iliac crest bone; however, bone-morphogenetic-protein 2 has shown to be a viable alternative with similar success rates. An alternative potential graft adjunct, umbilical cord stem cells (UCSC), has yet to be explored in vivo. There is ample pre-clinical literature supporting the utility and advantages of UCSC in ACR. Their capacity for self-renewal, pluripotent differentiation, and proliferation allows UCSC to be harnessed for regenerative medicine. Our study seeks to evaluate the feasibility of using UCSC and their osteogenic and regenerative capabilities in a mouse model to improve ACR.

METHODS: Sixteen FoxN1 mice were included in the study, which were separated into three groups: (1) calvarial defect surgery and no treatment (n=6), (2) calvarial defect surgery with poly(D,L-lactide-co-glycolide) (PLGA) treatment (n=6), (3) calvarial defect surgery with UCSC mixed with PLGA (n=4). Calvarial defect surgeries consisted of a sagittal skin incision followed by creation of 2 mm diameter, full-thickness, parietal bone defects using a 1.8 mm dental drill; of note, 2 mm is the established critical size defect of murine calvarial bone. The mice underwent microCT imaging at 1-, 2-, 3-, and 4-weeks postoperatively. At 2-weeks postoperatively, one mouse from each group was sacrificed for histologic analysis. At 4-weeks postoperatively, the remaining mice were then sacrificed for histologic examination.

RESULTS: All 18 mice underwent calvarial defect surgeries without postoperative complications or infections. All mice were fully ambulatory with no signs of neurologic deficits throughout the 4-week follow-up period. As evidenced by microCT imaging, at 1-, 2-, 3-, and, 4-weeks postoperatively, all calvarial defects in groups (1) and (2) remained patent without significant differences in defect sizes between the two groups. Histologically, group (1) and (2) defects demonstrated patency without significant size differences at both 2- or 4-weeks postoperatively. In contrast, the UCSC group (3) had significantly greater bone fill in the defects at each of the postoperative time points on microCT imaging and demonstrated a lack of patency histologically at final follow-up.

CONCLUSION: These results demonstrate a successful calvarial defect murine model for the investigation of UCSC-mediated osteogenesis and bone repair. Further, our findings provide evidence that PLGA alone has no short-term effect on bone formation nor any unwanted side effects, making it an attractive vehicle for graft substitutes. Further investigation using this UCSC and PLGA scaffold combination in a larger animal porcine model is warranted in hopes of future translation to ACR in patients with CLP.

TRACK: RESEARCH/TECHNOLOGY
PAPER
USMLE Step 1 Pass/Fail is Here: Are Plastic Surgery Applicants Really Better Off?

Presenter: Alisa Girard

Co-Authors: Kimberly Hui Ling Khoo, Christopher D. Lopez, MD, Isabel Lake, Cecil Qiu, MD, Michael L. Bentz, MD, Peter J. Taub, MD, Robin Yang, MD

Affiliation: Johns Hopkins University School of Medicine, Baltimore, MD

BACKGROUND: As of January 26, 2022, USMLE Step 1 score reporting has changed from a numeric to a pass/fail scoring system. Although the new scoring policy is expected to benefit medical students, there is concern that it will also amplify preexisting disadvantages and worsen disparities for students applying into the already-competitive plastic surgery match. Whether the reporting change will tangibly benefit applicants to plastic surgery has yet to be elucidated. This study aims to assess medical student opinions on the impact of this scoring change on their stress, expectations, and behaviors regarding plastic surgery residency applications.

METHOD: A cross-sectional survey was distributed to medical students and graduates via social media platforms from July 7th to October 22nd, 2020. The survey consisted of multiple-choice and free-response questions aimed at gauging student opinions and expectations regarding the Step 1 scoring change. Data were analyzed using Student t test and Chi-squared statistics, with an alpha level set at 0.05. For questions inquiring about likelihood of exhibiting a certain behavior, Net Likelihood Score (NLS) was used to grade aggregate sentiments.

RESULTS: Of 120 participants interested in plastic surgery, a majority were MD candidates (n = 83, 69.2%). Responses were split nearly equally between American Medical Trainees (AMTs) and International Medical Trainees (IMTs) (49.2% v. 50.8%). Of the 29 (24.2%) trainees who had already completed Step 1 (post-Step 1 students), 65.5% scored at least a 240. The average number of months spent studying for Step 1 in this cohort was 3.7±2.9 months. A plurality of respondents were against the new Step 1 score reporting (AMT: 40.7%; IMT: 44.3%). Most IMTs
(60.7%) felt that the reporting change would make HCS more competitive, whereas only 47.8% of AMTs expressed this opinion (p = 0.016). Similarly, there was a statistically significant association between training group and impact of the scoring change on stress levels (p < 0.001), with a greater percentage of AMTs expressing that the change will decrease stress levels compared to IMTs (71.2% vs. 24.6%). Overall, respondents felt that the pass/fail scoring system would increase their likelihood to engage with more research (49.2%; NLS = 48), dual apply (51.7%; NLS = 53), prioritize studying for Step 2 CK (74.2%; NLS = 77), and consider a dedicated research year (66.7%; NLS = 67).

CONCLUSION: While a pass/fail reporting system for Step 1 may alleviate some stress for medical trainees, other issues arise that may perpetuate disparities in access to adequate resources for a successful plastic surgery match. Residency programs should offer anticipatory guidance regarding prioritization of aspects of application to ease this psychosocial and financial pressure, as well as help students reorganize their constrained time.

METHOD: Electronic medical records from our institution were queried for patients with pre-existing scleroderma who underwent incisional release and fat grafting for perioral fibrosis from 2018-2021. For perioral release, semi-sharp cannula was tunneled under the vermilion border into the vermilion and along the skin. For grafting, cannulas were used to infiltrate the fat with a retrograde filling technique in a radial fanning manner. Their autoimmune diagnosis, anesthetic risk assessment (ASA), systemic complications stemming from their disease, and the degree of their presenting symptoms were reviewed along with their post-operative outcomes, subjectively and objectively.

RESULTS: From 2018-2021, 16 patients diagnosed with scleroderma were treated at our institution with incisional release and fat grafting for the management of facial perioral fibrosis and 2 diagnosed with dermatomyositis and treated in the same manner for facial lipodystrophy. Of the scleroderma patients, 8 presented with limited SSc and 8 presented with diffuse SSc. The mean patient age was 54.31 years. All SSc patients presented with functional symptoms with the most common concern (n=9) being ‘decreased mouth opening.’ Some patients (n=11) also presented with cosmetic concerns with ‘perioral rhytids’ being the most common (n=6). The average length-of-condition (LOC) was 17.47 years. The mean number of systemic complications per patient from SSc, at the time of presentation, was 3.06. The mean anesthetic risk assessment (ASA) was 2.44. On average, the amount of fat grafted during the operation was 14.89cc. The average procedure length was 52 minutes. Two patients with SSc required re-grafting. For one patient, this was part of the original treatment plan and for the other due to fat resorption. Compared to the rest of the patients, these patients had no statistically significant difference in age, co-morbidities, LOC, ASA score, or amount of fat grafted. All patients with dermatomyositis saw initial improvement but then had near-complete resorption requiring re-grafting. Patients who followed-up in the clinic or via telemedicine all reported improved functionality and were pleased aesthetically.

CONCLUSION: Patients with perioral fibrosis due to SSc can benefit from autologous fat-grafting. The immunosuppressive effects of certain stem cells may provide a localized anti-inflammatory response, downregulating the autoimmune condition. Incisional release in-combination with fat-grafting can enhance procedure outcomes. The use of technique provides beneficial functional and aesthetic outcomes. Patients with both diffuse and limited disease are appropriate candidates for this procedure. For patients suffering from dermatomyositis, the benefits of this procedure seem much more temporary.