with the recombinant human bone morphogenetic protein-2 (rhBMP-2) pathway, yet literature investigating the potential but unsubstantiated sex-dependent differential response to rhBMP-2 spine fusion is scarce. Clarifying whethera sex-based differential bone regenerative response could improve and personalize patient care in the setting of spine and other orthopedic procedures requiring bone healing. Herein, we investigated whether there is a sex-dependent bone regenerative response to rhBMP-2 in a rat spinal fusion model.

PURPOSE: The purpose of this study was to assess and validate the presence and extent of the sex differences in bone response to rhBMP-2 in vivo.

STUDY DESIGN/SETTING: Pre-clinical.

PATIENT SAMPLE: Male and female Sprague-Dawley rats, ages 12-16 weeks.

OUTCOME MEASURES: Radiography, fusion scoring, microCT.

METHODS: Twenty-eight Sprague-Dawley male and female rats underwent L4-L5 posterolateral fusion with bilateral placement of an absorbable collagen sponge loaded with 10 μg of rhBMP-2/animal (INFUSE^{TM}; 5 μg/implant; N=14/group). Bone regenerative response and fusion were assessed eight weeks postoperatively via radiography and blinded manual palpation, where each specimen was assigned a score of 0 (unfused, no bridging bone), 1 (unilaterally fused, L4-L5 bridging), or 2 (bilaterally fused). MicroCT imaging (N=3/group) was used for microarchitectural analysis to evaluate new bone, the bone volume fraction, and trabecular thickness.

RESULTS: As expected at this dose, radiography and manual palpation showed 100% fusion rates for both sexes. Fusion scores, though, were significantly different with females having a lower fusion score (female: 1.26±0.31 vs males: 1.55±0.33, *p=0.001). Radiography showed noticeably smaller fusion mass volumes in females vs males, but the fusion mass was found to be less compressible on manual palpation in females relative to males. MicroCT evaluation showed significant differences in females vs males, with females having significantly lower new bone volumes (female: 26.591±3.871 mm^3 vs male: 37.595±11.174 mm^3, *p=0.046), but a significantly higher bone volume fraction (female: 0.266±0.116 vs male: 0.126±0.064, *p=0.028) and significantly greater trabecular thickness (female: 0.198±0.016 mm vs male: 0.178±0.014 mm, *p=0.041).

CONCLUSIONS: This study shows that there may indeed be a sex-based difference in bone regeneration induced by rhBMP-2. We showed that female rats have higher quality, but less volume of new bone formation compared to males. Future work will evaluate the extent of this distinction, especially at sub-therapeutic doses of the growth factor, and will investigate the interplay between the BMP-2 pathway and sex hormones in bone regenerative outcomes.

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106. Subclinical *propionibacterium acnes* infection estimation in the intervertebral disc (SPInE-ID)

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BACKGROUND CONTEXT: Low back pain and vertebral end plate abnormalities are common conditions within the population. Subclinical infection caused by indolent pathogens can potentially lead to these findings, with differentiation between them notably challenging from a clinical perspective. Progressive infection of the intervertebral disc has been extensively associated with increasing low back pain, with *Propionibacterium acnes* specifically implicated with in relation to sciatica.

PURPOSE: To identify if the presence of an infective pathogen within the intervertebral disc is primary or is a result of intraoperative contamination, and whether this correlates to low back pain.

STUDY DESIGN/SETTING: Single-center prospective cohort.

PATIENT SAMPLE: Subjects included within the study will be between the ages of 18 and 65 years and have a diagnosis of lumbar disc herniation requiring open decompression surgery.

OUTCOME MEASURES: Tissue culture and pathogen identificationNR-SODIEQ-5DModic changesESR, CRP, Leucogram.

METHODS: Excised herniated disc fragments, muscle and ligamentum flavum samples will be collected during surgery and sent to microbiology for tissue culture and pathogen identification. A disc infection is considered if only disc tissue has a positive culture growth. Score questionnaires for pain, functionality and quality of life will be given preoperatively and at 1, 3, 6 and 12 months postoperatively. An MRI will be performed 12 months after surgery for analysis of Modic changes and baseline comparison. The primary endpoint is the rate of disc infection in patients with symptomatic degenerative disease. The secondary endpoints will be performance scores, Modic incidence and size.

RESULTS: Ninety-five patients were enrolled and completed one-year follow-up with full data collected. Eighteen patients (18.9%) presented at least one of the 3 collected tissues with a positive culture and 4 patients (4.21%) presented only intervertebral disc positive tissue culture, which was considered disc infection, while other patients were considered contaminated. *P. acnes* was cultured in 2 of the 4 infected discs. NRS for low back pain and sciatica, and ODI improved from mean baseline 7, 6 and 45 to final follow-up 1.2, 2.2, and 16, respectively. Performance score improvements were not statistically related to presence of disc infection. Modic changes and increasing of size over time were not related to disc positive culture. No patients developed clinical discitis over time.

CONCLUSIONS: Based on a strict methodology of tissue culturing and contamination controls, subclinical infection rate of the intervertebral lumbar disc is at 4.2% and is overestimated in the current literature. Subclinical disc infection is not related to worse outcomes after lumbar microdiscectomy in patients with lumbar disc herniation, and worsening of Modic changes over time is not related to the presence of pathogens in the disc.

FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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107. Internal deformations in human intervertebral discs under axial compression: a 9.4T MRI study

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BACKGROUND CONTEXT: Back pain will be experienced by 70-85% of all people at some point in their lives, and is linked with intervertebral disc (IVD) degeneration. However, few studies have attempted to quantify changes in the internal deformations within IVDs as they degenerate without disrupting the disc continuity. Recent advances in MRI technology provide the opportunity to observe 3D deformations within intact IVDs in unprecedented detail.

PURPOSE: The aim of this study was to quantify human IVD deformations under axial compression.

STUDY DESIGN/SETTING: 9.4T MRI images were obtained of human cadaveric motion segments under pure axial loading.

PATIENT SAMPLE: Four human vertebral body–IVD–vertebral body specimens (L4-L5) were used for this study. Two were classed as degenerate (age = 55.5 ± 3.5 years (average ± SD), Pfirrmann rank = 3.5 ± 0.4) and two were classified as nondegenerate (age = 24.0 ± 2.8 years, Pfirrmann rank = 2.0 ± 0.3).