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Background: Operative management of facial fractures is a three-dimensional (3D) educational challenge faced by surgery residents. Currently, most knowledge-based learning occurs outside the operating room (OR) using textbooks and videos with occasional use of cadaver and 3D models. We hypothesized that use of immersive virtual reality (IVR) could offer a realistic, reproducible, and feasible, 3D learning environment to fill in the gap between conventional learning modalities and experiential learning in the OR. Secondarily, we hypothesized that the gamified experience would improve residents’ learning.

Methods: An IVR module was programmed from a CT scan of human skeleton with an isolated zygomaticomaxillary complex (ZMC) fracture. Twenty participants completed a pre-intervention questionnaire assessing their demographics and gaming/surgical backgrounds. After watching a platform demonstration and completing a trial game, participants were asked to complete the module by identifying, segmenting, reducing, and plating the ZMC fracture using IVR. Participants then completed a post-intervention questionnaire to assess their experience with the IVR environment and its effectiveness for surgical learning and planning.

Results: The module was considered useful for conceptualization of operative anatomy (mean 4.3±1 out of 5; 5 being strongly agree), being an effective learning tool (mean 4.1±0.9), and its potential use in other training areas (mean 4.2±1). Senior residents indicated particular support for IVR’s benefit in improving operative competence and confidence (mean 3.6, p=0.02), and supported using IVR to replace other surgical training modalities (mean 3.6±0.7; p=0.03). The module was described as effective for surgical planning (mean 4.2±0.8). The anatomy and 3D perception of the module were found to be realistic (means 4.4±0.6 and 4.4±0.9, respectively).

Conclusion: The use of IVR in surgical training shows promising potential to fill the gap between knowledge-based and experiential learning of facial fractures. IVR provides a reproducible, digitally modifiable, and feasible modality, which utilizes patient-specific anatomy for pre-operative rehearsal and deliberate practice. The gamified experience associated with IVR may play a role in motivating residents and improving learning dynamics. More studies focusing on content validity and measuring objective performance metrics will help establish IVR validity as an innovative surgical training strategy.

7. WITHDRAWN

8. Combining Search Query Data with Operation Smile and Smile Train Outreach to Better Understand Global Cleft Surgical Care

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Background: Understanding patient awareness of cleft lip and/or palate (CL/P) and evaluating demand for necessary procedures may serve to better target future efforts in global outreach. One potential solution to help understand patient demand for cleft care is assessing the density of cleft-related internet search terms in developing countries.

Methods: We utilized internet search query data from Google Trends for the terms: “cleft lip”, “cleft palate”, “cleft lip and palate”, “cleft surgery”, and “cleft repair” from January 2004 to January 2021. Relative search volumes (RSV) recorded for the top 5 highest displaying countries and top three available regions within those countries were compared against global outreach by Operation Smile, as measured by the number of patients treated. World Health Organization (WHO) indicators were used to validate the RSV values for each country and better understand the current infrastructure and need for cleft care in those countries.

Results: Globally, there was an increase in RSV for the terms “cleft lip,” “cleft palate,” “cleft lip and palate”, “cleft surgery”, and “cleft repair” between 2004 and 2021. For “cleft lip,” the countries with the highest displaying RSVs included: Ghana (100%), Zimbabwe (97%), Nepal (78%), the Philippines (64%), and Kenya (52%). Countries with high RSVs and moderate to high WHO indicators included Ghana, Kenya, India, Nigeria, and Zimbabwe. Countries with high RSVs and poor WHO indicators included Nepal and Pakistan. Some countries had specific regions with high search demand that are not currently targeted for global outreach.

Conclusion: Using Google Trends’ longitudinal data may help find more feasible locations and targeted care for efforts in global outreach with better patient awareness and turnout.
where demand for CL/P is increasing. We describe a strategy that may be used to improve global outreach for patients, providers, and international organizations such as Operation Smile. By enhancing our understanding of patient demand based on relative search interest by country and subregion, global health organizations can better direct their efforts in providing care to those populations that express a high interest in cleft care but may not have the provision to provide this care.

9. Representation Matters: Disparities in Imaging in Plastic and Reconstructive Surgery Education Materials

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Background: Racial disparities permeate our healthcare system. One known contributor is implicit bias among healthcare professionals. Lack of representation among images used in medical education materials, a well-documented phenomenon, contributes to such bias. Because plastic surgery relies heavily on patient images it is highly susceptible to incorporating and perpetuating racial implicit bias. This study aims to assess visual representation of patient diversity in the American Society of Plastic Surgery (ASPS) Resident Education Curriculum (REC).

Methods: Color photos, graphics, and videos featured in the “Course Materials” (excluding articles) for each module in the REC curriculum were categorized using the Fitzpatrick scale (I-II, III-IV, or V-VI) by a team of six reviewers. Proportional data and average number± standard deviation of photos and graphics for each category were reported. Significant difference between images and graphics categorized as Fitzpatrick I-II and Fitzpatrick V-VI was investigated via a one-way ANOVA with Tukey’s post-test to adjust for multiple comparisons.

Results: An average of 1861 photographs and 237 graphics were assessed with 82% (1518± 25.11) of photos and 97% (231± 24.45) of graphics categorized as Fitzpatrick I-II, 12% of photos (220±9.57) and 2% (5± 2) as Fitzpatrick III-IV, and 7% (124± 2.64) of photos and 1% (2± 0.31) of graphics as Fitzpatrick V-VI. A one-way ANOVA with a Tukey’s post-test demonstrates a statistical difference between images and graphics categorized as Fitzpatrick I-II and Fitzpatrick V-VI (P<0.001). Significance was maintained despite excluding benign and malignant skin chapters (P<0.001).

Conclusion: Our data reveals an opportunity to improve racial representation in resident education. When 76% of patients in the US are white and 13% are Black, our findings demonstrate both an unequal and unrepresentative distribution of photos of non-white patients. This is furthered by the vast overrepresentation of fairer skin tones in included graphics, which are not limited by patient presentation. The discussion of implicit bias is incomplete if it does not also consider ways such biases are perpetuated (e.g. images). Residency is a formative time in a surgeon’s career and exposure to an accurate reflection of our diverse patient population is imperative.

10. Do Plastic Surgery Residents Get Sued? An Analysis of Malpractice Lawsuits

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Background: Residents may be implicated in malpractice lawsuits. Our study aims to examine medical malpractice lawsuits involving plastic surgery trainees.

Methods: Using the LexisNexis legal database, jury verdicts and settlements from all appellate state and federal cases between February 1988 and 2020 were queried, and a non-representative sample of over 300 cases was compiled, each of which were manually reviewed by 2 authors (A.G. and S.J.).

Results: During a 30-year period, 22 malpractice cases involving plastic surgery trainees were identified. Of these cases, 15 (68.2%) involved claims in which a trainee was directly named as a defendant. A total of 18 (81.8%) cases were due to procedural-related adverse outcomes, while 4 (18.2%) cases were associated with clinical or diagnostic-related adverse outcomes. Of the procedure-related cases, 5 (27.8%) occurred when the trainee was the lead surgeon.