

# Building of a Representative Plantar Pressure Image Sequence

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Plantar pressure image sequences represent an important data source in dynamic analysis of plantar related diseases and deformations. Usually, this data is also crucial in the study of sports and postural issues. The importance of plantar pressure studies is evident in the development of orthoses as well as in the orthopaedic and sports shoes. These special shoes and orthoses can alleviate the pain and correct deformations in the patients.

Frequently, the researchers deal with too much information to analyze and large variations (mainly between different foot positions) in the different trials. Thus, when the researchers visualize the information displayed, the ratio (useful information)/(data needed) should be maximized in order to help the diagnosis/study of plantar pressure related pathologies. Usually, three to five samples are needed to achieve an acceptable reliability in dynamic plantar pressure data acquisition.

In this work, the reliability of using just one image sequence representing the whole dataset of a foot from an individual is accessed.

In order to build the representative image sequence, the original image sequences are aligned both in space and time. Then, the average of the pixel intensities from the images with the same indexes is performed to each foot from each individual. A peak pressure image is built for each sequence. Maximum intensity pixel position, center of pressure displacement, arch index and modified arch index are parameters extracted from the built peak pressure images. These relevant plantar pressure parameters are also directly computed from the peak pressure images of each original sequence, and the average of these parameters is calculated for each foot from each individual.

Intraclass correlation coefficient and Pearson correlation coefficient were accessed between parameters values found by both methods in order to verify the correlation and consistency between them.

Intraclass coefficient and Pearson correlation coefficient were very close to one for all parameters used in this work excepting for the maximum pressure pixel position relatively to the foot limit. Nevertheless, the results indicate high correlation and consistency between the parameters obtained by both methods. Even in the case of the maximum pressure pixel position relatively to the foot limit there is a good correlation and a reasonable consistency.

Consequently, the computational framework proposed in this work can be a decisive tool, reducing the number of needed trials and maximizing the relevant information in the plantar pressure analysis.

**Keywords:** plantar pressure; mean image sequence; spatio-temporal alignment.

## References

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