INTRODUCTION: Medical education has historically been an area, which drives advances in medical research, ensuring that students receive the best skills for managing patients. Visualisation tools are perhaps the most important aspect for effective medical education. 3D printed models are showing significant potential as a visualisation tool to help comprehend and understand complex anatomy and pathologies. Whereas 2D imaging methods such as CT scans and MRI scans are inherently difficult to comprehend and interpret, using 3D printing technology instead poses a great potential.

MATERIALS AND METHODS: This study investigates the effectiveness of 3D models as a tool in medical education by comparing the relative increase in knowledge gained from its additional use on the topic of cleft lip and palate. Two study groups were given different seminar formats, a standard PowerPoint based seminar, compared to a 3D printed models integrated PowerPoint seminar. The level of knowledge gained by the seminar was established using a pre- and post-seminar assessment, surgical planning is another area where a study was undertaken to assess the use of 3D printed models as a tool for planning/ training of junior surgeons.

RESULTS: The additional use of the 3D printed model resulted in a significant improvement in average test scores (76.67% with 3D printed model integrated seminar, compared to 65.79% with PowerPoint only seminar P= 0.001). Student experience was also assessed using a post-seminar feedback survey, where the use of the 3D printed model was shown to significantly improve the learning experience by an average of 24.76%, with visualisation being improved by 57.84% (p= 0.001). Majority of Surgeons reported that pre-operative planning with the 3D printed model was beneficial in visualisation the anatomy/pathology and understanding steps of the procedure.

CONCLUSIONS: 3D printing has the potential to become a standard tool that aid in teaching and surgical planning.

14.40 A RETROSPECTIVE EXAMINATION OF THREE UNIQUE CLINICAL SCORING SYSTEMS TO RULE OUT CRANIOFACIAL FRACTURES WITHOUT CT IMAGING

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INTRODUCTION: CT imaging is currently the gold standard for ruling out facial fractures. Unfortunately, it exposes patients without fractures to unnecessary radiation and increases medical costs. Previous analyses by Sitzman and Exadaktylos have highlighted clinical criteria to rule out facial fractures, but have not been applied to other patient populations. In this study, we applied these diagnostic scales to our institution’s patient population and compared their effectiveness to that of our own unique criteria.

MATERIALS AND METHODS: Medical records of traumatic adult craniofacial fracture patients presenting to our institution between July 2012 and December 2014 were reviewed. Documented physical exam findings were applied to the three diagnostic scales and correlated with location specific imaging results. Negative predictive value, sensitivity, positive predictive value, and specificity were calculated for each scale for orbital, mandibular, nasal, and zygomatic fractures. Our Stony Brook Scale and Sitzmans Scale were applicable to all four facial areas, while Exadaktylos Scale was applicable only to the orbit.

RESULTS: Our cohort included 319 patients. Stony Brook Scale NPVs were strong for nasal, zygomatic, and mandibular fractures (92%, 85%, and 82%, respectively). Sitzmans Scale NPVs were significantly weaker for these same areas (28%, 28%, and 31%, respectively). Exadaktylos Scale provided the strongest NPV for orbital fractures (72%), which was negligibly higher than that of the Stony Brook Scale (69%), and noticeably higher than that of Sitzmans Scale (47%). All scales showed high sensitivities, ranging from 76–92%.

CONCLUSIONS: In the clinical setting, NPV is the best statistical tool for determining a test’s ability to confidently rule out facial fractures without CT imaging. The Stony Brook Scale is very efficient when investigating each particular part of the face. These findings encourage future prospective analysis and suggest that proper application of these criteria may help to avoid unnecessary CT imaging for facial trauma patients.