scaffolds with high level of porosity (>90%), interconnectivity, and mechanical properties (compressive modulus up to 2 kPa). The fibrous nanostructure of these scaffolds was joined to micronic cells of controllable size. ADSCs and OBs were obtained by using an adherent method and an enzymatic digestion method. ADSCs, OBs, and the mixture of ADSCs and OBs (at a ratio of 1:1) were cultured with PLLA/HAp nanostructured aerogel scaffolds, respectively. After 48 hours of in vitro culture, cell-scaffold complexes were subcutaneously implanted into the back of Sprague-Dawley rats in corresponding groups, and PLLA/HAp nanostructured aerogel scaffolds without cells were implanted in a control group. The rats in each group were killed at 8 weeks postoperatively. The macroscopic and histopathological observations were performed to assess the ectopic osteogenesis potential.

Results: After adipogenic, chondrogenic, and osteogenic induction, ADSCs were positive for Oil Red O, toluidine blue, and alizarin red staining. Results of flow cytometry showed that ADSCs were positive for CD147, CD90, CD105, and CD44, with the rate of positivity being >80%, but negative for CD117, CD34, CD131, and CD45, with the rate of positivity being <5%. Passage 3 OBs were positive for both alizarin red staining and alkaline phosphatase staining. At 8 weeks after implantation, soft tissues grew into the complexes under gross observation. At 8 weeks after implantation, ectopic bone formation was visible in each group. The bone formation was more visible in the ADSC-PLLA/HAp nanostructured aerogel scaffold group than in the other groups with a significant difference ($P < .05$).

Conclusions: To conclude, ADSCs can promote the ectopic bone formation of OBs in vivo in combination with PLLA/HAp nanostructured aerogel scaffolds.

CLINICAL IMPACT OF DIRECT-ACTING ANTIVIRAL TREATMENT ON PATIENTS WITH HEPATITIS C VIRUS–RELATED ORAL LICHEN PLANUS

Dario Di Stasio,[a] Marco Di Petrillo,[a] Antonio Romano,[a] Fausto Fiori,[a] Diana Russo,[a] Luigi Elio Adinolfi,[b] Alberta Lucchese,[a] Rosario Serpico,[a] and Aldo Marrone[b], [a] Multidisciplinary Department of Medical-Surgical and Dental Specialties, University of Campania "Luigi Vanvitelli", Napoli, Italy, and [b] Department of Advanced Medical and Surgical Sciences, University of Campania "Luigi Vanvitelli", Napoli, Italy

Objectives: Oral lichen planus (OLP) is a chronic inflammatory mucocutaneous disease. It has been related to hepatitis C virus (HCV) infection as one of the extrahepatic pathologic manifestations. The current treatment for HCV infection with direct-acting antivirals (DAAs) is highly effective and safe. This study aimed to evaluate the impact of HCV eradication on OLP clinical manifestations.

Methods: Patients with a histologic diagnosis of OLP and HCV chronic infection were recruited from the oral medicine and internal medicine units of the University of Campania "Luigi Vanvitelli." All patients received DAA treatment and were monitored at baseline and during and after treatment for liver function and antiviral response. Patients underwent an oral clinical examination before receiving DAAs (T0) and 8 weeks after the end of treatment (T1), and they were observed periodically in follow-up (FU). Statistical analysis was performed using Mann-Whitney and Wilcoxon tests, chi-square tests, and Fisher exact tests.

Results: Eighteen patients (13 females and 5 males; median age, 75 years) with chronic HCV infection of different genotypes were enrolled. All patients cleared HCV RNA with a sustained virologic response at FU. No adverse events were reported. The median FU was 92 weeks at T2. At T0, 5 patients presented with reticular and bilateral white lesions; 7 patients presented with erosive OLP; and 6 patients presented with a mixed form. The mean percentages of oral sites involved were 30% (±13.9) at T0, 20.8% (±12.9) at T1, and 16.2% (±15.2) at T2, showing improvement from T0 to T1 ($P = .007$) and T2 ($P = .005$). One patient developed oral cancer during the treatment and was excluded. Oral lesions have improved in 9 cases (52.9%) at T1 and in 10 cases (55.6%) at FU (T2); among these, 6 (60%) showed complete remission. However, statistical analysis did not reveal a significant correlation between oral improvement and HCV genotype ($P = .64$), viral load ($P = .27$), liver status ($P = .60$), isolated HBcAb positivity ($P = .633$), and type of DAA received ($P = .103$).

Conclusions: DAA treatment leading to HCV eradication can improve OLP symptoms. However, a causative relationship between HCV infection and OLP pathogenesis is difficult to establish. Further studies are necessary.

SELENIUM: A SOLE TREATMENT FOR EROSIVE ORAL LICHEN PLANUS (RANDOMIZED CONTROLLED CLINICAL TRIAL)

Passant Osama Qataya,[a] Naguiba Mahmoud El Sayed,[a] Nihal Mohamed El Guindy,[b] Marwa Ahmed Hafiz,[c] and Wael Mahmoud Samy[c], [a] Faculty of Dentistry, Alexandria University, Alexandria, Egypt, [b] Faculty of Science, Alexandria University, Alexandria, Egypt, and [c] Faculty of Pharmacy, Alexandria University, Alexandria, Egypt

Objectives: Oral lichen planus (OLP) is a chronic disease with immune-mediated pathogenesis. Selenium (Se), an antioxidant, plays a role in modulating immunity. The aim of this clinical trial was to evaluate 2 Se forms (novel topical hydrogel and oral capsules), solely, in treating erosive OLP based on clinical evaluation and salivary oxidative stress markers. To date, to our knowledge, this is the first study to evaluate the role of Se solely in treating erosive lesions associated with erosive OLP. This clinical trial has been registered in the Cochrane Database under registry number PACTR201901531815403.

Methods: Patients were allocated into 1 of 3 groups: group I, topical corticosteroids and topical antifungal as an adjunctive therapy; group II, novel topical Se hydrogel; or group III, systemic Se. Treatment lasted for 6 weeks. Patients were clinically evaluated at baseline and at 6 and 12 weeks for reduction in pain scores and clinical lesion size. Biochemical analysis was performed for salivary malondialdehyde (MDA) and total antioxidant capacity (TAC) levels at baseline and 6 weeks. Correlation between clinical signs and symptoms and salivary oxidative stress markers was measured at 6 weeks. Two-way analysis of variance (ANOVA) followed by a post hoc Tukey test was performed to assess for significant differences in mean pain scores, clinical lesion size, and salivary MDA and TAC levels at 6 weeks. One-way ANOVA was used to test for significant variations in clinical parameters at 12-week follow-up. Principal component analysis and nonmetric dimensional scaling were performed to test for correlation and possible relationships between clinical parameters and salivary oxidative stress markers.

Results: There was a significant reduction in signs and symptoms in response to all treatment modalities. However, there was no significant difference among the 3 groups at 6 weeks. At 12 weeks, group II had significantly lower pain scores than group I. Salivary MDA levels showed a significant decrease

in patients in group I and group III. TAC levels showed no significant difference in response to treatment.

Conclusions: Se can be proposed as a treatment for OLP. Salivary MDA levels can be a biomarker for OLP disease severity.

LONG-TERM OROFACIAL PAIN REDUCTION AFTER REPEATED BOTULINUM TOXIN INJECTION INTO MASSETER MUSCLES

Gale Ann Sebastian, Timothy Andrew Hess, and Mark Thomas Drangsholt, University of Washington School of Dentistry, Seattle, Washington, USA

Objectives: Neurotoxin injection into muscles to reduce movement or pain has seen increasing use and study. For orofacial pain, however, patient selection factors and long-term efficacy are not well characterized. The objective of the present study was to describe the clinical characteristics and effects in a series of patients with temporomandibular disorder [TMD] pain who had received multiple masseter neurotoxin injections over the course of years.

Methods: Patients referred for tertiary/quaternary care within the oral medicine clinical services from April 2015 to December 2019 were investigated. At least 40 patients with TMD pain were treated with botulinum toxin over this time period. Extensive baseline questionnaires along with pain drawings were used to characterize the patients, including graded chronic pain and related Pain, Enjoyment of Life and General Activity [PEG] scales. Symptom Checklist 90 Revised [SCL-90 R], General Anxiety Disorder 7-item [GAD-7], and Patient Health Questionnaire 9 [PHQ-9] psychological measures were also administered. Diagnostic Criteria for Temporomandibular Disorders [DC-TMD] examinations were done at each visit, along with standardized assessments of neurosensory abnormalities, with masseter and temporalis estimated volume. Fifty units of incobotulinum toxin A were injected into superior and inferior masseters bilaterally in each patient. Returning patients were seen in follow-up from 1 to 4.5 years later in the clinic with extensive metrics.

Results: Of 40 patients with TMD treated with at least 1 encounter with neurotoxin, 4 were located who had received at least 3 injection procedures over 12 months or longer and reported 50% or greater reduction in average pain intensity and pain impact. These patients' ages were 27, 29, 29, and 32 years; 3 were female. All reported having TMD pain for more than 5 years, and all were diagnosed with masseter myalgia, masseteric hypertrophy, definite sleep bruxism, migraine or tension-type headache, and mild to moderate psychological distress. All 4 were treated initially with self-care, nonsteroidal anti-inflammatory drugs, muscle relaxants, and occlusal appliances with some success, but they desired more reduction of pain and pain impact. All patients reported pain reduction after neurotoxin within 2-3 weeks, with effective (50-100%) pain relief for up to 6 months. Total injection visits ranged from 3 to 9 over the course of 1 to 4.5 years.

Conclusions: For a subset of patients with subacute TMD masseter pain, botulinum toxin injections resulted in substantial reductions in orofacial pain intensity and impact that could be sustained with repeated injections.

DISPARITIES IN THE GEOSPATIAL DISTRIBUTION OF DENTISTS IN THE UNITED STATES IN 2017

Robert Semco,[a,b] Justin C. Mccarty,[b,c] Molly P. Jarman,[b] Gezzer Ortega,[b] Tarsicio Uribe-Leitz,[b] Stephen Sonis,[d,e] Alessandro Villa,[d,e] and Regan W. Bergmark[b,f,g,h], [a] Harvard School of Dental Medicine, Boston, MA, USA, [b] Center for Surgery and Public Health, Brigham and Women's Hospital, Boston, MA, USA, [c] Department of Surgery, St. Elizabeth's Medical Center, Tufts University School of Medicine, Boston, MA, USA, [d] Division of Oral Medicine and Dentistry, Brigham and Women's Hospital and Dana-Farber Cancer Institute, Boston, MA, USA, [e] Department of Oral Medicine, Infection and Immunity, Harvard School of Dental Medicine, Boston, MA, USA, [f] Division of Otolaryngology–Head and Neck Surgery, Brigham and Women's Hospital and Dana-Farber Cancer Institute, Boston, MA, USA, [g] Department of Otolaryngology–Head and Neck Surgery, Harvard Medical School, Boston, MA, USA, and [h] Patient-Reported Outcomes, Value and Experience Center, Brigham and Women's Hospital, Boston, MA, USA

Objectives: Advanced dental and oral health conditions disproportionately affect racial and ethnic minority patients and patients of low socioeconomic status. The impact that the geographic distribution of dentists has on these disparities is largely unknown. The aims of this study were to map the geographic distribution of dentists within the United States at the county level and to determine whether this distribution explains a component of the observed health disparities.

Methods: The number and primary practice locations of all dentists in the United States in 2017 were extracted from the Health Resources and Services Administration's Area Health Resources Files. These data were combined with US census data to determine the density of dentists per capita at the county level, which was analyzed for association with population-level demographic characteristics using bivariable and multivariable linear regression.

Results: The median density of dentists by county in the United States is 33.7 dentists per 100,000 people (standard deviation, 24.4). Multivariable analysis showed that the density of dentists was positively associated with the percentage of residents with a college education, where the highest quartile of counties had 28.1 more dentists per 100,000 than the lowest (95% confidence interval [CI], 25.6, 30.6), and was negatively associated with the percentage of residents who were uninsured, where the highest quartile of counties had 12.5 fewer dentists per 100,000 than the lowest (95% CI, −15.0, −10.0), but the density of dentists was not associated with median household income. Furthermore, the density of dentists was positively associated with a greater non-White population composition, where the highest quartile of counties had 7.7 more dentists per 100,000 than the lowest (95% CI, 5.3, 10.0). Finally, the density of dentists was associated with some quantiles of urbanicity, where the most rural quantile of counties had 12.4 fewer dentists per 100,000 than the most urban (95% CI, −15.25, −9.56).

Conclusions: Dentists are unequally distributed within the United States. Controlling for population characteristics, counties with greater non-White population composition have more dentists per capita. Geographic access was not shown to adequately account for observed oral health disparities, indicating that there may be more important barriers to dental care for minority patients.

ANALYSIS OF LEARNER DEMOGRAPHICS FROM A MASSIVE OPEN ONLINE COURSE IN ORAL MEDICINE

Katherine France, Uri Hangorsky, Chia-Wei Wu, Thomas P. Sollecito, and Eric T. Stoopler, University of Pennsylvania, Philadelphia, Pennsylvania, USA