

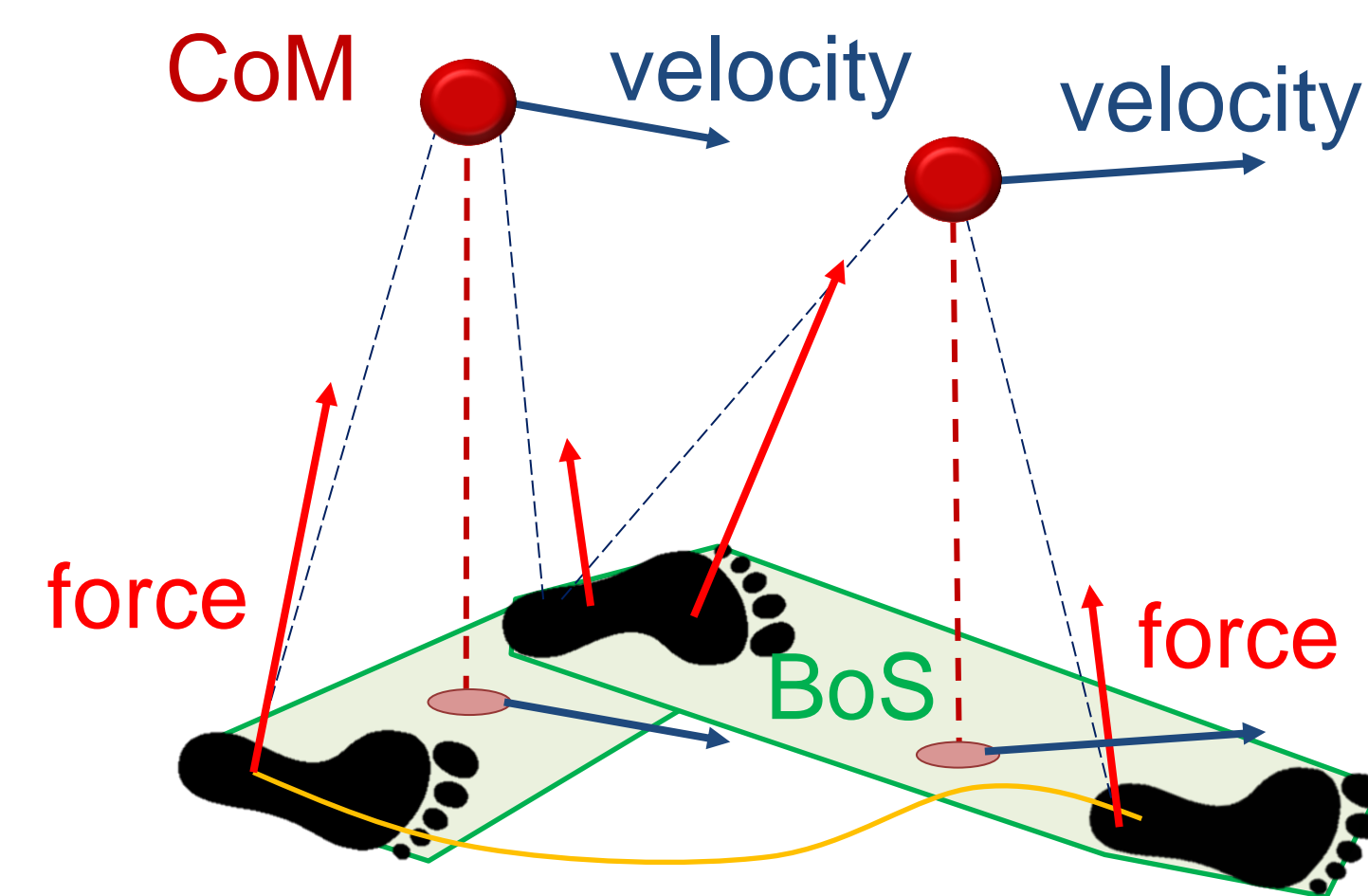
Estimating center of pressure and center of mass patterns in stroke survivors during daily life activities using force sensing shoes

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Objective – monitoring body balance in stroke survivors during daily life activities in a simulated in-home setting.

Body balance: estimating the movement of center of pressure (CoP) and center of mass (CoM) related to foot positions [1, 2].

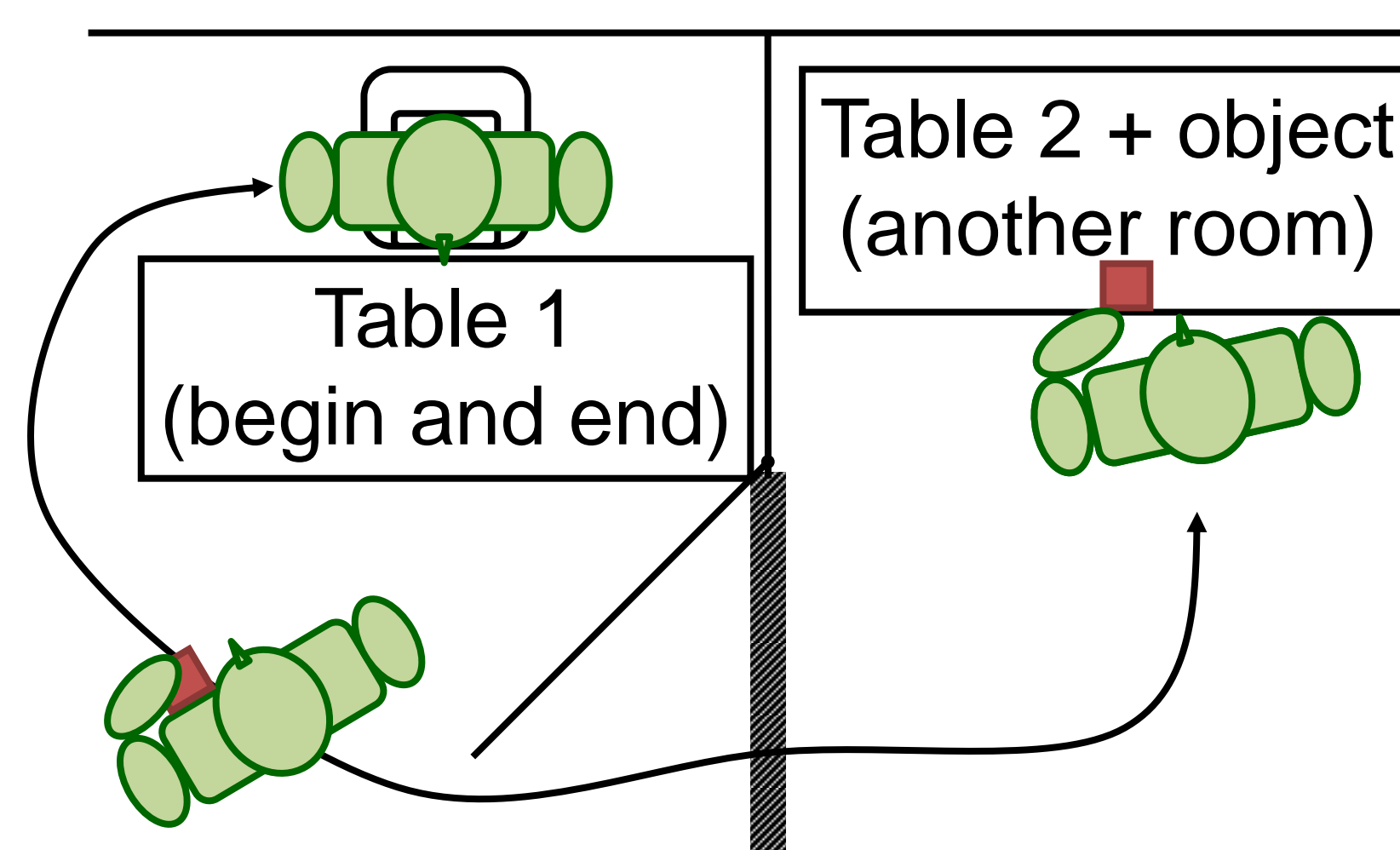


Qualitative parameters of balance

Method – evaluation of kinetics using Xsens Instrumented ForceShoes™ while performing 10 meters walking trials and simulated functional tasks. Results were related to Berg balance scale scores [3].



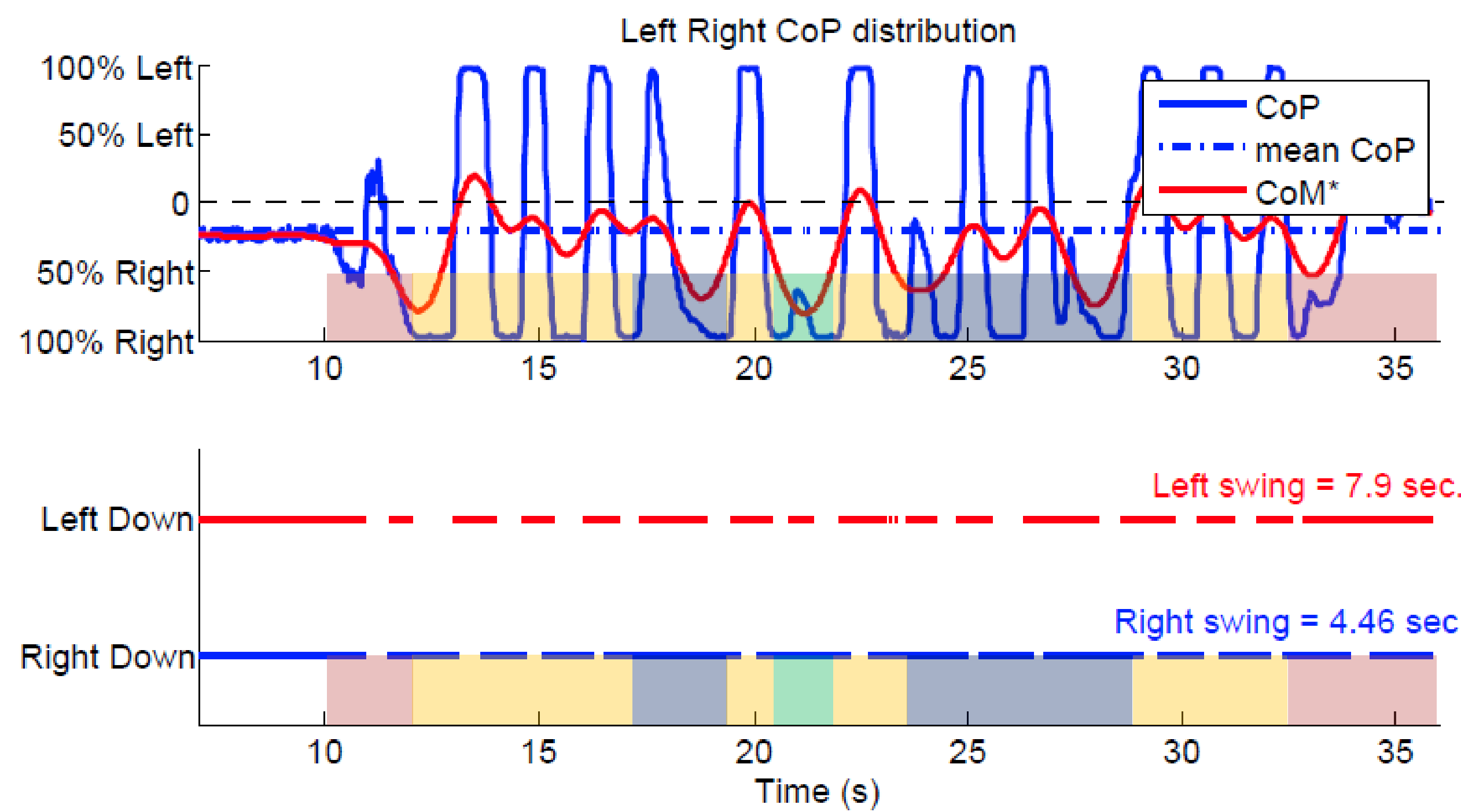
Xsens Instrumented ForceShoes™



Top-down view of the simulated ambulatory setting in which subjects move around and perform the functional tasks

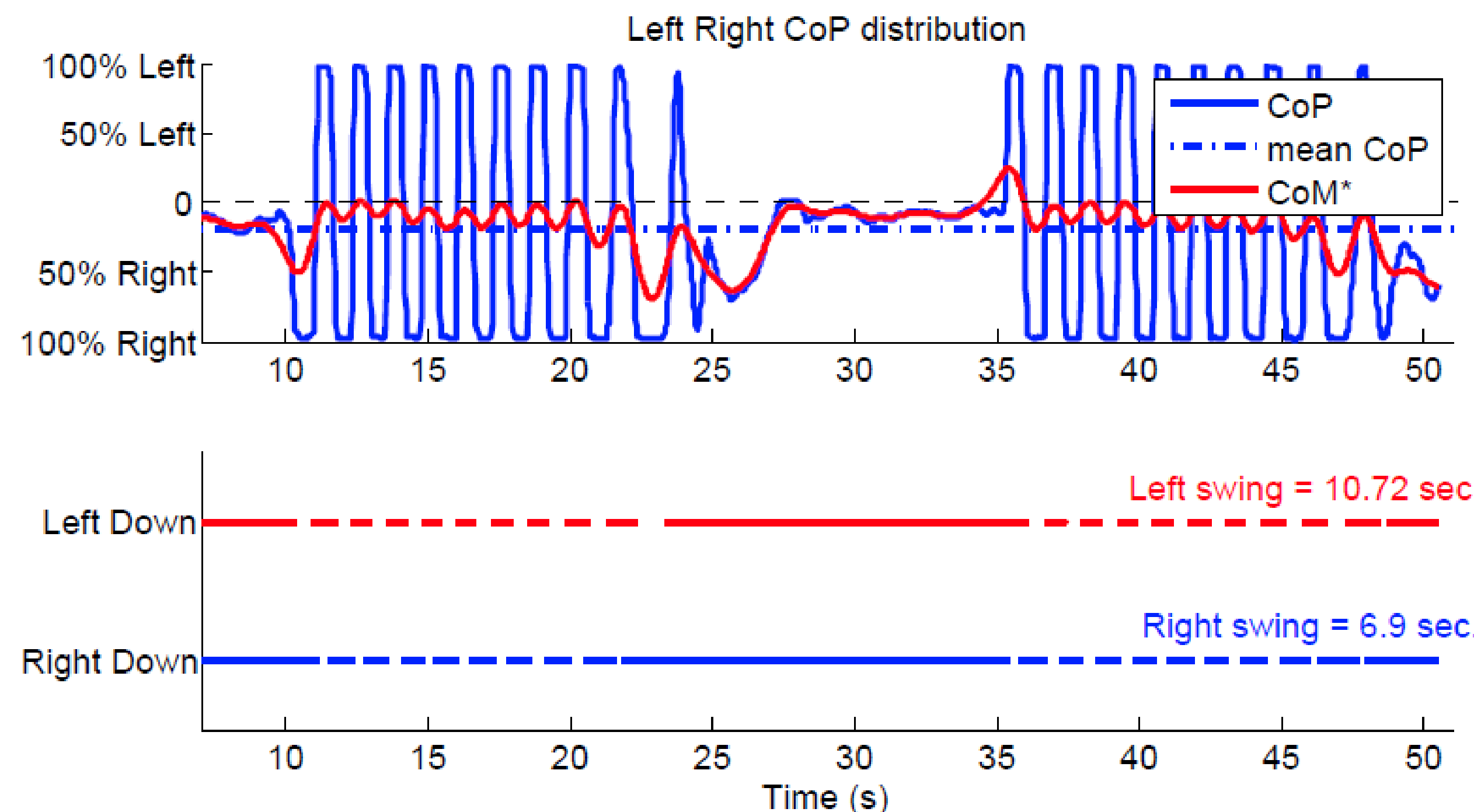
Functional task

• Male (47 years) left side affected, Berg Balance Scale: 53



Walking 2 times - 10 meters in a straight line

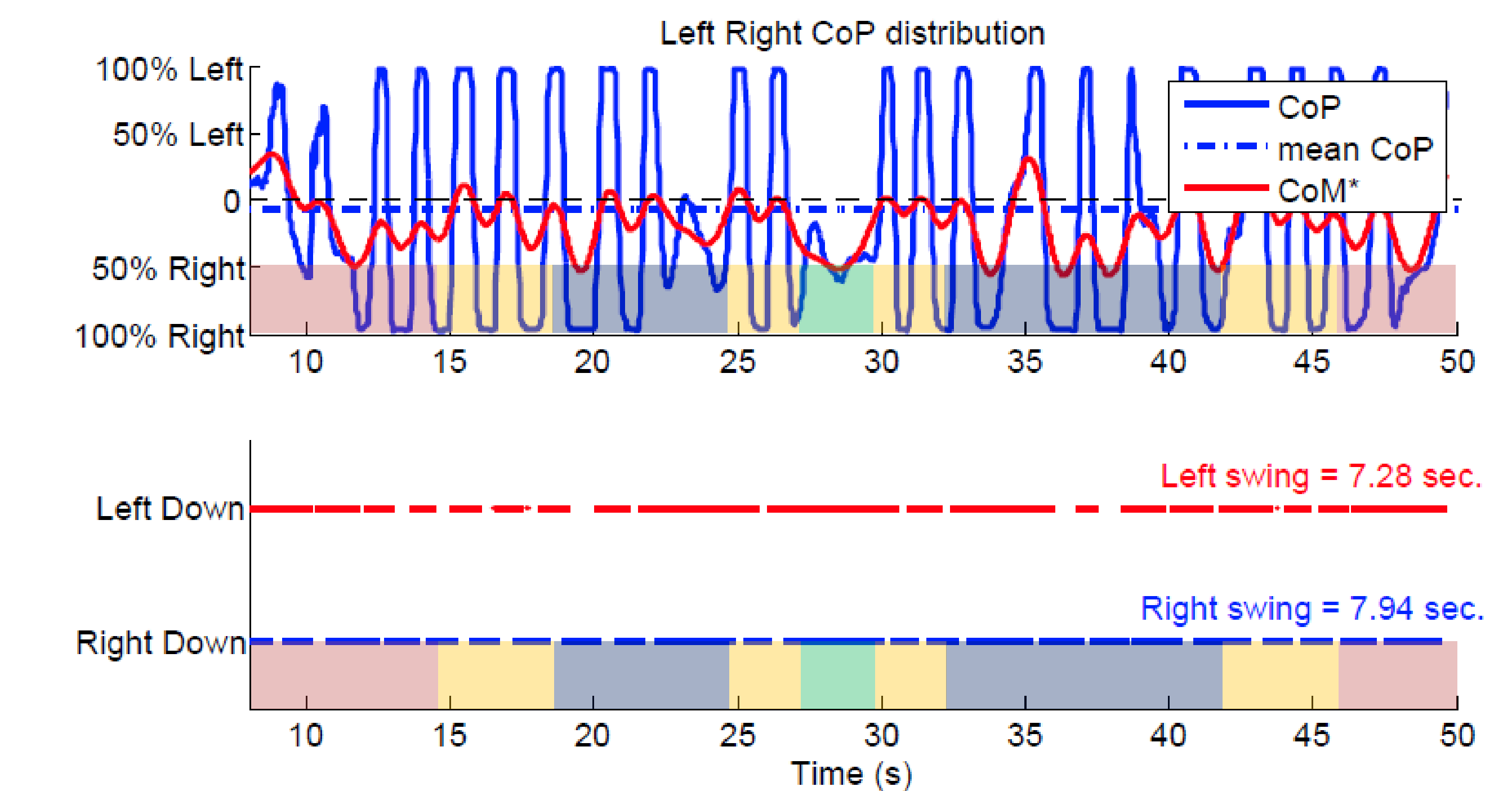
• Same male subject (47 years)



Mean CoP (negative is to the right)	Subject 1 (male)	Subject 2 (female)
Walking (10 metre walk trial)	-18%	-11%
Walking (functional task trial)	-14%	-13%
Overall (functional task)	-24%	-19%
Door opening and closing	-29%	-21%

Conclusion – The use of force shoes enables the measurement of CoP and CoM during ADL tasks without any location restrictions. Results indicate that in more demanding tasks during daily life activities, the mean CoP position shifts more towards the non-affected side.

• Female (64 years) left side affected, Berg Balance Scale: 43



Overall results – mean CoP value of 13 stroke survivors during different tasks. Mean age of 63.9 (SD ± 9.0) years and 2.3 (SD ± 1.8) years post stroke.

