



A data set of spatiotemporal gait parameters and plantar pressure distribution

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Background, Motivation and Objective. The assessment of spatiotemporal parameters and the distribution of plantar pressure during gait are paramount to understanding the effects of several factors such as aging, pathologies and interventions. Few studies have reported these data considering a large sample of individuals. However, these studies do not typically make the data public available, which prevents to assess the consistency of inferences and to establish reference data for these parameters. Therefore, the aim of this study is to present a proposal of a public data set of spatiotemporal gait parameters and plantar pressure distribution data to allow the application of these data in a broader way by the scientific community.

Methods. Spatiotemporal gait parameters (e.g. step width, step length, cadence and velocity) and plantar pressure distribution data of 100 subjects will be collected using a plantar pressure measuring system (FDM, Zebris) after a signed consent form were obtained by the participants. This system consists of two platforms arranged in series (total length of 316.0 cm, 60.5 cm width and resolution of 1.4 sensors/cm², operating at a sampling rate of 100 Hz). The data acquisition will be performed at the Laboratory of Biomechanics and Motor Control of the Federal University of ABC (<http://demotu.org/>). The volunteers will be instructed to perform ten barefoot walking trials on the platforms at 3 self-select speeds (comfortable, slow and fast). The subjects will be allowed to perform as much trials as they wish to become familiarized with the experimental procedures. Complete raw plantar pressure data from all trials and gait speeds and spatiotemporal gait parameters (average and standard deviations across trials) will be exported to files text and made available as part of the open data set. In addition, we will use image processing methods to segment and register the plantar pressure data to allow for within and between subject comparisons and make these data also available. All these data processing and analysis will be performed using the SciPy stack based on the Python language.

Results. Up to now, we have collected data from 50 subjects. Figure 1 illustrates the plantar pressure distribution in one condition for one individual. Figure 2 shows the results of image segmentation and registration of the plantar pressure data for this subject.

Discussion and Conclusions. To our knowledge, this will be the first study to provide raw plantar pressure data and spatiotemporal gait parameters in a large sample of individuals. We expect that these data will be useful for a range of applications including but not limited to educational purposes, test innovative data analysis methods, test the consistency of inferences made in previous studies and ultimately contributing to advance knowledge in the field.

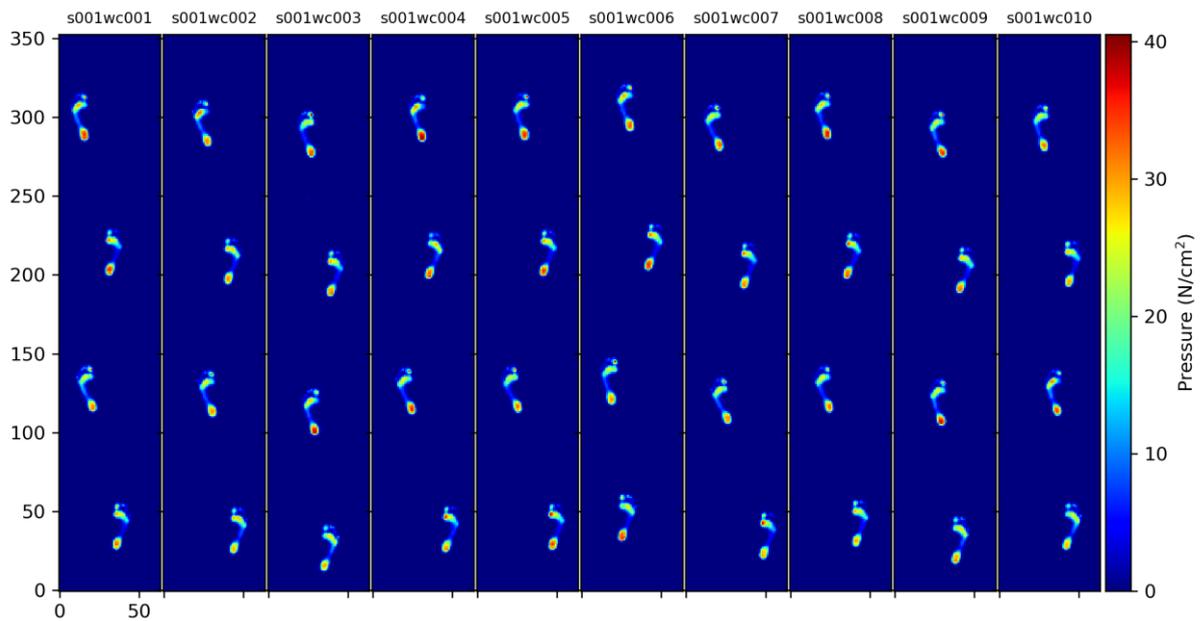


Figure 1. Plantar pressure distribution of one individuals during walking at comfortable speed.

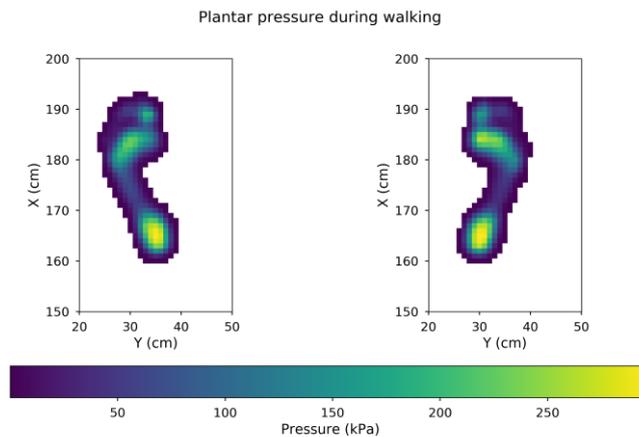


Figure 2. Mean plantar pressure distribution across all trials from Figure 1 after segmentation and registration of the images (plantar pressures).

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Keywords. Pedobarography; gait; spatiotemporal gait parameters; data set.