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INTRODUCTION: Despite increasing representation in surgery, women continue to lag behind men in important metrics. Little is known on how industry funding may also contribute to this ongoing disparity. This article seeks to quantify industry payments to academic plastic surgeons by gender and examine the relationship between funding and academic achievement.

METHODS: We conducted a cross-sectional analysis of industry payments disbursed to academic plastic surgeons in 2017. Faculty were identified using departmental listings of ACGME plastic surgery residency programs. Payments were identified via the Centers for Medicare & Medicaid Services open payment database. Academic achievement was assessed using rank (eg, assistant professor), leadership designation (eg, division head), and Scopus H-index, then controlled for time in practice.

RESULTS: Of the 805 academic plastic surgeons identified, 147 (18%) were female and 658 (82%) were male ($P < 0.0001$). Significant gender differences emerged in average yearly industry contributions (men: $3,202 versus women: $707; $P < 0.0001$). Across all academic ranks, men received significantly higher payments than women ($P < 0.05$). Men constituted 93% of full professors and were almost twice as likely to hold additional leadership positions compared to women (odds ratio, 1.82; $P = 0.0143$). After adjustment for time in practice, there was no difference in H indices between male and female academic plastic surgeons, although payment disparity persisted ($P < 0.0001$).

CONCLUSION: Substantial gender-based disparities exist among academic plastic surgeons’ academic rank and leadership attainment. A 3-fold difference in the amount of industry contributions men and women receive (regardless of time in practice) may be an underrecognized component of these academic achievement gaps. Increased transparency in how industry payments are disbursed is needed.

Keratinocyte Sheets Prepared Using Temperature-responsive Dishes Enhance the Survival Rate on Artificial Dermis

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PURPOSE: For severe burn injury or traumatic skin defect, cultured epithelial keratinocyte sheet therapy has been used in clinical practice since the 1980s. However, the survival rate of epithelial keratinocyte sheet on dermal-like tissue constructed with the artificial dermis is extremely low. Enzymatic treatment is typically used for obtaining epithelial keratinocyte sheets, but it tends to break the adhesion and basement membrane proteins, and this effect is directly linked to decrease in the survival rate of epithelial keratinocyte sheet on artificial dermis. On the other hand, a temperature-responsive culture dish requires no enzymatic treatment to harvest cell sheets, and the basal membrane proteins and intercellular adhesion proteins can remain in epithelial keratinocyte sheets prepared by temperature-responsive culture dishes. This study investigated the potential to enhance the survival rate of human epithelial keratinocyte cell sheets prepared by temperature-reducing treatment on the dermis-like tissue and compared the rate with that of the cell sheets harvested by enzymatic treatment with rat full-thickness skin defect model.

MATERIALS AND METHODS: Under inhalation anesthesia with isoflurane, a standardized 9cm² full-thickness skin defect was created in the back region of nude rats (n = 9 per group). Artificial dermis was cut to the same size as the defect and implanted by 5-0 nylon suture. The silicone sheet of artificial dermis was removed at 2 weeks after the initial operation, and the dermis-like tissue regeneration was confirmed. An epithelial keratinocyte sheet prepared from human epidermal cells in a normal culture dish by dispase treatment (DT sheets group) or a temperature-responsive culture dish (TR sheets group) was grafted on dermis-like tissue. One week after transplantation, the engrafted section was observed to measure the survival rate of epithelial keratinocyte sheets.

RESULTS: The survival rate of epithelial keratinocyte sheets in the TR group was significantly higher than that of the control DT group (120 ± 49 versus 63 ± 42 mm²; $P < 0.05$). Epidermis thickness of epithelial keratinocyte sheets in the TR group was significantly greater than that of the control DT group (165 ± 79 versus 65 ± 54 μm; $P < 0.01$).

CONCLUSIONS: This study showed that the epithelial keratinocyte sheets prepared with temperature-responsive culture dishes remarkably improved the survival rate on the dermal-like tissue after artificial dermal implantation when compared with the conventional sheet. This result suggested that the further possibility of reconstruction with artificial dermis and cultured epidermal sheet for full-thickness skin defect in clinical situations.

Professional Burnout in US Plastic Surgery Residents: Is It a Legitimate Concern?

Presenter: Demetrius M. Coombs, MD
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PURPOSE: The rate of burnout in medicine is double that in other professions and remains intimately associated with the desire to leave an institution, increased fiscal loses, substance abuse, depression, suicidal ideation, medical errors, and lower patient satisfaction scores. Unfortunately, no study, until now, has sought to examine burnout and its relationship to medical errors and program-related factors, by directly sampling all US Plastic & Reconstructive Surgery residents.

METHODS: Cross-sectional study of data collected from current US Plastic & Reconstructive surgery residents (Integrated and Independent) at ACGME-accredited programs during the 2018–2019 academic year and from participants in the 2018 ACAPS Plastic Surgery Boot Camps using the Stanford Professional Fulfillment Index, Maslach Burnout Index, Short Form-12 survey, alcohol use disorder identification test, and depression screening from the Personal Health Inventory. Additional data collected included demographics, relationship status, call schedule, perceived impact within one’s program, and admission of medical errors.

RESULTS: One hundred ninety-five subjects responded. Residents from each post-graduate year in the first 6 years were well represented. No relationship was found between burnout and age, gender, race, relationship status, or PGY level. Residents who reported that they do not feel like they matched into the right program, felt involved in program decisions, and felt like they had matched into the right program would not recommend their program to medical students, and do not feel involved in program decisions had a significantly higher incidence of burnout; \( P = 0.014, 0.001, \) and 0.013, respectively. There was a significant association between burnout and increasing hours worked in the week prior \( (P < 0.031); \) odds ratio \([OR],[1.03]\). Residents who reported feeling that they were taking too much call had significantly higher incidence of burnout, as opposed to residents who felt they took an appropriate amount of call or too little call \((P < 0.001).\) Residents were more likely to be professionally fulfilled if they would recommend their program to medical students \((P = 0.02), \) felt involved in program decisions \((P = 0.008), \) and felt like they had matched into the right program \((P = 0.001).\) There was a significant increase in emotional exhaustion with increasing average weekly work hours \((P = 0.002; \) OR, 1.04) and calls taken the month prior \((p = 0.03; \) OR, 1.11). There was a significant increase in interpersonal disengagement with increasing average weekly work hours \((P = 0.002; \) OR, 1.05) and calls taken the month prior \((P = 0.03; \) OR, 1.12). A significant association exists between burnout and laboratory errors \((P = 0.035)\) with a trending association between burnout and medication errors \((P = 0.078)\) was also observed.

CONCLUSION: This study represents the first and largest direct examination of burnout, self-reported medical errors, and program suitability in US Plastic & Reconstructive residents using a validated scale and suggests that burnout and some medical errors may be related to program-specific, modifiable factors. Additionally, we propose a novel screening instrument for burnout among plastic surgery residents (SMOKE/R questionnaire) based on the data, and outline future studies in this 3-part series to help optimize training within our specialty, facilitate curriculum development, and develop resources for residents burdened with burnout.

Role of Leupeptin in Preventing Hind Limb Ischemic Tissue Injury

Presenter: Irene Nozal Martin

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PURPOSE: Prolonged tourniquet ischemia leads to progressive muscle, nerve, and vascular injury. Currently, the only way to prevent injury to these tissues is by minimizing tourniquet time. Tissue ischemia leads to calpain activation and Wallerian-like degeneration. Calpain is expressed in the vascular wall and is implicated in several vascular inflammatory and degenerative disorders. Leupeptin inhibits the expression of calpain. We hypothesized that by inhibiting the expression of calpain with Leupeptin, we could diminish muscle, nerve, and vascular injury after prolonged tourniquet ischemia. We undertook a study to assess the role of Leupeptin in a rat model of prolonged hind limb ischemia.

METHODS: Ten male Sprague-Dawley rats weighing 300–400 g were subjected to 2-hours of blood flow occlusion in the left hind limb by application of a neonatal blood pressure cuff set to 300 mm Hg. Half of the rats were then randomly selected to receive twice weekly intramuscular injections of Leupeptin at 12 mg/kg in saline starting right after tourniquet release, whereas the other half received injections of saline alone. Blood flow occlusion was confirmed by the loss of a pulse detectible by a pulse oximeter and cyanotic discoloration of the limb. All animals were monitored for gait quality using the sciatic functional index. Two weeks after the tourniquet applications, the animals were sacrificed. The sciatic nerves, gastrocnemius muscles, and saphenous veins and arteries were harvested from the left and right hind limbs, fixed in 10% formalin and imaged following Masson’s trichrome staining.

RESULTS: The histologic images of the gastrocnemius muscle fascicle cross-sectional areas from both the hind limbs for the 2 groups—leupeptin and control—were imaged using a...