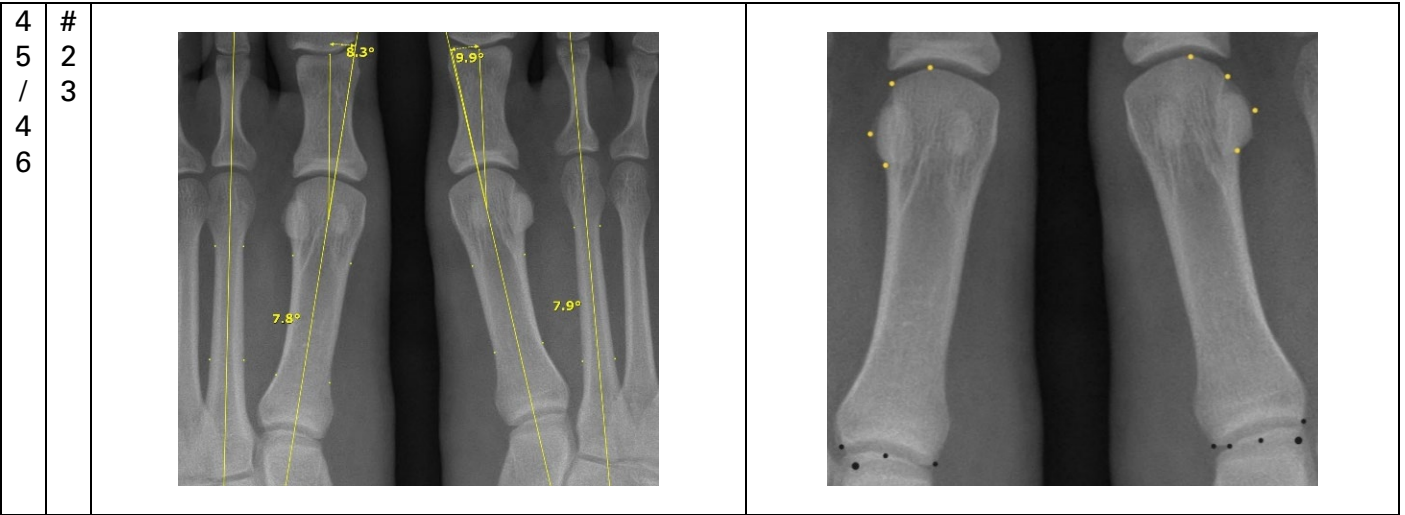
5 / 6	# 3		
7 / 8	# 4		
9 / 10	# 5		
11 / 12	# 6		

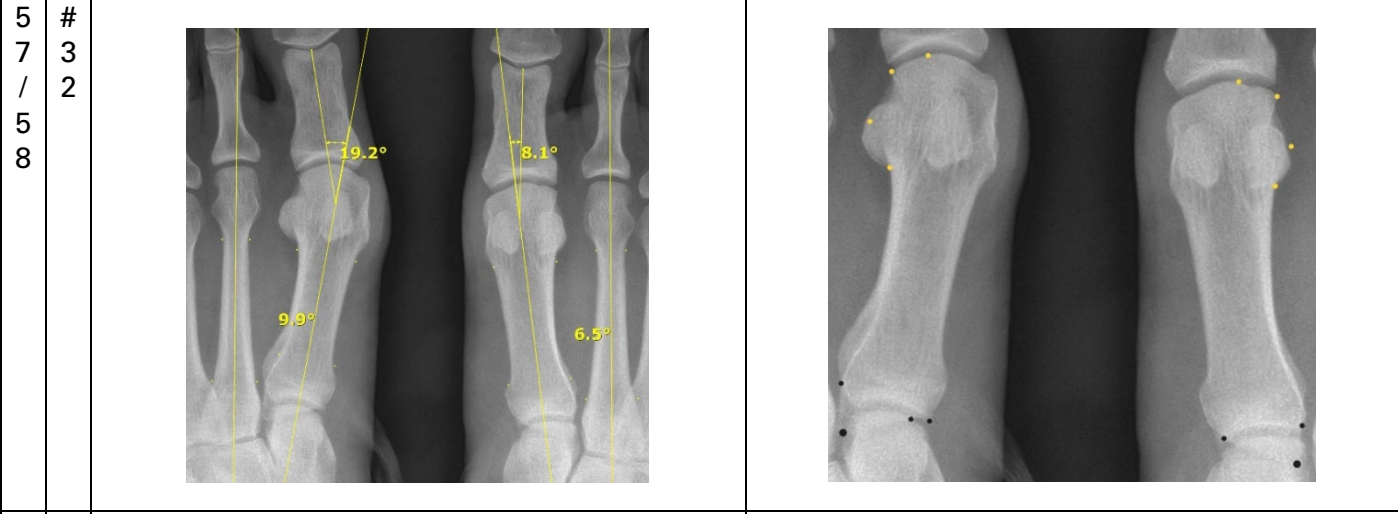
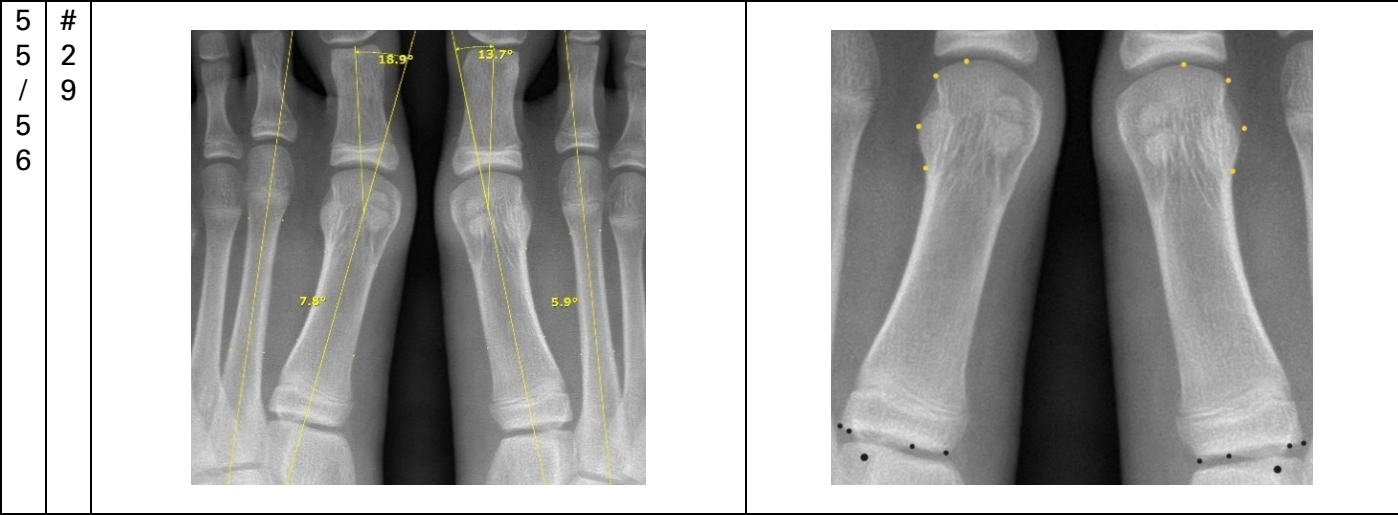
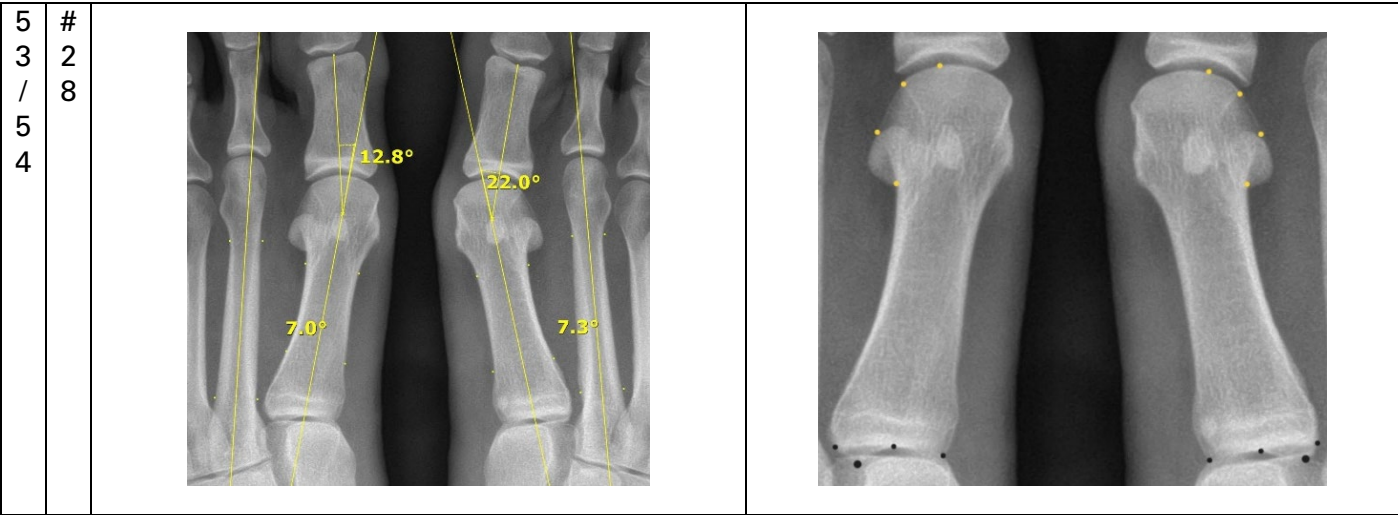


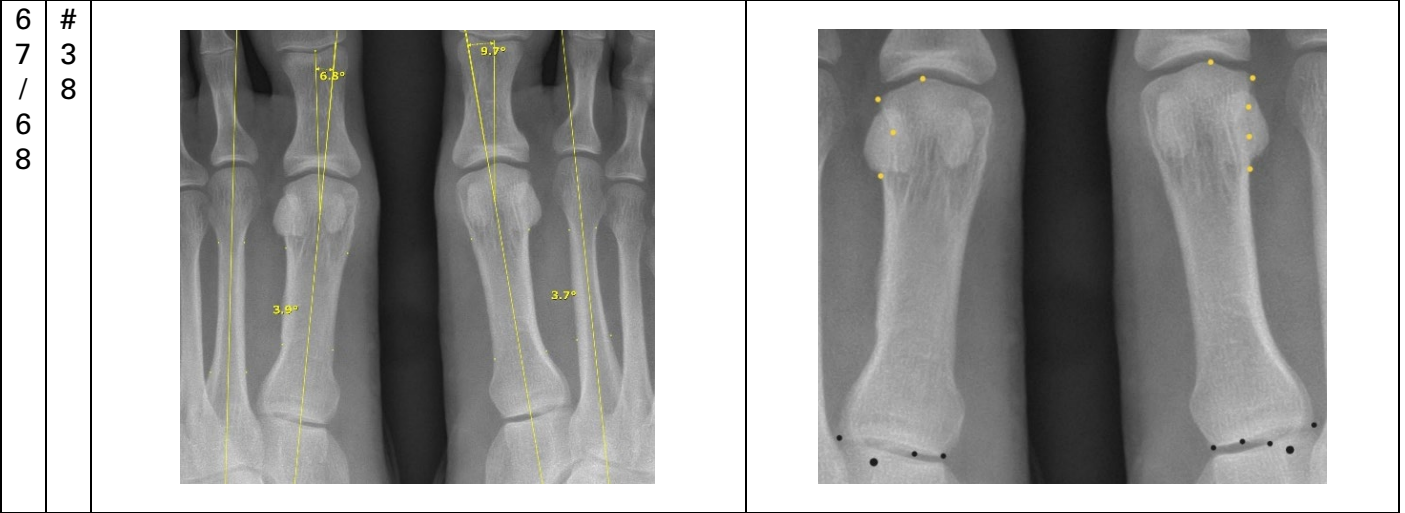
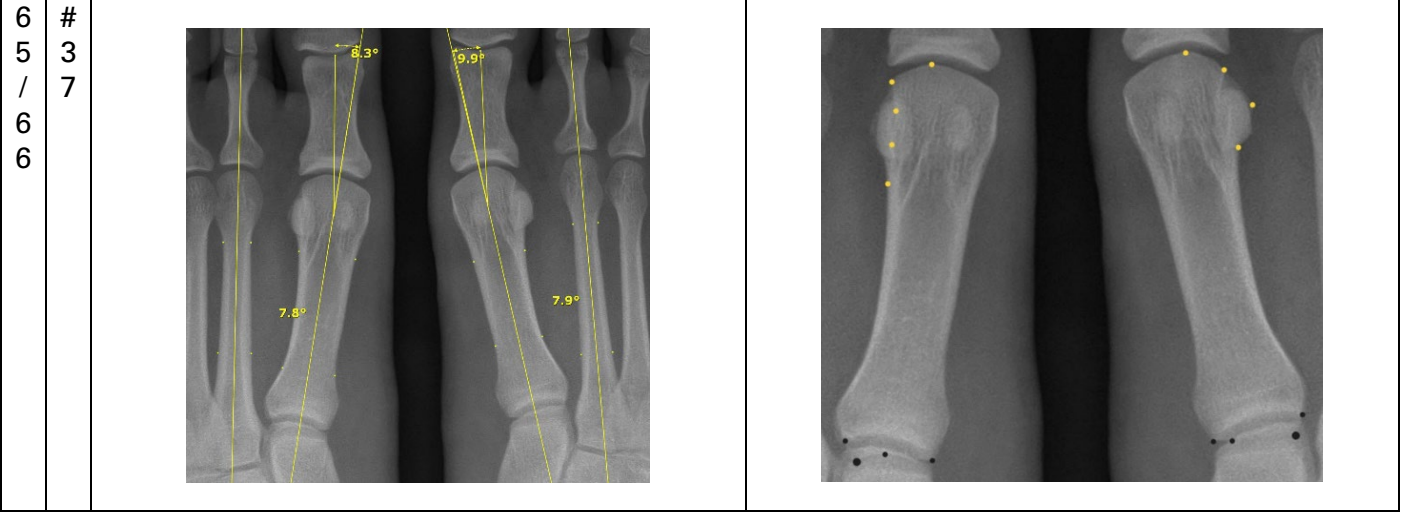
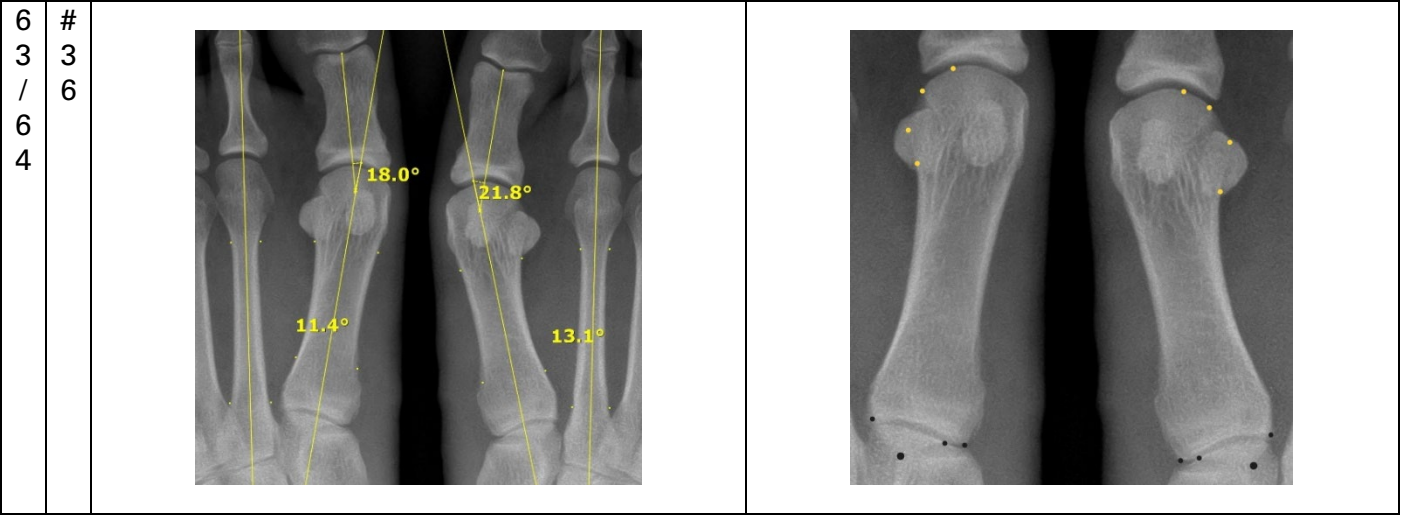
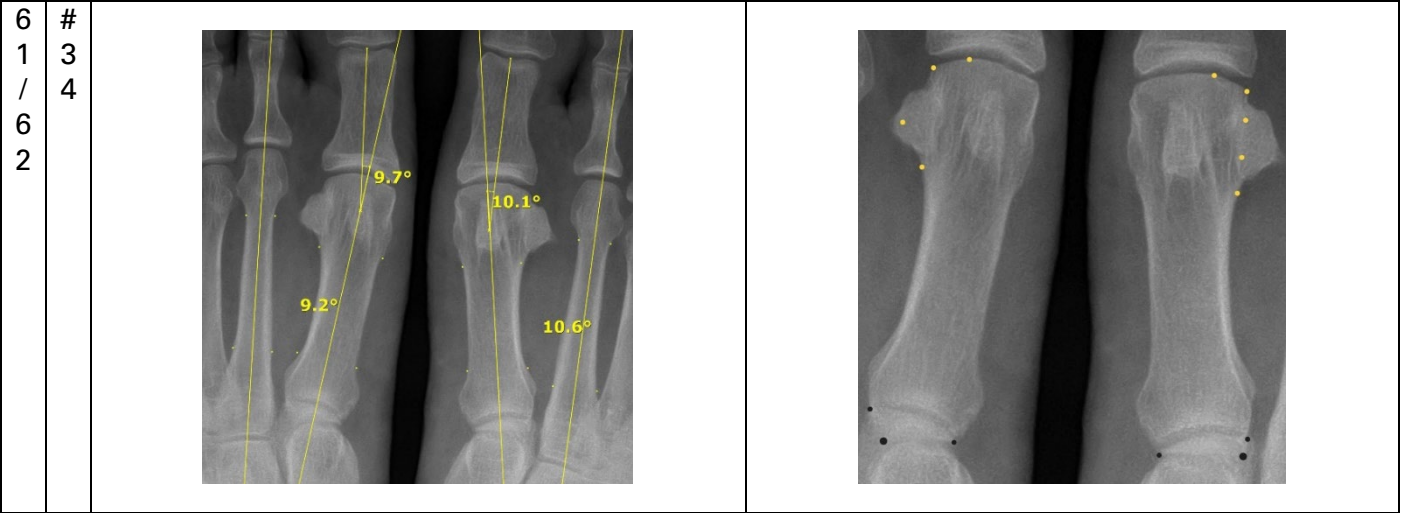
2 1 / 2 2	# 1 1		
2 3 / 2 4	# 1 2		
2 5 / 2 6	# 1 3		
2 7 / 2 8	# 1 4		

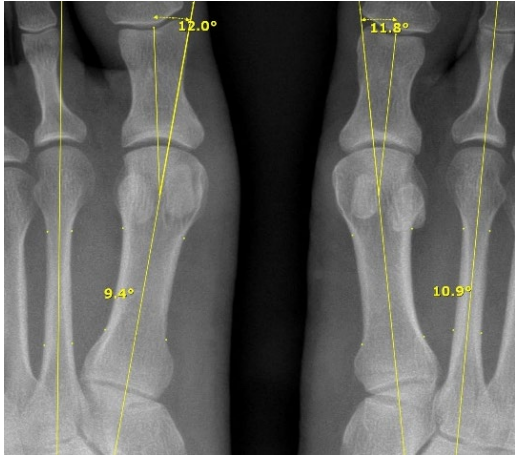
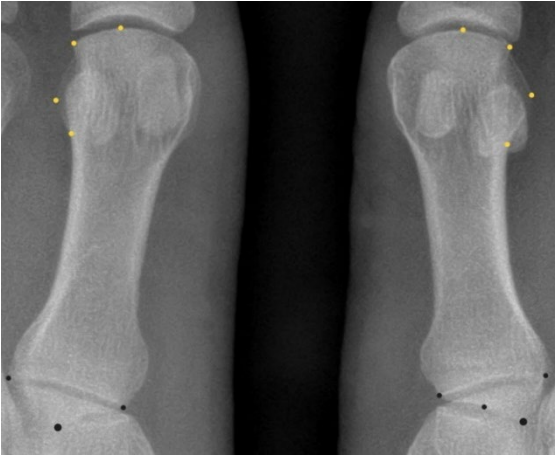
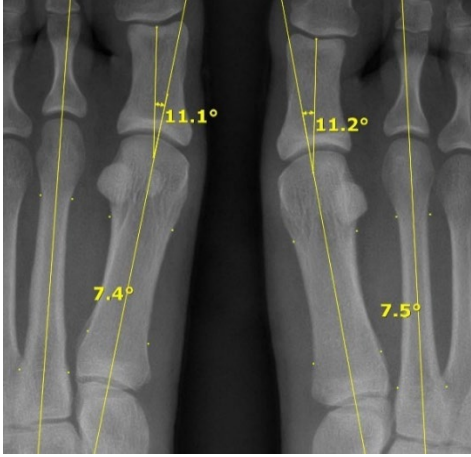
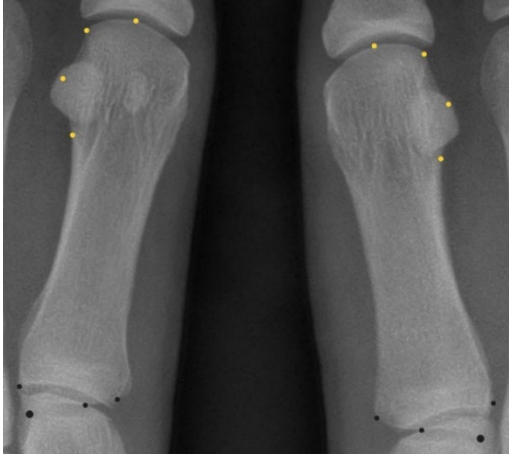
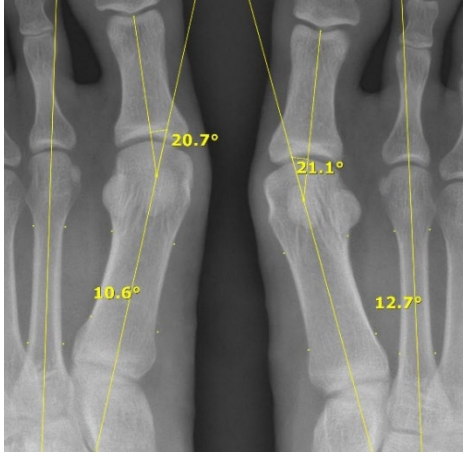

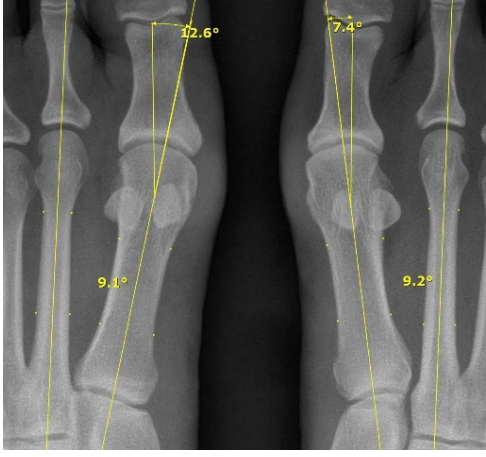

29 / 30	# 15		
31 / 32	# 16		
33 / 34	# 17		
35 / 36	# 18		

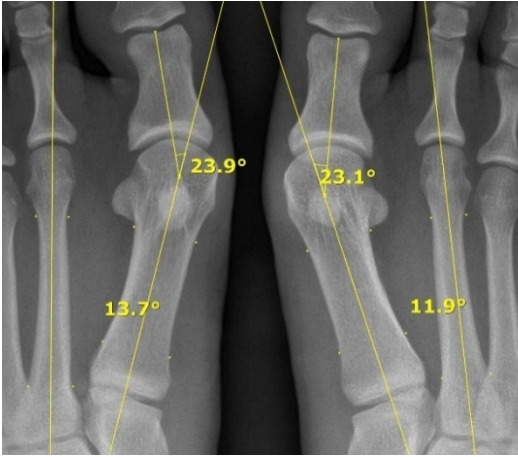
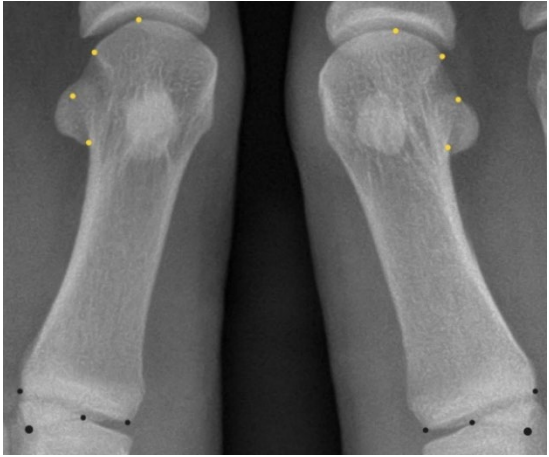
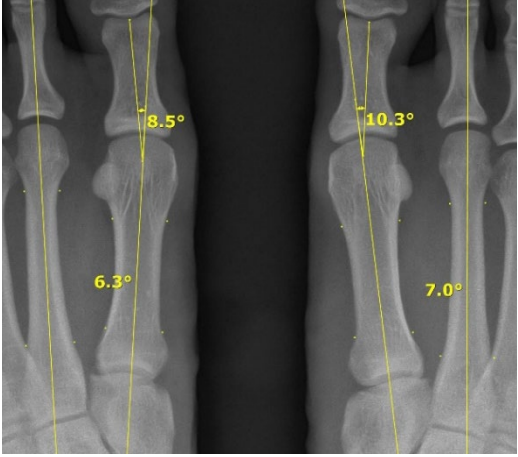
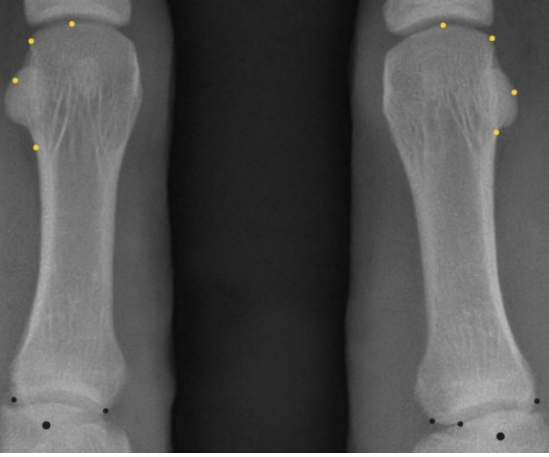
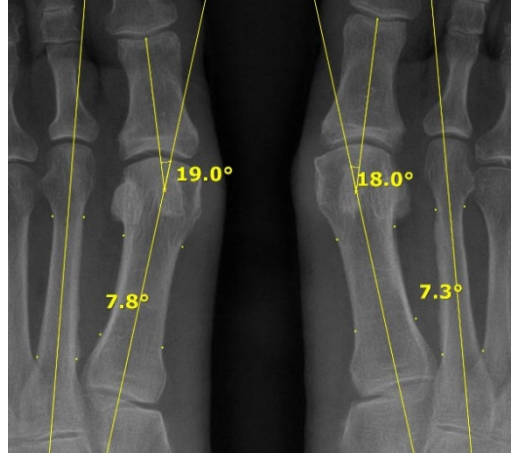
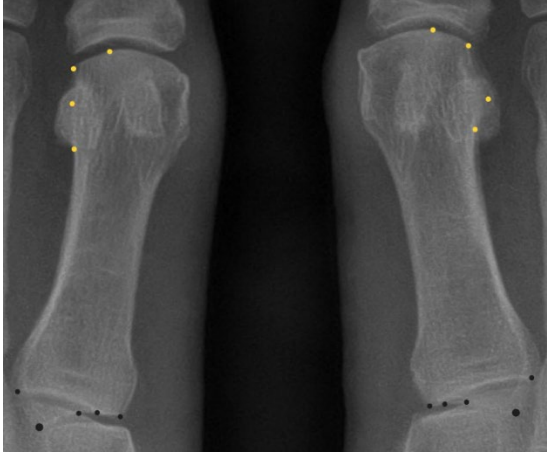
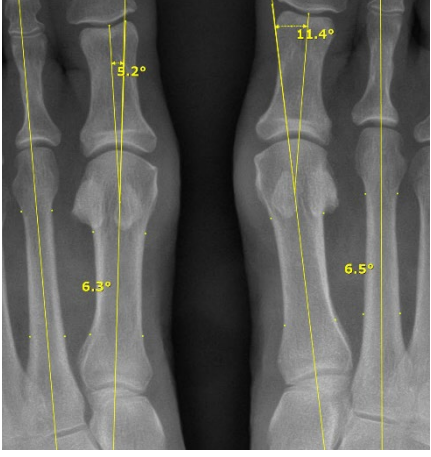



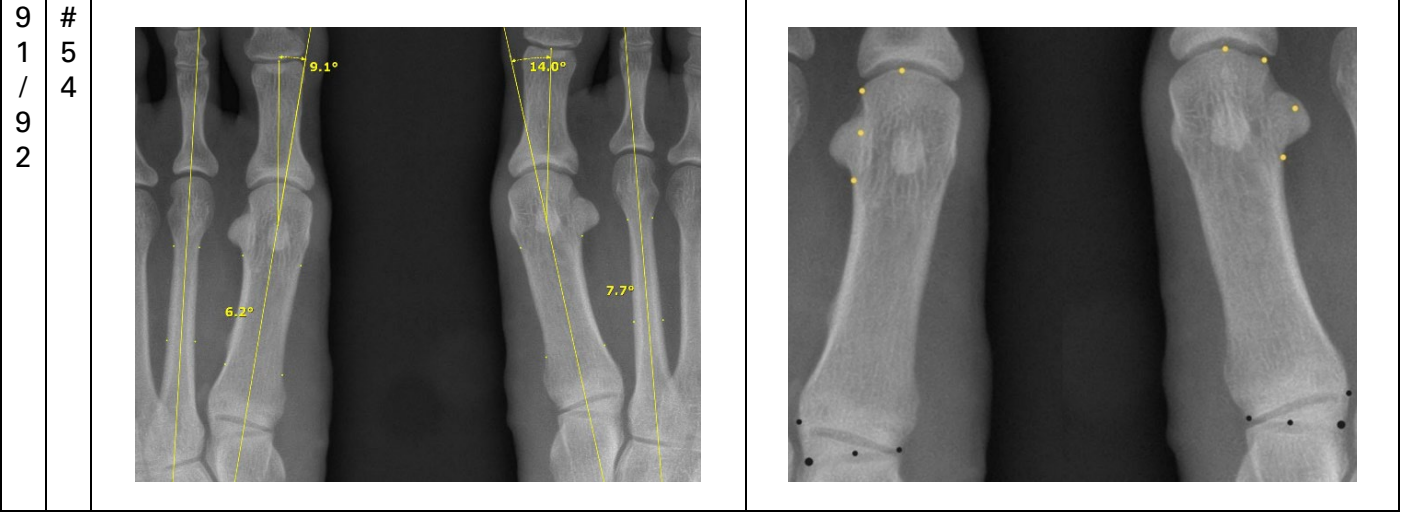
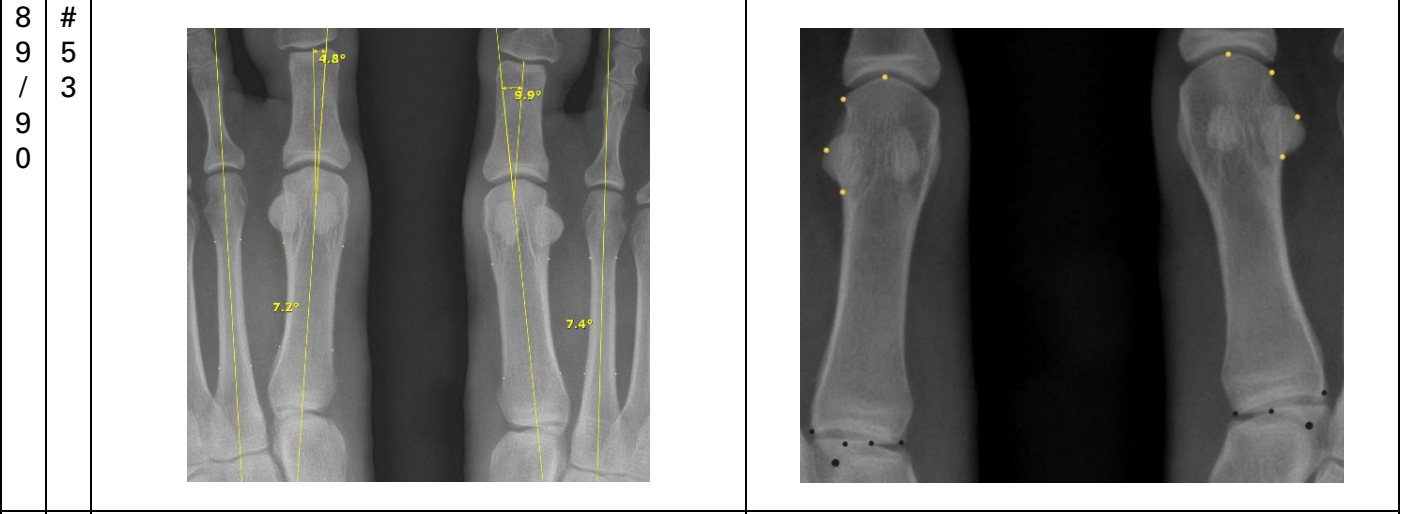
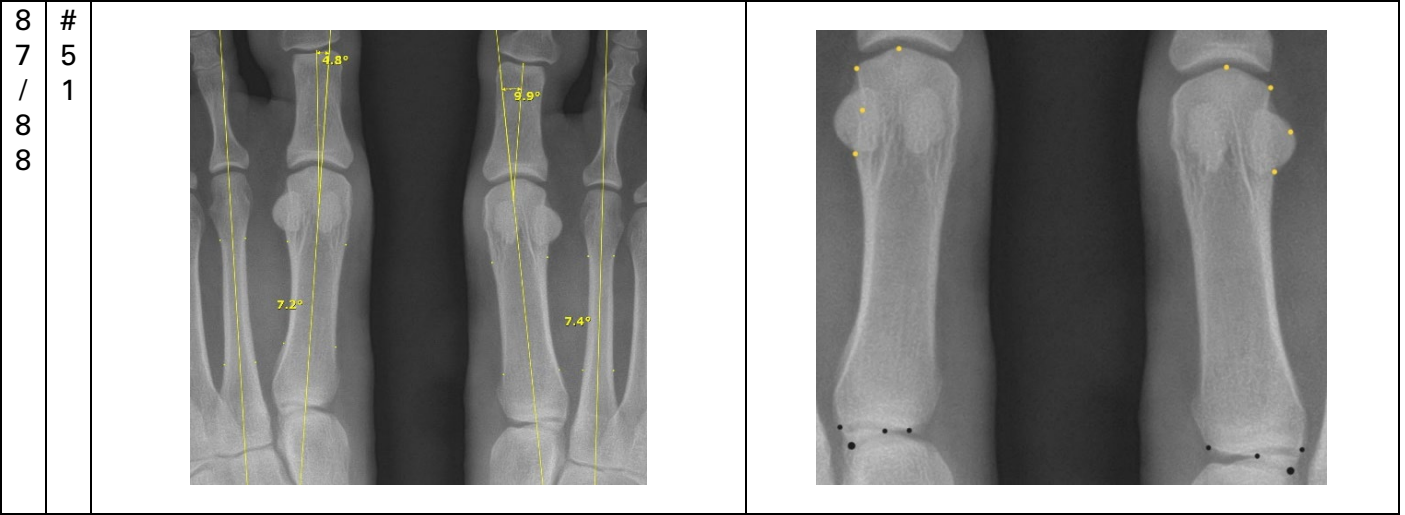
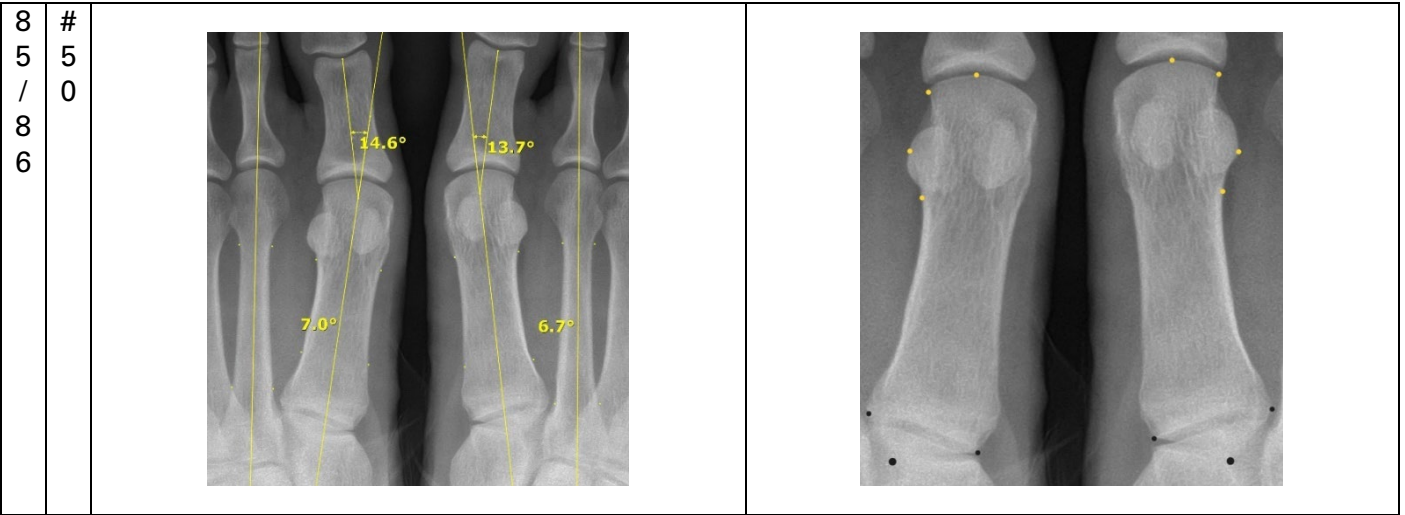


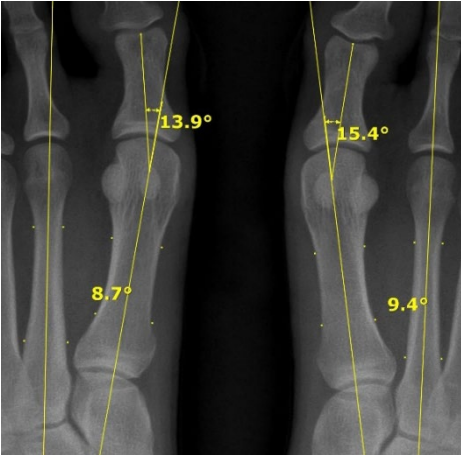
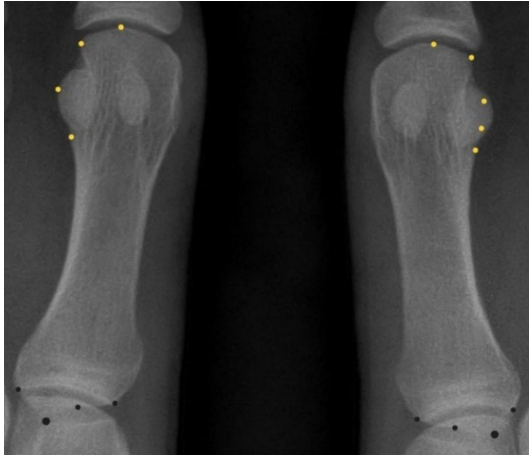
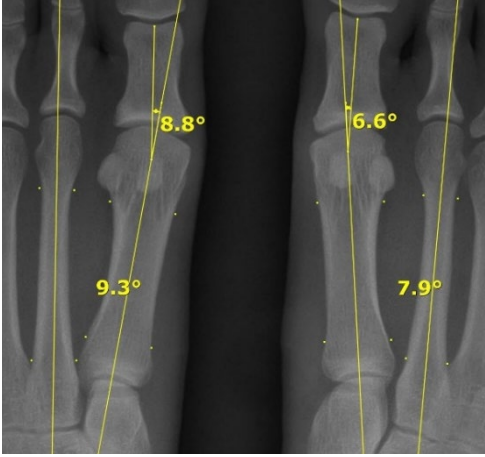
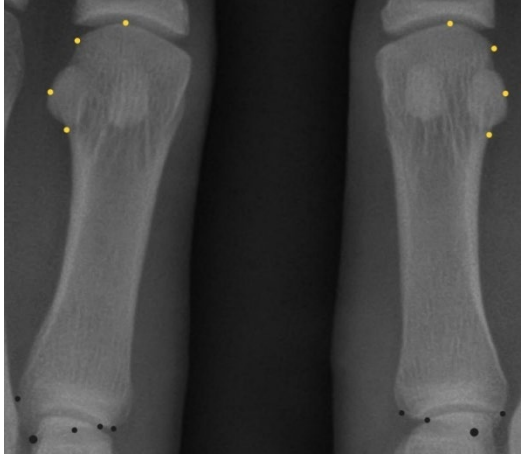
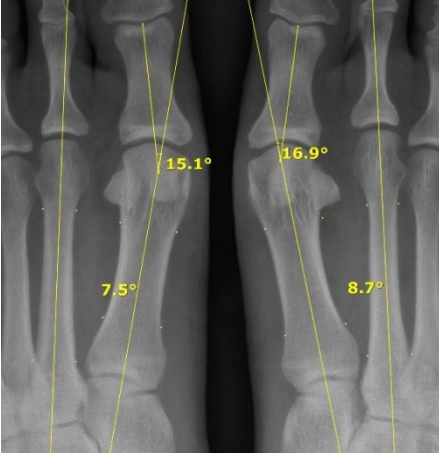
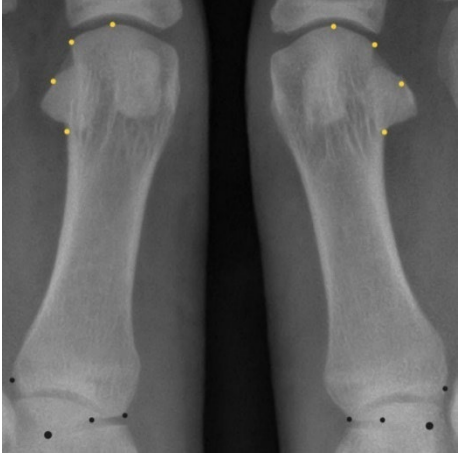


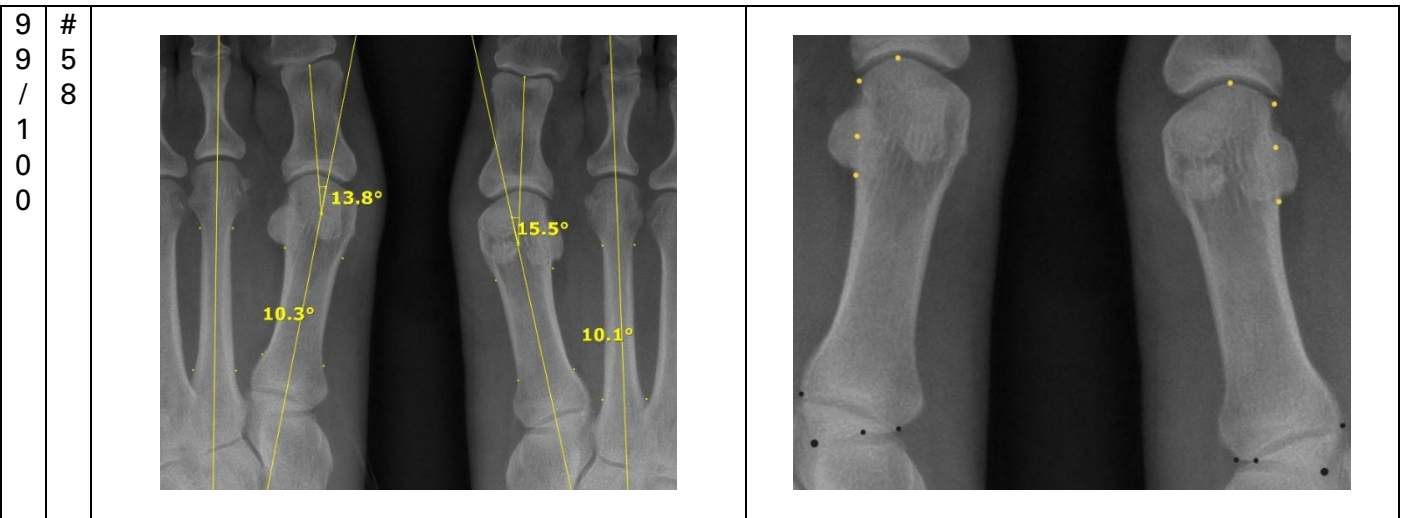


6 9 / 7 0	# 3 9		
7 1 / 7 2	# 4 0		
7 3 / 7 4	# 4 2		
7 5 / 7 6	# 4 3		

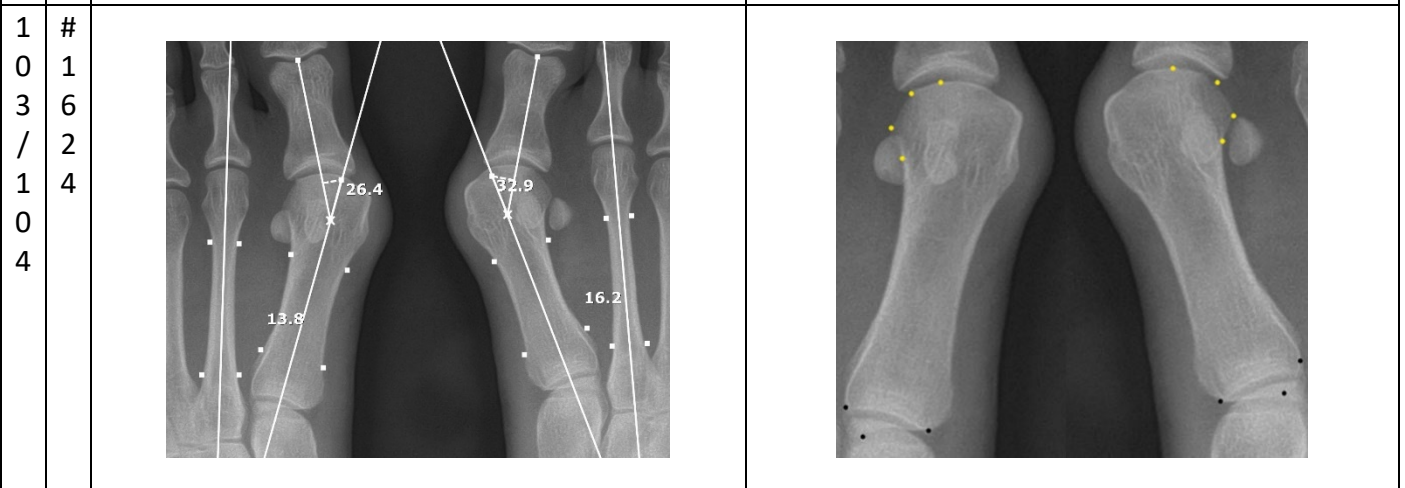
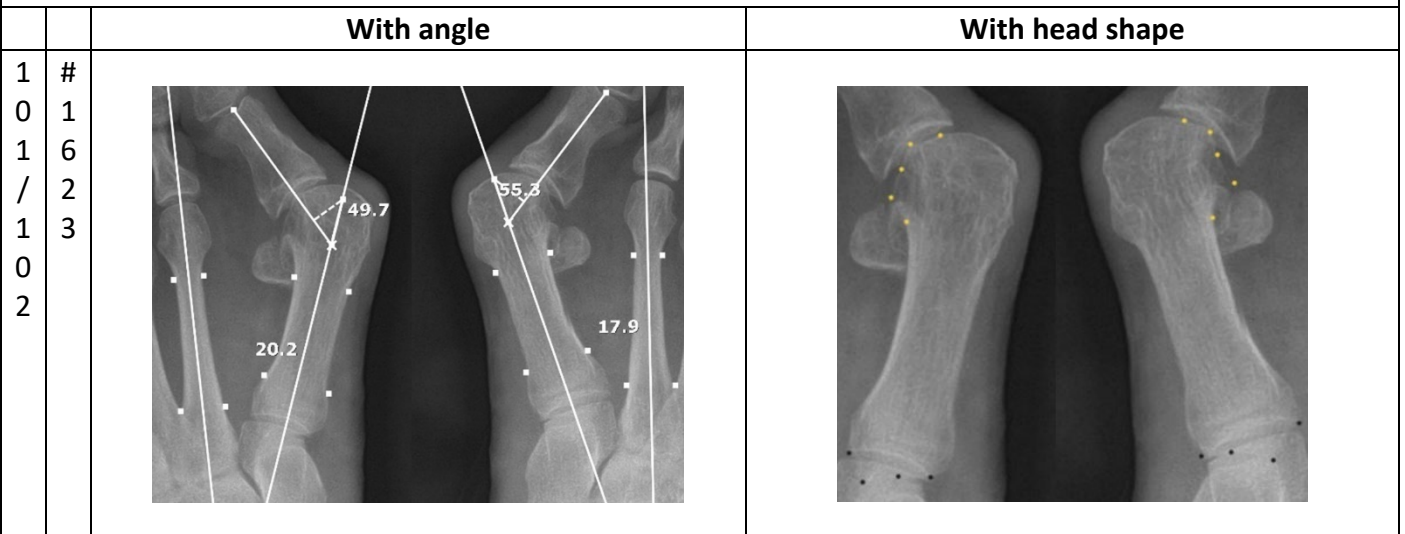
7 7 / 7 8	# 4 4		
7 9 / 8 0	# 4 5		
8 1 / 8 2	# 4 7		
8 3 / 8 4	# 4 9		

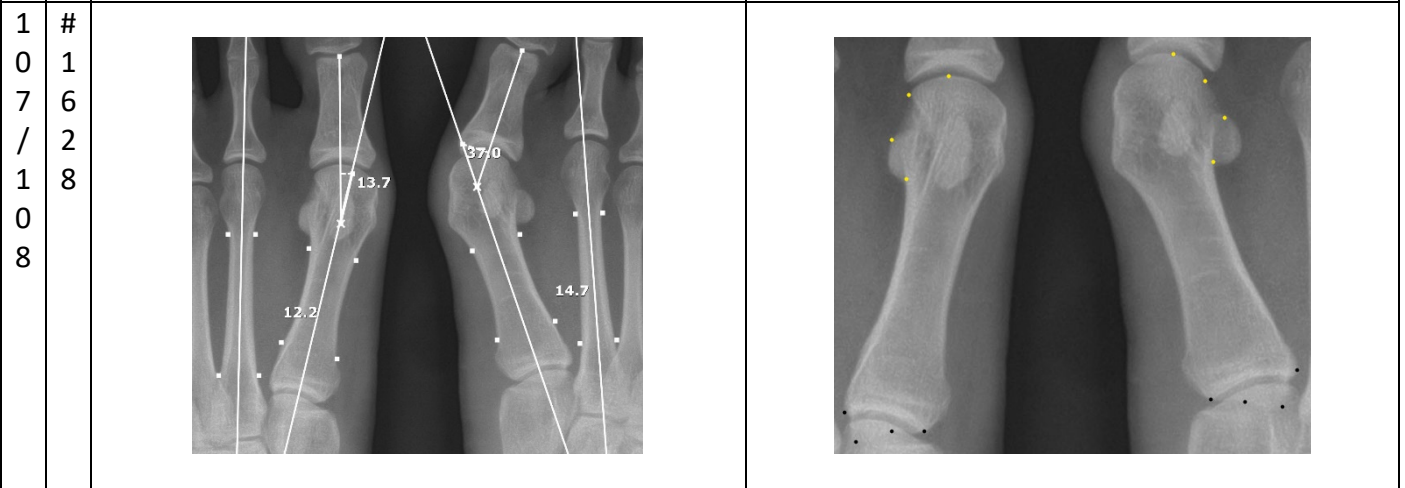



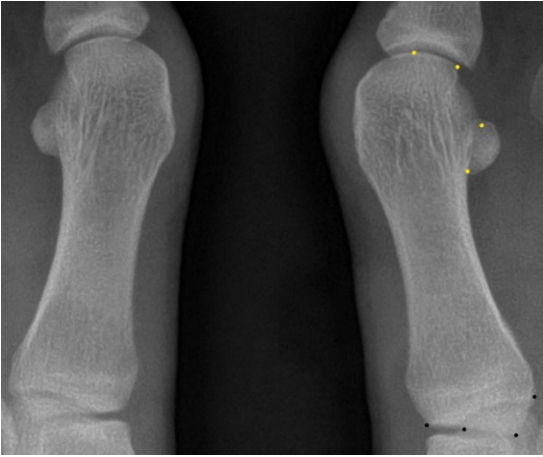
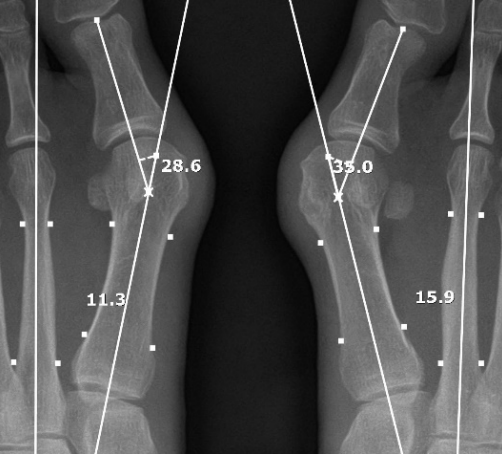
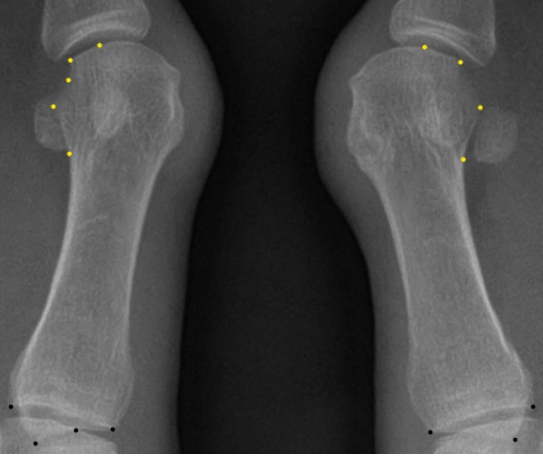
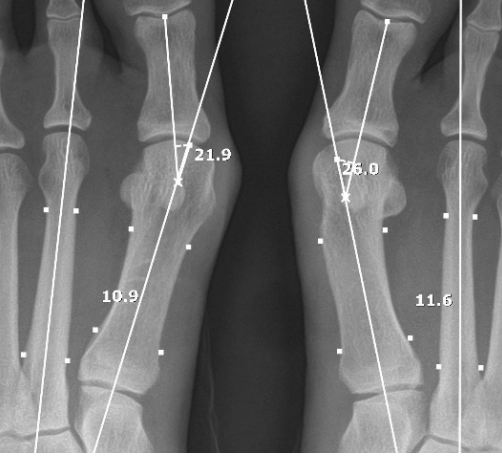
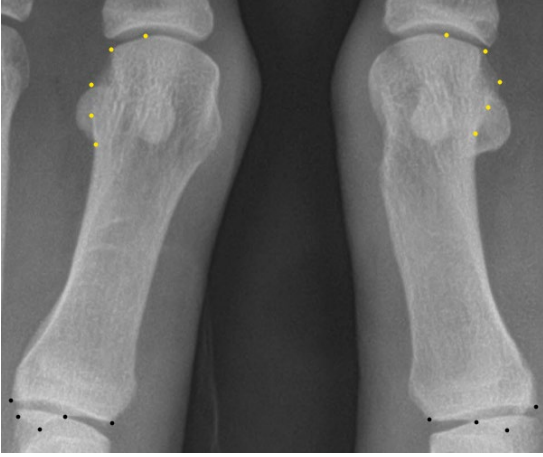
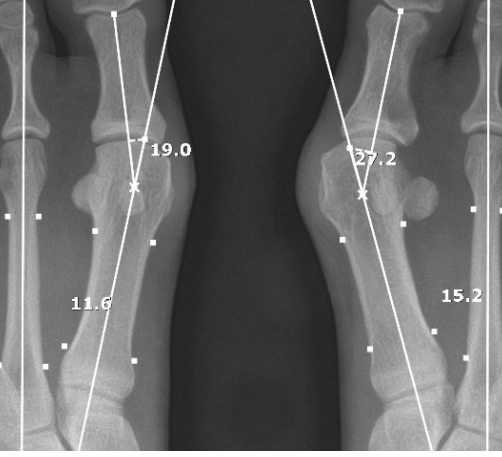
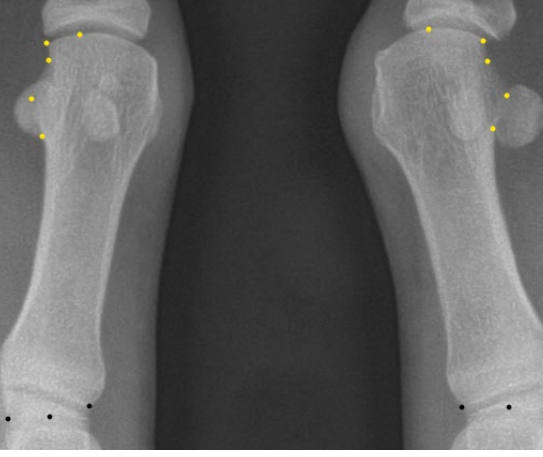
9 3 / 9 4	# 5 5		
9 5 / 9 6	# 5 6		
9 7 / 9 8	# 5 7		

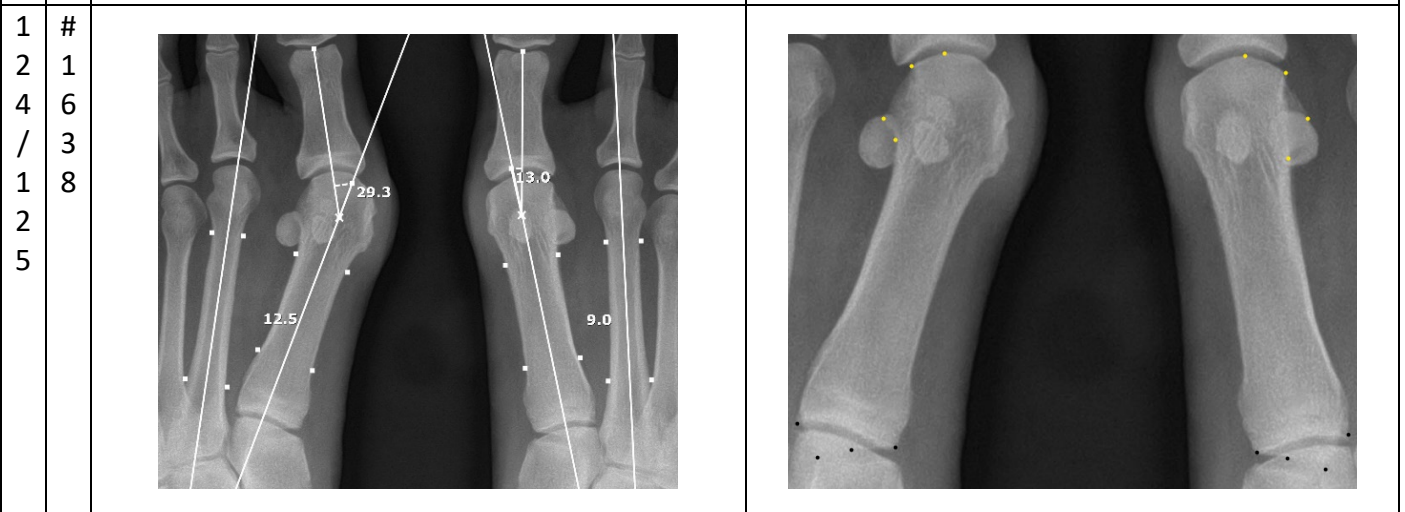
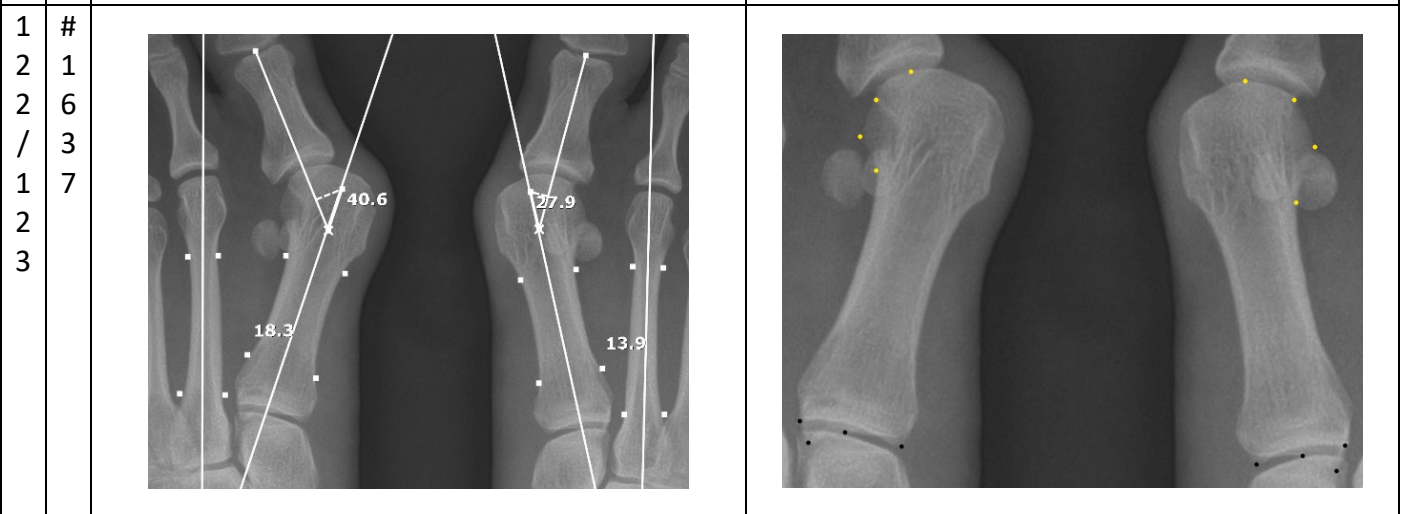
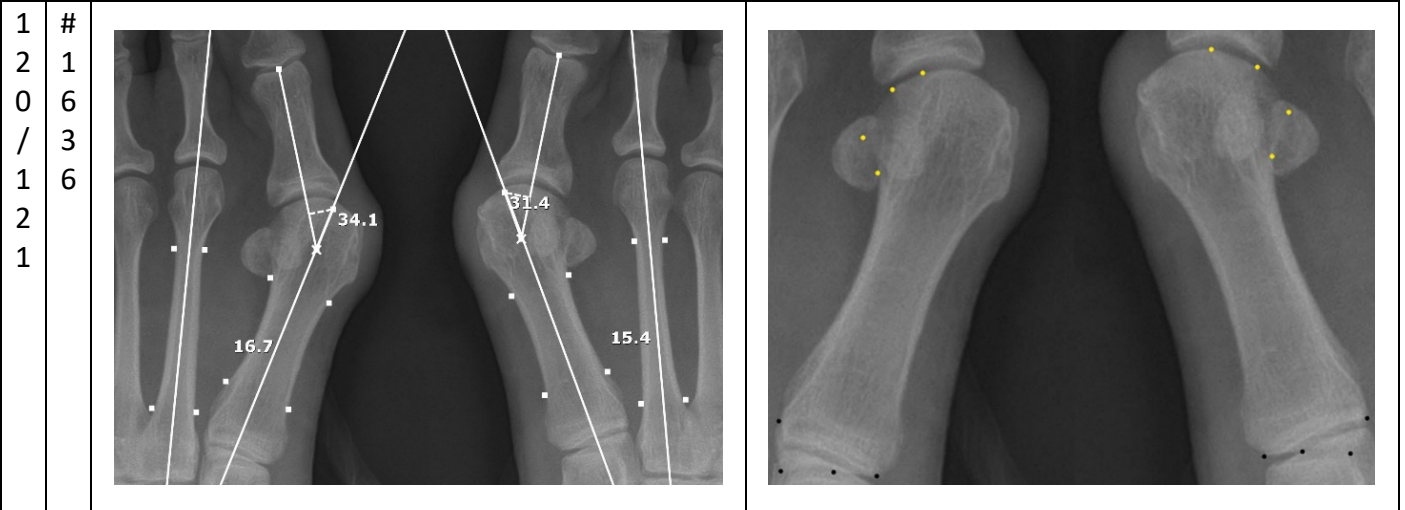
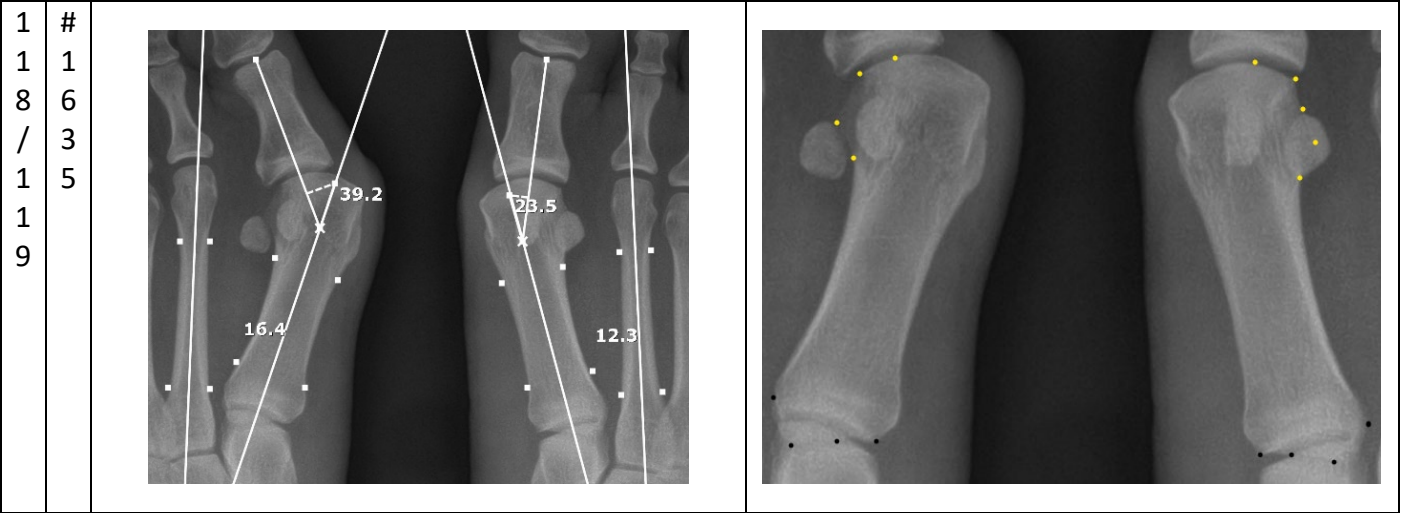


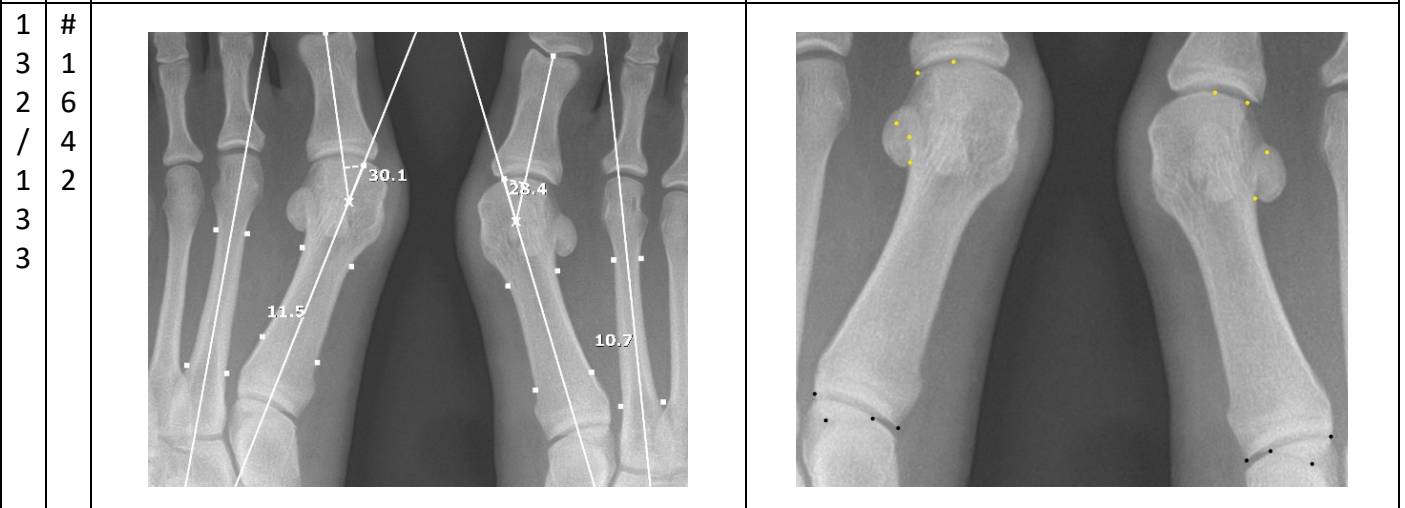
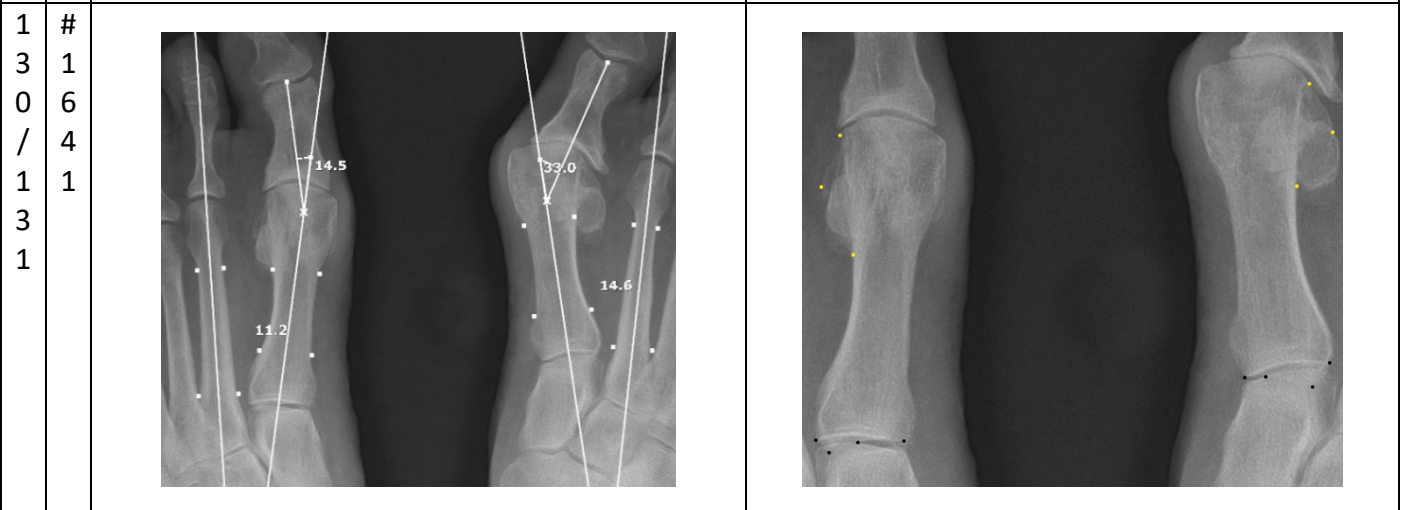
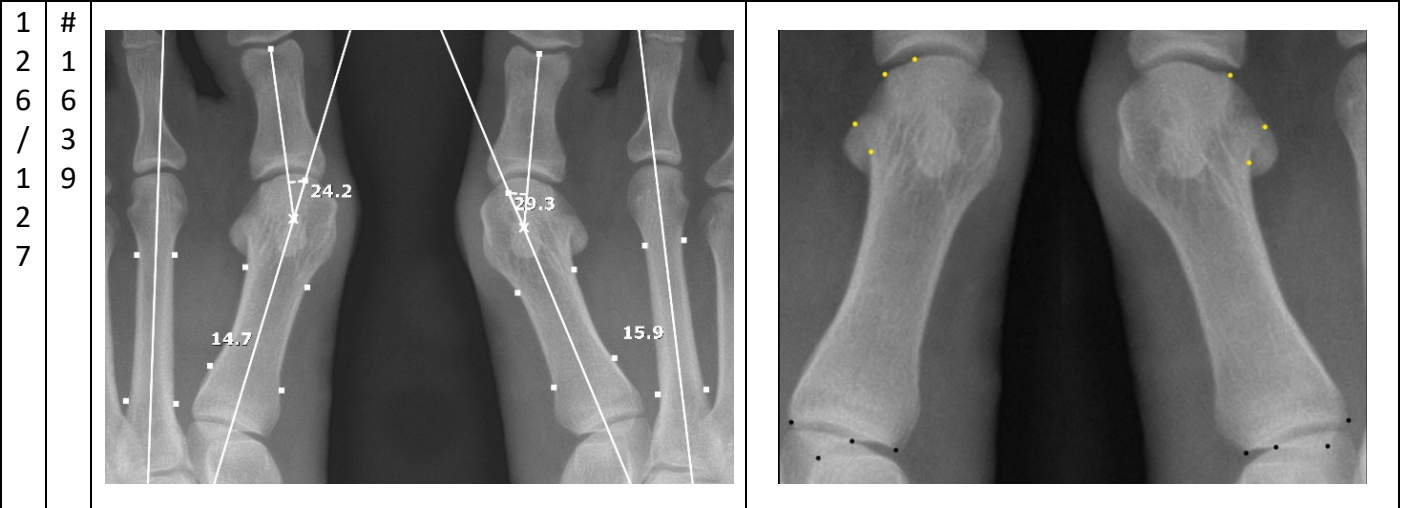
Bunion (preop)

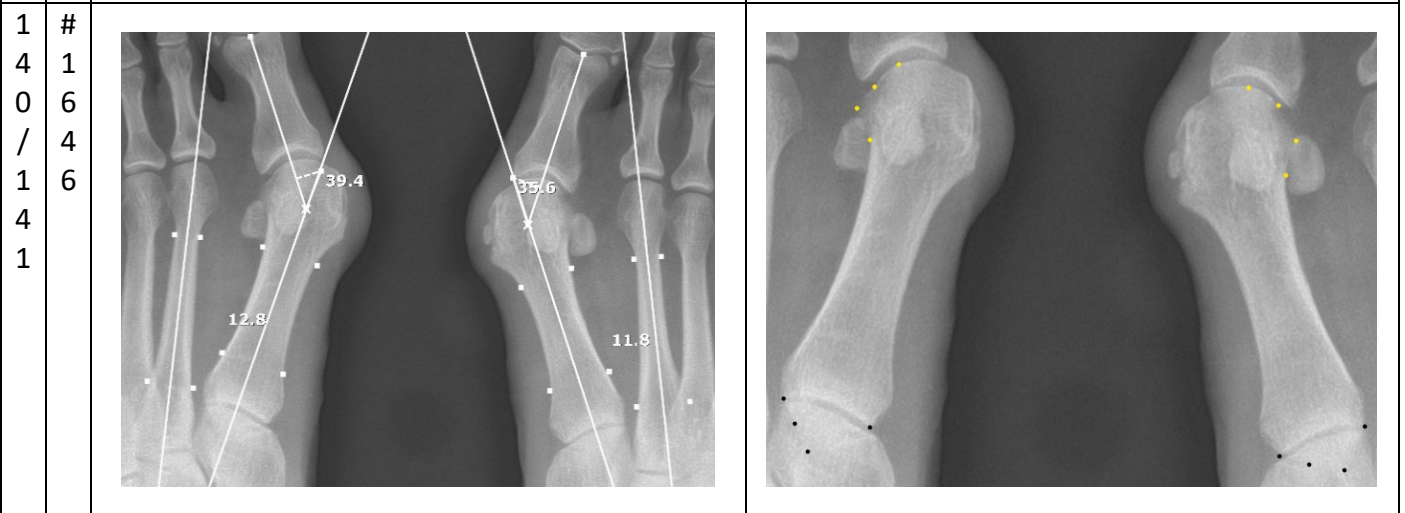
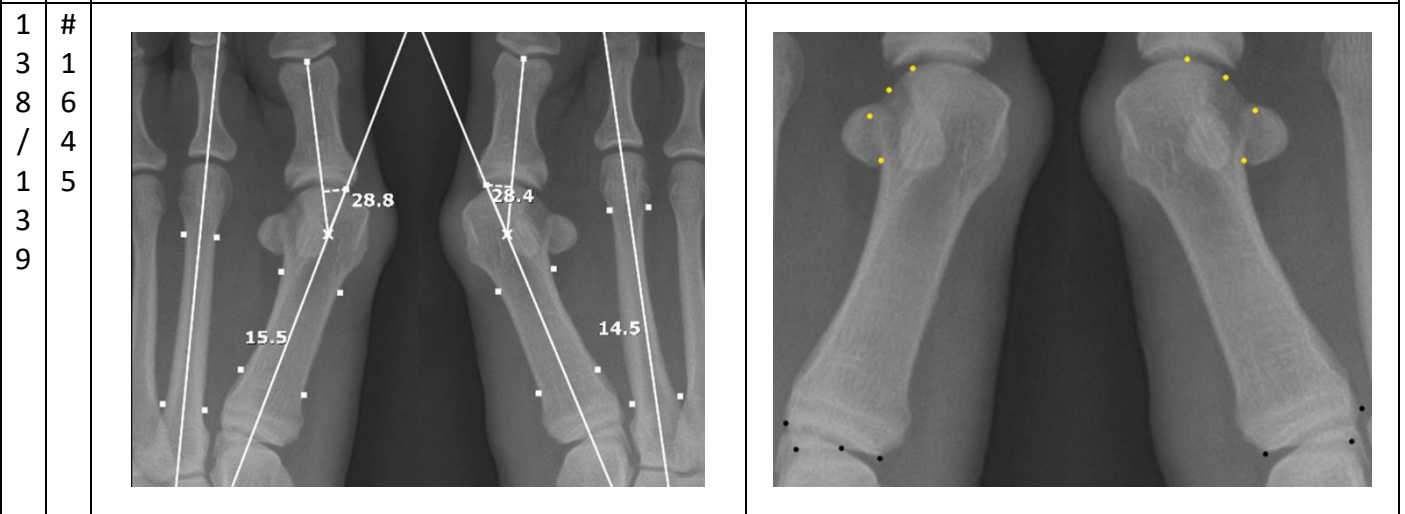
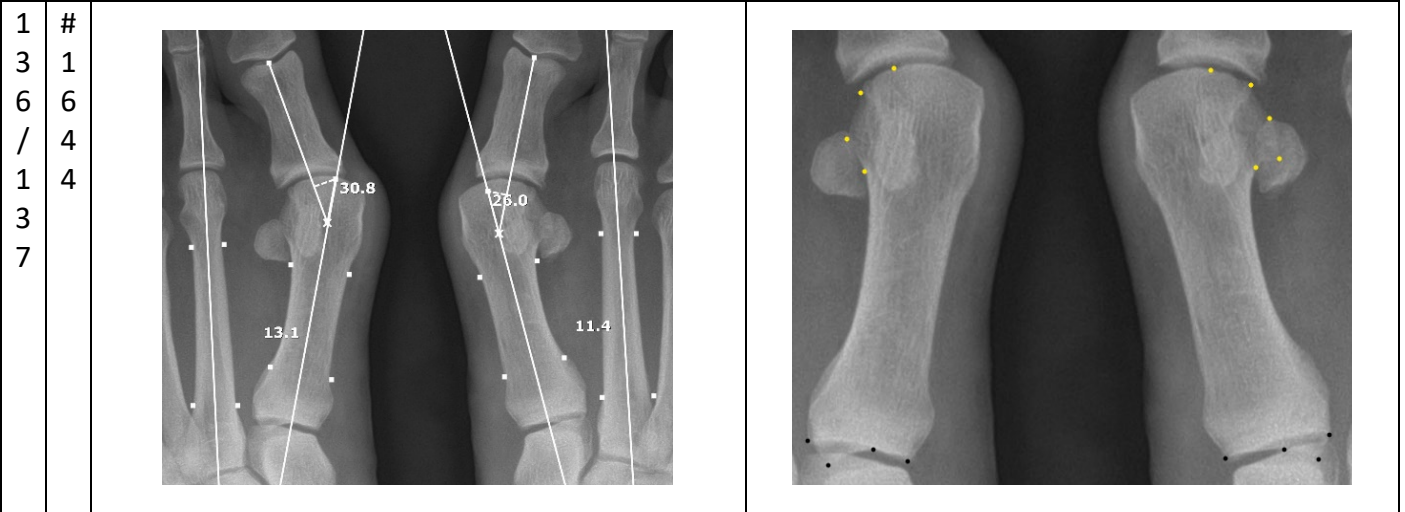
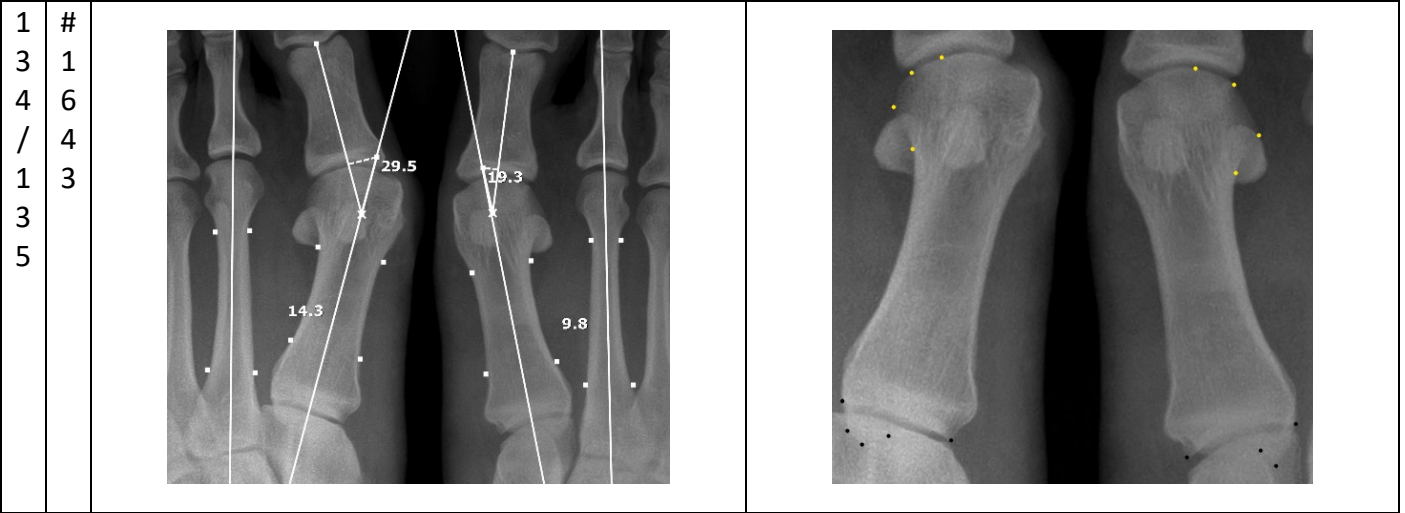


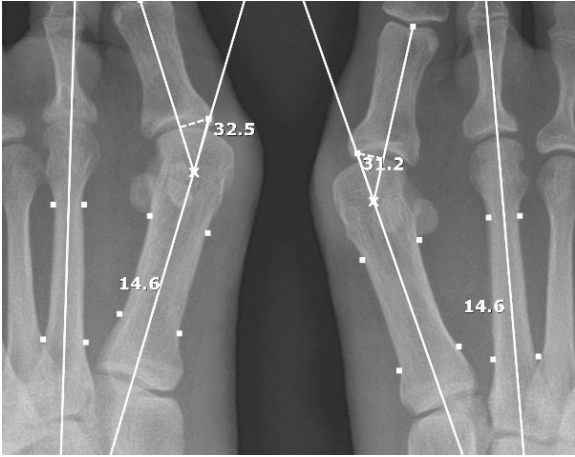
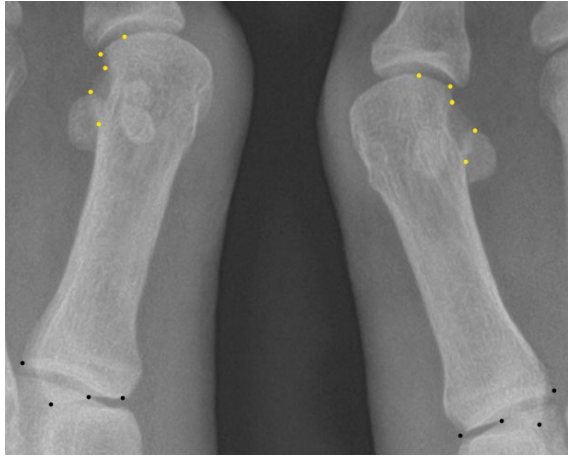
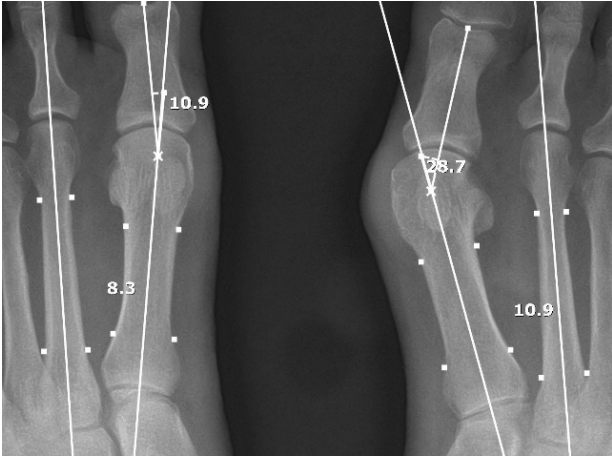

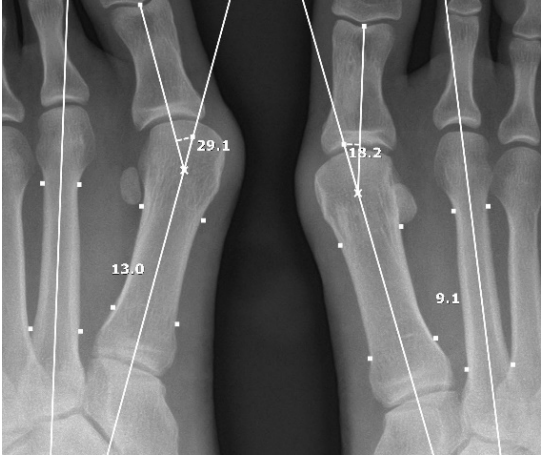
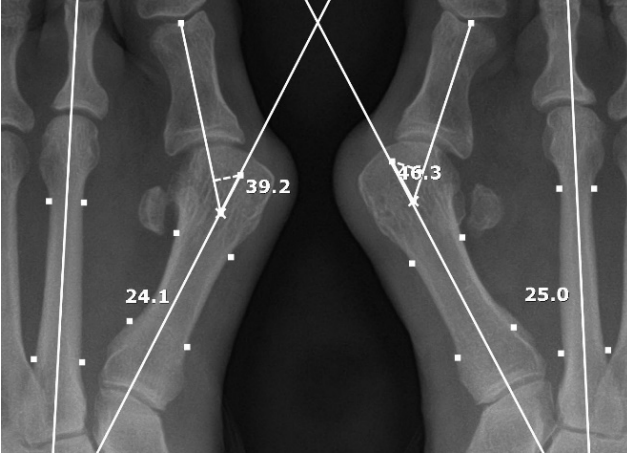
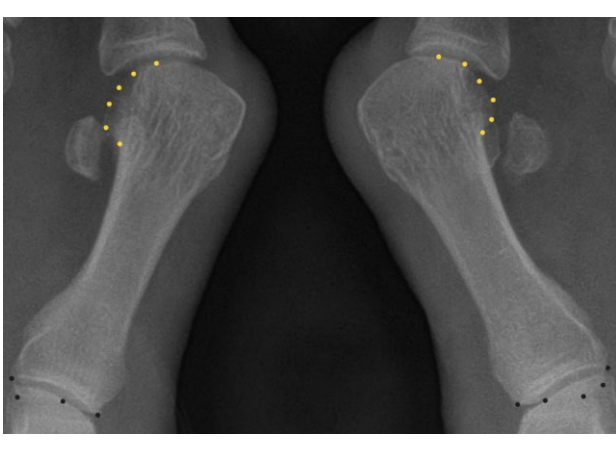


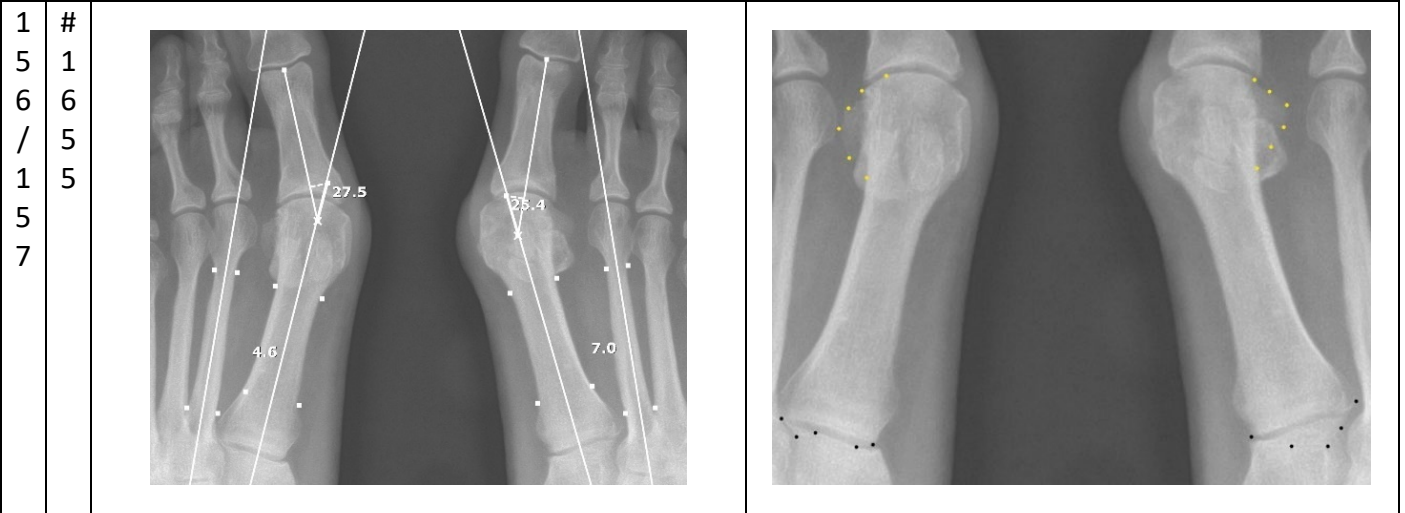
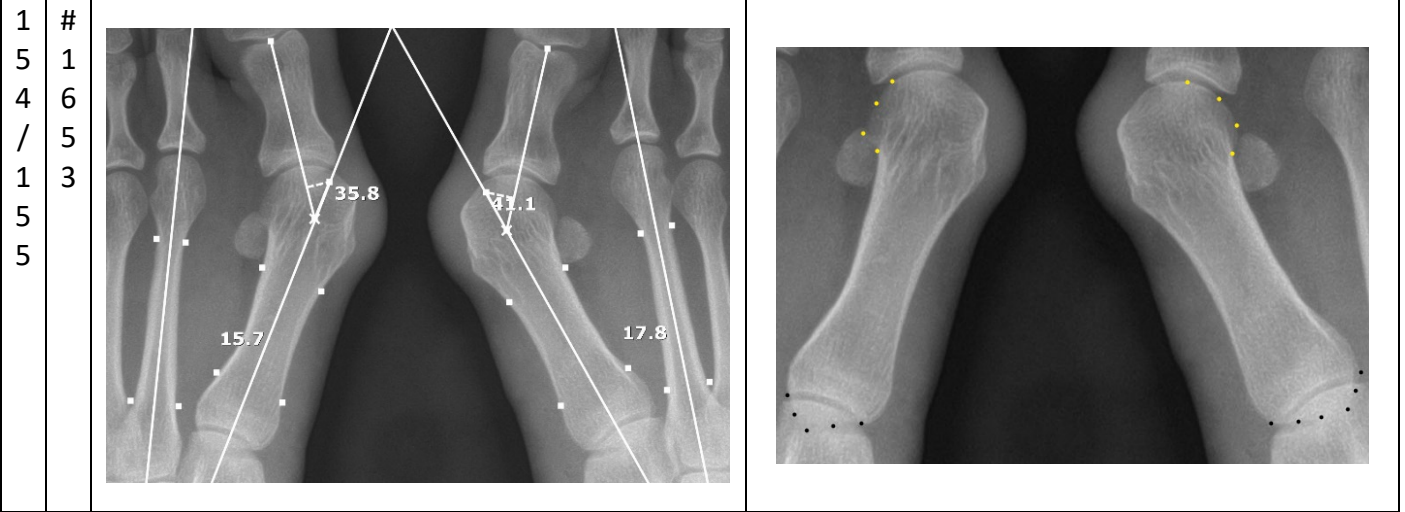
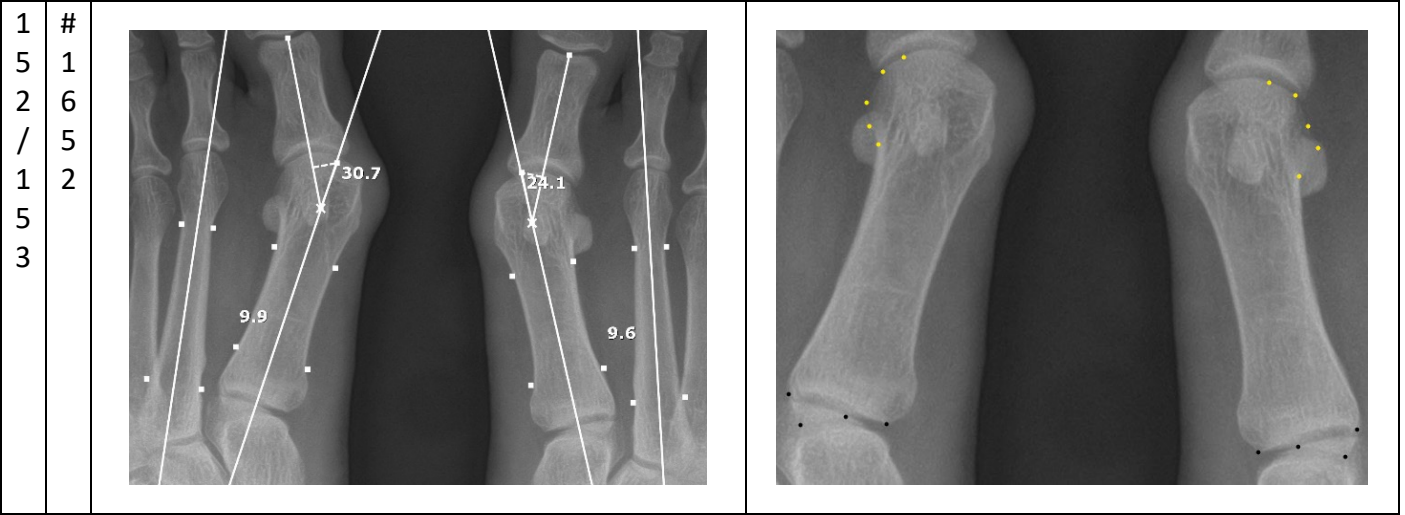
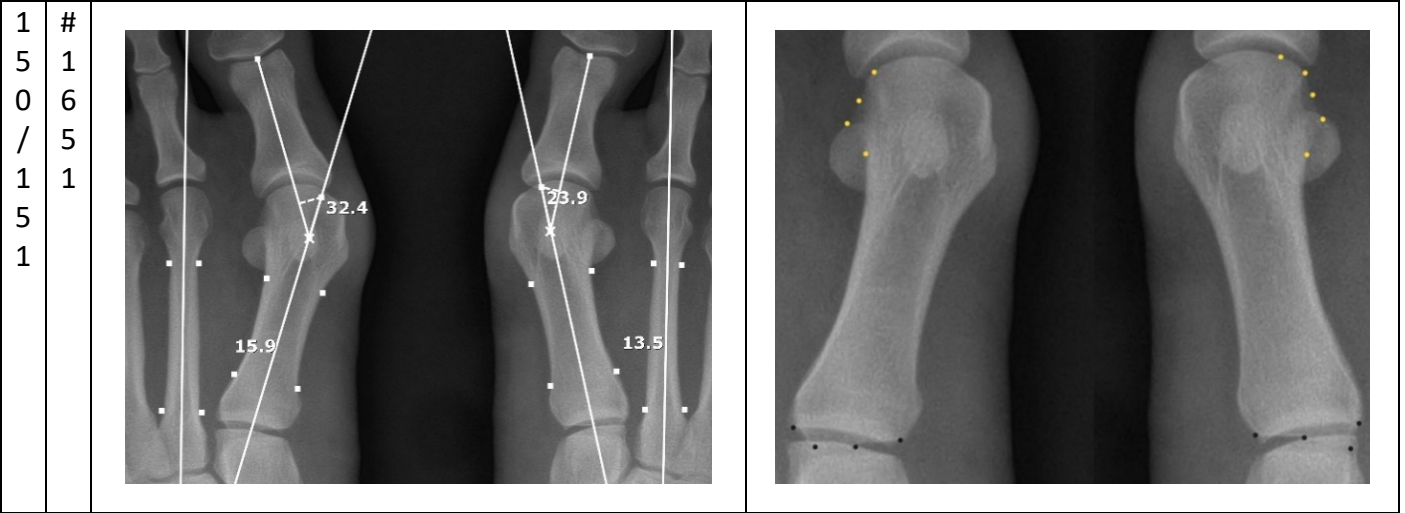
1 1 1	# 1 6 3 1		
1 1 2 / 1 1 3	# 1 6 3 2		
1 1 4 / 1 1 5	# 1 6 3 3		
1 1 6 / 1 1 7	# 1 6 3 4		

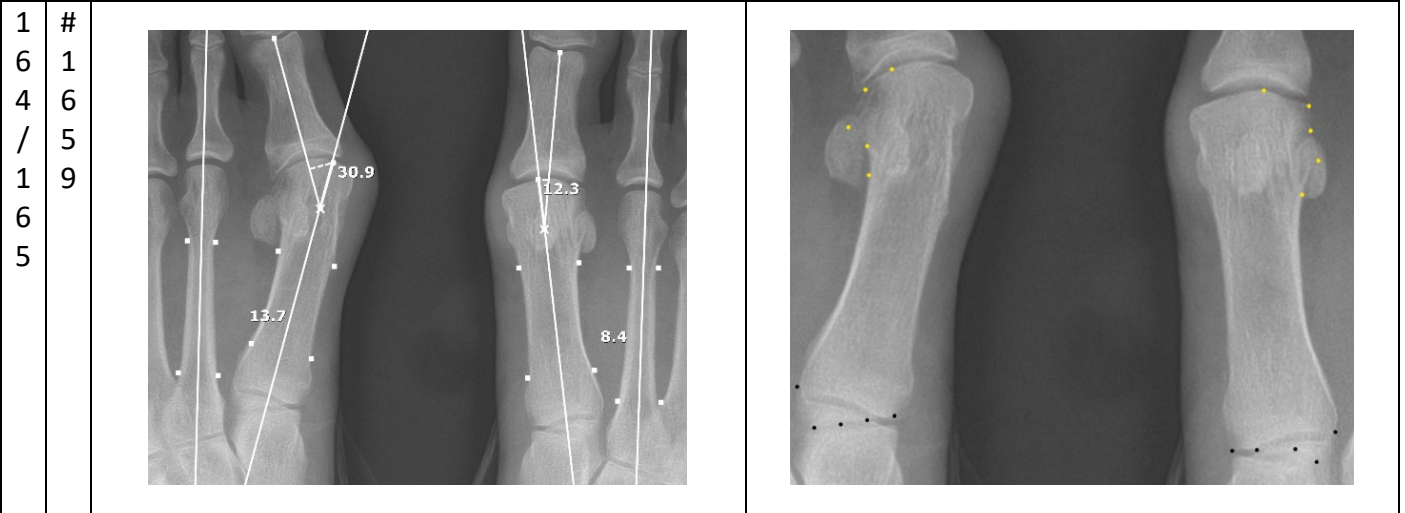
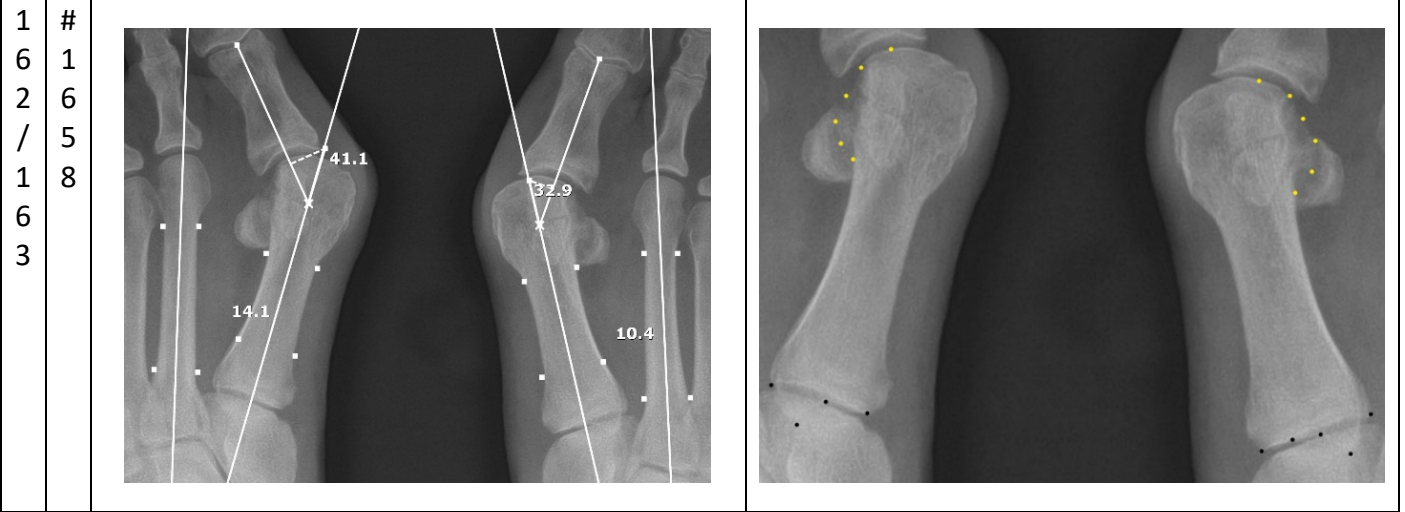
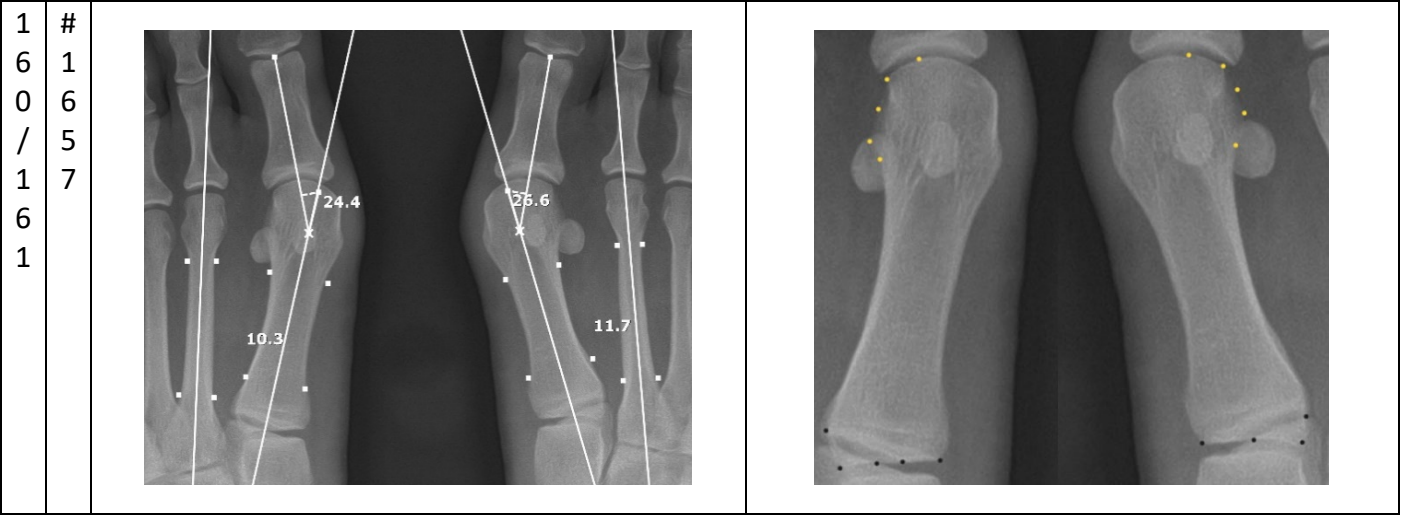
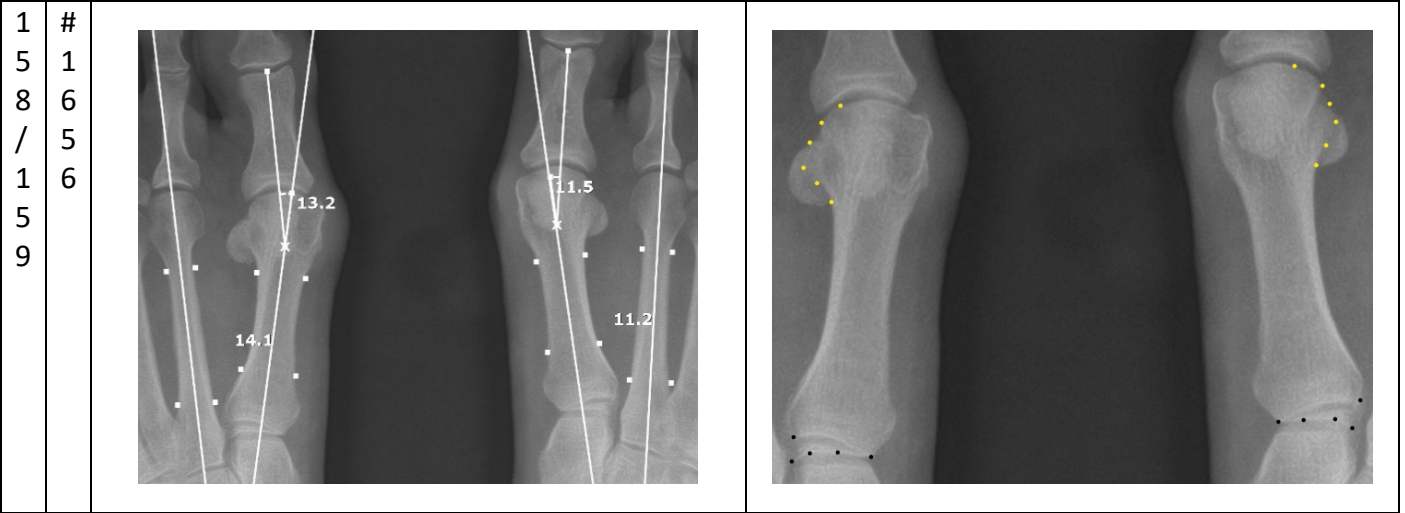


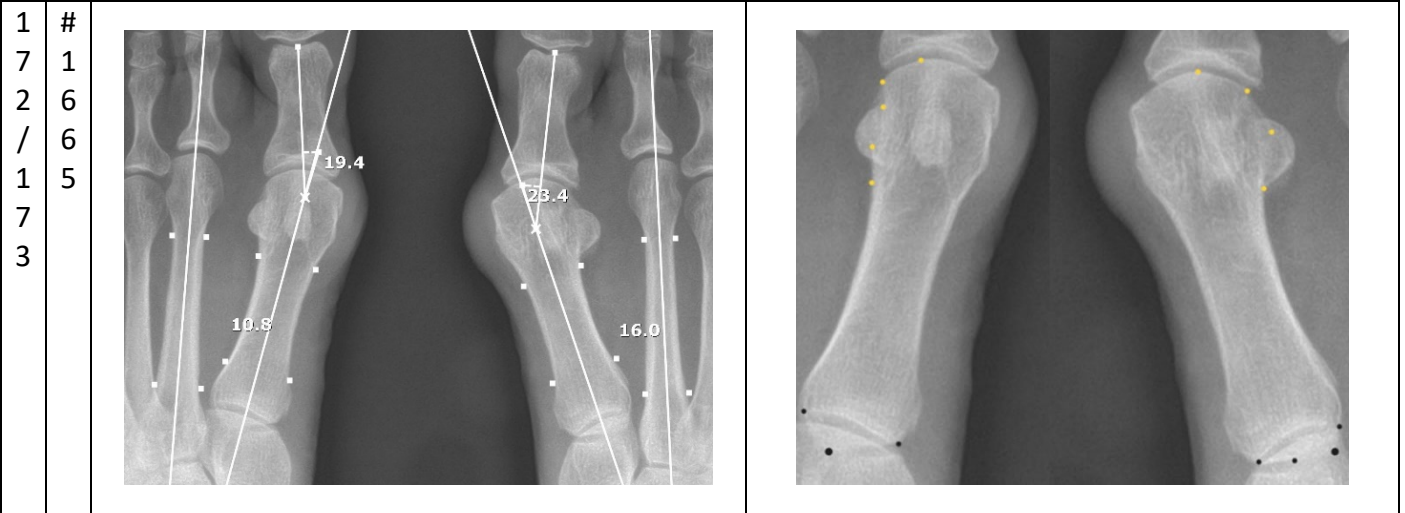
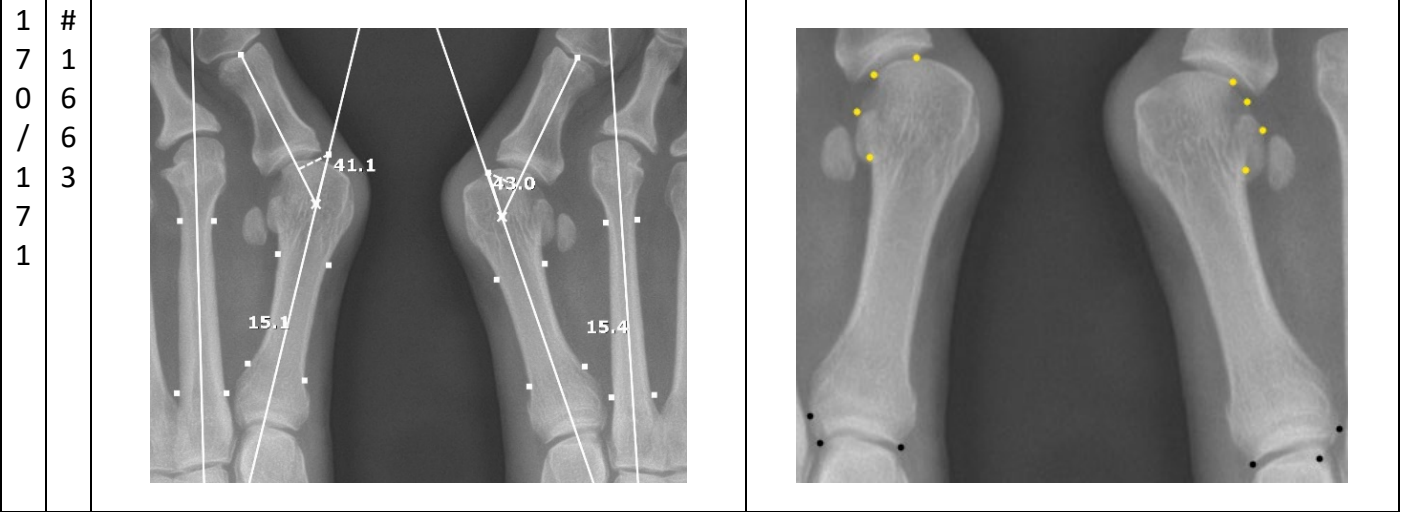
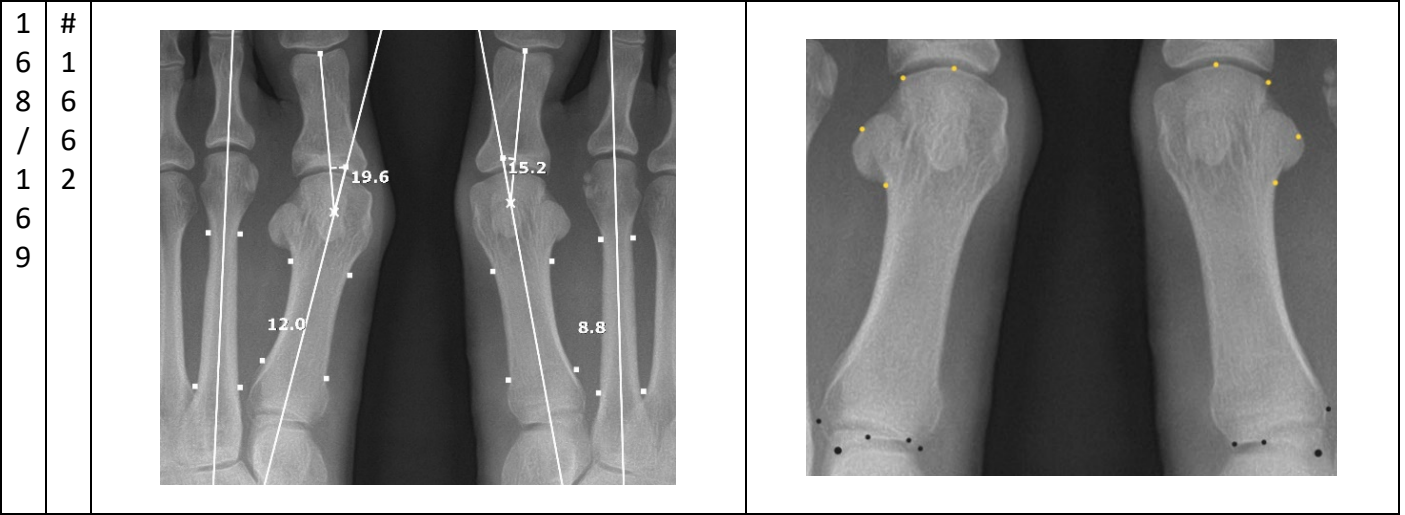
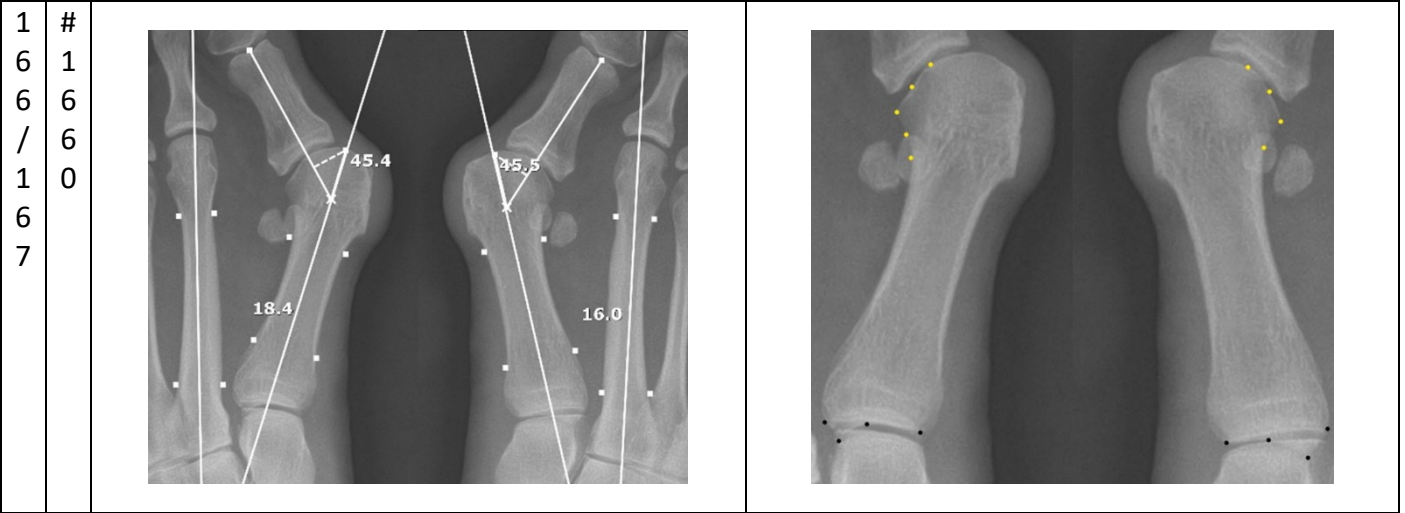


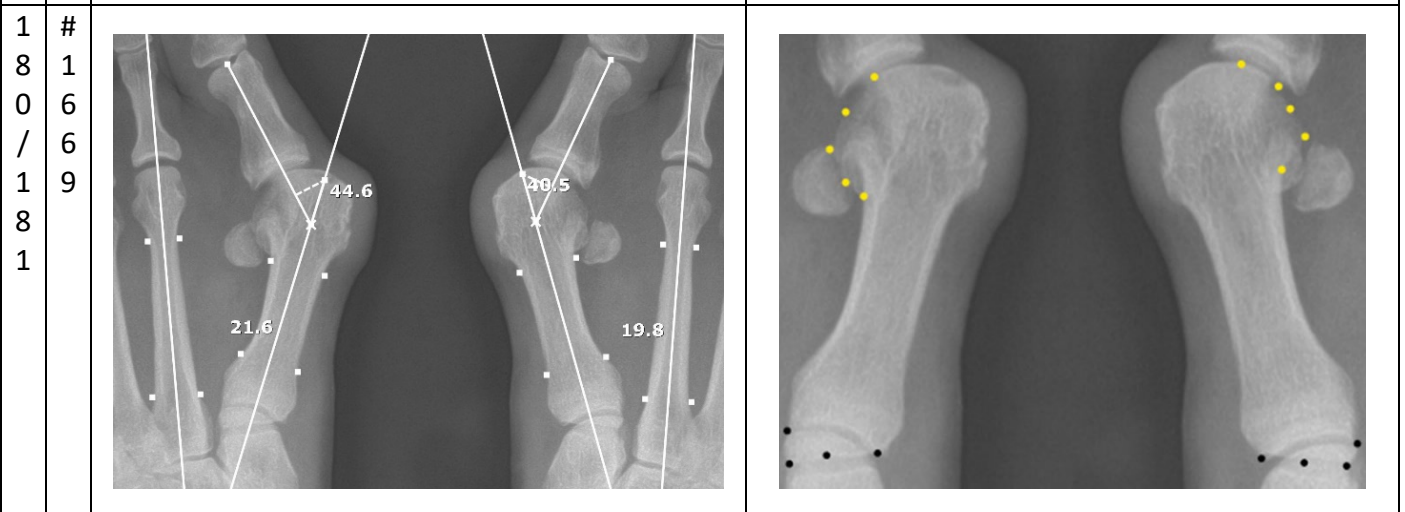
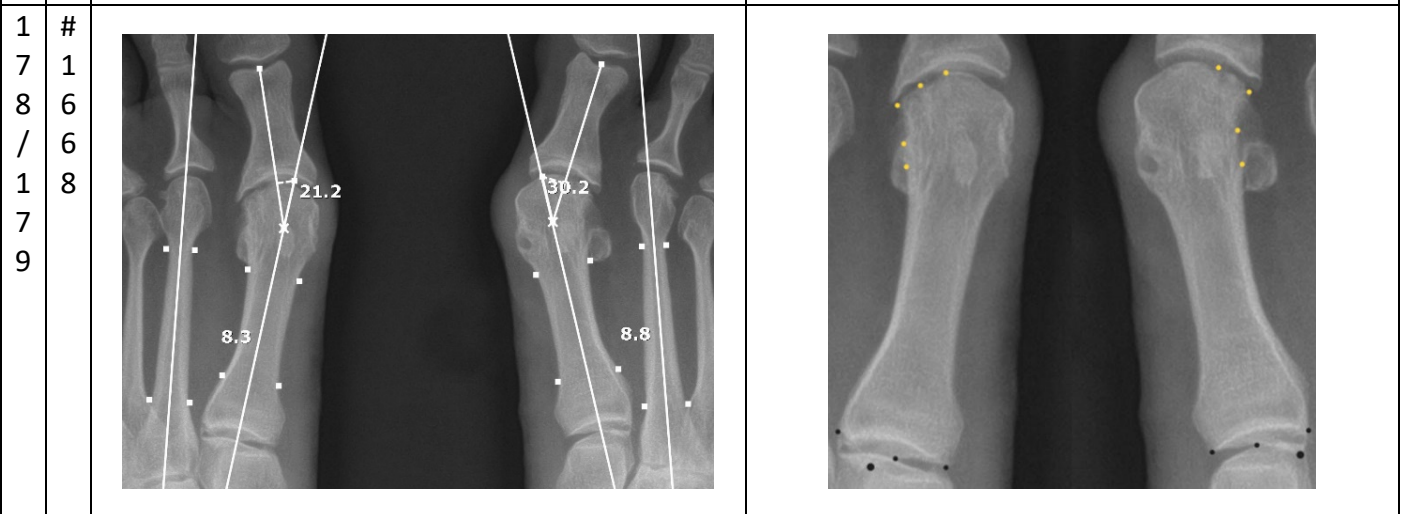
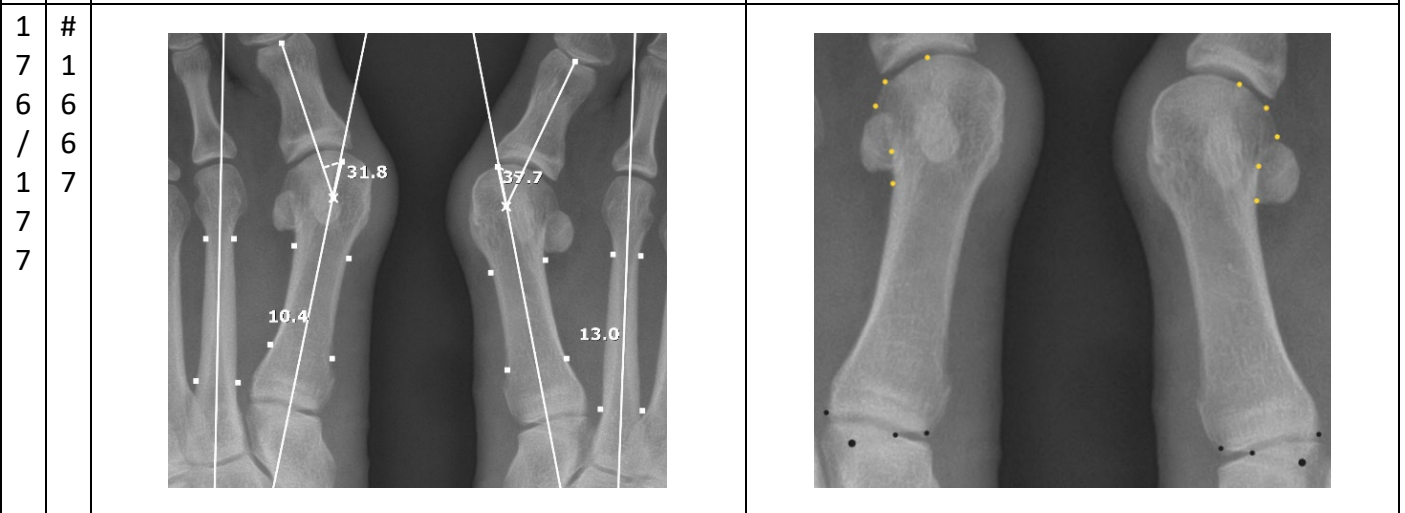
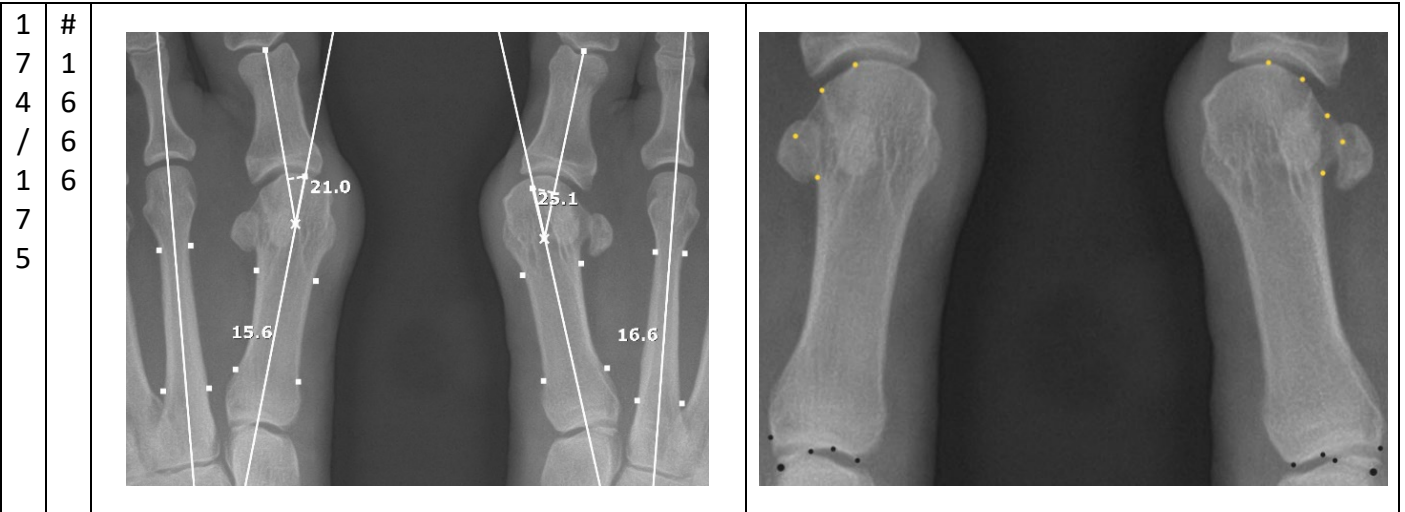


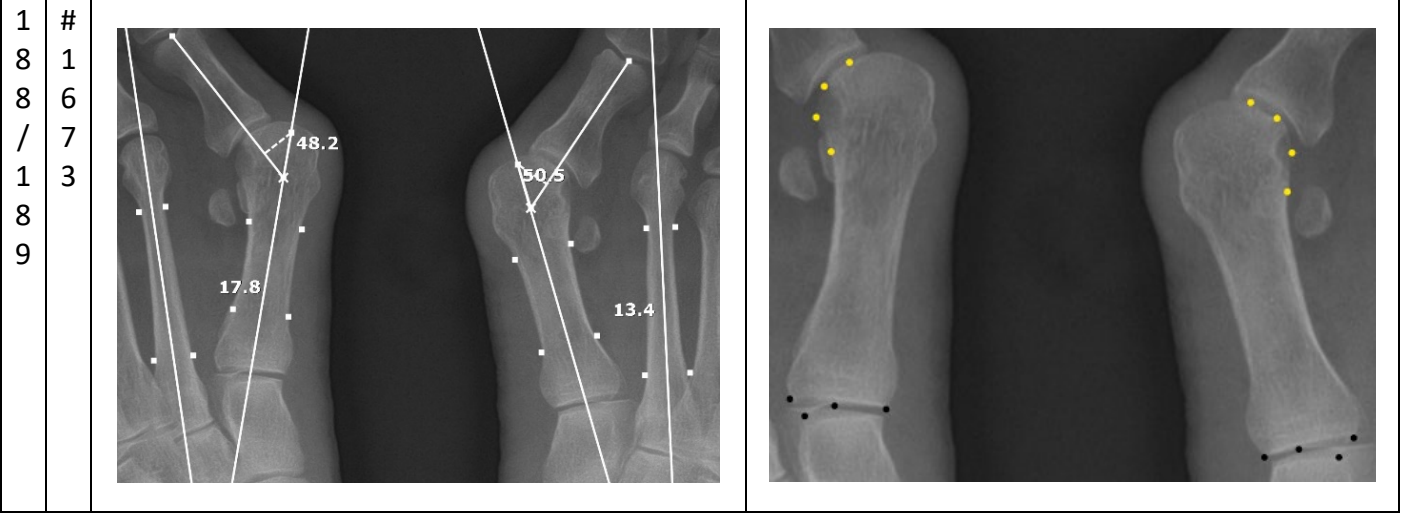
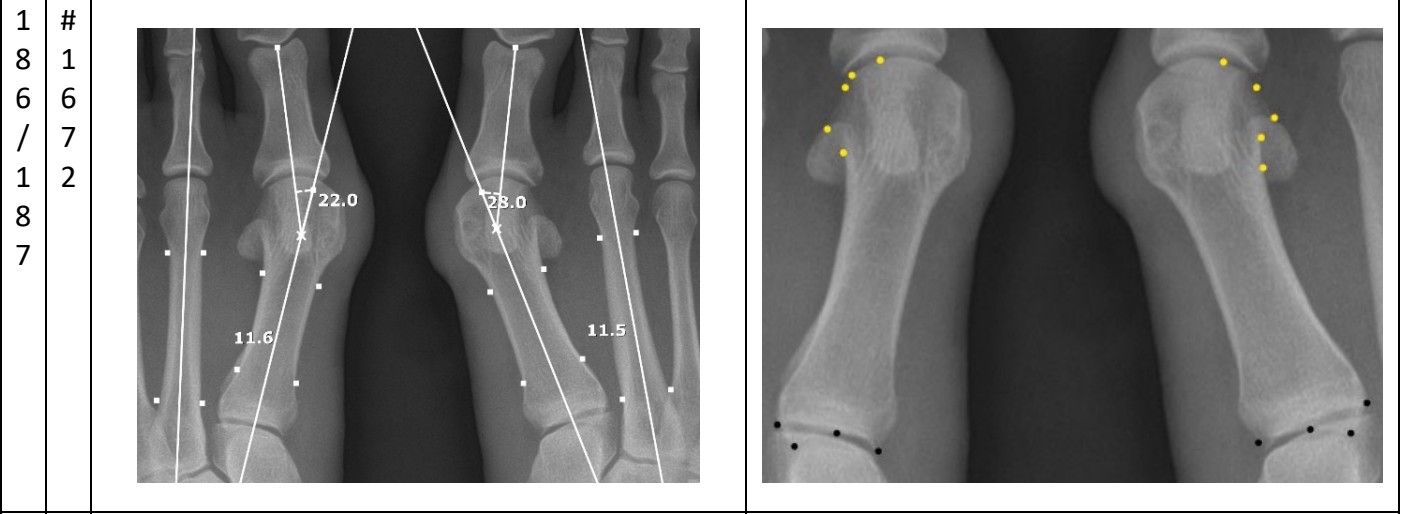
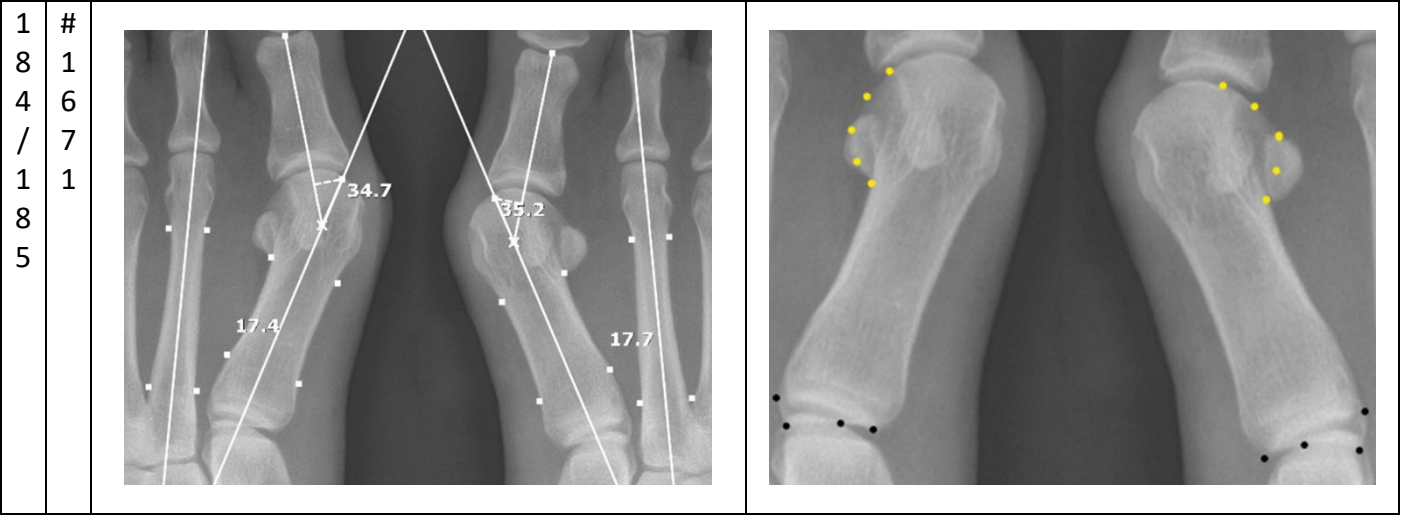
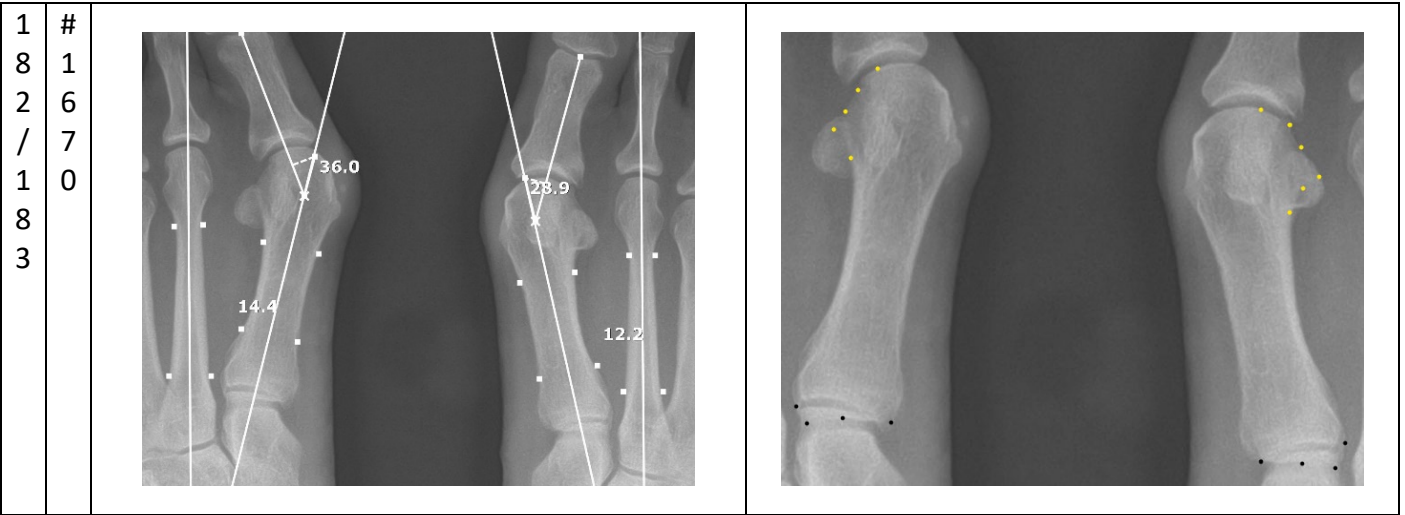
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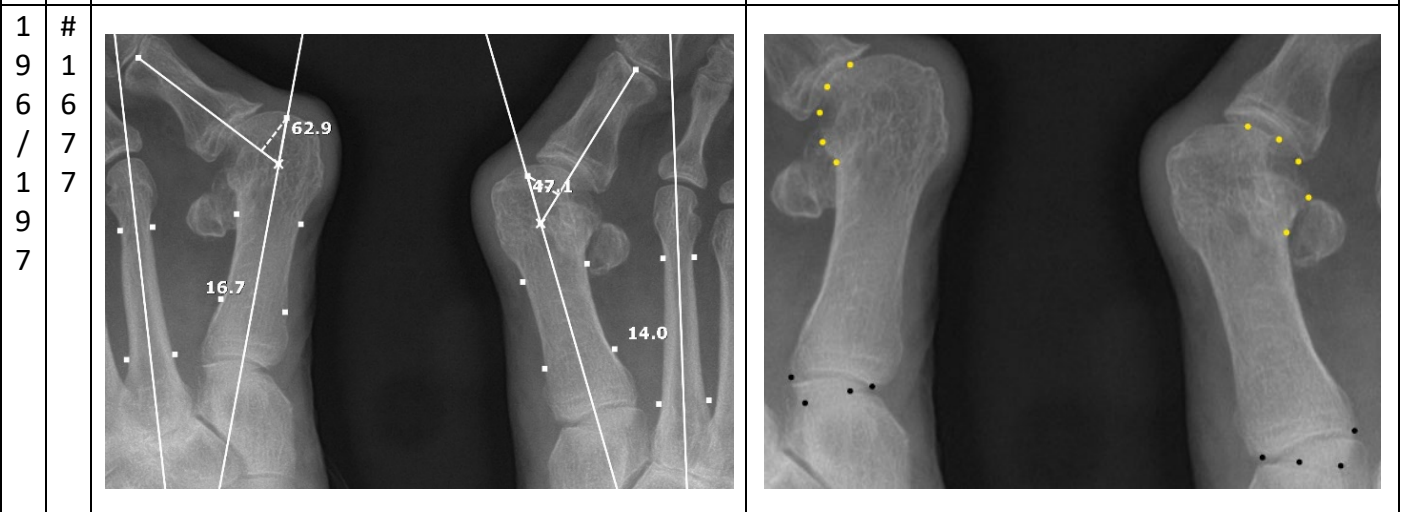
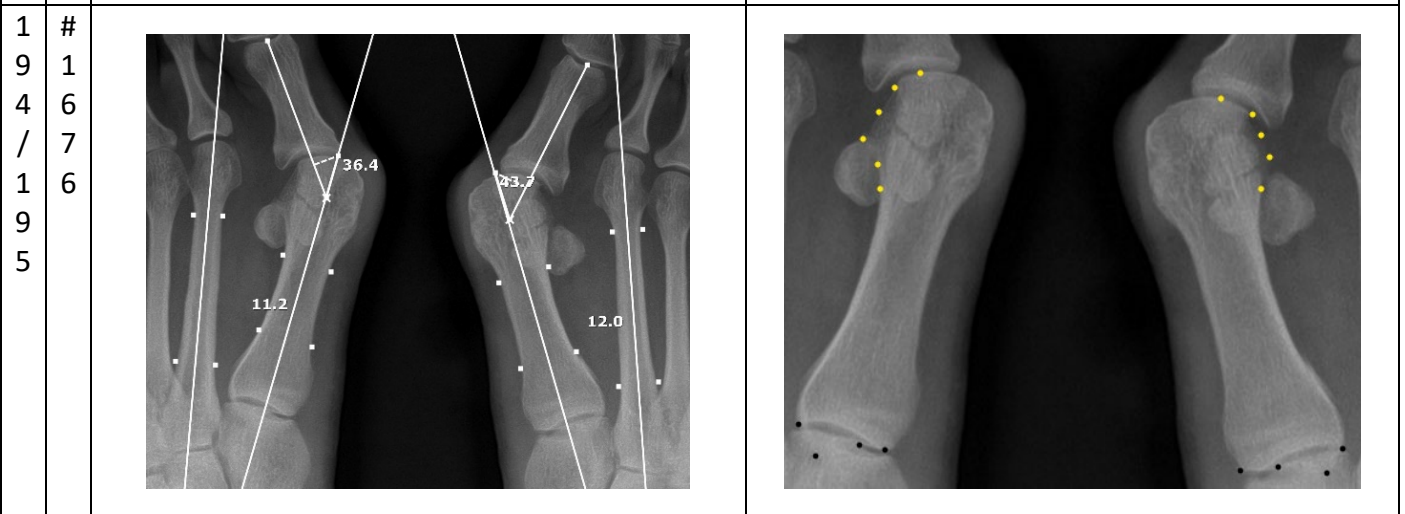
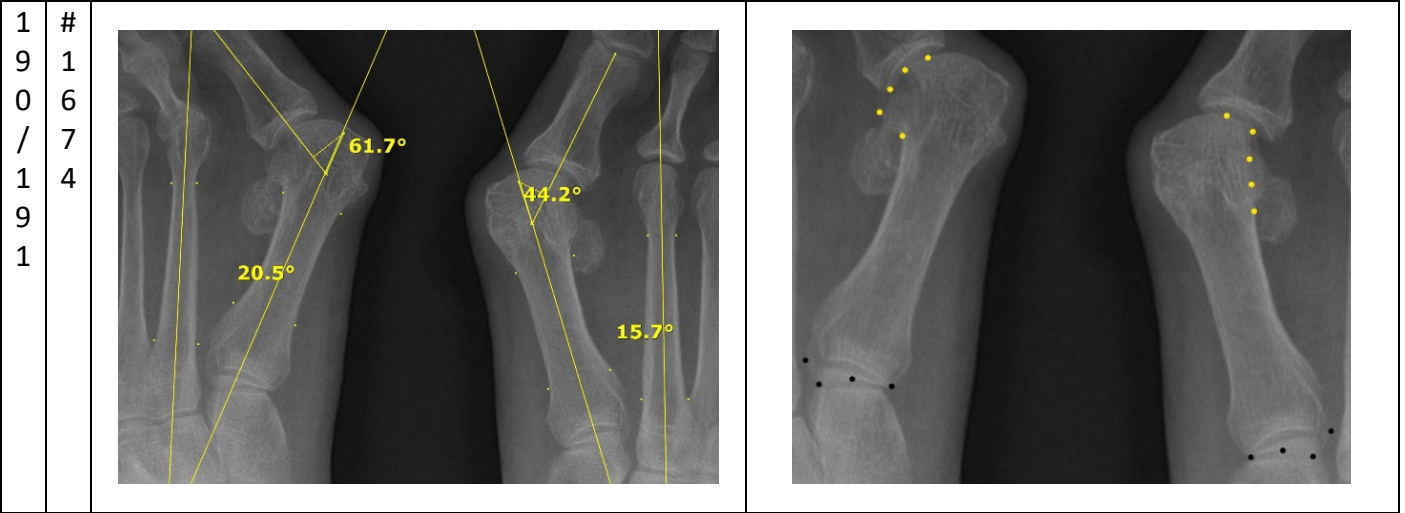












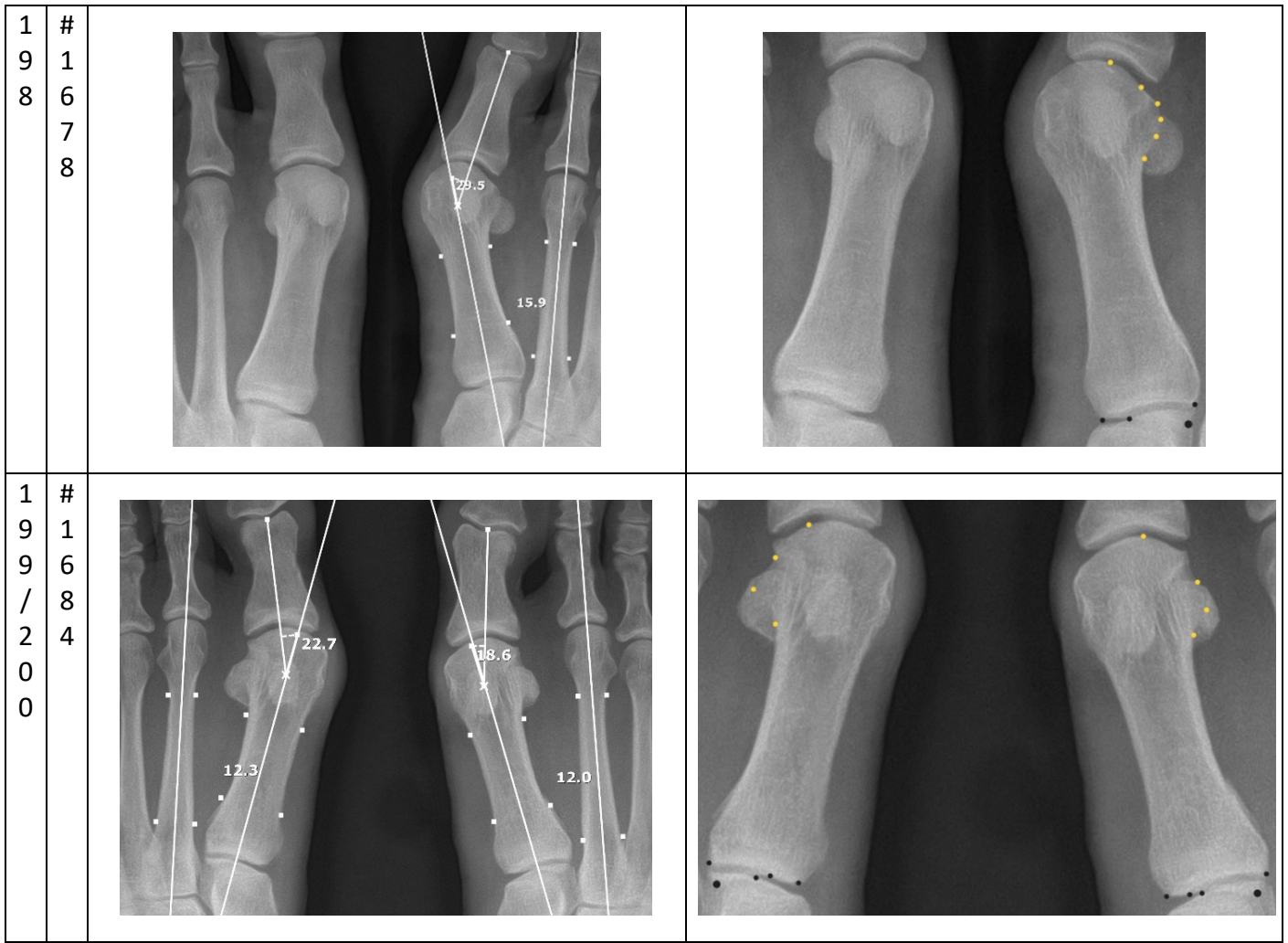


Table ii. Data for the metatarsophalangeal angle, intermetatarsal angle, round head, and inferior tuberosity position of each foot.

	Case/Side	IMA	MPA	MSP	Roundness	Tuberosity
1	1L	8.2	7.3	2	Angular	20
2	1R	8.4	10.5	2	Angular	20
3	2L	9.2	13.5	1	Angular	20
4	2R	5.5	12.4	1	Angular	10
5	3L	13.2	23.5	4	Intermediate	20
6	3R	10.1	19.4	5	Intermediate	20
7	4L	8.1	14.7	3	Angular	20
8	4R	7.7	7.2	2	Angular	10
9	5L	6.9	2.1	1	Angular	10
10	5R	6.9	1.6	1	Angular	20
11	6L	8.5	11.2	5	Intermediate	20
12	6R	8.2	17.5	3	Angular	20
13	7L	5.2	10.3	2	Angular	20
14	7R	4.3	9.4	2	Angular	10
15	8L	8.0	12.1	3	Angular	20
16	8R	9.3	16.9	2	Angular	10
17	9L	5.9	9.7	3	Angular	20
18	9R	7.4	10.9	4	Round	20
19	10L	7.6	12.2	4	Intermediate	20
20	10R	6.4	15.6	2	Intermediate	20

21	11L	9.2	10.9	3	Intermediate	20
22	11R	10.1	10.0	3	Intermediate	20
23	12L	6.0	3.6	2	Angular	20
24	12R	5.8	4.1	2	Angular	20
25	13L	11.7	9.7	4	Round	20
26	13R	7.7	8.1	4	Round	20
27	14L	5.5	2.5	2	Angular	10
28	14R	6.4	3.2	1	Angular	20
29	15L	7.7	11.1	5	Intermediate	20
30	15R	6.3	11.6	4	Intermediate	20
31	16L	9.1	13.5	2	Angular	10
32	16R	8.8	8.1	1	Angular	10
33	17L	10.8	13.7	3	Angular	10
34	17R	10.8	11.6	2	Angular	10
35	18L	10.5	22.7	3	Intermediate	20
36	18R	7.2	14.9	3	Intermediate	10
37	19L	9.9	11.5	4	Intermediate	10
38	19R	7.5	10.2	4	Intermediate	10
39	20L	8.3	8.2	2	Angular	20
40	20R	8.8	10.6	3	Angular	20
41	21L	3.4	5.2	1	Angular	10
42	21R	4.4	12.1	1	Angular	10
43	22L	7.6	4.5	2	Intermediate	10
44	22R	7.5	9.6	1	Intermediate	10
45	23L	7.8	8.3	2	Intermediate	20
46	23R	7.9	9.9	2	Round	20
47	24L	3.9	6.8	2	Angular	10
48	24R	3.7	9.7	2	Angular	10
49	25L	9.4	12.0	2	Intermediate	0
50	25R	10.9	11.8	2	Intermediate	10
51	27L	9.1	12.6	2	Angular	10
52	27R	9.2	7.4	4	Intermediate	20
53	28L	7.0	12.8	5	Intermediate	20
54	28R	7.3	22.0	5	Intermediate	20
55	29L	7.8	18.9	2	Intermediate	10
56	29R	5.9	13.7	2	Intermediate	10
57	32L	9.9	19.2	3	Intermediate	30
58	32R	6.5	8.1	2	Intermediate	20
59	33L	11.3	12.3	3	Intermediate	10
60	33R	10.1	15.6	2	Intermediate	30
61	34L	9.2	9.7	3	Intermediate	20
62	34R	10.6	10.1	4	Angular	30
63	36L	11.4	18.0	2	Intermediate	10
64	36R	13.1	21.8	4	Round	10
65	37L	7.8	8.3	2	Angular	20
66	37R	7.9	9.9	2	Round	20
67	38L	3.9	6.8	2	Angular	10
68	38R	3.7	9.7	1	Angular	10
69	39L	9.4	12.0	2	Intermediate	0
70	39R	10.9	11.8	2	Intermediate	10
71	40L	7.4	11.1	3	Intermediate	20

72	40R	7.5	11.2	7	Intermediate	20
73	42L	10.6	20.7	3	Intermediate	20
74	42R	12.7	21.1	4	Intermediate	20
75	43L	9.1	12.6	2	Angular	20
76	43R	9.2	7.4	4	Intermediate	10
77	44L	13.7	23.9	4	Intermediate	10
78	44R	11.9	23.1	4	Round	10
79	45L	6.3	8.5	4	Intermediate	10
80	45R	7.0	10.3	7	Angular	10
81	47L	7.8	19.0	3	Angular	10
82	47R	7.3	18.0	3	Intermediate	20
83	49L	6.3	5.2	2	Intermediate	0
84	49R	6.5	11.4	2	Angular	10
85	50L	7.0	14.6	2	Intermediate	10
86	50R	6.7	13.7	2	Intermediate	10
87	51L	7.2	4.8	2	Angular	20
88	51R	7.4	9.9	2	Intermediate	20
89	53L	8.5	12.9	1	Intermediate	10
90	53R	10.1	11.1	3	Intermediate	20
91	54L	6.2	9.1	3	Angular	20
92	54R	7.7	14.0	5	Intermediate	20
93	55L	8.7	13.9	3	Intermediate	10
94	55R	9.4	15.4	3	Intermediate	20
95	56L	9.3	8.8	4	Intermediate	20
96	56R	7.9	6.6	4	Intermediate	10
97	57L	7.5	15.1	2	Intermediate	10
98	57R	8.7	16.9	4	Intermediate	20
99	58L	10.3	13.8	2	Angular	20
100	58R	10.4	15.5	3	Angular	10
101	1623L	20.2	49.7	5	Intermediate	20
102	1623R	17.9	55.3	4	Intermediate	10
103	1624L	13.8	26.4	5	Round	20
104	1624R	16.2	32.9	4	Round	10
105	1626L	12.9	22.9	4	Round	20
106	1626R	11.2	22.4	5	Round	20
107	1628L	12.2	13.7	4	Intermediate	20
108	1628R	14.7	37.0	5	Intermediate	20
109	1629R	14.4	23.4	5	Round	20
110	1630L	4.7	38.0	4	Intermediate	10
111	1631R	12.6	30.4	7	Intermediate	10
112	1632L	11.3	28.6	5	Intermediate	10
113	1632R	15.9	35.0	6	Round	10
114	1633L	10.9	21.9	4	Intermediate	10
115	1633R	11.6	26.0	5	Intermediate	10
116	1634L	11.6	19.0	3	Intermediate	20
117	1634R	15.2	27.2	6	Round	20
118	1635L	16.4	39.2	6	Round	10
119	1635R	12.3	23.5	5	Intermediate	10
120	1636L	16.7	34.1	6	Round	20
121	1636R	15.4	31.4	6	Intermediate	20
122	1637L	18.3	40.6	7	Round	20

123	1637R	13.9	27.9	6	Round	20
124	1638L	12.5	29.3	5	Round	10
125	1638R	9.0	13.0	3	Intermediate	10
126	1639L	14.7	24.2	3	Round	10
127	1639R	15.9	29.3	4	Round	20
128	1640L	9.5	32.7	5	Angular	10
129	1640R	14.6	44.5	6	Intermediate	20
130	1641L	11.2	14.5	7	Intermediate	20
131	1641R	14.6	33.0	6	Round	20
132	1642L	11.5	30.1	5	Intermediate	20
133	1642R	10.7	28.4	5	Intermediate	10
134	1643L	14.3	29.5	5	Intermediate	10
135	1643R	9.8	19.3	3	Intermediate	10
136	1644L	13.1	30.8	6	Round	20
137	1644R	11.4	26.0	6	Round	20
138	1645L	15.5	28.8	5	Round	20
139	1645R	14.5	28.4	5	Round	20
140	1646L	12.8	39.4	5	Intermediate	10
141	1646R	11.8	35.6	5	Intermediate	10
142	1647L	14.6	32.5	2	Intermediate	10
143	1647R	14.6	31.2	5	Intermediate	10
144	1648L	8.3	10.9	2	Intermediate	20
145	1648R	10.9	28.7	4	Round	10
146	1649L	13.0	29.1	7	Intermediate	10
147	1649R	9.1	18.2	7	Angular	10
148	1650L	24.1	39.2	6	Round	20
149	1650R	25.0	46.3	6	Round	20
150	1651L	15.9	32.4	4	Intermediate	20
151	1651R	13.5	23.9	4	Intermediate	20
152	1652L	9.9	30.7	5	Intermediate	20
153	1652R	9.6	24.1	4	Intermediate	20
154	1653L	15.7	35.8	7	Intermediate	10
155	1653R	17.8	41.1	7	Intermediate	10
156	1655L	4.6	27.5	2	Round	20
157	1655R	7.0	25.4	4	Round	10
158	1656L	14.1	13.2	5	Round	20
159	1656R	11.2	11.5	4	Round	20
160	1657L	10.3	24.4	4	Intermediate	20
161	1657R	11.7	26.6	5	Intermediate	20
162	1658L	14.1	41.1	5	Round	10
163	1658R	10.4	32.9	5	Round	10
164	1659L	13.7	30.9	6	Round	20
165	1659R	8.4	12.3	4	Intermediate	10
166	1660L	18.4	45.4	7	Intermediate	20
167	1660R	16.0	45.5	7	Intermediate	20
168	1662L	12.0	19.6	4	Round	20
169	1662R	8.8	15.2	3	Round	20
170	1663L	15.1	41.1	7	Intermediate	20
171	1663R	15.4	43.0	7	Intermediate	10
172	1665L	10.8	19.4	4	Angular	10
173	1665R	16.0	23.4	5	Intermediate	20

174	1666L	15.6	21.0	4	Intermediate	20
175	1666R	16.6	25.1	5	Intermediate	20
176	1667L	10.4	31.8	4	Round	10
177	1667R	13.0	37.7	5	Round	20
178	1668L	8.3	21.2	2	Angular	10
179	1668R	8.8	30.2	5	Angular	20
180	1669L	21.6	44.6	7	Round	30
181	1669R	19.8	40.5	7	Intermediate	20
182	1670L	14.4	36.0	6	Intermediate	20
183	1670R	12.2	28.9	4	Intermediate	20
184	1671L	17.4	34.7	5	Round	20
185	1671R	17.7	35.2	5	Round	20
186	1672L	11.6	22.0	4	Intermediate	20
187	1672R	11.5	28.0	4	Intermediate	20
188	1673L	17.8	48.2	6	Intermediate	20
189	1673R	13.4	50.5	6	Angular	20
190	1674L	20.5	61.7	7	Round	20
191	1674R	15.7	44.2	6	Angular	20
192	1675L	11.9	25.2	4	Intermediate	30
193	1675R	11.3	26.3	5	Round	30
194	1676L	11.2	36.4	5	Intermediate	20
195	1676R	12.0	43.7	5	Intermediate	20
196	1677L	16.7	62.9	7	Round	20
197	1677R	14.0	47.1	6	Round	20
198	1678R	15.9	29.5	5	Intermediate	20
199	1684L	12.3	22.7	4	Intermediate	20
200	1684R	12.0	18.6	4	Intermediate	20
Average		10.85	21.44	3.89		
Range		(1.6-25)	(1.6-55.3)	(0-7)		

Supplementary Material 3 – multiple tables and crosstab tables

Means – roundness summary						
	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
IMA * Roundness	200	100.0%	0	0.0%	200	100.0%
MPA * Roundness	200	100.0%	0	0.0%	200	100.0%
MSP * Roundness	200	100.0%	0	0.0%	200	100.0%

Report				
Roundness		IMA	MPA	MSP
Angular	Mean	7.674	12.128	2.45
	N	47	47	47
	SD	2.4301	7.9370	1.316
Intermediate	Mean	11.047	21.888	4.11

	N	109	109	109
	SD	3.3450	11.9089	1.595
Round	Mean	13.736	30.270	4.89
	N	44	44	44
	SD	4.3600	11.7720	1.205
Total	Mean	10.846	21.438	3.89
	N	200	200	200
	SD	3.9737	12.6217	1.683

ANOVA Table					
			Sum of Squares	df	Mean Square
IMA * Roundness	Between Groups	(Combined)	844.734	2	422.367
	Within Groups		2297.463	197	11.662
	Total		3142.197	199	
MPA * Roundness	Between Groups	(Combined)	7528.693	2	3764.347
	Within Groups		24173.460	197	122.708
	Total		31702.154	199	
MSP * Roundness	Between Groups	(Combined)	146.852	2	73.426
	Within Groups		416.728	197	2.115
	Total		563.580	199	

ANOVA Table				
			F	Sig.
IMA * Roundness	Between Groups	(Combined)	36.217	< 0.001
	Within Groups			
	Total			
MPA * Roundness	Between Groups	(Combined)	30.677	< 0.001
	Within Groups			
	Total			
MSP * Roundness	Between Groups	(Combined)	34.711	< 0.001
	Within Groups			
	Total			

Measures of Association		
	Eta	Eta Squared
IMA * Roundness	.518	.269
MPA * Roundness	.487	.237
MSP * Roundness	.510	.261

Means - tuberosity summary						
	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
IMA * Tuberosity	200	100.0%	0	0.0%	200	100.0%
MPA * Tuberosity	200	100.0%	0	0.0%	200	100.0%
MSP * Tuberosity	200	100.0%	0	0.0%	200	100.0%

Report				
Tuberosity		IMA	MPA	MSP
0	Mean	8.367	9.733	2.00
	N	3	3	3
	SD	1.7898	3.9260	.000
10	Mean	9.822	20.014	3.48
	N	77	77	77
	SD	3.5600	11.4587	1.744
20	Mean	11.512	22.600	4.20
	N	114	114	114
	SD	4.1052	13.3799	1.581
30	Mean	12.567	23.500	4.17
	N	6	6	6
	SD	4.4881	11.9700	1.722
Total	Mean	10.846	21.438	3.89
	N	200	200	200
	SD	3.9737	12.6217	1.683

ANOVA table					
			Sum of Squares	df	Mean Square
IMA * Tuberosity	Between Groups	(Combined)	167.542	3	55.847
	Within Groups		2974.655	196	15.177
	Total		3142.197	199	

MPA * Tuberosity	Between Groups	(Combined)	746.513	3	248.838
	Within Groups		30955.641	196	157.937
	Total		31702.154	199	
MSP * Tuberosity	Between Groups	(Combined)	35.166	3	11.722
	Within Groups		528.414	196	2.696
	Total		563.580	199	

ANOVA table				
			F	Sig.
IMA * Tuberosity	Between Groups	(Combined)	3.680	.013
	Within Groups			
	Total			
MPA * Tuberosity	Between Groups	(Combined)	1.576	.197
	Within Groups			
	Total			
MSP * Tuberosity	Between Groups	(Combined)	4.348	.005
	Within Groups			
	Total			

Measures of association		
	Eta	Eta Squared
IMA * Tuberosity	.231	.053
MPA * Tuberosity	.153	.024
MSP * Tuberosity	.250	.062

ANOVA table ^{a,b,c}							
			Sum of Squares	df	Mean Square	F	Sig.
IMA * New2	Between Groups	(Combine d)	155.088	1	155.088	10.280	.002
	Within Groups		2987.109	198	15.086		
	Total		3142.197	199			

MPA * New2	Between Groups	(Combine d)	436.693	1	436.693	2.766	.098
	Within Groups		31265.461	198	157.906		
	Total		31702.154	199			
MSP * New2	Between Groups	(Combine d)	28.830	1	28.830	10.675	.001
	Within Groups		534.750	198	2.701		
	Total		563.580	199			

a. With fewer than three groups, linearity measures for IMA * New2 cannot be computed.

b. With fewer than three groups, linearity measures for MPA * New2 cannot be computed.

c. With fewer than three groups, linearity measures for MSP * New2 cannot be computed.

Crosstabs - Association between head shape and ITP

Roundness * tuberosity cross tabulation						
Count						
		Tuberosity				Total
		0	10	20	30	
Roundness	Angular	0	25	21	1	47
	Intermediate	3	40	63	3	109
	Round	0	12	30	2	44
Total		3	77	114	6	200

Chi-squared tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson chi-square	9.393*	6	.153	.138
Likelihood ratio	10.423	6	.108	.139
Fisher-Freeman-Halton exact test	8.287			.151
N of valid cases	200			

*6 cells (50.0%) have expected count less than 5. The minimum expected count is .66.

Chi-squared tests				
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)
Pearson chi-square	6.391*	2	.041	.039
Likelihood ratio	6.460	2	.040	.041
Fisher-Freeman-Halton exact test	6.330			.040
N of valid cases	200			

*0 cells (0.0%) have expected count less than 5. The minimum expected count is 17.60.

Crosstab				
Count				
		New2		Total
		10	20	
Roundness	Angular	25	22	47
	Intermediate	43	66	109
	Round	12	32	44

Total	80	120	200
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Table iv. Results of the Mantel-Haenszel test for trend for the three ordinal variables.

IMA				
Head Shape	IMA ≤ 9	$9^\circ \leq \text{IMA} \leq 15^\circ$	IMA $> 15^\circ$	Total
Angular	33	13	1	47
Intermediate	34	60	15	109
Round	6	22	16	44
Total	73	95	32	200
			p-value	< 0.001
IMA				
Tuberosity	IMA $\leq 9^\circ$	$9^\circ \leq \text{IMA} \leq 15^\circ$	IMA $> 15^\circ$	Total
0	1	2	0	3
10	33	37	7	77
20	39	51	24	114
30	0	5	1	6
Total	73	95	32	200
			p-value	0.021
Roundness				
Tuberosity	Angular	Intermediate	Round	Total
0	0	3	0	3
10	25	40	12	77
20	21	63	30	114
30	1	3	2	6
Total	47	109	44	200
			p-value	0.022