it with funnel plots. DISCUSSION/SIGNIFICANCE OF FINDINGS: Understanding the factors that influence the growth of asymptomatic thoracic aortic aneurysms (TAA) is paramount, as the size and growth rate of TAAs dictates the clinical course. Little is understood about the degree to which different characteristics influence growth. This meta-analysis will help elucidate factors that promote TAA growth.

Evaluation

85965

Biomechanical analysis of vertebral body polymethylmethacrylate cement augmentation performed using two different techniques

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ABSTRACT IMPACT: This study will answer key questions that spine surgeons have regarding techniques used in cement augmentation of vertebral compression fractures and will ultimately advance patient care for such injuries. OBJECTIVES/GOALS: The objective of this study is to determine if a difference exists in load-bearing characteristics and load-to-fracture between injecting cement anteriorly prior to screw placement versus cement augmentation via fenestrated pedicle screws. We also expect differences in load-to-failure characteristics between different cement volumes. METHODS/STUDY POPULATION: This study will be performed in a bioengineering laboratory that has access to a Materials Testing System (MTS). Eight cadaveric specimens will be selected from our stock after pre-screening via CT for inclusion and exclusion criteria. The levels T8-L1 will be dissected from the vertebral column along with any soft tissue structures. The vertebral bodies will be potted in an epoxy mold. From each spine, there are 2 groups of three. One vertebral body from each spine will serve as an internal control, one will be augmented with cement via a cannula and then instrumented with a non-fenestrated screw and the third will be instrumented will a fenestrated screw and then augmented with cement. After appropriate curing time, repeat CT imaging will be completed. The specimens will then be loaded to failure and the results analyzed. RESULTS/ANTICIPATED RESULTS: We hypothesize that we will see a better anterior spread with the cannula/non-fenestrated screw method as compared to the fenestrated screw. The reason being is that we would expect the fenestrated screw to experience more cement extruding from the fenestration rather than being directed anteriorly. We believe a better anterior spread of the cement will lead to a greater load-bearing capacity for the vertebral body. We also believe that a difference will exist in load-to-failure testing with the two volumes being tested, though we cannot predict to what a degree this difference will be impactful as there have been few studies prior looking at this. DISCUSSION/SIGNIFICANCE OF FINDINGS: This study is significant because it will aid in determining the optimal technique to implement in the setting of vertebral compression fractures. This will lead to improved patient care as well as a greater understanding of the instrumentation used in such procedures. The results will lay the groundwork for future research on this procedure.

Precision Medicine

15564

Going with the Flow: Engineering Vascularized Urothelial Flaps for Female-to-Male Phalloplasty in Transgender Patients

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ABSTRACT IMPACT: This project uses rapid prototyping, 3D printing, and cell seeding to solve the most common post-operative complications that arise from the current methods of urethral elongation during phalloplasty. OBJECTIVES/GOALS: Post-op fistula and stricture formation occur in up to 50% of phalloplasty patients. These complications arise from the mismatch between skin and uroepithelium, or from scarring secondary to ischemia. Here we describe the fabrication of a novel vascularized urothelial flap for phalloplasty that contains discrete urothelial and vascular channels. METHODS/STUDY POPULATION: A custom designed 3D negative mold, with a urethral channel and a vascular inlet and outlet channel was prototyped in Adobe Fusion 360 and printed on a Prusa i3 MK3S printer in PLA. A 2mm diameter pluronic sacrificial macrofiber was used to connect the channels to form a vascular loop, and 1% type-I collagen was extruded over the mold. After solidifying, the scaffold was demolded and seeded with grade I urothelial carcinoma (SW780 cells, at 5-10 x 106 cells/mL) in the urethral channel, and adenovirus-infected E4 endothelial cells (at 3x106 cells/mL) in the vascular channel. The scaffolds were cultured up to 14 days and then fixed for histologic analysis. RESULTS/ANTICIPATED RESULTS: Collagen scaffolds were fabricated reliably using the custom 3D negative molds. After both seven and fourteen days of culture, the urothelial channel contained a robust, stable urothelial monolayer lining throughout the channel. By 14 days urothelial multilayer formation was seen, providing definitive evidence of a more mature urothelial layer. Grooves within the collagen allowed for nests of urothelial cells to develop, leading to increased multilayer formation. In addition, the vascular channels supported a healthy endothelial lining at both seven and fourteen days. There were no significant histological differences between constructs seeded with 5x106 urothelial cells/mL and 107 cells/mL. We anticipate that multilayer formation will increase with time, and that constructs will survive beyond 28 days. DISCUSSION/SIGNIFICANCE OF FINDINGS: We have developed a novel strategy to engineer vascularized urethral tissue. These constructs can be kept for at least 14 days and form stable monolayers and multilayers consistent with native urothelial architecture. Using 3D printing and autologous cell seeding promises to create patient-specific vascularized urethral flaps for phalloplasty.

22732

Impact of Type-I Interferon Manipulation During Embryo Implantation and Placentation

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ABSTRACT IMPACT: This research will promote understanding the role of the Type-I Interferon signaling pathway during embryo

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