Repository for Image Data of Traditional Dysplastic Subjects

Henak CR, Abraham CL, Anderson AE, Maas SA, Ellis BJ, Peters CL, Weiss JA: Patient-specific Analysis of Cartilage and Labrum Mechanics in Human Hips with Acetabular Dysplasia. *Osteoarthritis and Cartilage.* In Press.

Overview

It is difficult to obtain high resolution image data of human hip joints. Therefore, the CT arthrogram image datasets for the subjects included for finite element analysis of cartilage contact stress have been made available. The 10 subjects with normal hip anatomy were made available as part of an earlier study (Harris MD et al., *J Orthop Res*, 2012, DOI: http://dx.doi.org/10.1002/jor.22040). The 10 subjects with traditional acetabular dysplasia have been made available with this study in order to assist other investigators with the study of the mechanics of the dysplastic acetabulum.

Accessing the Image Data

The image data can be downloaded at this address:

http://mrl.sci.utah.edu/software/dysplastic-hips-image-data

If you have not registered on the MRL site previously, you will be asked to create an account. Registration allows us to keep track of the use of the image data (number of downloads, who, where). Your registration information is safe and will not be redistributed.

Separate files are available for each of the 10 subjects. Each file is a Linux tape archive (tar) file, compressed with GNU Zip (gzip). Thus each file has the ending ".tar.gz". The size of each file is approximately 3 GB.

Under Linux or other Unix operating systems, each individual download can be uncompressed and extracted using the commands:

    gunzip <filename>.tar.gz
    tar – xvf <filename>.tar

This will create a subdirectory containing all of the image data files for the particular subject in DICOM format, as well as a copy of the license agreement and this file. Each image file represents one slice of the image dataset.

Both gzip and tar are available for Windows, and there are a number of free software tools that can extract .tar.gz files under Windows.

The image files have the extension ".dcm". Many image processing, segmentation and visualization programs can open these DICOM files directly. The free software ImageJ is one option:

http://rsbweb.nih.gov/ij/

To open an image stack in Image J, choose "Import" from the "File" menu, and then choose "Image Sequence". Choose the first image in the stack and then click "Open".

Subject Information

Subjects with acetabular dysplasia were recruited for our study from patients being treated in our clinic for hip pain secondary to acetabular dysplasia. The basic characteristics of these subjects are listed in the table below.

Subject	Age (yrs)	Gender	Side	Weight (kg)	Height (cm)	BMI (kg·m^{-2})
TRAD01	35	F	R	66	174	21.6
TRAD02	25	M	L	130	188	36.8
TRAD03	20	F	L	54	168	19.4
TRAD04	32	M	R	104	197	26.7
TRAD05	31	F	L	67	178	21.3
TRAD06	24	F	L	70	173	23.4
TRAD07	18	F	Both (FE = L)	50	159	19.9
TRAD08	27	F	R	46	164	17.1
TRAD09	20	F	R	51	164	19.0
TRAD10	24	M	L	85	172	28.7

Image Acquisition

CT images were acquired at the University of Utah Hospital. Each subject with acetabular dysplasia was being seen at the University of Utah Orthopedics Center for hip pain. The hip which was being evaluated clinically was selected for CT arthrogram. The hip capsule was injected with ~20 ml of contrast agent (2:1 Xylocaine to OMNIPAQUE® 350, GE Healthcare Inc., Princeton, NJ) under fluoroscopic guidance. CT images of both femurs and the entire pelvis were acquired following injection of the contrast agent. Joint traction was applied during the CT scan using a hare traction device. The images below indicate the bone and cartilage regions in the image data.
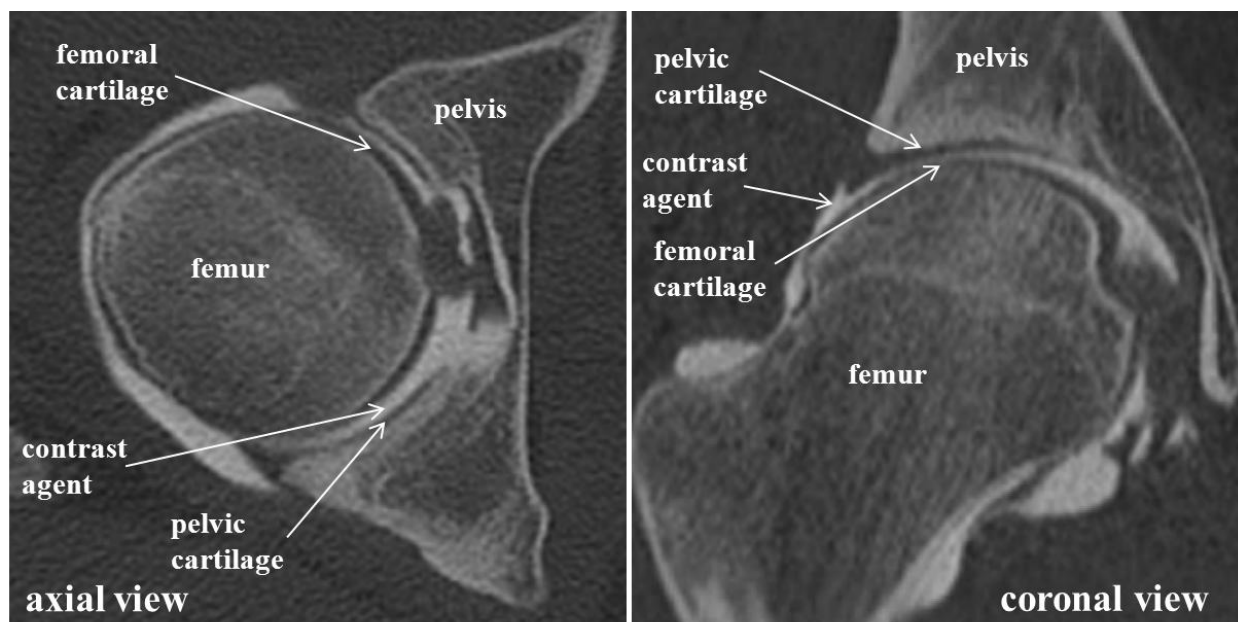
Resampled Image Information

CT images were resampled to improve the resolution of the segmentation masks. Resampled images are provided for download. All images have a resampled in-plane resolution of 1536 × 1536, an original in-plane resolution of 512 × 512 and a bit depth of 16.

Subject Number	Resampled in-plane resolution (mm)	Original in-plane resolution (mm)	Resampled slice thickness (mm)	Original slice thickness (mm)
TRAD01	0.222657	0.667969	0.233331	0.7
TRAD02	0.286457	0.859374	0.333329	1.0
TRAD03	0.223958	0.671875	0.333329	1.0
TRAD04	0.233073	0.699219	0.333496	1.0
TRAD05	0.225260	0.675781	0.333329	1.0
TRAD06	0.233724	0.701172	0.333329	1.0
TRAD07	0.237630	0.712891	0.333329	1.0
TRAD08	0.192708	0.578125	0.333332	1.0
TRAD09	0.206380	0.619141	0.333332	1.0
TRAD10	0.218099	0.654297	0.333333	1.0