

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

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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

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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 quartile 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

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Objectives: The aims of this study were as follows: (1) to review the learning impact of The Oral Cavity: Portal to Health and Disease (TOC), a massive open online course in oral medicine developed by Penn Dental Medicine using the Coursera platform; and (2) to analyze course enrollment to determine worldwide interest in accessible, high-quality oral medicine education.

Methods: The authors analyzed Coursera learner statistics to critically evaluate learner traits and course engagement for TOC, which launched on September 17, 2017, and covers topics relevant to oral medicine and the interprofessional relationship between dentistry and medicine.

Results: To date, TOC has garnered 16,653 visitors, 4,318 of whom have enrolled and demonstrate approximately steady continued monthly and daily engagement. Most learners are between 25 and 34 years of age, and 54% are female, reflecting interest in acquiring oral medicine–related knowledge in this demographic. TOC includes more participants than Coursera averages who have obtained professional and doctoral degrees. TOC participants also include more individuals who are unemployed, employed part time, and self-employed, demonstrating a broad range of participants. Some participants have successfully applied to and enrolled in dental schools and oral medicine residency programs, including at the University of Pennsylvania. Enrollees are from 6 continents, with higher proportions of learners than other courses on the platform being from Africa and Asia. The countries with the highest proportions of participants include the United States, India, Egypt, the United Kingdom, and Brazil, demonstrating a geographically wide interest among these participants. One hundred twenty-six learners have rated the course with 4.9 of 5 stars; 95% of participants have given the course a “thumbs up”; and many submit positive reviews, including one individual who remarked, “It is a great course for dental students who want to know how systemic diseases or conditions may affect in [sic] the Oral Cavity.”

Conclusions: Coursera is a worldwide technology platform that hosts free courses spanning various levels and disciplines. TOC presents an opportunity to learn oral medicine and interprofessional health care concepts for individuals with interests in dental, medical, and allied health professions. High learner engagement with wide global distribution demonstrates interest in oral medicine–related education worldwide.

OPTIMIZING OVERNIGHT ORAL APPLIANCE FOR SUSTAINED-RELEASE VARNISH DELIVERY SYSTEM OF SIROLIMUS

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Objectives: Intraoral trays can be used to deliver treatment materials and medications for dental or mucosal conditions. Maintaining appropriate salivary levels of the active ingredient is challenging when using local application. We have previously analyzed salivary levels and local effects of slow-release varnishes (with clotrimazole or sirolimus as the active ingredient)

during the daytime. The aims of the present study were as follows: (1) to optimize overnight appliances for slow-release medications by measuring saliva and blood levels and (2) to evaluate the safety of overnight use.

Methods: An acrylic tray containing 0.5 mg of sirolimus in a sustained-release varnish was applied to 6 anterior teeth for 12 hours in 10 healthy volunteers. Whole unstimulated saliva was collected 1, 2, 10, and 12 hours after application, and a blood sample was taken after 12 hours. Drug levels were analyzed. Results from slow- and fast-release formulations, varnish application position on the tray (buccal, palatal, or lingual), and tray placement (mandibular vs maxillary) were compared. The volunteers evaluated the varnish and tray. The study was approved the hospital ethics committee.

Results: Salivary sirolimus was undetected with use of the slow formulation. The faster formulation produced salivary concentrations of 0.3–45 ng/mL. The highest salivary levels were observed with a mandibular tray with lingual varnish application (up to 178 ng/mL). The sialometry of all participants was within normal range (0.2–2 mL/min), and the highest drug levels were found when salivary flow was lowest. The medication was undetected in the blood. No local reactions or side effects were reported.

Conclusions: Salivary concentrations of medications delivered using an oral tray can be affected by the release rate of formulation and, more important, by the position of the tray and the varnish within it and salivary flow rate. Overnight oral trays can be used to deliver medications especially when 24-hour drug exposure is desired. Further studies regarding local factors affecting drug release and salivary levels are required.

THALIDOMIDE THERAPY FOR REFRACTORY MUCOSAL DISEASE: BENEFIT AND RISKS OVER 10 YEARS

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Background: The immunomodulatory and antiangiogenic effects of thalidomide have been demonstrated in a number of refractory ulcerative oromucosal conditions, including recurrent aphthous stomatitis (RAS), Behçet disease, erythema multiforme (EM), erosive lichen planus, and orofacial granulomatosis (OFG). Thalidomide acts by modulating the inflammatory cascade, interacting with various cytokines, including tumor necrosis factor- α , interleukin 10, and cyclooxygenase 2. Despite its efficacy, thalidomide is associated with a number of risks, including peripheral neuropathy, thromboembolic disease, and embryofetal toxicity, which limit its clinical use.

Methods: A retrospective review of the clinical database of the Oral Medicine Department at the Royal National ENT and Eastman Dental Hospitals, UCLH, London, UK, was undertaken to identify patients prescribed thalidomide between 2009 and 2019.

Results: Sixteen patients (9 men and 7 women) with a mean age of 46 years (range, 20–66 years) were identified in this cohort. Clinical diagnoses included RAS (n = 10), human immunodeficiency virus (HIV)-related oral ulceration (n = 3), EM (n = 2), and OFG (n = 1). All patients, with the exception of HIV-related cases, had proved refractory to systemic corticosteroids and/or immunosuppressive therapy. Patients were treated for a mean of 50 months (range, 1–120 months) with doses ranging