

# Skeleton Builder

A skeleton is a hierarchically connected set of segments or “bones” with translation and rotation data. Skeleton Builder, as the name implies, is a tool within Cortex that allows you to construct a skeleton by creating bones and connecting them together. Each bone is defined by the motion of three point locations used to construct its translation and rotation data.

Skeleton Builder skeletons are relatively simple, direct and fast calculations of bones that are defined and calculated from one joint center to another. The joints can be specified by surface markers or virtual (calculated) markers. Typically, one bone axis is defined from one virtual joint center to a second virtual joint center. Then a 3D local coordinate system is defined with the origin point, bone axis point, and plane point. The operator has the option to rotate any axis to match custom angle definitions or to correct for limb and body deformities. An important advantage of Skeleton Builder skeletons is that they represent the method of how biomechanical models are commonly computed, but are set up without any coding.

## Advantages

- Entire specification is done in Cortex
- Entire specification is stored in local files for easy retrieval
- You can make changes to the setup and see results in the Cortex 3D workspace or on Cartesian graphs
- Appropriate for identifying rigid external props like chairs, walkers, sport implements and other objects
- Easy to create rotational and transitional offsets
- Easy to track individual rotation channels, such as for a hinge
- Calculations are performed in real-time and are available to be used in Cortex to instantly give feedback to the operator or subject
- 3D graphical interface and display to show segmental positions and orientations plus graphical gizmo to rotate the segment
- You can either specify the segment to be solved with 6 DOF (i.e., with respect to the global coordinate system) or with respect to an adjacent segment and get flexion/extension, abduction/adduction and internal/external rotation

