

## Walking while mechanically coupled

The dataset is made up of full-body kinematics data of 6 subjects performing two main tasks:

- walking alone (Solo Trial);
- walking together with another subject while mechanically coupled through a stretcher-like object (Paired Trial).

Data were collected by using the VICON system with 14 infrared bonita camera. Subjects were fully instrumented by 34 passive markers placed according to the Plug-In-Gait marker placement (see Fig.1).

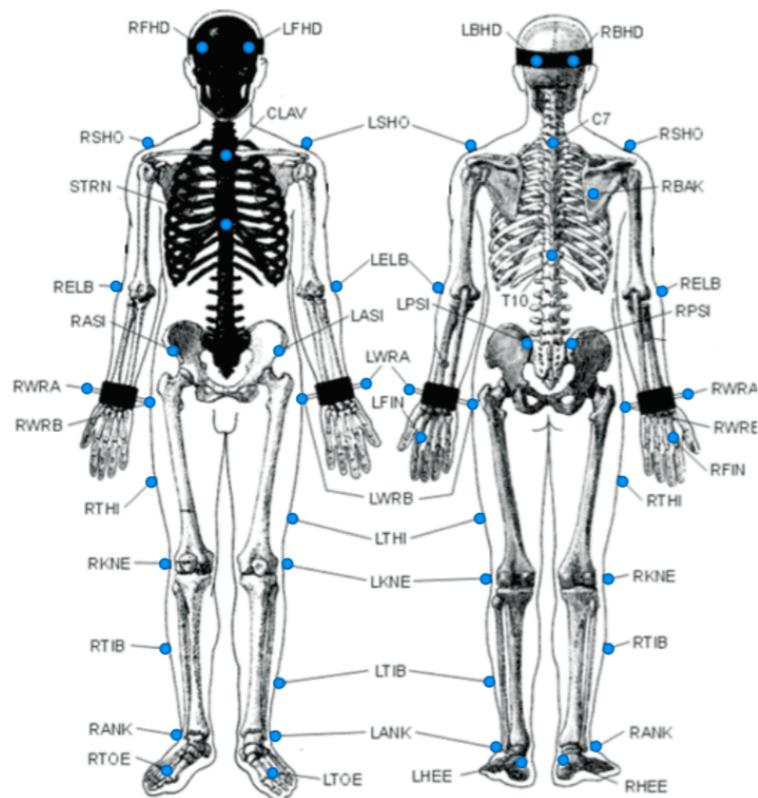


Figure 1 - Marker placement: 26 markers + 8 markers on head and wrist bands. For the experiments the optional marker RBAK was not used.

The stretcher like object used to mechanically coupled a pair of subjects was also instrumented with 6 markers in order to detect its position during the trials.

The experiment parameters and subject metadata are provided in the files *Subject\_Disposition.xlsx* and *Database\_Subjects\_CoMTrajectory.xlsx*. The trajectory of each marker placed on each subject within a pair is stored in *Pair\*.mat* while the trajectory and the velocity of the CoM for each subject evaluated at each gait cycle can be found in *CoM\_trajectories* and *CoM\_velocities*.

In detail:

- *Pair\*.mat*: For each pair (\*=1,2,3,...,7), the cells represent the trials performed by the pair. By opening one cell (trial) it is possible to find several fields. The relevant one is the 'DATA' field (hdl\*{1,#trial}.DATA)

where it is possible to find several parameters related to the Subject in front of the stretcher (1) or behind it (2), For simplicity we will refer only to the Subject in front to explain the rest of the fields (same can be said for the Subject behind just by replacing 1 with 2 or A with B). The main field to be analyzed are:

- *hdl\*{1,#trial}.DATA.Pos1* → it contains all the markers' trajectories, related to markers on the right (R) or on the left (L) or in the center (C).
- *hdl\*{1,#trial}.DATA.CoMs01A.C.CoM* → it contains CoM trajectory
- *hdl\*{1,#trial}.DATA.CoM\_Table* → it contains Table CoM trajectory.
- *CoM\_trajectories*: each field is a Subject that is identified by a number (pair to which he/she belongs) and a letter A/B to indicate whether the subject is in front of the stretcher (A) or behind (B).
  - *COM\_GCT.Subject\*\*.Single* → contains a number of cells corresponding to the total number of trials that the Subject\*\* did during the 'Solo Trial'. Since some of the 6 analyzed subjects can compare in different pairs or in the same pair but in different position, in order to map the subject inside a pair to the real subject (whose parameters are stored in *Database\_Subjects\_CoM\_Trajectory.xlsx*) please refer to *Subject\_Disposition.xlsx*. In each trial one can access to the COM trajectory along the forward direction;
  - *COM\_GCT.Subject\*\*.Coupled* → contains a number of cells corresponding to the total number of trials that the Subject\*\* did during the 'Paired Trial'; In each trial one can access to the COM trajectory along the forward direction;
  - *COM\_GCT.Subject\*\*.Media* → it is the mean CoM trajectory for both Single and Paired trials.
- *CoM\_velocities*: same scheme of *CoM\_trajectories*.