train a model using boosted trees to classify each video as PD or non-PD. Model performance was evaluated using leave-one-out cross-validation. Additionally, we used recursive feature elimination to reduce model complexity. RESULTS/ANTICIPATED RESULTS: A model using two features identified by recursive feature elimination yielded a model with an overall accuracy of 81% in cross-validation. In our sample, the model had 86.2% sensitivity, 75.9% specificity, and an AUC of 0.839. Additional improvement may be possible with more data processing, especially in the time-domain. DISCUSSION/SIGNIFICANCE: We built a classifier that was able to reliably and accurately discriminate between videos of motor assessments in people with Parkinson's and people without. This may provide a low cost screening tool in rural areas or primary care clinics with limited access to neurologist expertise.

63

Echinococcosis in US patients: retrospective analysis of a neglected zoonosis with regional animal spillover risks

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OBJECTIVES/GOALS: Our objective is to address the gaps in our epidemiologic understanding of Echinococcosis, a neglected and emergent zoonotic parasite in the US. Comparing regional differences in human cases with known Echinococcus genotypes in canine reservoirs will reveal landscape-level transmission risks. METHODS/STUDY POPULATION: Retrospective analysis of de-identified diagnosis codes for human echinococcosis in the US from 2002-2022 in a federal multi-healthcare network database (TriNetX). Analyses included Kaplan-Meier survival and specific parasite species cohort comparisons with descriptive summaries of demography and co-morbidities, and odds ratios for interventions (surgery, anti-parasitics, cyst aspiration) and complications (anaphylaxis, sepsis, etc.) Mitochondrial genomes of Echinococcus spp. from next-generation sequencing ova-positive archival animal scat (National Park Service), along with sequences from published sources in the US, will be used to compare regional genotypic and reservoir host differences. RESULTS/ANTICIPATED RESULTS: Over 36,000 US patients were diagnosed with Echinococcosis in the past twenty years. Most cases had an unspecified parasite species, primarily affecting pediatrics (average age 16y +/- 10y) in the South/Southeast US, with very few interventions or medical complications reported. Patients with specific parasite species diagnoses (E. granulosus or E. multilocularis, N=500) had higher rates of mortality (11.7% at 10y), surgical (8.8%) and medical (18.2%) interventions, and complications (2%-17.2%), with demographic differences noted. Sequencing data and analysis pending for 47 Echinococcus positive wolf samples, with 78 additional sequences available for two types of Echinococcus spp. in wildlife, and lacking data for domestic dog-adapted strains in the US. DISCUSSION/SIGNIFICANCE: This study revealed a higher-than-expected burden of Echinococcosis in the US, confirming it is an under-recognized neglected and emergent disease. Future studies will address gaps regarding the origin of unspecified infections, with targeted surveillance of domestic dogs in high-risk areas.

64

Finite Element Analysis of a Porous Dual Component 3D-Printed Bone Graft for Alveolar Ridge Augmentation

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OBJECTIVES/GOALS: Our goal was to assess the ability of a 3D-Printed dual cover-core design alveolar ridge bone graft, to withstand the average maximum masticatory force of a healthy person. To this end, we characterized the materials, ran a finite element analysis (FEA) model, and validated it using a resin 3D-printed version tested under compression with strain gauges. METHODS/STUDY POPULATION: A tricalcium-phosphate/hydroxyapatite paste and mixed methacrylated alginate-gelatin were used for the core, and polycaprolactone for the cover. These were characterized using ASTM standards D695 and D638 for compression, tensile, and rheological testing. Then we converted cone CT-scan images of a mandibular alveolar ridge defect to an .stl file, and designed the cover and core in Meshmixer. The model was then imported into ANSYS 11.0, and a downward compression force of 500 N, the maximum masticatory force of a healthy adult, was applied on the graft and mandible's top ridge. The different models included solid and porous covers and cores, as well as comparing screws on one or both sides of the cover, then validated by compressing a resin 3D-printed versions. RESULTS/ANTICIPATED RESULTS: The FEA model provided maximum displacements, Von Mises stress (VMS), and stress/strain values for each model. The highest maximum displacement was found on the solid covers with a combination of both buccal and lingual screws, at 0.162 mm. The lowest maximum displacement was found in the porous cover at 0.085 mm. All VMS values were below the tensile yield strength, meaning that the materials would not yield. The highest maximum stress was found on the porous cover at 13.52 MPa, the lowest was 1.06 MPa on the cover with no screws. The highest strain was found on the porous model at 0.010, which was 5.6x higher than the solid cover. The porous cover also showed less stress shielding, thus allowing a beneficial mechanical stimulation of the bone, and the lowest maximum displacement, possibly due to flexion through the pores. DISCUSSION/SIGNIFICANCE: Preliminary FEA models demonstrated that for the considered materials, a cover-core design of the mandibular implant would sustain the desired 500 N of force without yielding. The porous cover provides the most benefits, causing the least stress shielding and allowing diffusion of biological factors to support the osteoinductive role of the core.

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