

Name	Ref. <sup>1</sup>	Location	Static (35)	Dyn. (35)
HeadL		On headband, just above ear	X	X
HeadR		On headband, just above ear	X	X
HeadFront	SGL	On headband, Forehead	X	X
Chest	SME	Sternum	X	X
SpineThoracic2	TV2	Spine, 2nd Thoracic Vertebra	X	X
SpineThoracic12	TV12	Spine, 12th Thoracic Vertebra	X	X
LShoulderTop	SAE	Shoulder	X	X
LElbowOut	HLE	Elbow (outside)	X	X
LElbowIn	HME	Elbow (inside)	X	X
LWristIn	RSP	Wrist (thumb side)	X	X
LWristOut	USP	Wrist (pinkie side)	X	X
LHand2	HM2	Hand (basis of Forefinger)	X	X
RShoulderTop	SAE	Shoulder	X	X
RElbowIn	HLE	Elbow (outside)	X	X
RElbowOut	HME	Elbow (inside)	X	X
RWristOut	RSP	Wrist (thumb side)	X	X
RWristIn	USP	Wrist (pinkie side)	X	X
RHand2	HM2	Hand (basis of Forefinger)	X	X

<sup>1</sup> Sint Jan, S. Van (2007). Color Atlas of Skeletal Landmark Definitions. Guidelines for Reproducible Manual and Virtual Palpations. Edinburgh : Churchill Livingstone.

Name	Ref. <sup>1</sup>	Location	Static (35)	Dyn. (35)
WaistLFrontS	IAS	Pelvis (Anterior Superior Iliac Spine)	X	X
WaistBack	(IPS)	Sacrum	X	X
WaistRFront	IAS	Pelvis (Anterior Superior Iliac Spine)	X	X
LThighFrontLow		Patella (above knee)	X	X
LKneeOut	FLE	Knee	X	X
LShinFrontHigh	TTC	Shin	X	X
LAnkleOut	FAL	Ankle	X	X
LHeelBack	FCC	Heel	X	X
LForefoot2	FM2	2 <sup>nd</sup> Toe	X	X
LForefoot5	FM5	5 <sup>th</sup> Toe	X	X
RThighFrontLow		Patella (above knee)	X	X
RKneeOut	FLE	Knee	X	X
RShinFrontHigh	TTC	Shin	X	X
RAnkleOut	FAL	Ankle	X	X
RHeelBack	FCC	Heel	X	X
RForefoot2	FM2	2 <sup>nd</sup> Toe	X	X
RForefoot5	FM5	5 <sup>th</sup> Toe	X	X

<sup>1</sup> Sint Jan, S. Van (2007). Color Atlas of Skeletal Landmark Definitions. Guidelines for Reproducible Manual and Virtual Palpations. Edinburgh : Churchill Livingstone.

Foot	<p>General remarks:</p> <ul style="list-style-type: none"> <li>The line from <b>HeelBack</b> to <b>Forefoot2</b> defines the long axis of the foot. <b>Forefoot2</b> and <b>HeelBack</b> should be approximately at the same height relative to the floor when the person is standing with the foot flat on the ground, as they set the “slope” of this long axis.</li> <li><b>Forefoot5</b> is only used as a tracking marker, and the exact placement is less important. Place <b>Forefoot5</b> approximately at a position where it will hold well on the shoe. Pronation/Supination is set to zero based on the static trial.</li> </ul>
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Name	Position	Pictures	
Forefoot2 (FM2)	<b>2<sup>nd</sup> Toe</b> (Foot/Metatarsus – 2nd head)		
Forefoot5 (FM5)	<b>5<sup>th</sup> Toe</b> (Foot/Metatarsus – 5th head)		
HeelBack (FCC)	<b>Heel</b> Foot/Calcaneus – Aspect of the Achilles Tendon insertion		


Shank	General remarks: <ul style="list-style-type: none"> <li>• <b>AnkleOut</b> defines the axis of the simplified ankle joint, so it must be placed accurately at the lateral malleolus</li> <li>• <b>ShinFrontHigh</b> is a tracking marker only, so the exact placement is less important. If the cameras have problems seeing it during the swing phase, it may be moved 1-2 cm laterally.</li> </ul>
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Name	Position	Pictures	
AnkleOut (FAL)	<b>Ankle</b>  (Fibula – Apex of the Lateral Malleolus )		
ShinFrontHigh (TTC)	<b>Shin</b>  (Tibia – Tibial Tuberosity)		



Thigh	General remarks: <ul style="list-style-type: none"> <li>• <b>KneeOut</b> is placed as close as possible to the flexion-extension axis of the knee. The exact axis is calculated from the movement of the first dynamic trial.</li> <li>• <b>ThighFrontLow</b> is a tracking marker only, so the exact placement is less important. If the cameras have problems seeing it during the swing phase, it may be moved 1-2 cm laterally.</li> </ul>
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Name	Position	Pictures	
KneeOut (FLE)	<b>Knee</b>  (On the lateral femoral condyle, as close as possible to the knee flexion/extension axis)		


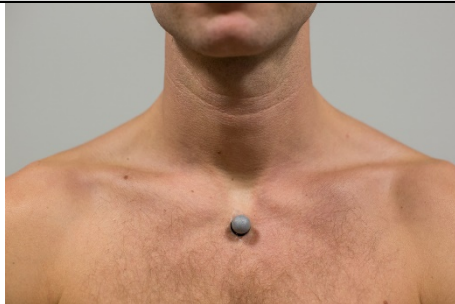






ThighFrontHigh (PAS)	<b>Patella</b>  (Along the central line of the patella, 1 cm proximally of the superior border of the patella when the knee is extended)	
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Pelvis	General remarks: <ul style="list-style-type: none"> <li>• Placement of all three pelvis markers is critical to get the correct orientation of the pelvis and correct hip joint centre locations.</li> <li>• When viewed from the front, both <b>WaistFront</b> markers must be at the same height and placed symmetrically relative to the centreline of the body.</li> <li>• When viewed from the side, the line connecting <b>WaistBack</b> with the midpoint of the IAS markers defines the pelvis tilt. Place the <b>WaistBack</b> marker at a height so that the forward tilt matches the anatomy of the person.</li> </ul>
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Name	Position	Pictures
WaistFront (IAS)	<b>Pelvis</b>  (Ilium – Anterior Superior Iliac Spine)	
WaistBack	<b>Sacrum</b>  (Sacrum – Midpoint between left and right Posterior Superior Iliac Spine)	



Thorax	General remarks: <ul style="list-style-type: none"> <li>The Thorax is defined from the midpoint of the <b>ShoulderTop</b> markers to the two <b>WaistFront</b> markers.</li> <li><b>SpineThorasic2</b> and <b>SpineThorasic12</b> are tracking markers only, so the exact placement is less important.</li> <li><b>Chest</b> defines the frontal direction of the shoulder segment. It is no problem to move it a few centimetres up or down, but it should not be moved to the left or right.</li> </ul>
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Name	Position	Pictures	
Chest (SME)	<b>Sternum</b> (Manubriosternal Edge)		
SpineThorasic2 (TV2)	<b>Spine</b> (Spinous Process of the 2nd Thoracic Vertebra)		
SpineThorasic12 (TV12)	<b>Spine</b> (Spinous Process of the 12th Thoracic Vertebra). Follow the more distal ribs using your fingers. They merge at TV12		

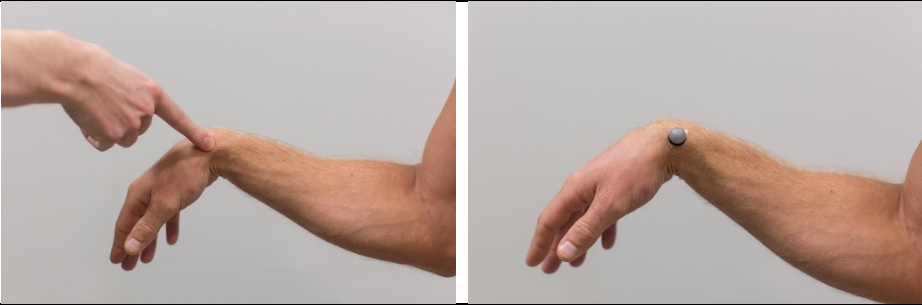


Shoulders	General remarks: <ul style="list-style-type: none"> <li>The midpoint of the shoulder markers is used to define the thorax and shoulder segment.</li> <li>The shoulder markers are used to define the shoulder joint (glenohumeral joint)</li> <li>The markers can be moved 1-2 cm medially, but must be placed symmetrically on both body sides.</li> </ul>
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Name	Position	Pictures
ShoulderTop (SAE)	<b>Shoulder</b> (Scapula – Acromial Edge)	

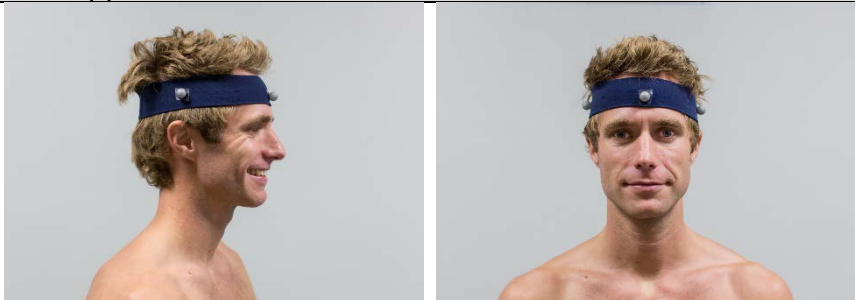
Upper arm	General remarks: <ul style="list-style-type: none"> <li>Marker placement for the arms is less critical than for the legs and pelvis.</li> <li><b>ElbowOut</b> and <b>ElbowIn</b> define the flexion axis of the elbow so should be placed as close to this axis as possible</li> </ul>
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Name	Position	Picture(s)
ElbowOut (HLE)	<b>Elbow (outside)</b> (Humerus – Lateral Epicondyle)	
ElbowIn (HME)	<b>Elbow (inside)</b> (Humerus – Medial Epicondyle)	

Wrist / Hand	General remarks: <ul style="list-style-type: none"> <li>Marker placement for the arms is less critical than for the legs and pelvis.</li> <li><b>WristIn</b> and <b>WristOut</b> define the flexion axis for the wrist joint so should be placed close to that axis. However, they may be moved 1-2 cm for better visibility to the cameras.</li> </ul>
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Name	Position	Picture(s)
WristIn (RSP)	<b>Wrist (thumb side)</b>  (Radius – Styloid Process)	
WristOut (USP)	<b>Wrist (pinkie side)</b>  (Ulna – Styloid Process)	
Hand2 (HM2)	<b>Hand (forefinger)</b>  (Hand/Metacarpus – Head, Medial Aspect of the forefinger)	

Head	General remarks: <ul style="list-style-type: none"> <li>The head axis is defined from the midpoint of the shoulder markers to the midpoint of the <b>HeadR</b> and <b>HeadL</b> markers.</li> <li>When you look at the person from the side, the <b>HeadR</b> and <b>HeadL</b> markers should be aligned with the shoulder markers.</li> <li>The <b>HeadFront</b> marker is a tracking marker only, so the exact placement is not important.</li> </ul>
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Name	Position	Picture(s)
HeadL	<b>Above ear</b> (on headband)	
HeadR	<b>Above ear</b> (on headband)	
HeadFront	<b>Forehead</b> (on headband, Skull - Glabella)	