Dataset

A human head micro-CT dataset : skull and soft tissues

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Abstract
The present Dataset contains the micro-CT scan of the head of an anonymous 54 year old female donor, at a voxel resolution of 145µm. The skin of the face has been masked in order to avoid the donor to be recognized.

Keywords: Cranial osteology, Head, Homo sapiens, Micro-CT, Soft tissues

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INTRODUCTION

Among digitization techniques, X-ray microtomography (µCT; Elliott and Dover, 1982) allows to digitize with unprecedented resolution the 3D structure of biological samples. X-ray µCT was developed only a decade after the advent of the first commercial X-ray computed tomography (CT) systems in the early 1970's. While X-ray CT is nowadays a widespread 3D imaging technique being routinely used worldwide for medical diagnosis, X-ray µCT is still an emerging imaging tool within the biomedical field. Microtomography cannot be used on living patients (much higher X-ray doses are usually required; besides, a human body would not fit in most microtomographs). However, its main advantage over conventional X-ray CT is its increased spatial resolution: finer anatomical details can be revealed on µCT virtual slices (see Figure 1). Here, we provide a µCT data set of the head of an adult donor (see Table 1). This dataset can be used for various educational purposes such as 3D computer visualization during class, or for student homework.

Inventory number	UM_HS_2018_09_13
Taxon	*Homo sapiens*
Gender	Female
Scan parameters	Voltage: 150 kV Current: 0.308 mA Voxel size: 144.7µm Filter: Aluminum (1mm) Number of projections: 4*1440 Exposure time: 0.6s

Table 1. Related model and scan parameters

METHODS

The head of an anonymous 54 year old female donor was scanned using an Easytom 150 (RX-Solutions) microtomograph. Data acquisition parameters are described in table 1. In order to further ensure the identity of the donor to remain concealed, we digitally removed the skin and a fraction of the soft tissues to make sure that the face can not be recognized when 3D visualization of the dataset is performed. To do so, the original µCT volume was manually modified using the 3D lasso mask function of MorphoDig Software (Lebrun 2018). The µCT data are provided in MHD format, and can be opened with a wide range of freeware, among which Fiji, 3DSlicer and other VTK based software such as MorphoDig.

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The authors sincerely thank those who donated their bodies to science so that anatomical research could be performed. Results from such research can potentially increase mankind's overall knowledge that can then improve patient care. Therefore, these donors and their families deserve our highest gratitude. We also want to thank Maud Moulin for the curation and preparation of the donor. 3D data acquisition was performed using the µCT facility of the MRI platform member of the national infrastructure France-BioImaging supported by the French National Research Agency (ANR-10-INBS-04, «Investments for the future»), and of the Labex CEMEB (ANR-10-LABX-0004) and NUMEV (ANR-10-LABX-0020). -

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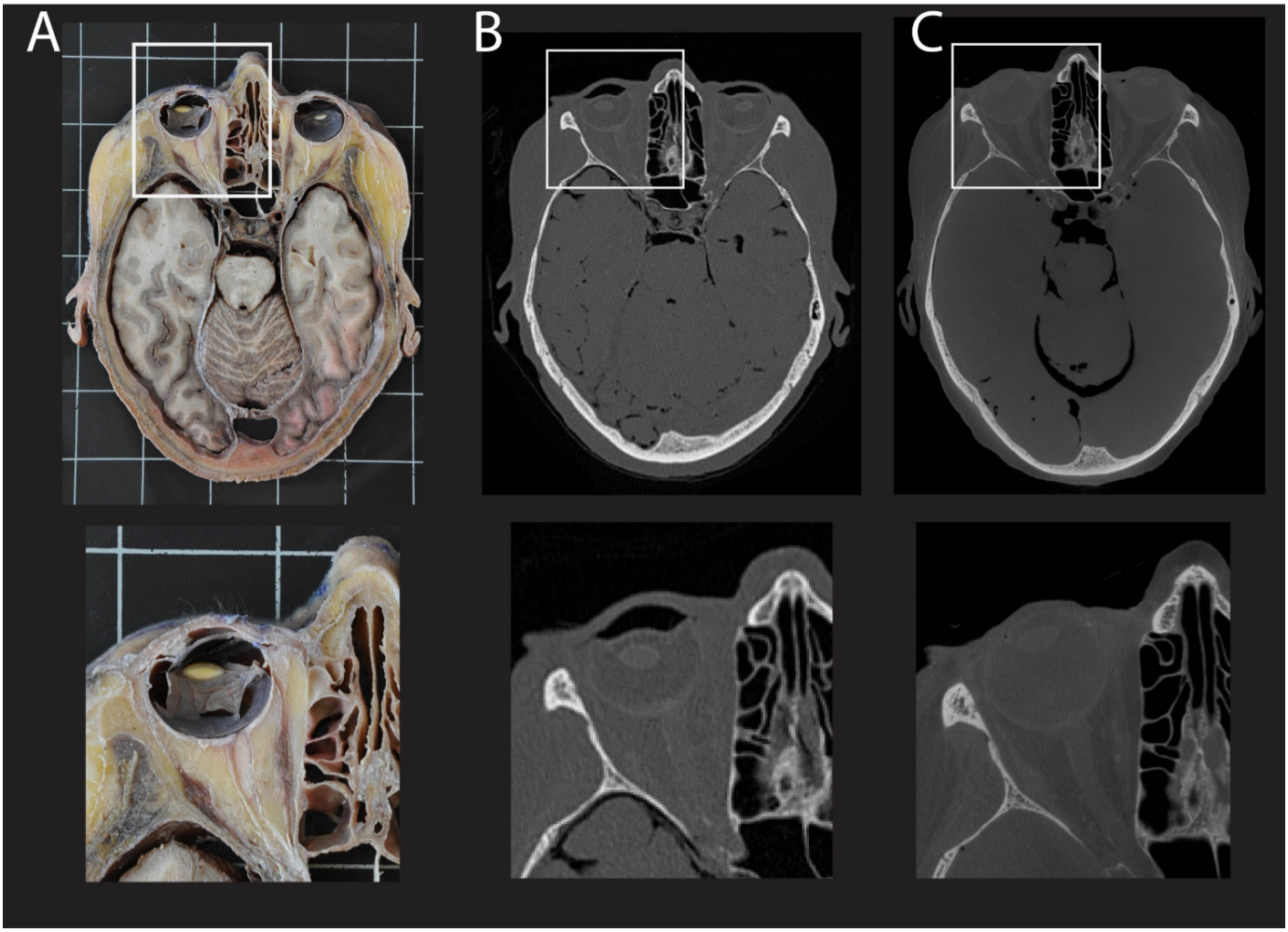

Figure 1. head axial slices of the same anonymous donor*. A) Anatomic slice B) medical ct slice at 0.449*0.449*0.625 mm voxel size C) X-ray µCT slice at 0.145 mm isotropic voxel size. Bottom row: focus on the left eye, ethmoid and sphenoid region.

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