Pilot study on virtual reality teaching of the gastrointestinal tract vasculature

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Virtual reality platforms are emerging technologies that are increasingly being used in medical education. Published data have shown that the use of VR has a positive impact on students' ability to understand spatial and structural anatomy. The aim of this pilot study was to evaluate students' experiences with VR teaching on the vascularisation of the gastrointestinal tract. Eighteen first-year medical students gave their consent and participated in this pilot study, which consisted of a teacher-led VR session with a duration of 30 min. After the session, the students were asked to fill in an anonymous feedback form. Students found that the session was useful (83.3%) and interesting (94.5%). 88.9% agreed and strongly agreed that the content was appropriate, and 93.8% appreciated that they had learned something new. For 88.9%, the VR session helped to understand better the anatomical relationships. 77.7% of the students think that VR facilitates their anatomy learning, and 72.2% consider that VR sessions should be implemented in future anatomy teaching. 50% of the students suggested that a VR session duration should last between 30 and 45 min. This pilot study is one of the first steps in the integration of virtual reality into the teaching and learning of anatomy in higher medical education in our institution. Based on the feedback, VR technology helps students gain a tridimentional visualisation and is an effective tool to conceptualise the relations of the anatomical structures and their vascularisation. Furthermore, it enhances students' level of knowledge and motivation. No ethical approval was required for this study.

The accuracy of two low-cost techniques for the digitisation of archaeological human bones

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Archaeological human bone specimens showing pathological changes such as poorly healed fractures or signs of diseases (e.g. rickets, leprosy or osteoarthritis) are very valuable educational resources. They are not only useful for the teaching of students of Medicine and Medical Sciences, but also for outreach and public engagement activities to raise awareness about bone health and related research. As these specimens are often too fragile to be handled in practical classes or at public events, digital 3D models or 3D prints can be used instead. In this study, we aimed to assess the accuracy of two low-cost techniques for the digitisation of archaeological human bones. Six bone specimens were selected from the University of Aberdeen's archaeological human remains collection housed at Marischal College in Aberdeen. These six bones were all well-preserved and showed clear signs of pathologies. They were digitised using micro-computed tomography (microCT), 3D photogrammetry and a low-cost 3D laser scanner. The 3D photogrammetry model and 3D laser scan of each bone were then compared to the microCT-based reference model of the same bone. We found that both low-cost digitisation techniques led to some inaccuracies in the 3D models compared to the microCT reference models. However, photogrammetry provided more accurate models than the low-cost 3D scanner. In addition, the photorealistic texture of the photogrammetry models allowed for the identification of even small surface features. In conclusion, 3D photogrammetry is a good low-cost solution for the digitisation of human bone specimens. The model accuracy is sufficient to depict macroscopic pathological changes, and their photorealistic texture facilitates the identification of these changes. No ethical approval was required for this study, but we ensured that the use of the archaeological human bone specimens adhered to the British Association of Biological Anthropology and Osteoarchaeology digital imaging code (2019).

CNTNAP2 expression in the early developing human fetal forebrain

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CNTNAP2 encodes a neuronal transmembrane protein member of the neurexin superfamily (CASPR2) which plays key roles in development, including in synapse formation and potassium channel clustering. Mutations in the human CNTNAP2 gene cause a syndromic neurodevelopmental disorder characterised by intellectual disability, speech impairment, early-onset seizures, developmental regression and autism. Its expression is modulated by FOXP2, and the two genes have both been implicated in the development of language and speech. This study explores the expression CNTNAP2 in the early developing human forebrain. Transcriptomic data was taken from (https://www.ebi.ac.uk/biostudies/arrayexpress/studies/E-MTAB-4840solo.bmap.ucla.edu/shiny/webapp/); and (NeMO Analytics—scRNA workbench;). In the cerebral cortex tissue, RNAseq from 8 and 17 PCW showed decreasing CNTNAP2 expression with age. By 18 PCW, scRNAseq revealed it was chiefly expressed by GABAergic neurons of MGE origin, intermediate progenitor cells (IPC) and in some dividing radial glia. In the thalamus, RNA seq at 18 PCW showed the highest CNTNAP2 expression in more mature glutamatergic neurons and in GABAergic neurons co-expressing