

Normalizing the Pelvis Segment Angle Example

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The Coda and Helen Hayes pelvis are tilted forward approximately 20 degrees from the horizontal.

In describing the orientation of the pelvis or for describing the hip joint angle, it is often convenient to define a pelvis angle that has a coronal plane parallel to the floor (eg a vertical segment with zero tilt).

Step 1. Create landmarks along the Iliac Crest vertically above the hip joint landmarks.

Workspace | Signals and Events | Models | Reports | CalT

Segments | Landmarks | Muscles | Subject Data / Metrics

Landmarks | Functional | Digitizing

Landmark Name: RT_ILIAC

Define Orientation Using:

Starting Point: RIGHT_HIP (Reference)

☐ Targets and/or Landmarks:

Ending Point: (On a line)

*Lateral object: (On a plane)

*Project From: (Projection onto a line or plane)

* = Optional

☒ Existing Segment: LAB

Landmark Offset from Start Point (Reference) or Segment Origin

☐ Offset to Existing Calibration Target or Landmark

☒ Offset Using the Following ML/AP/AXIAL Offsets

X: 0.0

Y: 0.0

Z: ASIS_DISTANCE

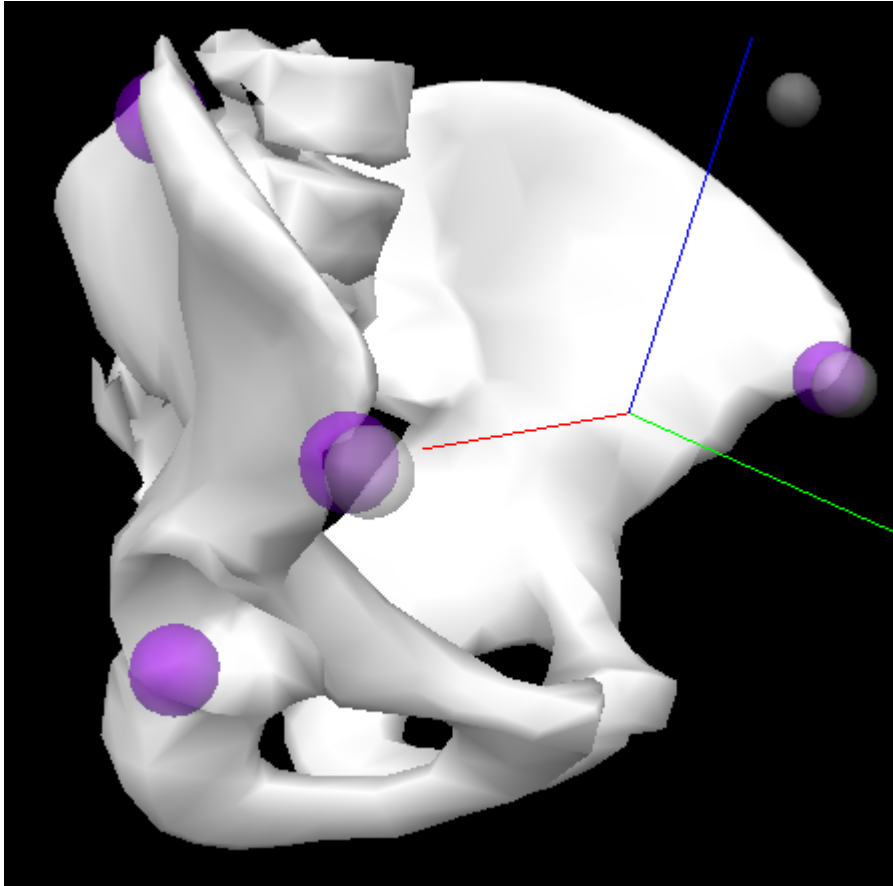
☐ Offset by Percent (1.0 = 100%) (Meters when not checked)

☒ Calibration Only Landmark (Not generated for assigned motion file(s))

Undo Changes | Apply | Build Model | Close Tab

Note that the Z edit box contains the subject metric **0.5*ASIS_DISTANCE** there are no strict dimensions, but it is convenient to base it partly on the subjects size. Note that this will end up being the length of a virtual pelvis segment, and will not be used for any inverse dynamics calculations, so the distance does not actually matter because only the orientation of the segment coordinate system

will be used for segment and joint angles.



Create a left iliac crest landmark

Workspace | Signals and Events | Models | Reports | CalT

Segments | Landmarks | Muscles | Subject Data / Metrics

Landmarks | Functional | Digitizing

Landmark Name:

Define Orientation Using:

Starting Point: (Reference)

☐ Targets and/or Landmarks:

Ending Point: (On a line)

*Lateral object: (On a plane)

*Project From: (Projection onto a line or plane)

* = Optional

☒ Existing Segment:

Landmark Offset from Start Point (Reference) or Segment Origin

☐ Offset to Existing Calibration Target or Landmark:

☒ Offset Using the Following ML/AP/AXIAL Offsets

X:

Y:

Z:

☐ Offset by Percent (1.0 = 100%) (Meters when not checked)

☒ Calibration Only Landmark (Not generated for assigned motion file(s))

Undo Changes | Apply | Build Model | Close Tab

Step 2. Create a Visual3D pelvis that is kinematic only.

Segments | Segment Properties | IK Constraints

Segment Name:

☒ Kinematic Only

Segment Type:

Create

use the hip landmarks and the iliac crest landmarks

Segments
Segment Properties
IK Constraints
RPV_2

Define Proximal Joint and Radius

Lateral
Joint
Medial
Radius (Meters)

RT_ILIAC
None
LT_ILIAC
0.10549

Define Distal Joint and Radius

Lateral
Joint
Medial
Radius (Meters)

RIGHT_HIP
None
LEFT_HIP
0.10549

Extra Target to Define Orientation (if needed)

Location
None

Select Tracking Targets (Ctrl-Left Mouse Click to Multiselect)

☐ Use Calibration Targets for Tracking

☐ RFRA
☐ RMP5
☐ RTIB
☒ SACR

☐ RHEE
☐ RMT1
☐ RTOE
☐ T10

☐ RKN2
☐ RMT5
☐ RUPA
☐ XIPH

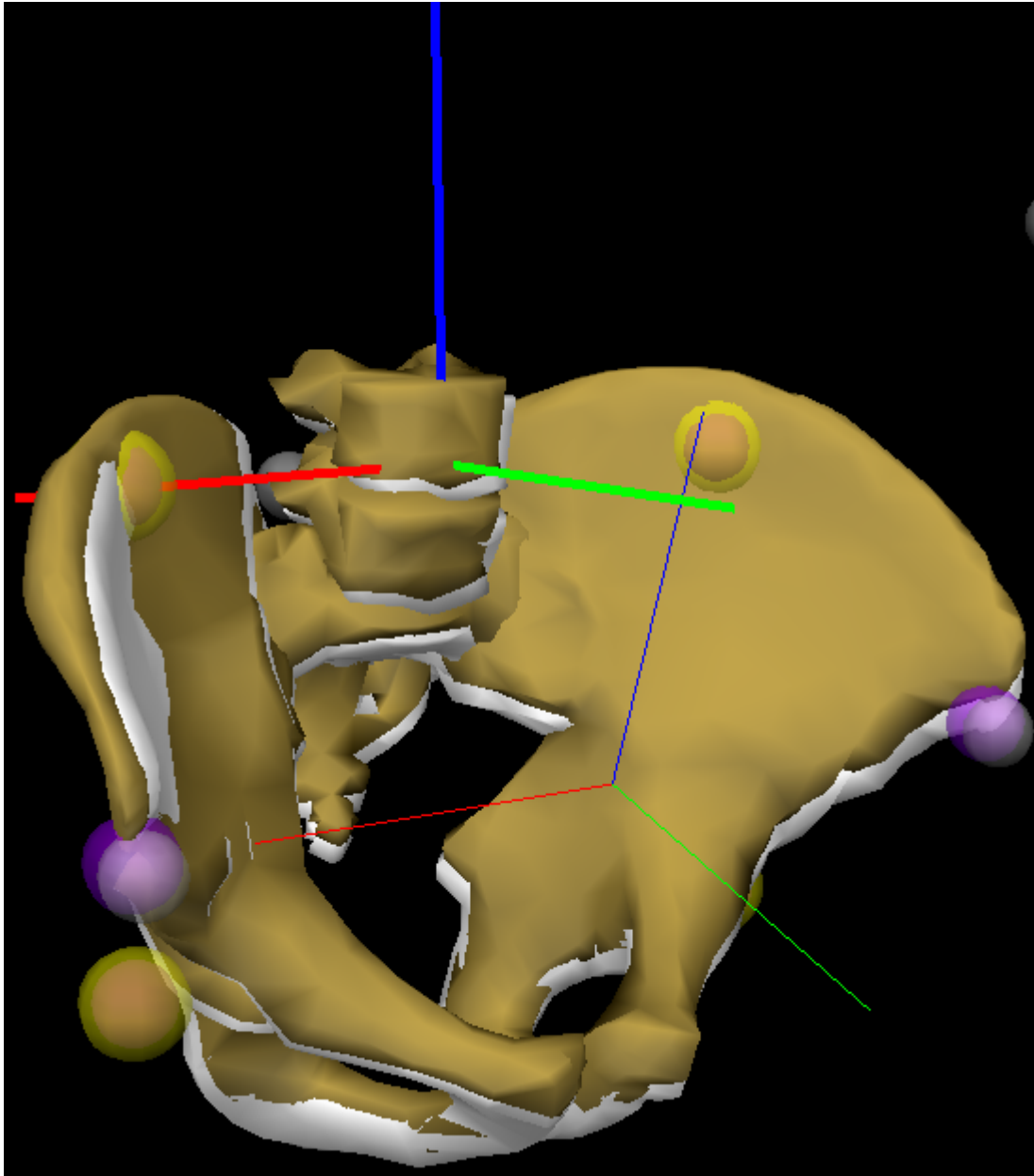
☐ RKNE
☐ RSHO
☐ RWRA

☐ RMP2
☐ RTHI
☐ RWRB

Depth (Meters): 0.12

Close Tab
Guess Properties
Apply
Build Model

Use Coda pelvis tracking markers LASI, RASI, SACR



There are now 2 pelvis segments labeled **Pelvis** and **RPV_2**

Pelvis segment RPV_2 has a z-axis that is now directed vertically upward, which means that the pelvis segment angle relative to the laboratory will have no anterior tilt.

Pelvis segment angle and Hip joint angle can now be defined relative to segment RPV_2.

For example,

Compute Model Based Data

Data NameRKNEE_ANGLE

FolderORIGINAL

Result Folder will always be Original

Joint Angle (degrees):

Segment and Reference Segment define the angle desired.
Normalization is relative to standing posture.
The Cardan Sequence defines the order of rotations.
Warning!!! If you are using the anatomical axes (ML, AP, or AXIAL) the sign of the angle follows the Right Hand Rule about the actual corresponding segment coordinate system axes.

CreateReset DialogClose

Model Based Item Properties

JOINT_ANGLE

Use Negative

☐ X

☐ Y

☐ Z

Normalization

Normalization Off

SegmentRight Shank

Reference SegmentRight Thigh

Cardan SequenceX-Y-Z

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