

1. ABOUT THE DATASET

Title: Human hip joint impingement shape and motion model: input and output data for an initial study of eight typical cam-type hip shapes

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Organisation: University of Leeds.

Rights-holder(s): University of Leeds

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Description:

This dataset contains the input and output data for a computational study of femoroacetabular impingement. The model is composed of a simplified shape model of the human hip joint and the use of hip movement data from multiple activities and multiple subjects. The relevant study is a first demonstration of the capability of the model, which illustrates the effects of the location of a specific femoral bony shape feature on hip joint impingement measures. The details of the shape model design and the values selected for this study are included. The raw hip joint motion data is available in a separate dataset which is linked to this one (<https://doi.org/10.5518/1253>). The raw outputs from the modelling performed for this study are also included.

Cite as:

Jones, Alison (2022) Human hip joint impingement shape and motion model: input and output data for an initial study of eight typical cam-type hips. University of Leeds. [Dataset]
<https://doi.org/10.5518/1231>

Related publication:

Jones AC, Stewart TD, Maher N, Holton C. Can a computational model predict the effect of lesion location on cam-type hip impingement? *Clinical Orthopaedics and Related Research* (Accepted Dec 2022)

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2. TERMS OF USE

Copyright 2022 [University of Leeds] This dataset is licensed under a Creative Commons Attribution 4.0 International Licence: <https://creativecommons.org/licenses/by/4.0/>

3. PROJECT AND FUNDING INFORMATION

Project title: Engineering tools for analysis of impingement in the human hip joint

Dates: 1st August 2020 – 31st January 2022

Funding organisation: Alison Jones was funded for this work by the Royal Academy of Engineering under the Leverhulme Trust Research Fellowship scheme, 2020-2022.

4. CONTENTS

The set of files starting with the number 1 contain the raw angle inputs used for the modelling cases in this study (.csv files) and the definitions and sources for those angles (.pdf files).

Definitions & sources: acetabular rim shape	"1 - acetabular_rim_coverage_basis.pdf"
Input data: acetabular rim shape	"1 - acetabular_rim_coverage_angles.csv"
Definitions & sources: femoral neck-cam shape	"1 - femoral_neck_cam_basis.pdf"
Input data: femoral neck-cam shape	"1 - femoral_neck_cam_angles.csv"
Definitions & sources: joint orientation angles	"1 - hip_joint_orientation_basis.pdf"
Input data: joint orientation angles	"1 - hip_joint_orientation_cases.csv"

The file starting with the number 2 contains the selection of hip activity, subject and trial cases from a wider dataset collected in a separate project. The raw data can be found in a separate dataset (<https://doi.org/10.5518/1253>).

Details of activity and subject case selection for hip movements

"2 - hip_motion_case_selection.csv"

The files starting with the number 3 include some basics of how the code works and definitions of the output metrics taken. The video file shows an example of a single motion case on one of the hip shapes, with points highlighted in red as impingement occurs.

Basics of how the code works	"3 - code_function_basics.pdf"
Explanation of the output metrics	"3 - code_output_metric_definitions.pdf"
Demonstration of basic function for one case (video)	"3 - code_demo_hip2_squat.avi"

The zip files starting with the number 4 contains the version of the Matlab code used to compute the data presented in this study.

Code (Matlab scripts) used for the study

“4 – code_versionFAI5.zip”

The files starting with the number 5 contain the impingement incidence data. The number of motions cases where impingement occurred for each hip shape is given in the “summary” file. A more granular version of the data is also provided, showing the incidence over the subjects for each activity.

Output data: impingement incidence

“5 - impingement_incidence_by_activity.csv”

Output data: impingement incidence (high level summary)

“5 - summary_incidence.csv”

The files starting with “6 – Hip” contain the raw data on the depth of impingement during the hip motion cases. There is a .csv file for each hip shape/orientation case in the study (two shapes, four orientations, resulting in eight cases). The X in the file name below is replaced with 1-8 indicating those hip cases. The “Summary_impingement_depth” file gives the maximum and mean depth values for each hip and each activity across all of the individual motion cases where impingement occurred.

Output data: impingement depth (raw data Hip X)

“6 – HipX_impingement_depth_ace.csv”

Output data: impingement depth (high level summary)

“6 - Summary_impingement_depth.csv”