This file contains positions of osseous landmarks of the Hip III patients.

Version 1: 2021-05-08

2021 - Fischer et al. - Effect of the underlying cadaver data and patient-specific adaptation of the femur and pelvis on the prediction of the hip joint force estimated using static models, Journal of Biomechanics

Table 1: The landmark coordinates are presented in millimeter in the global CT coordinate system using the LPS orientation: Left is the positive x direction, posterior is the positive y direction, and superior is the positive z direction. _R = Right. _L = Left

Landmark	Subject	H1L	H2R	H3L	H4L	H5L	H6R	H7R	H8L	H9L	H10R
Pelvis											
ASIS_R	x	-140.3	115.9	-124.2	-102.4	-108.6	106.5	-101.2	-120.6	-99.4	-157.1
	y	-64.0	30.0	-49.6	-82.1	-39.1	76.4	-77.2	-41.5	-36.9	-51.5
	z	1648.3	1726.5	1593.8	1464.9	1618.0	1593.3	1729.3	1654.6	1608.4	1671.0
ASIS_L	x	113.3	-111.9	128.5	148.1	118.4	-114.8	142.8	152.5	132.1	88.8
	y	-50.4	33.5	-47.6	-47.7	-48.7	69.4	-85.5	-32.9	-52.3	-76.5
	z	1649.5	1747.8	1587.7	1474.8	1605.5	1593.0	1723.5	1660.6	1606.8	1665.5
HJC_R	x	-94.8	80.9	-92.2	-67.9	-92.7	71.5	-62.2	-74.2	-68.7	-113.8
	y	-1.7	-32.8	0.7	-21.2	22.8	19.7	-17.8	11.5	33.5	4.1
	z	1576.7	1671.2	1522.7	1390.9	1539.7	1519.7	1655.2	1581.7	1530.2	1595.3
HJC_L	x	70.8	-77.9	82.0	103.2	93.9	-85.3	109.4	105.8	104.1	60.9
	y	-0.6	-37.1	2.7	7.7	18.2	17.5	-30.1	25.4	22.8	-11.0
	z	1575.3	1687.1	1517.4	1406.1	1527.5	1517.3	1639.9	1593.8	1529.5	1596.1
PSIS_R	x	-66.7	47.3	-41.5	-32.9	-42.5	49.5	-9.4	-30.2	-23.0	-57.3
	y	79.2	-118.2	97.5	67.3	114.2	-82.7	66.5	98.0	117.7	87.9
	z	1678.7	1777.6	1619.3	1500.4	1625.5	1612.5	1743.1	1690.3	1634.7	1699.6
PSIS_L	x	23.1	-33.8	47.2	45.4	63.5	-45.1	63.6	51.1	75.5	32.1
	y	86.8	-110.6	98.8	75.6	110.4	-88.7	62.8	104.6	107.8	78.6
	z	1673.3	1781.7	1616.4	1503.2	1620.2	1611.6	1747.2	1694.4	1635.4	1699.8
AIIS	x	87.3	92.8	107.2	123.0	106.6	96.3	-84.2	123.5	119.1	-133.5
	y	-37.5	12.6	-34.4	-31.9	-19.1	62.4	-56.8	-21.8	-18.0	-31.2
	z	1612.9	1694.9	1559.5	1437.9	1557.4	1549.9	1680.6	1627.7	1560.8	1635.7
MP	x	-4.5	-1.3	5.0	32.3	-2.3	-4.0	11.2	24.6	20.4	-36.4
	y	-54.9	20.9	-51.7	-48.5	-28.5	86.7	-81.7	-44.2	-24.6	-53.6
	z	1551.5	1650.9	1514.1	1369.6	1508.8	1501.7	1630.5	1570.8	1501.7	1576.0
PT	x	12.9	20.1	21.8	47.9	16.9	13.1	-14.8	47.0	45.3	-59.3
	y	-57.7	26.3	-53.8	-50.7	-34.3	87.6	-84.0	-43.8	-27.1	-56.1
	z	1554.7	1648.6	1511.2	1374.2	1515.6	1498.7	1630.2	1567.0	1503.6	1578.6
IIT	x	36.2	42.6	38.0	67.0	46.8	31.1	-14.7	59.7	68.0	-72.4
	y	32.5	-67.9	43.2	59.3	58.5	-6.2	-1.8	59.7	62.9	50.8
	z	1498.0	1594.5	1458.8	1339.7	1462.9	1444.0	1576.8	1522.6	1449.6	1544.0
PIT	x	43.1	61.9	48.2	75.6	67.5	40.1	-36.8	66.9	76.3	-81.6
	y	56.6	-96.3	62.9	74.0	80.3	-32.6	36.8	88.4	84.0	67.7
	z	1528.6	1630.2	1485.4	1364.1	1486.5	1473.1	1611.5	1556.5	1482.3	1569.9
IS	x	30.4	51.0	50.7	62.1	61.2	39.1	-25.4	61.1	71.2	-79.0
	y	55.2	-84.0	55.5	65.0	64.4	-28.5	32.3	74.4	81.2	55.8
	z	1568.4	1659.8	1521.9	1401.0	1520.7	1516.8	1652.8	1595.0	1528.3	1605.9
PIIS	x	26.3	51.9	49.6	57.9	61.6	47.2	-14.5	63.1	75.0	-67.9
	y	74.8	-111.7	82.6	72.0	101.2	-65.2	55.5	88.0	102.1	71.6
	z	1638.7	1734.7	1576.3	1472.7	1597.4	1573.4	1714.7	1661.6	1600.1	1672.6
SIC	x	80.5	112.0	135.9	116.3	124.9	111.8	-83.7	122.6	131.5	-127.1
	y	28.2	-45.3	18.0	24.0	41.4	-5.9	9.0	51.5	22.6	14.2
	z	1726.2	1810.2	1651.0	1552.3	1672.0	1657.9	1803.3	1742.4	1686.7	1746.7
IT	x	122.3	143.8	155.2	167.2	144.1	136.3	-116.3	161.9	155.7	-158.9
	y	-0.6	-14.8	-1.1	-14.5	15.2	20.4	-19.9	28.1	0.4	-0.1
	z	1697.1	1776.6	1622.5	1497.5	1643.4	1625.6	1773.0	1705.9	1657.8	1720.9
Femur											
HJC	x	70.8	80.9	82.0	103.2	93.9	71.5	-62.2	105.8	104.1	-113.8
	y	-0.6	-32.8	2.7	7.7	18.2	19.7	-17.8	25.4	22.8	4.1
	z	1575.3	1671.2	1517.4	1406.1	1527.5	1519.7	1655.2	1593.8	1529.5	1595.3
GT	x	124.1	125.1	118.4	150.7	146.8	121.6	-105.8	156.9	155.8	-165.2
	y	20.9	-52.3	29.4	28.6	33.1	-0.2	-5.7	49.4	38.7	18.1
	z	1570.2	1668.4	1518.0	1404.7	1523.4	1513.9	1647.9	1586.4	1529.8	1593.4
P1	x	107.6	116.4	116.2	144.6	130.8	108.7	-103.1	144.6	143.7	-150.6
	y	6.4	-36.3	14.8	10.6	18.2	18.4	-19.8	29.8	21.1	10.0
	z	1533.1	1620.8	1474.1	1359.9	1485.3	1477.1	1604.9	1545.7	1480.5	1549.2
LT	x	75.8	83.4	81.6	108.7	98.0	79.4	-71.9	110.0	111.4	-129.0
	y	14.8	-46.0	19.1	18.4	30.4	9.7	-3.8	34.9	33.6	33.7
	z	1506.6	1604.3	1461.2	1344.4	1466.9	1444.9	1589.2	1522.5	1462.5	1531.4
MEC	x	24.2	18.3	23.2	57.6	52.9	35.7	-18.0	65.6	54.3	-52.7
	y	4.4	-36.0	30.4	25.5	23.5	2.7	-11.7	55.4	29.8	38.1
	z	1144.3	1258.1	1102.4	1007.5	1116.2	1085.7	1212.7	1180.7	1082.9	1200.7
LEC	x	117.1	106.8	114.0	148.2	131.8	119.6	-102.3	152.9	146.7	-132.5
	y	4.6	-36.6	47.0	32.0	27.6	22.6	-14.1	40.8	34.5	50.8
	z	1144.3	1249.6	1099.3	998.6	1112.7	1078.8	1207.4	1173.0	1083.7	1200.5
MPC	x	43.9	40.4	40.7	77.4	70.0	57.1	-36.5	88.5	72.8	-67.9
	y	31.9	-71.3	66.9	55.3	53.5	-17.6	19.9	79.4	71.1	70.7
	z	1135.6	1251.3	1096.9	1000.9	1105.0	1074.4	1212.9	1170.1	1076.6	1188.3
LPC	x	100.4	93.1	97.4	130.5	117.0	111.3	-83.0	137.3	132.2	-115.9
	y	30.1	-64.8	71.6	57.8	51.9	-4.0	15.2	69.8	65.9	74.6
	z	1135.6	1249.7	1096.2	1000.5	1107.4	1075.2	1211.0	1168.0	1075.3	1186.7
P2	x	75.3	63.5	72.2	108.2	93.7	76.0	-60.0	111.6	102.3	-96.7
	y	-13.4	-25.2	28.9	20.0	13.9	28.4	-16.5	35.1	22.6	39.1
	z	1117.6	1236.0	1075.5	977.4	1090.1	1058.9	1197.4	1150.0	1058.0	1175.8

Figure 1: Landmarks on the hip bone

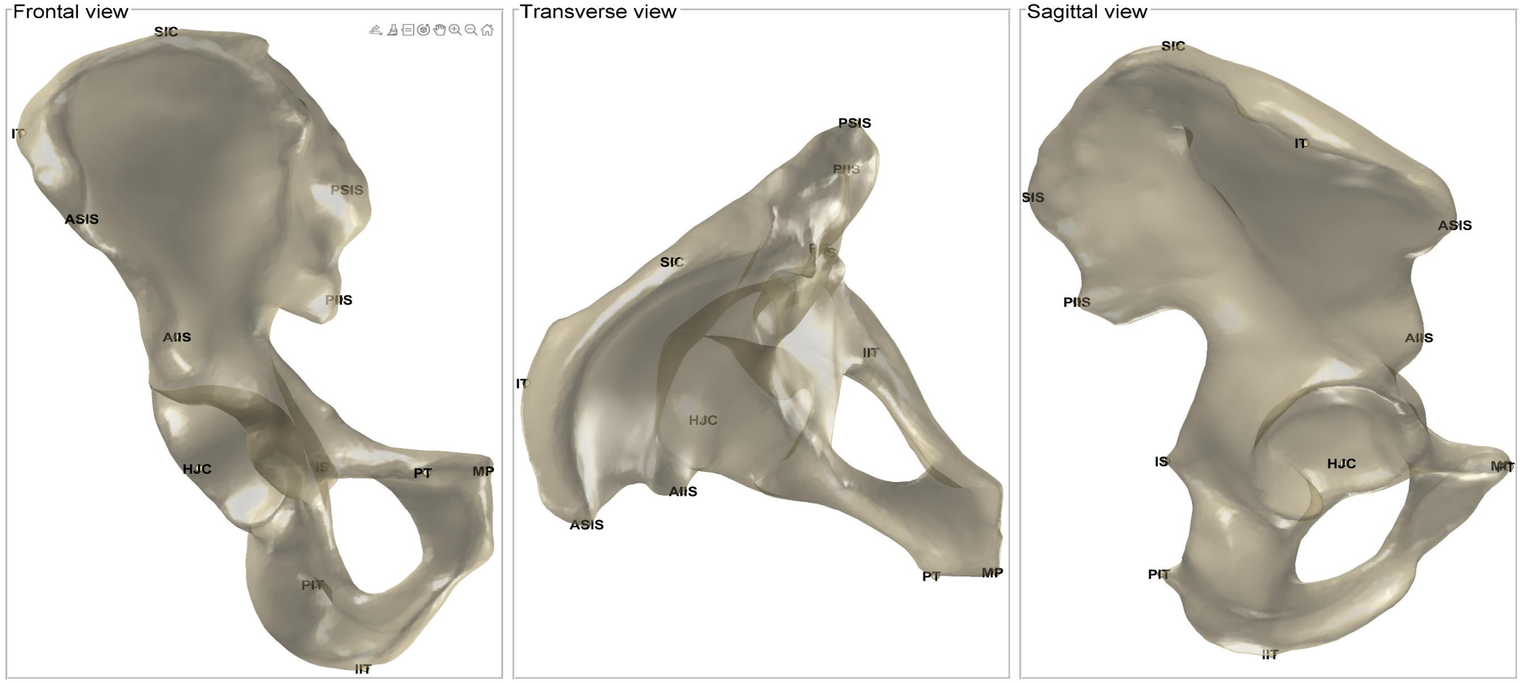

Table 2: Description of the landmarks of the hip bone

Abbreviation	Name
ASIS	Anterior superior iliac spine
AIIS	Anterior inferior iliac spine
HJC	Hip joint center
MP	Most medial and anterior point to the pubic symphysis
PT	Pubic tubercle
IIT	Most inferior point of the ischial tuberosity
PIT	Most posterior point of the ischial tuberosity
IS	Ischial spine
PIIS	Posterior inferior iliac spine
PSIS	Posterior superior iliac spine
SIC	Most superior point of the iliac crest
IT	Most lateral point of the iliac tubercle

Table 3: Description of the landmarks of the femur

Abbreviation	Name
HJC	Hip joint center
GT	Most superior point of the greater trochanter
P1	Closest point between the neck and shaft axis on the neck axis (Bergmann et al., 2016)
LT	Lesser trochanter
MEC	Medial epicondyle
LEC	Lateral epicondyle
MPC	Most posterior point of the medial condyle
LPC	Most posterior point of the lateral condyle
P2	Intercondylar notch (Bergmann et al., 2016)

2016 - Bergmann et al. - Standardized Loads Acting in Hip Implants
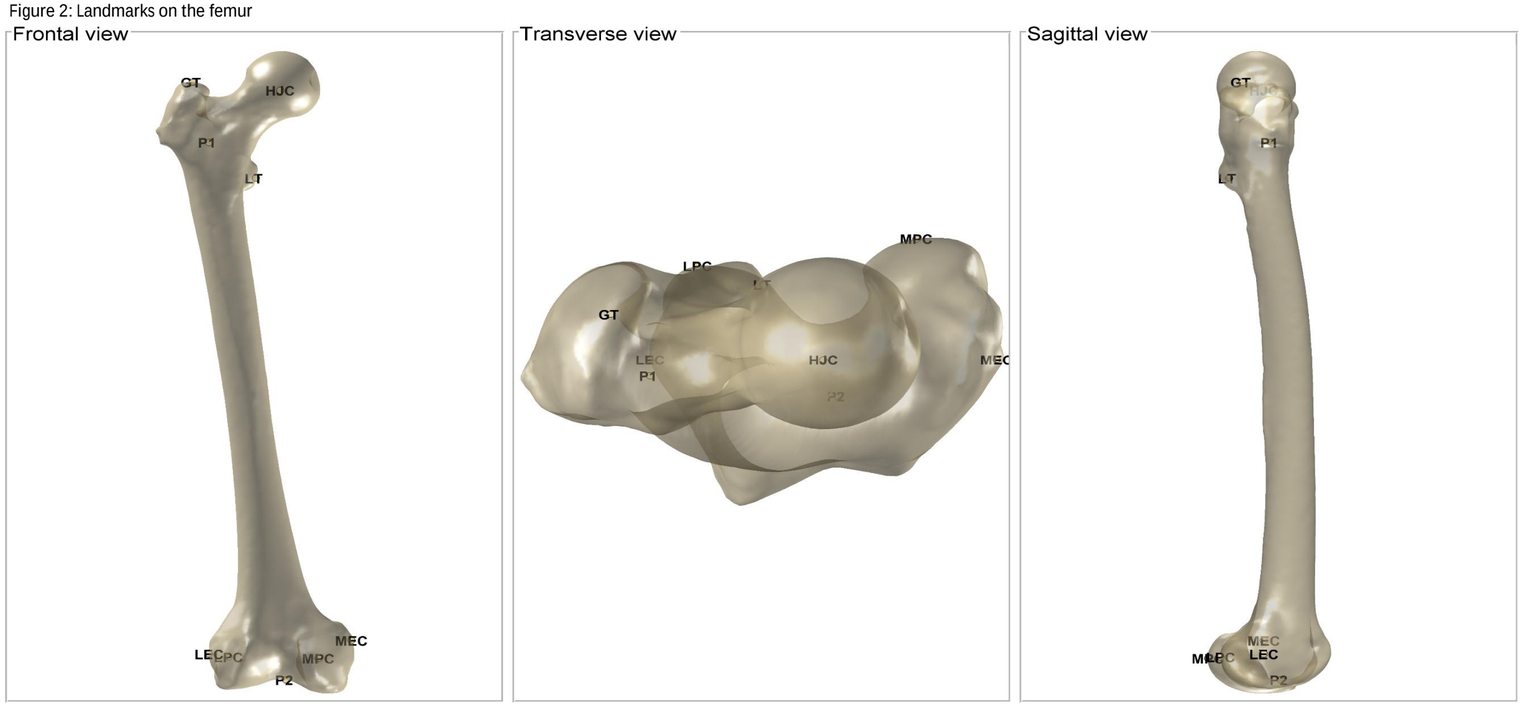
Figure 2: Landmarks on the femur