Referral Pathways for Patients Receiving Care in a University Oral Medicine Clinic

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Abstract

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BACKGROUND: In the United States healthcare system, primary care providers and general dental practitioners are responsible for referring their patients to Oral Medicine (OM) providers for orofacial and oral mucosal diseases. Referral streams may be inefficient, as patients are seen by other specialists such as otolaryngologists and dermatologists before being seen in OM clinics. Few studies have investigated the referral pattern to university-based OM clinics, and knowledge of the pattern may ultimately help improve referral efficiency. **METHOD**: This was a retrospective, cross-sectional chart review study that provided a snapshot of the patients referred to a university dental school OM specialty clinic. We investigated referral patterns and referral efficiency, and the correlation between them, patients' demographics, and other psychosocial conditions. We reviewed 161 electronic health records of patients seen for their first visit at the Oral Medicine Clinical Service (OMCS) at the University of Washington between December 1, 2019, and February 28, 2020. **RESULTS**: The sample was mostly female (n=115, 71.4%; male n=46, 28.6%), and the mean age of patients in the study sample was 53.2 years (SD=18.1; range=18-93). Our results found that 42% of patients were referred by dentists, including general and specialist dentists, with medical doctors referring another 40% of patients (mostly general practitioners, fewer specialists). Patients saw 5-6 providers of different specialties before their OMCS visit, with an average of 6-7 visits before coming to the OMCS. Referral efficiency was not significantly different between males and females, but it differed among the diagnostic categories. In general, patients with TMD concerns and oral mucosal disease experienced an average of 39- and 29-month referral efficiency, respectively, versus obstructive sleep apnea and headaches, which were 85 and 61 months, respectively. Somatization with pain significantly increased with slow referral efficiency. **CONCLUSIONS**: Referral efficiency should be improved. To that end, general dentists and medical providers should be more aware of the OM specialty and insurance eligibility should be more inclusive. More studies are needed to understand the provider prospective for referring or not referring their patients to OM providers.

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Background and Significance

The Oral Medicine Specialty

Oral Medicine's origins date as early as 1926 in the United States (US) and the 1950s in Europe (Bez, 2017). Oral Medicine (OM) is a distinct specialty within dentistry that focuses on the diagnosis and non-surgical management of orofacial disease. Oral Medicine provides a link between medicine and dentistry. It is a specialty that should be recognized more widely as it provides a beneficial diagnostic and treatment service for medical practitioners in primary and secondary medical care (Zakrzewska, 1994).

In 1926, OM was first introduced in the US and in 1945, under the leadership of Dr. Samuel Charles Miller, the Academy of Oral Medicine (AAOM) was formally organized. Over more than 75 years, the AAOM has dedicated efforts to reform several aspects of knowledge, professional education, many dental and medical research needs, and specifically oral health services of OM to the community. In March 2020, at the meeting of the American Dental Association's (ADA) National Commission on Recognition of Dental Specialties and Certifying Boards, they reviewed and approved the AAOM's application for specialty recognition and adopted the resolution recognizing OM as a dental specialty. Accreditation by the ADA has implications for OM services promotion and reimbursement, which will impact referrals from other healthcare providers and dentists. Long-term and indirect effects may be in dental students' knowledge of OM services, which may impact future referrals because the students are future referring providers. This recognition will increase access to funding possibilities for clinical scientists and researchers to expand the range of OM-related fields of interest to improve the population's condition (Stoopler, 2020).

In general, OM specialists are skilled in providing diagnostic and medical management for patients with diseases or disorders in the orofacial area whose treatment integrates general medicine or other specialties such as dermatology and rheumatology. These disorders and orofacial problems include, but are not limited to, temporomandibular joint disorders (TMD), myofascial pain, fibromyalgia, trigeminal neuropathic pain disorders (e.g., burning mouth syndrome), neuropathic pain, and oromandibular movement disorders (e.g., clenching/bruxism, dystonia, tardive dyskinesia). Another vital aspect of the OM specialists' diagnostic and management role is to manage soft tissue disorders such as aphthous stomatitis, ulcers, lichen planus, vesiculobullous conditions, and allergic/hypersensitivity reactions. Other problems addressed by OM specialists include oral dysplasia and salivary gland disorders as well as psychosocial management of the above conditions. Many of these problems fall outside the expertise or scope of general medical providers (GMPs) and general dental practitioners (GDPs). Thus, patients with these problems may not be served and managed in a regular dental or medical office, and they may be better referred to an OM specialist (Scully, 2016).

Teaching hospitals and dental schools are the primary and best-known facilities for OM practices. More than one-third of OM providers spend at least 25% of their time in these settings, whereas 14% spend more than 25% of their time in private practice. The medical school setting is the least common facility for OM practice, with 90% of a group of providers noting that less than 10% of patient care took place in this type of setting. Similarly, 85% reported less than 10% of time spent in a public health clinic setting. The private practice (non-dental/medical school or hospital) setting was utilized by 66% of the providers less than 10% of the time, whereas 14% of them spent more than 25% of their time in private practice (Stoopler,

2011). Another study concluded that 84% of surveyed OM providers spend less than 25% of their work time engaging in research activities. The development of practice-based dental research networks designed to carry out clinical trials to solve challenges directly related to clinical practice has allowed clinicians to increase their involvement in oral health and dental research (Mjor, 2007).

Specialist Referral in the American Healthcare System

Physician referrals play an essential role in ambulatory medical care in the US (Barnett, 2012). Despite the frequency of specialist referrals, the referral process presents many challenges, such as insurance qualifications and eligibility based on specialty being barriers to patients accessing providers (Dudley, 2001). Additionally, the availability of particular specialists in certain areas and the availability of appointments within suitable timeframes may be barriers.

The referral process involves referral decision-making followed by care coordination. A general definition for the coordination of healthcare is "the deliberate organization of patient care activities between two or more participants involved in a patient's care to facilitate the appropriate delivery of healthcare services" (Department of Health & Human Services, Victoria State Government, 2018). Referral guidelines are good resources to improve the process by clarifying which conditions should ideally be managed by GMPs and GDPs versus specialists. Multiple types of communications between the referring providers and the specialists have been investigated, and current referral forms can be (re)designed to improve the referral process. They should be complete, detailed, incorporated into the electronic health record

system, and address patients' and providers' needs, standardized across fields (Vimalananda, 2019).

Several specialty organizations have referral guidelines and protocols in place for many different conditions and disorders. The ADA recommends dentists participate in training programs, fellowships, and continuing dental education courses in order to be familiar with the referral process for patients to the correct specialist as well as pre-and post- referral communication between the referring dentist and the specialist (American Dental Association, 2007).

One of the current strategies suggests involving specialist prescreening of referrals to review those that may be unnecessary, may need triage or referral to a more appropriate specialist, or require some other tests before consulting them (California Health Care Foundation, 2019). Typically, a thorough dental exam is inconclusive for orofacial problems beyond problems with the teeth , so if general dentists need to refer, for example, for a non-dental pain diagnosis, a dental specialist is critical. Unfortunately, waiting lists for some specialists can be long, resulting in frustration and worry for the patient. The process may be expensive if patients see multiple specialists between the initial appointment for the chief concern and the final diagnosis (Jackman, 2018).

Referral to the Oral Medicine Specialist

The field of dentistry has multiple specialties, but many referrals from GMPs and GDPs are sent to orthodontists or oral surgeons initially as GMPs and GDPs may be more familiar with these dental specialties than with OM (Sardella, 2007). Other authors suggest, however, that the lack of specific knowledge or familiarity with soft tissue lesions and many other orofacial

conditions such as TMDs could also convince GMPs and GDPs to refer their patients to an OM specialist (Sardella, 2007). In the typical scenario, GMPs and GDPs decide to refer their patients to an OM specialist for one or more reasons, such as when specialty involvement is urgent to solve the current diagnostic or therapeutic dilemma, when uncommon conditions require management, or when the patient feels it is time to be seen by a specialist.

Physicians tend to refer patients to other physicians in other facilities for many reasons, ranging from the need for specialty care to addressing overcrowding problems. According to Forrest (2002), there are three main reasons GMPs refer a patient to a specialist: (1) a patient looks for advice on a specific diagnosis or treatment (about 52.1% of patients); (2) a patient requests surgical management (37.8%); and (3) a patient directly asks the specialist to manage their case (25.1%).

In the OM field, early diagnosis and appropriate referral are critical. They improve outcomes and reduce the complexity and long-term negative impact of treatment in cases such as oral cancer. For example, without expert knowledge and familiarity, oral complications of medical interventions such as mucositis caused by radiotherapy, osteonecrosis by bisphosphonates, oral signs of systemic problems such as HIV infection, or graft-versus-host disease could be missed by general dentists. Therefore, many authors have stressed the great value and significance of appropriate referrals to the OM or orofacial pain specialist. So, they will take care of the patient in the context of their specialties. (Villa, 2015).

Modification of care delivery is one of the desired effects of managed care (i.e., to effectively coordinate and oversee care delivery); extreme and possibly unnecessary care is eliminated, improving quality while reducing costs (Light, 1995). Referrals from GMPs are the

main conduit for bringing specialty care attention to patients in managed care systems, so understanding how managed care affects the overall referral process has implications for patient care outcomes, as well as for physicians' acceptance of and satisfaction with these arrangements (Anthony, 2003). Oral Medicine, to date, is not part of a managed care system, therefore GMPs may not even know of its existence, and referral pathways to OM have not been built into their systems yet.

Acute or chronic orofacial pain conditions could range from common problems such as TMD and burning mouth syndrome to less-frequent disorders, such as trigeminal neuralgia and ~~so-called~~ atypical odontalgia. Most chronic pains in the head and neck region represent a diagnostic or management challenge to dentists (Sessle, 2009). Typically, patients with such problems first present to their GMP or GDP. Referral may be necessary if prior treatment or recommendations have resulted in incomplete improvement, no change, or worsening symptoms. Depending on a GMP or GDP's expertise and scope of practice, the diagnostic and management approach they can provide may be limited. Alternatively, the GMP or GDP may trial basic diagnostic or management approaches to rule out differential diagnoses and then decide for the referral. Depending on the presenting problem, a GMP or GDP may refer a patient to a non-OM specialist first, subsequently referring to an OM specialist.

Moreover, some conditions commonly managed by OM specialists are related to systemic disease. Therefore, patients may be referred by the provider managing the systemic disease. For example, OM specialists might receive referrals from otolaryngologists, hematologists, oncologists, radiation oncologists, rheumatologists, and dermatologists,

depending on the disease or condition. OM providers, then, are highly engaged in interprofessional practice (Scully, 2016).

Previous research has aimed to characterize current OM referral processes and patterns. In one US study, almost all patients seen by an OM provider had previously seen more than one provider before the OM expert treatment (Villa, 2015). Another US study found that patients had previously seen an average of three providers for the presenting problem before the OM consultation (Pinto, 2015). Furthermore, those patients had experienced their symptoms for more than 16 months before the OM consultation, on average (Pinto 2015).

In an Australian study of patients receiving OM services, 82% of referrals came from private dental practice (general and specialists), and 18% came from physicians; that study suggested that the demand for OM services is strong (Farah, 2007). In a study of patients with clinical diagnoses, 28% were referred by GDPs who graduated in dentistry and 25% were referred by GDPs who graduated in medicine with a postgraduate degree in dentistry; 47% were referred by other types of physicians (e.g., family physicians, dermatologists, ear-nose-throat [ENT] specialists). Thirty percent of patients without a clinical diagnosis were referred by GDPs who graduated in dentistry, and 25% were referred by GDPs who graduated in medicine with a postgraduate degree in dentistry. Among those referred without a clinical diagnosis, 45% were referred by family physicians or other categories of physicians (Sardella, 2007). Last, an Irish study found that GDPs made most referrals to an OM specialist, and only 26.1% of referrals came from a GMP (Riordain, 2011). Together, previous research suggests that OM specialists' treatment tends to be referred by another provider, which is most often a GDP.

A multidisciplinary approach toward the complete healthcare, including oral healthcare, of a patient represents the best possible care. However, awareness of dental specialties among healthcare providers and the public in the US is still low (Atchison, 2018). As an initial step of the referral process, most patients will first contact their GMP, and perhaps a GDP for most diseases, including certain oral conditions. Though an OM specialist may be the most appropriate provider for some patients, an efficient referral may not happen for many reasons, including lack of awareness of the specialty.

Purpose of the Study

To improve OM referral processes, we first need to characterize current practices. It is crucial to understand and document OM patient referral experience and health service processes encountered by patients. Referral processes take time, and patients require close monitoring to determine those who urgently need consultation and management. Efficient referral processes can save patients' time and effort by limiting visits to unrelated specialists and making the diagnostic process as efficient as possible. Accordingly, this study's overall objective is to document OM patient experiences with referral to the specialty and, more specifically, the referral pathways, sources, and timelines. The objective of this study is to build on previous studies by determining how demographic characteristics, clinical diagnoses, and consequences of the presenting problem impact the referral pathways and processes. To characterize current practices, the primary objective is to explore referral streams for patients seeking care in the University of Washington Oral Medicine Clinical Services (UWOMCS). To meet this objective, there were four research aims:

- Determine which referral sources (e.g., GDPs, dental specialists, otolaryngologists) are the most common for formal referrals (phone call, letter, or email).

  Hypothesis 1: 40-50% of referrals will come from GDPs, based on previous studies in the US and internationally (e.g., Guan,2020, Pinto, 2015).

- Determine the average number of providers seen for the presenting problem before UWOMCS intake.

  Hypothesis 2: Patients will have seen 2-3 providers before presenting at the UWOMCS (Villa, 2015).

- Determine the average length of time between the onset of the presenting problem and UWOMCS intake.

  Hypothesis 3: On average, patients will report experiencing the presenting problem for 18-24 months before their UWOMCS intake appointment (Pinto, 2015).

- Determine demographic (e.g., gender, race, distance from clinic) and clinical features (e.g., type of disease/pain, patient distress) associated with more or less efficient referral to the clinic.

  Hypothesis 4 (Exploratory): In general, UWOMCS patients will be primarily female, with an average age of 40-50 years, referred for mucosal lesions/or TMD.

Methods

Study Design and Overview

This was a retrospective, cross-sectional chart review study that provided a snapshot of the patients referred to a university dental school OM specialty clinic (i.e., the UWOMCS). Working backward and consecutively from February 29, 2020, we reviewed the charts of 179

new patients presenting to the UWOMCS. Data were abstracted from the charts as described below. The IRB application for these study procedures was determined to be exempt, as no patient consents needed to be collected. This retrospective chart review involved abstracting health record data from new patient visits at the UWOMCS between December 1, 2019 and February 28, 2020. We chose this period as it is considered typical for all the attending providers' availability and stream of new patients. Also, this period immediately preceded the Covid-19 pandemic's effects on the clinic's operations.

Study Setting

The study focused on patients presenting for a new patient visit at the UWOMCS. The Department of OM at the University of Washington School of Dentistry is ideal for collecting data about OM specialty service referral pathways. It is an active clinic that draws patients from a large region and many types of referring providers. The UWOMCS and the clinic at the University of California of San Francisco are the only two on the US's west coast accredited by the AAOM and the ADA. Additionally, UWOMCS delivers evidence-based care, with comprehensive treatment and management of conditions whose management may fall between dentistry and medicine. Most patients are referred to UWOMCS directly from dental or medical providers, but self-referral is possible.

The UWOMCS is an academic institute that belongs to the UW School of Dentistry. The educational mission is a priority of the clinic. Most UWOMCS faculty work full time in the department, and most of them have been employed for at least five years. University of Washington Oral Medicine Clinical Service faculty and fellows spend at least one-and-one-half hours with new patients, reviewing and addressing all the aspects of the presenting problem.

Generally, the following health information is available in the electronic dental (axiUm) and medical (MindScape) record systems that were accessed for this chart review:

- "Patient card," which includes insurance type and zip code information.
- Oral Medicine clinic intake questionnaires, of which there are three main types: orofacial pain/neuropathic pain conditions; oral mucosal disease; and sleep disorders forms. Each form includes different aspects of health history according to intended purpose. The oral mucosal conditions form the only one with the specific question regarding the referring provider.
- Chief concern and provider diagnosis. We categorized chief concerns into seven categories: TMD (e.g., TMJ pain, facial muscle pain, limitation of mouth opening, and TMJ clicking or noise); oral mucosal diseases (e.g., oral ulcers, inflamed gingivae, red or white lesions, and any oral lesion); neuropathic disorders (e.g., unspecified facial numbness, pain, or burning sensation); headaches (e.g., Migraine headaches); sleep apnea (e.g., obstructive sleep apnea); salivary gland disorders (e.g., Sjogren syndrome related gland disorders) and other." We categorized provider diagnoses using the same categories. See Appendix for full descriptions of chief concern and provider diagnosis.
- Symptom Checklist – 90 (SCL-90R) raw data and scores. Another valuable piece of information was the psychosocial factor of facial pain. We measured those parameters using the SCL-90R, part of the intake form for patients presenting with likely TMD and/or mucosal disease conditions. The SCL-90R form includes four subscales: anxiety, with scores (<0.445=normal, 0.445 to <1.105=moderate, and >1.105=severe); depression (<0.535=normal, 0.535 to <1.100=moderate, and >1.100=severe);

somatization (i.e., a range of behaviors such as reporting numerous physical symptoms, frequent utilization of health care, and persistence in seeking a physical or biomedical explanation for and treatment of symptoms) with pain (<0.500=normal, 0.500 to <1.000=moderate, and >1.000=severe); and somatization without pain (<0.428=normal, 0.428 to <0.857, and >0.857=severe) (McNeil, 2001). The sleep disorder form does not have the SCL-90R form questionnaire.

- Pain intensity, which was evaluated according to the patient self-rating of average pain intensity over the previous six months, using the numerical rating scale (0-10) score system (i.e., 0=no pain to 10=most severe pain).
- Clinical chart notes (treatment progress notes).
- Scanned paper and electronic records (including contact notes) from OM attendings.
- Appointment logs.

See the Appendix for a complete list of study variables and their coding/categorization.

Subjects

At the time of this study, the UWOMCS providers were seeing at least 20 new OM patients per week. Based on the calculation that if every OM attending provider had at least two new patients per week, and the clinic had 10 OM specialists, it was estimated that 80 patients per month would be seen. We aimed to have a sample size of at least 150 patients.

Inclusion criteria. To be included in this chart review study, patients had to be adults (18 years old or older) who have established care in the UWOMCS before March 1, 2020. The sample represents patients with one or more primary presenting problems related to orofacial disease/disorders or dysfunction (e.g., TMD, oral lesions, orofacial pain). The patients also had

to have referral information (i.e., referring provider's qualification/specialty, number of previous providers) available in their new patient evaluation report.

Exclusion criteria. Patients were excluded from this chart review study if they were: (1) Re-establishing care at UWOMCS or being treated in the clinic but seen at the clinic by a second provider in the same clinic for a consultation or specific procedure; (2) Seeking an evaluation or second opinion from a consulting provider and not intended to establish long-term care in the clinic; or (3) Presenting for the mandibular advancement device (MAD) trial, which targets patients with mild-moderate obstructive sleep apnea and have already gone through using the continuous positive air pressure (CPAP) machine.

If data were missing from the Axium dental records, medical records were searched if they were available via the MINDscape medical records search engine that belongs to the University of Washington Medical Center.

To ensure data reliability, we double-coded 20 randomly selected charts, which were reviewed by one of four OM residents (5 charts per resident). Very infrequent minor discrepancies were resolved by returning to the patient's chart and recording the correct information.

Data Collection and Management

Charts were reviewed manually, and we used Research Electronic Data Capture (REDCap), a web tool for translational research purposes, for building a chart abstraction form to input and organize data. REDcap is HIPAA-compliant, though no identifying information was collected. The chart abstraction form was completed for each subject, filling in all available data and recording which study data were missing from the chart. Data were stored securely in

REDCap and transferred to a single spreadsheet (i.e., Excel file). Data were coded according to the categories/codes presented by variable in the Appendix.

Statistical Analyses

Descriptive statistics (e.g., percentage, mean, standard deviation) for variables such as age, gender, race, type of referring provider, type of chief concern, and referral efficiency (i.e., number of months between the onset of the chief concern until being a patient at the UWOMCS were calculated. Tests of group differences (e.g., t-test, ANOVA) were also run to address study hypotheses. SPSS was used to run all statistics (see Appendix for variable coding).

Results

This study reviewed electronic health record entries for 179 consecutive new-patient visits at UWOMCS between December 1, 2019, and February 29, 2020. Eighteen patients presenting during the study sampling frame did not meet inclusion criteria. Ten of these patients were seen in the clinic more than two years previously but were scheduled for a new patient visit and required to complete the new patient intake form, though they were not technically new patients. The other eight patients were excluded because they were, at the time of their first visit, younger than 18 years old. Thus, the analytic sample for this study included a total of 161 patients.

Demographics

The sample was mostly female (n=115, 71.4%; male n=46, 28.6%); see Table 1 for demographic data of the sample. Most of the new patients were White (n=119, 73.9%), with other races/ethnicities less prevalent (Asian or Asian Indian [n=16, 9.9%], Middle Eastern or North Africa [n=8, 5%], Hispanic or Latino [n=2, 1.2%], Native Hawaiian or other Pacific Islander

[n=1, 0.6%], Black or African American [n=2, 1.2%], American Indian or Alaska Native [n=1, 0.6%], other [n=3, 1.9%], and missing [n=9, 5.6%]. Patients' ages were between 18 and 93 years, and the mean age of patients in the study sample was 53.2 years (SD=18.1). About one-quarter of the patients were 60-69 years old (n=41, 25.5%), with fewer patients in the other age groups.

On average, patients lived 35.5 miles away from the clinic (SD=22.5; distance data missing for four participants). About one-third of the sample had at least some education at the college level, including up to a four-year college degree (n=53, 32.9%); 27.3% had at least some graduate-level education (i.e., 17 or more years of education; n=44, 27.3). More than half of the sample was employed (n=84, 52.2%), with fewer patients indicating they were retired (n=56, 34.8%). Over half of the sample was married (spouse in the household; n=86, 53.4%), with fewer patients describing themselves as never married (n=37, 23%). At the time of their first visit, almost all the sample had private insurance (n=106, 65.8%) or Medicare (n=51, 31.7%). At the time of their first visit, almost all the sample had private insurance (n=106, 65.8%) or Medicare (n=51, 31.7%), and the other four patients (2.5%) paid out of pocket. See Table 1 for full details about demographics.

General Clinical Trends

Almost all of the sample reported receipt of regular dental care. Nearly all charts reviewed indicated that these new patients see the dentist (n=154, 95.7%), with only one patient (0.6%) reporting not having regular dental care (data missing for n=6, 3.7%). On their intake forms, one-third of the sample described their oral health as "good" (n=49, 30%), with fewer describing it as "very good" (n=36, 22.4%), "excellent" (n=15, 9.3%), "fair" (n=7, 4.3%), and "poor" (n=7, 4.3%; data missing for n=33, 20.5%). Most of the sample endorsed seeing a GMP regularly (n=155, 96.3%), with only two reporting

not being under the regular care of a GMP (n=2, 1.2%; data missing for n=4, 2.5%). Self-reported general health descriptions were missing for 50 people in the sample (31.1%), but the others described their general health as “very good” (n=44, 27.4%), “good” (n=39, 24%), “fair” (n=15, 9.3%), “excellent” (n=11, 6.8%), and “poor” (n=2, 1.2%).

Patients presented to the UWOMCS with a range of chief concerns. Nearly half of the patients had a primary chief concern of temporomandibular joint-related problems (n=79, 49.1%). Less frequently experienced primary chief concerns were a trigeminal neuropathic or orofacial pain problem (n=34, 21%). Some patients (n=24, 14.9%) presented with a secondary concern, including a trigeminal neuropathic and/or orofacial pain problem (n=10, 6.2%). See Table 2.

The distribution of UWOMCS provider diagnosis, which was categorized the same as chief concern, was similar to that for chief concern. Half of the sample had a primary diagnosis of TMD (n=83, 51%). For those with a secondary diagnosis (n=20, 12.4%), the distribution was as follows: TMD n=11 (6.8%); trigeminal neuropathic condition and orofacial pain n=4 (2.5%). Only one patient had a third diagnosis, which was chronic osteomyelitis. See Table 3 for a complete description.

Hypothesis 1

Regarding our first hypothesis (i.e., 40-50% of referrals came from GDPs), we found that one-third of the sample was referred by a GDP (n=54, 33.5%), which included general dentists who worked at private or community clinics or the general practice clinic at the UWSOD. One quarter of the sample was referred by a GMP (n=42, 26.1%), most of whom work within the Kaiser Permanente network or at the University of Washington Medical Center. Fewer patients were referred by a medical specialist (n=23, 14.3%), ten of whom were referred by an otolaryngologist, with one patient each per the other most common specialists (dermatologist, rheumatologist, allergy specialist, sleep medicine specialist, pain medicine specialist,

neurologist, gastroenterologist, ophthalmologist, infectious disease specialist, endocrinologist, oncologist, and hematologist).

Among those referred by dental specialists (n=14, 8.7%), seven patients were referred by a periodontist, two from an endodontist, two from an orthodontist, two from a prosthodontist, and one from an oral surgeon. Another type of provider (e.g., physical therapist, psychologist, or mental health therapist) made the referral for 11 patients in the sample (6.8%). Data on the referring provider were missing for 17 subjects (10.6%). Those data did not support our first hypothesis, even if including all referrals by dentists (n=68, 42.2%), but 33.5% of patients were referred by GDPs.

Most patients in the sample were initially referred formally via letter, email, or phone call by a specific provider (n=106, 65.8%). Less frequently, patients were informally referred via provider recommendation (n=13, 8.1%), family member or friend recommendation (n=3, 1.9%), or self-referral (n=2, 1.2%). Sixteen patients (9.9%) were referred but without indication of the type of referral, and information about the referral was missing for 21 patients (13%).

Hypothesis 2

In addressing our second hypothesis (i.e., patients would have seen 2-3 providers before presenting at UWOMCS), we found that before establishing care at the UWOMCS, patients had been seen by an average of over five different providers (M=5.5, SD=4.5, range 1-14). Patients reported they had between 1 and 16 visits to any provider for the same chief concern they presented to the UWOMCS (M= 6.71, SD=5.1). We did not find support for our second hypothesis, and, in fact, the observed average number of providers was double what we predicted.

Hypothesis 3

To address our third hypothesis (i.e., on average, patients will report experiencing the presenting problem for 18-24 months before their UWOMCS intake appointment), we found that patients presenting with a diagnosed problem (n=152) experienced the problem for an average of 39.5 months (SD=45.1, range 1-132 months) prior to the UWOMCS intake appointment. We did not find support for our third hypothesis and instead observed that referral efficiency was longer by at least 12 months than what we predicted.

Hypothesis 4

Concerning our final hypothesis, we predicted that patients would be primarily female, with an average age of 40-50 years, and referred for mucosal lesions/or TMD. We found general support for these predictions. The majority of the sample was female (n=115, 71.4%; male n=46, 28.6%) and TMD conditions accounted for half (n=79, 49.1%) and oral mucosal disease one-fifth (n=32, 19.9%) of the sample. The majority of the sample was older than predicted (60-69y n=41, 25.5%; 50-59y n=26, 16.1%).

On average, the time between the onset of chief concern and first visit to the UWOMCS was longer for men (M=41.79 months, SD=48.2, n=43) than for women (M=38.63, SD=44.0, n=109); however, this difference was not statistically significant, $t(150)=0.39$, p=0.70. Gender does not seem to be related to referral efficiency in our sample. Likewise, an ANOVA revealed no significant difference in referral efficiency to the UWOMCS between patients of different races/ethnicities, $F(7)=0.53$, p=0.81. See Table 4 for complete details. The time between the onset of chief concern and first visit to the UWOMCS is not significantly correlated with age, $r=-0.08$, p=0.33, n=152. For the 154 patients for which pain intensity ratings were available

(M=4.97, SD=2.67), pain intensity was not significantly correlated with referral efficiency, (*r*=0.033, p=0.689).

Assuming that patients who lived far from the clinic might experience worse referral efficiency, we ran a Pearson correlation analysis to conclude if there was an association between distance from clinic and referral efficiency. Among the 148 patients with available data, this association was not significant (*r*=-0.05, p=0.52).

SCL-90R data were available for 135 patients. The time between the onset of chief concern and first visit to the UWOMCS correlates significantly with the somatization with pain subscale of the SCL-90R (*r*=0.172, p=0.047). The other SCL-90R parameters were not correlated with referral efficiency (anxiety *r*=-0.02, p=0.76; depression *r*=-0.03, p=0.71; somatization without pain *r*=0.09, p=0.29).

Diagnostic category was related to referral efficiency, *F*(7)=3.06, p=0.005, n=152. Patients with headache and sleep apnea had, on average, experienced a much longer gap between the onset of chief concern and first visit to the UWOMCS compared to patients with TMD conditions, oral mucosal disease, or a trigeminal neuropathic condition and orofacial pain. See Table 5 for complete details.

Mean age differed by type of diagnosis, *t*(112)=0.-4.062, p<0.001. Eighty-three patients, with an average age of 47 years (SD=19), were diagnosed with TMD, while thirty-one patients, with an average age of 63 years (SD=14), had a diagnosis related to oral mucosal diseases.

Discussion

There were some interesting findings in this retrospective chart review. For both total number of providers seen and the number of visits to those providers, patients had an average

of 5-6 different providers seen previously, which was double the number reflected by previous studies (Pinto, 2015). Few other studies have measured the average number of providers or number of previous visits for a particular chief concern before the patients see an OM specialist. However, some studies raised the importance of expanding the knowledge and the familiarity with oral mucosal conditions or TMD-related symptoms (Almazrooa, 2021; Guan, 2020). Other studies' findings show that the GMPs refer their patients to another provider (i.e., non-OM providers), such as otolaryngologists, dermatologists, and oral surgeons (Miloro, 2016). Another theory to explain the patients' delay to seek OM consultation is patients' behaviors such as unawareness of their own oral mucosal pathology and some seek help only when worried, in pain or following advice (Allen, 2015). Another example is the oral cancer which appeared that patients were mainly responsible for the delays in diagnosis (Scully, 1986).

The average number of the total previous visits for a chief concern was 6-7 visits, double what we expected. This number may reflect the severity and complexity of cases treated in the UWOMCS. Another possible explanation is that patients might look for the diagnosis and management through their GMP, as they are the ones who have all the health history information; however, for all the conditions explored by our study, providers saw the patients with variable degrees of knowledge, experiences, and confidence in diagnosing and treating patients (Guan, 2020).

Another interesting finding is that referral efficiency is slow. Patients' experiences with their chief concern were as long as more than ten years, and the sample had experienced their chief concern for an average of 40 months. According to the National Institute for Health and Care Excellence (NICE), which published guidance about referrals, it can be assumed that

inappropriate referral resulted in this delay (Bradley, 2020); however, it is not necessarily clear if the delay is related to the patient, providers, insurance wise, other factors, or a combination. We believe that the relatively low level of awareness of the OM specialty may play a role in the above findings. It might be related to the level of experience in diagnosing and managing the most common oral health conditions.

Through the chart review, we answered questions regarding the referral pattern. Our data reflected that one-third of patients were referred by GDPs, about 25% less than what we hypothesized or other studies concluded. However, 9% of patients in the sample were referred by dental specialists, which means 43% of patients were referred by dentists, broadly. This finding might be explained by patient preference to see specialty dentists more than general dentists. Another reason could be an increase in specialty-trained dentists therefore more availability of specialists. In one study, 25% of patients were referred by GDPs who graduated in medicine with a postgraduate degree in dentistry (Sardella, 2007). Forty percent of referrals came from physicians (GMPs or specialists), and those results did not entirely reflect the findings of previous studies (Guan, 2020; Pinto, 2015). Referral letters are most likely the only method by which information transmits between general dental practitioners and hospital-based services. A previous study found that some providers had some difficulties with referring their patients to OM providers, including technical issues, communications, or lack of time (White, 2004). Interestingly, only one patient in our sample was referred by an oral surgeon. The reason may be that most patients that require biopsy procedures to rule out or confirm any dysplastic changes are referred by other providers to oral surgeons for their advanced knowledge and experiences (Czerninski, 2014).

The patients' demographics and the chief concerns in our sample were similar to the other studies done at other university OM clinics (Guan, 2020), except for mean age. The observed mean age in our sample was higher, with one-quarter of the sample in the 60-69-year-old category compared to 50-59-year-old category which was 16.1% . Because Medicare insurance eligibility starts in the early 60s, increased access to care may be driving the observed trend due to available insurance coverage.

Though referral efficiency was slow, patients were seen for an intake visit in the UWOMCS in timely manner. A third of the referrals were sent two months or less before the patient's first scheduled visit in the OMCS. If any delays occurred, it would be related to the processing, verification of insurance, and visit eligibility. If the patient is eligible for appliance fabrication or requests a specific provider, there might be some delay.

Our sample was 72% female and 28% male; it is well known that females seek care considerably more than males (Cleary, 1982). According to a previous study, women used more medical services and have higher outpatient expenditures than men, even when controlling for health status variables (Bertakis, 2000). Men tend to underuse primary care health services despite their susceptibility to particular disorders, and many of these findings relate to psychological theories (Tudiver, 1999). Furthermore, supported by other study data, referral efficiency for males was, on average, of 42 months, versus 39 months for females; however, this difference was not statistically significant in the context of referral efficiency.

Patients 60-69 years old represented the largest age group (50%) of new patients referred for TMD. Temporomandibular joint disorder is a chronic condition and a common problem for which patients will seek care (Blyth, 2004). Along with TMD, oral mucosal

conditions account for a large percentage of the referrals (20%), consistent with other studies showing those are the most common conditions for which providers will refer patients to OM specialists (Pinto, 2015; Miller, 1996). More significant spending increases for the elderly, leading to the development of Medicare and its continued fee-for-service nature, changes in the health care delivery system, including rapid growth in managed care enrollment among persons under age sixty-five (Lubitz, 2001). Until the time the patients are eligible for Medicare, they might not have access to dental care and might use alternative routes for seeing dental care, such as urgent dental care clinics or being seen by an otolaryngologist for the TMD because symptoms overlap with otological symptoms. Thus, such patients may commonly visit otolaryngologists (Santosh, 2020). Further, oral mucosal problems might be addressed by otolaryngologists, such as food contact allergic reactions and middle and inner ear problems related to those parts being immunologically responsive to food contact hypersensitivities (Ramakrishnan, 2010). Another possible explanation is that older patients may not experience orofacial conditions until later in life, thus not drawing them to the OMCS earlier.

Race or ethnicity were not related to referral efficiency. However, the sample was predominantly White (n=114, 74%) and Asian (n=16, 10%), and so there may not be enough heterogeneity to draw conclusions. Race wise, the clinic distribution was similar to that observed previous studies (Miller, 1996). Limited access to care may drive this distribution versus actual differences in distribution of disease and referral efficiency (Buchmueller, 2020). Health disparities among minority racial and ethnic groups have a significantly long history, continuing to exist in the United States (Waidmann, 2000) to the present times. However, disparities in access to care among racial/ethnic groups and income levels have reduced

significantly (Wang, 2013). Insurance coverage and health status (exceptionally functional limitations, such as movement disability and whom wheelchair and bed bound) were the most critical factors associated with healthcare access. In this study, distance from the clinic was another factor that was not significantly related to referral efficiency. Still, rural status might add some disadvantages for most healthcare use measures, independently of poverty and health care supply (Caldwell, 2016)

Our study defined a positive negative correlation between the referral efficiency and SCL-90R parameters, significant only for somatization with pain but not the other subscales such as depression and anxiety. Most other studies defined these subscales; anxiety, depression, somatization with and without pain, as correlated with TMD-related disorders, whether myofascial pain or muscle myalgia (Ćelić, 2011; Yap, 2002). Patients with sleep apnea conditions had much lower referral efficiency compared to patients with TMD, oral mucosal disease, or neuropathic pain conditions.

We speculate that given the consideration the obstructive sleep apnea is a chronic condition which is usually diagnosed first at 35-40 years and increasing with age (Fietze, 2019). Depending on severity, patients with these conditions will start the CPAP machine. The success rate concluded that adherence to CPAP is limited (Yetkin, 2008). Recently, non-CPAP therapies are frequently explored and prescribed widely among OM and sleep medicine clinics to treat mild to moderate sleep apnea (Hamoda, 2018).

Strengths

To our knowledge, this study was the first on the topic completed on the west coast of the US. It is essential to know the level of OM care offered in this part of the country. Now, we have a clearer understanding of our patients' referral streams, and results are similar to other studies with regard to the types of referring providers (Pinto, 2015).

The study incorporated psychosocial factors (i.e., SCL-90R scores) as correlates of referral efficiency. We found a significant negative correlation between somatization with pain and referral efficiency. The findings underscore the clinical utility of expanding exploration of the patients' report of pain within the context of their psychological status. According to the data we extracted, it will be valuable to report the psychological aspects of pain as another enhancer to improve the referral efficiency.

Limitations

First, at the chart review period, we had four attending providers in the retirement process. We began transferring over their patients to the other providers within the OMCS, affecting the scheduling of new patients who were initially referred to be seen by the retiring providers. Second, we were unable to define the variable of diagnostic delay due to missing data on this variable, such as when the condition was first diagnosed. Third, we were unable to determine the precise number of visits per diagnosis because patients presented to the clinic with multiple symptoms and sometimes more than one diagnosis. Last, insurance status may have heavily impacted the demographics of the patients in this study since OMCS does not accept patients with Medicaid coverage, which creates a barrier to care for potential patients with this type of coverage. These patients are guided to different paths, not included in this

study, such as evaluation by dental students in the Dental Urgent Care Clinic at the UW School of Dentistry under the guidance of OM attendings or referral to other clinics such as the UW otolaryngology clinic as most of these clinics accept Medicaid covered patients.

Clinical Recommendations

1. Oral Medicine practices should expand to remote areas of the state and nationwide. It is crucial to include underserved areas from an Oral Medicine specialty standpoint. The recent growth of telehealth infrastructure may assist with reaching patients in more remote areas or those who have difficulty traveling. Most oral medicine providers are affiliated with academic institutions, primarily in large cities, due to the interprofessional nature of the specialty and to make easier urban access, but this does not provide equitable or good access in remote or rural areas.
2. Increase the level of awareness and knowledge of the OM specialty. Oral Medicine has been recognized as the 11th dental specialty by the American Dental Association, Commission of Recognition for Dental Specialties in 2020. This will help increase numbers of specialists to meet the needs of patients with oral medicine problems. It is crucial to expand and raise the GDP and GMPs' familiarity with referral options for care for oral medicine conditions they might see in their practices. This will help improve the referral efficiency and lessen the burden of multiple visits to multiple providers who may not have the expertise to diagnose and manage these conditions.
3. Expand medical and dental health insurance coverage for Oral Medicine services, including state-sponsored programs such as Medicaid. In 2021, over 680,000 Washington State residents are receiving Apple Health for Adults (Medicaid), with the

number is increasing (Eligibility Overview Washington Apple Health Programs, 2021). This will improve access for low-income individuals, which include a higher percentage of racial and ethnic minority patients, patients with disabilities and patients in rural underserved areas.

4. Improve and standardize the intake form for all new patients in the following ways:
    a. Request thorough medical and problem histories at least a week prior to the patients' appointment if possible. The patient will have enough time to gather the medical information and remember the essential historical facts about their chief concern.
    b. Clearly include a request for information about the referring provider with date of referral , which is a critical for working with the referring provider in a care team and allows updates about the chief concern status or diagnosis.
    c. Make the problem history intake form less complicated and detailed. We found that some patients skipped some of the questions because they needed further explanation, or they might not understand the intent of questions (e.g., the SCL-90R form). Some providers may prefer to be able to save time and skip some of the in-person interview subjective questions. However, unanswered questions need to be repeated verbally to the patient if they did not understand them, omitted them because of lack of time, or did not think they were related to his or her condition. So, we recommend making these forms less detailed; making a form easier to read or fill out is a worthy task.

Future Directions

Our results showed that the average number of providers seen by a patient prior to their first Oral Medicine appointment was higher in this study compared to other studies. Further studies in this area should include surveying randomly selected providers (dentists and medical providers) in both rural and urban areas about their referral decisions (i.e., provider, patient preferences) and whether or not there are financial or insurance limitations of the patient that impact their referral.

Another area of study is how Oral Medicine practices can broaden access through practice innovations or advocacy for care through insurance reform and lessen barriers to care for individuals without insurance coverage or who are otherwise unable to afford services.

Conclusions

In summary, 42% of patients were referred by dentists, including general and specialist dentists. However, the majority of referrals were from general dentists, with medical doctors referring another 40% of patients (mostly general practitioners, fewer specialists). One of the surprising findings was that patients saw 5-6 providers of different specialties before their OM visit, with an average of 6-7 visits. Referral efficiency was not significantly different between males and females, but it differs among the diagnostic categories. In general, patients with TMD concerns and oral mucosal disease experienced an average of 39- and 29-month referral efficiency, respectively, versus obstructive sleep apnea and headaches, which were 85 and 61 months, respectively. Somatization with pain significantly correlated with referral efficiency.

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Table 1: Demographic Characteristics of New Patients at Baseline

Baseline characteristic	**Subgroups**		**Total**	
	n	*%*	*n*	*%*
Age Group in years				
18-29	23	14.4		
30-39	22	13.7		
40-49	18	11.2		
50-59	26	16.1		
60-69	41	25.5		
70-79	26	16.1		
80-89	3	1.9		
90-99	2	1.2		
			161	100
Gender				
Male	46	28.6		
Female	115	71.4		
			161	100

Table 1, continued: Demographic Characteristics of New Patients at Baseline

Baseline Characteristics	Subgroups		Total	
	N	%	N	%
Race/Ethnicity				
White	119	73.9		
Asian or Asian Indian	16	9.9		
Middle eastern or North Africa	8	5		
Hispanic or Latino	2	1.2		
Black or African American	2	1.2		
Native Hawaiian or Other Pacific Islander	1	0.6		
American Indian or Alaskan Native	1	0.6		
Other	3	1.9		
Missing	9	5.6		
			161	100

Table 1, continued: Demographic Characteristics of New Patients at Baseline

Baseline Characteristics	Subgroups		Total	
	N	%	N	%
Education				
Four-year college degree	53	32.9		
Graduate-level education (17+ years of education)	44	27.4		
High school	11	6.8		
Elementary school-level education	1	0.6		
Missing	52	32.3		
			161	100
Occupation				
Employed	84	52.2		
Retired	56	34.8		
Unemployed	8	5		
Student	5	3.1		
Disabled	1	0.6		
Other	2	1.2		
Missing	5	3.1		
			161	100

Table 1, continued: Demographic Characteristics of New Patients at Baseline

Baseline Characteristics	Subgroups		Total	
	N	%	N	%
Marital status				
Married (spouse in household)	86	53.4		
Never married	37	23		
Divorced	13	8.1		
Widowed	11	6.8		
Separated	3	1.9		
Married (spouse not in household)	1	0.6		
Other	5	3.1		
Missing	5	3.1		
			161	100
Insurance data				
Private insurance	106	65.8		
Medicare	51	31.7		
			161	100

Note. N = 161. Participants were on average 53.2 years old (*SD* = 18.1).

Table 2: *Chief Concern Distribution*

CC Categories	1st CC		2nd CC		Full sample	
	n	*%*	*n*	*%*	N	*%*
TMD conditions	79	47.1	5	3.1		
Oral mucosal Conditions	32	19.9	2	1.2		
TNP/Orofacial Pain	34	21	10	6.2		
Headaches	3	1.9	5	3.1		
Sleep apnea	10	6.2				
Salivary gland disorder	3	1.9	2	1.2		
Total	161	98	24	14.9		
					161	100

CC; Chief concern

Table 3*: Diagnosis Distribution*

Dx Categories	1st Dx		2nd Dx		3rd Dx		Full sample	
	n	*%*	*n*	*%*	*n*	*%*	N	*%*
TMD conditions	83	51	11	6.8				
Oral mucosal conditions	31	19	2	1.2				
TNP condition/Orofacial pain	27	16.8	4	2.5				
Headache	5	3.1	2	1.2				
Sleep apnea	10	16.2						
Salivary gland disorder	1	0.6	1	0.6				
Other	2	1.2			1	0.6		
No diagnosis	2	1.2						
Total			20	12.4	1	0.6	161	100

Dx= Diagnosis

Table 4: *Average Referral Efficiency by Race/Ethnicity*

Race	N	Mean (months)	SD	SE	95% CI		Min.	Max.
					LL	*UL*		
More than one race	8	52.9	59.8	21.1	2.9	102.8	1	132
Asian or Asian Indian	14	51.4	53.2	14.2	20.7	82.2	5	132
White	114	38	43	4	30	46	1	132
Other	3	28	18	10	17	73	12	132
American Indian or Alaska Native	1	24					24	24
Hispanic or Latino	1	12					12	12
Black or African	1	8					8	8
Native Hawaiian or Other pacific Islander	1	3					3	3
Total	143	39.1	44.3	3.7	31.8	46.5	1	132

Note. Number of patients = 134, SD=Standard deviation, SE=Standard error CI = confidence interval.

LL = lower limit; *UL* = upper limit.

Table 5: *Average Referral Efficiency by Diagnosis*

	N	*Mean*	*SD*	SE	95% CI		Min.	Max.
					LL	*UL*		
Salivary gland disorder	1	132					132	132
Sleep Apnea	10	85.5	54.7	17.3	46.4	124.7	6	132
Headache	5	60.8	55.9	24.9	-8.6	130.2	4	132
TMD conditions	82	39.3	46.6	5.1	29.6	49.1	1	132
Other	1	36					36	36
Oral mucosal disease	25	28.9	32.1	6.4	15.7	42.1	2	132
TNP/OFP	27	26.4	32.4	6.2	13.6	39.2	1	132
No diagnosis	1	24					24	24
Total	152	39.5	45.1	3.7	32.3	46.8	1	132

Note. Number of patients = 152

TNP=Trigeminal neuropathic pain

OFP=Orofacial pain

Appendix: Variables extracted from electronic health records.

1) Study variables and their coding:
2) Chart number: Last four digits: XXXX
3) Date of the first visit: MM/DD/YYYY
4) Date of birth: MM/DD/YYYY
5) Gender: Male, Female, or missing.
6) Occupation: Employed, Retired, Disabled, Student, Unemployed, Other, or Missing.
7) Level of education: Elementary school or less, High school: 9, 10, 11, 12., Some college, College: 13, 14, 15, 16, 17, 18., Graduate degree, Other, or Missing.
8) Marital status: Married (spouse in the household), Married (spouse not in the household), Divorced, Widowed, Separated, never married, Other, or Missing.
9) Race or Ethnicity: American Indian or Alaska Native, Asian or Asian Indian, Black or African American, Hispanic or Latino, Middle Eastern or North African, Mixed, Native Hawaiian or Other Pacific Islander, White, Other, or Missing.
10) Zip code: XXXXX.
11) Insurance plan: Private insurance, Medicaid, Medicare, Self-paid, Other or Missing.
12) Type of referral: Formal referral (e.g., letter, phone call, or email), Provider recommendation, Friend or family member recommendation, Self-referral, Missing.
13) The number of providers seen before the OMCS first visit: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, or missing.
14) Does the patient see a regular dentist? Yes, no, or missing.
15) Patient's oral health description: Excellent, very good, Good, Fair, Poor, or Missing.
16) Does the patient see a primary care physician? Yes, no, or missing.
17) Patient's general health description: Excellent, very good, Good, Fair, Poor, or Missing.
18) Chief concern (patient's words): XXXXXXXXXXXXXXXXXXXXX.
19) Oral Medicine specialist diagnosis: XXXXXXXXXXXXXXXXXXXXX.
20) Average pain intensity in the previous six months: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
21) SCL90 parameters: Anxiety= X.XX, Depression= X.XX, Somatization with pain= X.XX, Somatization without pain= X.XX, or Missing.
22) Age groups categories in years coding:
    I. 18-29 years.
    II. 30-39 years.
    III. 40-49 years.
    IV. 50-59 years.
    V. 60-69 years.
    VI. 70-79 years.
    VII. 80-89 years.
    VIII. 90-99 years.
23) Chief concerns and diagnoses related categories coding:

1) TMD conditions.
    A) Chief concerns:
        I. Bite change.
        II. Increased clenching or grinding activity.
        III. TMJ muscles pain or tightness.

IV. TMJ pain, clicking, or locking.

B) Diagnoses:

I. Bruxism.
II. Condylar overgrowth.
III. Disc displacement with or without reduction.
IV. Eustachian tube dysfunction.
V. Facial muscles myofascial pain.
VI. Joint degenerative condition.
VII. Osteoarthritis.
VIII. Parafunctional habits.
IX. Synovial chondromatosis.
X. TMD myalgia.
XI. TMJ arthralgia.
XII. TMJ dislocation.
XIII. Whiplash related TMD.

2) Oral mucosal diseases.

A) Chief concerns:

I. Burning sensation.
II. Reduced or changed taste.
III. Swelling.
IV. White, red, or blue lesions of lips, mouth, or throat.

B) Diagnoses:

I. Acid reflux.
II. Allergic stomatitis.
III. Amalgam Tattoo.
IV. Aphthous ulcer.
V. Bullous pemphigoid.
VI. Candida infection.
VII. Cold sores.
VIII. Erythema multiforme.
IX. Fibrous dysplasia.
X. Geographic tongue.
XI. Gingivitis.
XII. Herpes.
XIII. Lichen planus (ulcerative, erosive, reticular).
XIV. Lichenoid reaction.
XV. Median rhomboid glossitis.
XVI. Mucosal keratosis.
XVII. Mucous membrane pemphigoid.
XVIII. Pemphigus vulgaris.
XIX. Pyogenic granuloma.
XX. Squamous papilloma.
XXI. Systemic Lupus Erythematosus.
XXII. Traumatic Ulcerative Granuloma with Stromal Eosinophilia.

3) Trigeminal Neuropathic condition/Orofacial Pain.
    A) Chief concerns:
        I. Burning tongue.
        II. Tingling or painful sensation of mouth or face.
        III. Tooth pain.
    B) Diagnoses:
        I. Atypical odontogenic pain.
        II. Burning mouth syndrome.
        III. Dentin sensitivity.
        IV. Glossodynia.
        V. Hypogeusia.
        VI. Irreversible pulpitis.
        VII. Neuroglia.
        VIII. Neuropathic pain.
        IX. Oromandibular dyskinesia.
        X. Sinus infection.
4) Headaches.
    A) Chief concerns:
        I. Bilateral or unilateral headache.
        II. Migraine management.
    B) Diagnoses:
        I. Migraine.
        II. Tension type headache.
5) Sleep apnea.
    A) Chief concerns:
        I. Mild/moderates sleep apnea.
        II. Needs mandibular advancement device.
    B) Diagnoses:
        I. Mild/moderate sleep apnea.
6) Salivary gland disorders.
    A) Chief concerns:
        I. Dry mouth.
    B) Diagnosis:
        I. Salivary gland swelling.
        II. Sialorrhea.
7) Other:
    A) Chief concerns:
        I. Dental implants procedure failure.
        II. Evaluation of metal sensitivity prior to dental implant placement.
        III. TMJ evaluation prior to Invisalign fabrication.
    B) Diagnoses:
        I. Osteomyelitis.
        II. Scar tissue.
        III. Teeth crowding.

24) Referring provider Categories coding:

1) General Dentist:
    I. General Dentist.
2) Dental Specialist:
    I. Endodontist.
    II. Periodontist.
    III. Orthodontist.
    IV. Oral surgeons.
    V. Prosthodontist.
    VI. Oral and maxillofacial radiologists.
    VII. Another dental specialist.
3) Primary Care Provider (Medical):
    I. Family medicine providers.
    II. Physician assistant / nurse practitioner.
4) Medical Specialist:
    I. Otolaryngologist.
    II. Dermatologist.
    III. Rheumatologist.
    IV. Allergy and immunology specialist.
    V. Pain medicine specialist.
    VI. Sleep medicine specialist.
    VII. Gastroenterologist.
    VIII. Sports medicine specialist.
    IX. Endocrinologist.
    X. Oncologist.
    XI. Hematologist.
    XII. Infectious disease specialist.
    XIII. Pulmonologist.
    XIV. Neurologist.
    XV. Gynecologist.
    XVI. Ophthalmologist.
    XVII. Pathologist.
    XVIII. General surgeon.
    XIX. Orthopedic surgeon.
5) Other:
    I. Physical therapist.
    II. Psychologist.
    III. Other.

25) Time between chief concern onset and the OMCS first visit coding in months:
    I. Up to one year, number of months.
    II. 1 year, 12 months.
    III. 2 years, 24 months.
    IV. 3 years, 36 months.
    V. 4 years, 48 months.

VI. 5 years, 60 months.
VII. 6 years, 72 months.
VIII. 7 years, 84 months.
IX. 8 years, 96 months.
X. 9 years, 108 months.
XI. 10 years, 120 months.
XII. >10 years, 132 months.
XIII. Unknown.
XIV. Missing.

26) Time between first visit to any other provider and first OMCS visit coding in months:
I. Up to one year, number of months.
II. 1 year, 12 months.
III. 2 years, 24 months.
IV. 3 years, 36 months.
V. 4 years, 48 months.
VI. 5 years, 60 months.
VII. 6 years, 72 months.
VIII. 7 years, 84 months.
IX. 8 years, 96 months.
X. 9 years, 108 months.
XI. 10 years, 120 months.
XII. >10 years, 132 months.
XIII. OMCS initial visit was the first visit. 0 months.
XIV. Unknown or missing.

27) Timeline of chief concerns when it was diagnosable in months:
I. Up to one year, number of months.
II. 1 year, 12 months.
III. 2 years, 24 months.
IV. 3 years, 36 months.
V. 4 years, 48 months.
VI. 5 years, 60 months.
VII. 6 years, 72 months.
VIII. 7 years, 84 months.
IX. 8 years, 96 months.
X. 9 years, 108 months.
XI. 10 years, 120 months.
XII. >10 years, 132 months.
XIII. At the OMCS first visit, 0 month.
XIV. Unknown or missing.

28) Timeline between the first diagnosis and the one made at the first OMCS clinic:
I. Up to one year, number of months.
II. 1 year, 12 months.
III. 2 years, 24 months.
IV. 3 years, 36 months.

V. 4 years, 48 months.
VI. 5 years, 60 months.
VII. 6 years, 72 months.
VIII. 7 years, 84 months.
IX. 8 years, 96 months.
X. 9 years, 108 months.
XI. 10 years, 120 months.
XII. >10 years, 132 months.
XIII. At OMCS initial visit was the first diagnosis, 0 month.
XIV. Unknown or missing.