**Supplementary material**

This material is provided for: “A data set with kinematic and ground reaction forces of human balance”.

The marker set model used in this study is based on the work of Leardini and collaborators ([2011](#_ENREF_5); [2007](#_ENREF_6)). There is a tutorial of the Visual3D software for the IOR Full Body Model (<http://c-motion.com/v3dwiki/index.php?title=Tutorial:_IOR_Gait_Full-Body_Model>) which is close related to the present model we employed.

**Table 1. Label, name, and description of the 42 markers used.**

|  |  |  |
| --- | --- | --- |
| Label | Name | Description |
| R.Front.Head /L.Front.Head | Right/Left front head | Approximately over the right/left temple. |
| R.Back.Head /L.Back.Head | Right/Left back head | On the back of the head, roughly in a horizontal plane of the front head markers. |
| R.Shoulder /L.Shoulder | Right/Left shoulder | Right/Left Acromio-clavicular joint. |
| C7 | 7th cervical vertebrae | Spinous process of the seventh cervical vertebrae. |
| T2 | 2nd thoracic vertebrae | Second thoracic vertebrae. |
| T7 | 7th thoracic vertebrae | Seventh thoracic vertebrae. |
| L1, L3, L5 | 1st, 3rd, 5th lumbar vertebrae | First, third and fifth lumbar vertebrae. |
| IJ | Incisura jugularis | Deepest point of incisura jugularis. |
| PX | Xiphoid process | Xiphoid process (most caudal point of the sternum). |
| R.ASIS/L.ASIS | Right/Left anterior superior iliac spine | Anterior superior iliac spine. |
| R.PSIS/L.PSIS | Right/Left posterior superior iliac spine | Posterior superior iliac spine. |
| R.Iliac.Crest/L.Iliac.Crest | Right/Left iliac crest | Iliac crest. |
| R.GRT/L.GRT | Right/Left greater trochanter | Most lateral prominence of the greater trochanter. |
| R.Knee/L.Knee | Right/Left femoral epicondyle | Most lateral prominence of the lateral femoral epicondyle. |
| R.Knee.Medial/L.Knee.Medial | Right/Left medial femoral epicondyle | Most medial prominence of the medial femoral epicondyle. |
| R.HF/L.HF | Right/Left head of the fibula | Proximal tip of the head of the fibula. |
| R.TT/L.TT | Right/Left tibial tuberosity | Anterior border of the tibial tuberosity. |
| R.Ankle/L.Ankle | Right/Left lateral malleolus | Lateral prominence of the lateral malleolus. |
| R.Ankle.Medial/L.Ankle.Medial | Right/Left medial malleolus | Most medial prominence of the medial malleolus. |
| R.Heel/L.Heel | Right/Left heel | Aspect of the achilles tendon insertion on the calcaneous. |
| R.MT1/L.MT1 | Right/Left 1st metatarsal head | Dorsal margin of the first metatarsal head. |
| R.MT2/L.MT2 | Right/Left 2nd metatarsal head | Dorsal aspect of the second metatarsal head. |
| R.MT5/L.MT5 | Right/Left 5th metatarsal head | Dorsal margin of the fifth metatarsal head. |

**Table 2. Label and name of the calculated angles.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Planar angles |  | 3D Cardan angles |
| Label | **Name** | **Label** | **Name** |
| Sp5\_Sp4\_FE | Sp5\_Sp4 Flexion/Extension | R/LHe\_Lab\_Angle | Right/Left Head\_Lab Angle |
| Sp4\_Sp3\_FE | Sp4\_Sp3 Flexion/Extension | R/LTh\_Lab\_Angle | Right/Left Thorax\_Lab Angle |
| Sp3\_Sp2\_FE | Sp3\_Sp2 Flexion/Extension | R/LPel\_Lab\_Angle | Right/Left Pelvic Angle |
| Sp2\_Sp1\_FE | Sp2\_Sp1 Flexion/Extension | R/LHe\_Th\_Angle | Right/Left Head\_Thorax Angle |
| Sp1\_Pel\_FE | Sp1\_Pelvis Flexion/Extension | R/LTh\_Pel\_Angle | Right/Left Thorax\_Pelvis Angle |
| R/LSp5\_Sp4\_LB | Right/Left Sp5\_Sp4 Lateral Bending | R/LA\_Th\_Transl | Right/Left Acromium\_Thorax Translation |
| R/LSp4\_Sp3\_LB | Right/Left Sp4\_Sp3 Lateral Bending | R/LHip\_Angle | Right/Left Hip Angle |
| R/LSp3\_Sp2\_LB | Right/Left Sp3\_Sp2 Lateral Bending | R/LKnee\_Angle | Right/Left Knee Angle |
| R/LSp2\_Sp1\_LB | Right/Left Sp2\_Sp1 Lateral Bending | R/LAnkle\_Angle | Right/Left Ankle Angle |
| R/LSp1\_Pel\_LB | Right/Left Sp1\_Pelvis Lateral Bending |  |  |
| R/LSh\_Th\_LB | Right/Left Shouder\_Thorax Lateral Bending |  |  |
| R/LSh\_Th\_AR | Right/Left Shoulder\_Thorax Axial Rotation |  |  |

**Table 3. Convention for the planar angles.**

|  |  |
| --- | --- |
| Label | Convention |
| Sp5\_Sp4\_FE | Flexion (+)/Extension (-) |
| Sp4\_Sp3\_FE | Flexion (+)/Extension (-) |
| Sp3\_Sp2\_FE | Flexion (+)/Extension (-) |
| Sp2\_Sp1\_FE | Flexion (+)/Extension (-) |
| Sp1\_Pel\_FE | Flexion (+)/Extension (-) |
| RSp5\_Sp4\_LB  LSp5\_Sp4\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSp4\_Sp3\_LB  LSp4\_Sp3\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSp3\_Sp2\_LB  LSp3\_Sp2\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSp2\_Sp1\_LB  LSp2\_Sp1\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSp1\_Pel\_LB  LSp1\_Pel\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSh\_Th\_LB  LSh\_Th\_LB | Right (-)/Left (+)  Right (+)/Left (-) |
| RSh\_Th\_AR  LSh\_Th\_AR | Right (-)/Left (+)  Right (+)/Left (-) |

**Table 4. Convention for the tri-dimensional Cardan angles.**

|  |  |
| --- | --- |
| Label | Convention |
| RHe\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (-)/Left (+)  Rotation: Right (-)/Left (+) |
| LHe\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (+)/Left (-)  Rotation: Right (+)/Left (-) |
| RTh\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (-)/Left (+)  Rotation: Right (-)/Left (+) |
| LTh\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (+)/Left (-)  Rotation: Right (+)/Left (-) |
| RPel\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (-)/Left (+)  Rotation: Right (-)/Left (+) |
| LPel\_Lab\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (+)/Left (-)  Rotation: Right (+)/Left (-) |
| RHe\_Th\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (-)/Left (+)  Rotation: Right (-)/Left (+) |
| LHe\_Th\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (+)/Left (-)  Rotation: Right (+)/Left (-) |
| RTh\_Pel\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (-)/Left (+)  Rotation: Right (+)/Left (-) |
| LTh\_Pel\_Angle | Flexion/Extension: Anterior (+)/Posterior (-)  Lateral Bending: Right (+)/Left (-)  Rotation: Right (-)/Left (+) |
| R/LA\_Th\_Transl | Anterior (+)/Posterior (-)  Right (+)/Left (-)  Up (+)/Down (-) |
| R/LHip\_Angle | Flexion (+)/Extension (-)  Adduction (+)/Abduction (-)  Rotation: Internal (+)/External (-) |
| R/LKnee\_Angle | Flexion (+)/Extension (-)  Adduction (+)/Abduction (-)  Rotation: Internal (+)/External (-) |
| R/LAnkle\_Angle | PlantarFlexion (-)/DorsiFlexion(+)  Adduction (+)/Abduction (-)  Inversion (+)/Eversion (-) |