

Materials List for

Measuring 3D In-vivo Shoulder Kinematics using Biplanar Videoradiography

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jove.com/video/62210

Materials

| Name | Company | Catalog Number | Comments |
|---|-------------------------------|----------------|--|
| Calibration cube | Built in-house | N/A | 10 cm Lucite box with a tantalum bead in each corner and four additional beads midway along the box's vertical edges (12 beads total). The positions of each bead are precisely known relative to a corner of the box that serves as the origin of the laboratory coordinate system. |
| Distortion correction grid | Built in-house | N/A | Lucite sheet that covers the entire face of the 16 inch image intensifier and contains an orthogonal array of tantalum beads spaced at 1 cm. |
| ImageJ | National Institutes of Health | N/A | Image processing software used to prepare TIFF stack of bone volumes. |
| Markerless Tracking Workbench | Custom, in house software | N/A | A workbench of custom software used to digitize anatomical landmarks on 3D bone models, constructs anatomical coordinate systems, uses intensity-based image registration to perform markerless tracking, and calculates and visualize kinematic outcomes measures. |
| MATLAB | Mathworks, Inc | N/A | Computer programming software. For used to perform data processing and analysis. |
| Mimics (version 20) | Materialise, Inc | N/A | Image processing software used to segment humerus, scapula, and ribs from CT scan. |
| Open Inventor | Thermo Fisher Scientific | N/A | 3D graphics program used to visualize bones |
| Phantom Camera Control (PCC) software (version 3.4) | | N/A | Software for specifying camera parameters, and acquiring and saving radiographic images |
| Pulse generator (Model 9514) | Quantum Composers, Inc. | N/A | Syncs the x-ray and camera systems and specifies the exposure time |
| Two 100 kW pulsed x-ray generators (Model CPX 3100CV) | EMD Technologies | N/A | Generates the x-rays used to produce radiographic images |

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|--|------------------------|-----|---|
| Two 40 cm image intensifiers (Model P9447H110) | North American Imaging | N/A | Converts x-rays into photons to produce visible image |
| Two Phantom VEO 340 cameras | Vision Research | N/A | High speed cameras record the visible image created by the x-ray system |