

## 3D printing and its impact on anatomy teaching, A case study of manufacturing human shoulder

Reza Zamani <sup>1\*</sup>, Edward Totton <sup>1</sup>, Sion Edwards <sup>2</sup>, HENDY Glyde <sup>1</sup>, Abdelmalek Benattayallah <sup>3</sup>, Mohammad Akrami <sup>2</sup>

<sup>1</sup>Medical School, University of Exeter, Exeter, United Kingdom

<sup>2</sup>Department of Engineering, College of Engineering, Mathematics, and Physical Sciences University of Exeter, Exeter, United Kingdom

<sup>3</sup>MR Research Centre, St. Luke's Campus, University of Exeter, Exeter, United Kingdom

\* Corresponding to: Professor Reza Zamani ([r.zamani@exeter.ac.uk](mailto:r.zamani@exeter.ac.uk))

### Abstract

Anatomical models played a significant role in medical science education and surgical preparation. In the last decade, using 3D printing techniques have been raised rapidly in different industrial sectors, including medical sciences for more detailed and customised models from an anatomical landmark (1, 2). The 3D printers can manufacture models in different scale with different materials while this approach can help the students to learn the anatomical structures when they are segmenting them using MRI or CT data and then manufacture them.

#### MRI data capturing



#### Anatomical modelling



#### 3D printing



For this purpose, a team of medical science and engineering students were selected to develop an anatomical model of the human shoulder complex through project based learning (PBL) activities (3). The main objective of this project was to develop this anatomical model in order to enhance our knowledge of the biomechanical mechanism underlying joint motion which helps to solve the related clinical problems for this main joint such as anterior shoulder dislocation (4) or rotator cuff tears (5). This bio-realistic 3D printed model offered significant knowledge for the function and malfunction for various shoulder disorders and also help the students to analyse different tissues including the bones, ligaments, cartilages, muscles and tendons which is used for anatomical science education.

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### **Ethical approval**

Approved by the CEMPS ethics committee, University of Exeter, with the reference 281 number: eEMPS000040 v3.0.

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