Virtual Knee Alignment Device (vKAD)

Offset Calculation of Tibia and Thigh Marker

Plug-in Gait

The placements of the thigh and tibia marker (THI, TIB) are essential for the rotation of the upper and lower leg (thigh and shank rotation) in the „Plug-in Gait“ model. Already minor deviations results in wrongly defined knee and ankle axes and consequently leads to incorrect kinematic as well as kinetic results of the knee and ankle joint.

vKAD

The vKAD (virtual Knee Alignment Device) is a supplementation to the „Plug-in Gait“ model. After the static recording, the extra model with four additional medial markers on knee and ankle joints (Figure 1) enables the automatic calculation of

- rotation offsets of the attached THI and TIB marker
- tibial torsion of the lower leg
- leg length as well as knee and ankle widths

These calculations are automatically taken into account in the kinetic and kinematic analyses of the dynamic recordings.

Properties

The automatic consideration of the offsets of the manually attached THI and TIB markers enables even less experienced “Plug-in Gait” users to carry out a meaningful analysis. In addition, an automatic calculation instead of manual measurements of the anthropometric parameters provides a high level of reproducibility.

Applications

- Lower Body Plug-in Gait marker set
- Biomechanics
  - Movement and gait analysis
  - Sport/Performance diagnostic

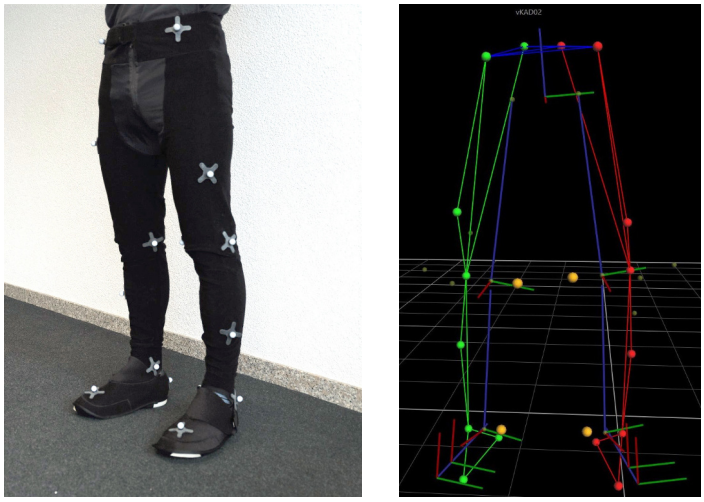

Figure 1: Left: «Plug-in Gait» Lower Body with vKAD marker placement, Right: 3D-maker (right leg: green, left leg: red, medial marker: yellow).

Preparation

The integration of the vKAD model in Nexus 2.x is easy. All necessary files Can be downloaded directly from extranet.prophysics.ch:81/_h4JN46gkcN5VwR. This downloaded folder „PlugInGaitAi_vKAD.zip“ contains all necessary files as well as a short README with further instructions.

Process

- Fix marker on subject (Figure 1)
- Create new subject with «PlugInGait_Lowerbody_Ai_vKAD»
- Insert marker diameter, bodymass and height
- Execute static recording
- Execute pipeline «1_Virtual_KAD_Static»
  - «Reconstruct»
  - «Autolabel Static»
  - «Scale Subject VSK»
  - «Static Skeleton Calibrations – Markers Only»
  - «vKAD (Run Static BodyLanguage Model) »
  - «LegLength (Run Static BodyLanguage Model) »
  - «Delete Unlabeled Trajectories»
  - «Process Static Plug-in Gait Model»
  - «Save Trial - C3D + VSK»

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