Analysis of Referral Pathways, Diagnosis, and Treatment Patterns in a University -Based Orofacial Multidisciplinary Pain Clinic

by

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ABSTRACT

Background- The prevalence of multifactorial chronic diseases is increasing globally. The objective of this study was to examine associations between chronic orofacial pain complaints and psychological distress in patients assessed at a multidisciplinary clinic inspired by the biopsychosocial model.

Methods- A retrospective study design was employed to analyse data collected from patient charts recorded at the University of Alberta Multidisciplinary Orofacial Pain Clinic between 2018-2023. The team comprises a pharmacist, dietitian, family physician, oral and maxillofacial surgeon, psychologist, orofacial pain and oral medicine specialist, along with the oral medicine residents. Demographic, clinical variables, psychological were retrieved. The psychological variables included the Adverse Childhood Experiences (ACE) scale, Pain Catastrophizing Scale (PCS), and Injustice Experience Questionnaire (IEQ). To evaluate the associations between the severity of TMJ pain and headaches and psychological variable scores, Pearson's chi-square test, Fisher's exact test, and binomial logistic regression were performed.

Results- The study analysed 288 charts of patients ranging in age from 13 to 93 years (mean age 46.69, SD 16.5). Most patients were female (82.6%) and resided primarily in Alberta (94.4%), with some also from Saskatchewan and British Columbia. Self-reported behaviors included tobacco smoking (15.5%), alcohol consumption (59.4%), and recreational drug use (15.5% current, 8.5% past). This study confirmed significant associations in patients with a moderate or severe risk of PCS. Among these, patients had 3.7 and 3.9 times higher odds of experiencing

moderate to severe TMJ pain and headaches, respectively, compared to those with a low PCS risk. Additionally, patients with a high risk of IEQ had 2.8 times higher odds of experiencing moderate to severe headaches compared to those with a low IEQ risk. About 14.8% of patients did not answer the ACE, PCS, or IEQ variables and were thus excluded from analysis.

Conclusion- Pain severity in chronic orofacial symptoms (TMJ pain and headaches) was associated with higher PCS scores. Similarly, higher IEQ scores correlated with increased headache severity. The significant number of patients who declined to answer the psychological assessments suggests underlying psychological factors.

PREFACE

This thesis is an entirely original work authored by Parvaneh Badri. The research project, to which this thesis contributes, received ethical clearance from the University of Alberta Research Ethics Board under the project titled: "Analysis of Referral Pathways, Diagnosis, and Treatment Patterns in a University -Based Orofacial Multidisciplinary Pain Clinic," with approval reference Pro00112133, granted in August 2021.

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CHAPTER 1 INTRODUCTION

This chapter introduces the concept of chronic pain and defines it as a constant pain experience that persists from three to six months or longer. The chapter also defines the three main types of chronic pain (nociceptive, neuropathic, and Nociplastic) and presents an overview of different pain management strategies. Additionally, the concept of chronic orofacial pain (COFP) is introduced and defined here as persistent facial and mouth pain caused by conditions such as trigeminal neuralgia and temporomandibular disorder (TMD). COFP is then further explored through its various mechanisms, diagnoses, and management strategies. As well, the chapter presents the biopsychosocial model, discussing how various biological, psychological, and social factors affect chronic pain management and how COFP is best treated through an interdisciplinary approach. The impact of three major psychological distress factors – Adverse Childhood Experiences (ACEs), Pain Catastrophizing Scale (PCS), and Injustice Experience Questionnaire (IEQ) – on pain perception is also explained. Following a brief history of the University of Alberta's (U of A's) multidisciplinary approach to COFP through the establishment of its Orofacial Multidisciplinary Pain Clinic (OMPC), the chapter concludes with the thesis' problem statement, research questions, objectives, and hypothesis.

1.1 Background

1.1.1 Chronic Pain

1.1.1.2 Definition

The International Association for the Study of Pain (IASP) introduced a definition of pain in 1979, which characterizes it as a distressing combination of emotional feelings associated with potential harm to tissues or described in relation to such harm. This definition has since been revised by the IASP, which now describes pain as: "[a]n unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (Raja et al., 2020). A large portion of the population experiences pain as either a temporary or chronic event. Evidence indicates that, globally, 20-30% of adults suffer from pain, with prevalence rates differing based on location and demographic characteristics (Turk & Okifuji, 2002). It is estimated that one every 5 Canadians suffer from chronic pain (An Action Plan for Pain in Canada, March 2021) and over 1 million Albertans experience acute or chronic pain (Alberta Pain Strategy, 2019 -2024. Pain causes distress and hampers daily activities, productivity, and social interactions (Gatchel, 2004). Chronic pain, defined as pain lasting more than three months and persisting beyond normal tissue healing time, significantly impacts quality of life and poses challenges to healthcare systems globally (Inoue et al., 2015). It affects millions worldwide, causing both physical and psychological burdens (Inoue et al., 2015). Chronic pain can be caused by injury, illness, or unknown sources. This form of pain is one of the main contributors to disability and leads to significant financial strain due to healthcare expenses and decreased productivity (Breivik, Eisenberg, & O'Brien, 2013).

1.1.1.3 Mechanism

The underlying mechanisms of pain involve interactions among the nervous system as well as various biological, psychological, and social elements. Central sensitization, where the central nervous system becomes overly responsive to stimuli, also plays a role in perpetuating pain (Latremoliere & Woolf, 2009). Moreover, neuroinflammation and changes in pain modulation pathways can contribute to the persistence of pain. At the same time, psychological and social aspects greatly impact individuals experiencing pain (Turk, Fillingim, Ohrbach, & Patel, 2016). It is common for those with pain to simultaneously be struggling with conditions like depression, anxiety, and stress, which can worsen their perception of pain and impede treatment effectiveness. The outcome of chronic pain management is linked to factors such as status, education level, and access to healthcare (Atkins & Mukhida, 2022).

1.1.1.4 Classifications

Pain is classified into three categories based on its mechanism (Gerdle et al., 2020; Rankin, 2020):

Neuropathic pain affects an estimated 3-8% of the population (Bouhassira, Lantéri-Minet, Attal, Laurent, & Touboul, 2008), with some studies suggesting that the number may be closer to 10% (Van Hecke, Austin, Khan, Smith, & Torrance, 2014). This type of pain is defined by the IASP as “pain caused by a lesion or disease of the somatosensory nervous system” (Jensen et al., 2011; Rankin, 2020). Neuropathic pain can be either central or peripheral and may result from trauma, toxin exposure, or metabolic disturbances (e.g., diabetic neuropathy), or from neurodegenerative, autoimmune, or vascular conditions (e.g., multiple sclerosis or stroke) (Rankin, 2020; Scholz et al., 2019).

Nociceptive pain arises from the direct activation of nociceptors due to actual or potential tissue damage that is non-neuronal (Rankin, 2020)(IASP Task Force on Taxonomy 1994). Chronic nociceptive pain can be observed in conditions like arthritis or lumbago without a neuropathic cause. This type of pain is associated with a normally functioning nervous system.

Nociplastic pain, as defined by the IASP, is "pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain" (IASP Task Force on Taxonomy 1994). Current theories suggest that nociplastic pain involves sensitization through nociceptor activation and/or pain spreading and worsening over time (Rankin, 2020).Examples include TMD, fibromyalgia and pain associated with inflammatory bowel syndrome, as well as some forms of non-specific lumbago.

In 2019, the World Health Organization (WHO) updated the International Classification of Diseases (ICD-11) to include chronic pain as its own category, recognizing it as a fully separate and independent disease rather than just a symptom. In ICD-11, chronic pain is categorized as either primary or secondary, depending on whether it is a symptom of another primary condition (Rankin, 2020; Scholz et al., 2019). Patients may experience one or several types of chronic pain simultaneously (Gerdle et al., 2020; Rankin, 2020).

1.1.1.5 Management

Several different social, psychological, and biological factors contribute to chronic pain, making it a highly complex condition to manage. Because of its inherent complexity, chronic pain needs to be managed holistically, which requires a multidisciplinary strategy that involves not only

medical and biological treatment options, but also – and equally as importantly – social and psychological therapies.

Managing chronic pain at the biological level necessarily includes exploring its neurological and physiological aspects. Treatment may involve pharmacological options, such as opioids or anti-inflammatories, and/or non-drug interventions, such as surgery or physical therapy (Manchikanti, Singh, Schultz, Datta, & Hirsch, 2009). Neuroimaging enables clinicians to better understand the brain's involvement in chronic pain while at the same time allowing more targeted treatment that effectively deals both with pain perception and neural pathway modulation(Apkarian, Baliki, & Geha, 2009).

At the social level, managing chronic pain involves considering the many potential social determinants of health. For instance, the patient's access to healthcare, education level, and socioeconomic status may contribute to the success or failure of the pain management regime. Access to healthcare means the degree of accessibility a patient may or may not have to treatment options and specialists. The degree of healthcare access substantially affects not only the uptake of the treatment but its level of success (Grol-Prokopczyk, 2017). Similarly, a patient's education level can also affect the degree to which a patient understands their condition and follows their healthcare professional's recommended pain management plan. Lower educational attainment tends to be associated with poorer treatment outcomes, as does lower levels of socioeconomic status. The common element in both of these cases (lower educational and socioeconomic levels) is the lack of awareness or knowledge of both the patient's condition and of the pain management support and healthcare resources that are available to the patient (Fillingim, King, Ribeiro-Dasilva, Rahim-Williams, & Riley III, 2009).

At the psychological level, chronic pain management necessarily includes interventions that address a broad spectrum of psychological conditions, such as anxiety, depression, and stress, as psychological conditions often exacerbate the perception of pain while also interfering with the patient's treatment (Gatchel, Neblett, Kishino, & Ray, 2016). Pain management supports that include coping strategies help patients to better manage their pain. Current popular psychological interventions include MBSR (mindfulness-based stress reduction) and CBT (cognitive-behavioral therapy), which have demonstrated success in improving patients' quality of life through the reduction of perceived pain intensity (Hofmann, Asnaani, Vonk, Sawyer, & Fang, 2012).

From the above, it is clear that successful chronic pain management must involve a multifaceted approach that considers not only biological and physiological aspects, but also the social and psychological conditions of the patient. This "biopsychosocial" care model is a holistic, patient-centred strategy that improves patients' health outcomes as well as overall quality of life through the interdisciplinary involvement of a healthcare team comprising physicians, physical therapists, social workers, and psychologists (Stanos & Houle, 2006). However, this model is only effective when there is good coordination and communication within the healthcare team, with all professionals working together to develop and support a personalized treatment plan.

1.1.2 Chronic Orofacial Pain

1.1.2.1 Definition

Chronic orofacial pain (COFP) is a multifactorial condition that encompasses various types of pain disorders affecting the face, mouth, and TMJs. COFP is often challenging to identify and

manage due to its nature and the similarity of symptoms to other medical conditions. The condition impacts millions of individuals worldwide, with estimates suggesting that it affects around 7% of the global population. This type of pain can lead to disability. Furthermore, it greatly affects a patient's quality of life by causing challenges to eating, speaking, and carrying out everyday tasks (Ananthan & Benoliel, 2020a; Sessle, 2021).

1.1.2.2 Mechanism

COFP develops through a combination of central and peripheral mechanisms. Peripheral factors include nerve injury or inflammation, such as in trigeminal neuralgia or temporomandibular joint disorders (TMD). Central mechanisms involve changes in pain processing pathways, leading to conditions like burning mouth syndrome and persistent idiopathic facial pain (Canfora et al., 2023). COFP can stem from causes such as trauma, dental procedures, infections, autoimmune diseases, or neuropathic conditions. Moreover, it often accompanies or triggers conditions like depression, anxiety, and sleep disorders, which can make pain perception worse for patients and complicate their treatment.

1.1.2.3 Diagnosis

Currently, the diagnosis of COFP remains tricky and problematic due to its nature (Bahra & Goadsby, 2004). The International Classification of Headache Disorders (ICHD 3) ("Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition," 2018) and the International Classification of Orofacial Pain (ICOP) (Orofacial, 2020) provide guidelines for diagnosing these pain conditions. Treating COFP usually involves an approach that considers the biological, psychological, and

social aspects of pain, which requires a multidisciplinary team for the assessment, diagnosis, and management of the pain.

1.1.2.4 Management

Recent advances in understanding the genetic and environmental influences of COFP have highlighted the importance of personalized treatment approaches. Research is ongoing to identify biomarkers that can predict treatment response and develop targeted therapies that address the underlying mechanisms of pain (Ananthan & Benoliel, 2020a). Ongoing studies aim to find markers in the body that can forecast how individuals respond to treatments and to create treatments that target the root cause(s) of the pain (Zhang et al., 2023).

1.1.3 Biopsychosocial Model of Chronic Pain

The biopsychosocial model, introduced by George Engel (1977), provides a holistic approach to understanding and treating chronic pain. In contrast to the biomedical model, which focuses only on biological factors, the Engel model considers the multifactorial interactions between biological, psychological, and social factors. This complex perspective is especially valuable in managing COFP, offering a more refined understanding of the condition (Engel, 1977).

Assessing chronic pain involves various methods to capture its complexity. Using the McGill Pain Questionnaire (MPQ), which assesses sensory, emotional, and cognitive aspects of pain, atypical facial pain can be distinguished from trigeminal neuralgia. The MPQ also helps in developing effective pain management strategies (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). Psychological factors play a significant role in COFP, with conditions like depression and anxiety worsening pain and hindering treatment. Addressing the psychological factors is crucial for

effective pain management and improving patient outcomes (Turk & Okifuji, 2002), as chronic pain can lead to unwanted lifestyle changes and reduced quality of life.

The West Haven-Yale Multidimensional Pain Inventory identifies areas where psychological interventions can make a significant difference by helping patients manage their pain better and improve their overall well-being (Vowles, Fink, & Cohen, 2014). These include psychological interventions such as Cognitive-Behavioral Therapy (CBT), Mindfulness-Based Stress Reduction (MBSR), and Acceptance and Commitment Therapy (ACT). With CBT, patients learn to develop coping strategies, reduce anxiety and depression related to their pain, and improve their quality of life (Greene, Klasser, & Epstein, 2010), while MBSR and ACT approaches help patients focus on improving emotional regulation and reducing stress, making them highly useful tools for managing chronic pain (Vowles et al., 2014).

As mentioned above, effective management of COFP requires a multidisciplinary approach that involves integrating care from various specialists. The biopsychosocial model offers a robust framework for managing COFP by addressing biological, psychological, and social factors. A multidisciplinary approach necessarily includes psychological assessments and interventions, which are essential for effective pain management and improving patient well-being (Engel, 1977).

1.1.4 Applying the Biopsychosocial Model to COFP

The biopsychosocial model can effectively be applied to manage COFP. In so doing, a multidisciplinary team needs to explore and address the multifaceted pain dimensions that may underlie a patient's symptoms. A multidisciplinary strategy to pain management considers all possible biological, psychological, and social aspects that may be affecting the patient and dives

deep to determine what is causing and potentially exacerbating the pain. This comprehensive approach leads to a more thorough and definitive diagnosis as well as a treatment plan that is better aligned to the unique needs of each individual patient, resulting in better overall patient outcomes.

1.1.4.1 Biological Factors

Biological factors contributing to COFP may include neural and musculoskeletal abnormalities. Temporomandibular joint disorders (TMD), trigeminal neuralgia, and burning mouth syndrome are common conditions with biological etiology. These and similar conditions can lead to persistent pain due to nerve inflammation, muscle dysfunction, or other structural issues (Canfora et al., 2023).

1.1.4.2 Psychological Factors

Psychological components significantly impact the perception and management of COFP. Anxiety, depression, and stress can exacerbate pain symptoms and hinder treatment outcomes. For assessing these types of psychological distresses, health professionals commonly administer the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder Assessment (GAD-7) (Turk & Okifuji, 2002). In addition, evidence shows a significant improvement in pain management and a general enhancement in the patients' quality of life under psychological distress when CBT, MBSR, ACT strategies are applied (Gatchel et al., 2007; Vowles et al., 2014)

1.1.4.3 Social Factors

Social factors (e.g., socioeconomic status, access to healthcare, and support systems) play a critical role in the experience and treatment of COFP. Social supports can buffer the impact of pain, while social isolation and financial constraints can worsen outcomes. Community support

groups and patient education in treatment plans can provide significant benefits, serving as integrating social interventions (Durham et al., 2016).

An individual's cultural background and other influences can majorly affect their perception and expression of physical discomfort, such as chronic orofacial pain. Their cultural touchpoint can also affect how they cope with the pain. For instance, an individual's cultural influences may play a role in their attitudes and beliefs related to pain as well as in the coping strategies they use to alleviate it. While one culture may stress the need to endure the pain, including chronic pain (leading to underreporting), another culture may encourage seeking medical advice and assistance such as pain-relieving pharmaceutical interventions (Edwards, Moric, Husfeldt, Buvanendran, & Ivankovich, 2005). At the same time, cultural influences may impact the kinds of social supports that are available for those dealing with chronic pain. Research indicates that a robust social support network is crucial in helping individuals cope with and manage their pain (Kim, Sherman, Ko, & Taylor, 2006; Kim, Sherman, & Taylor, 2008). It is therefore critically important that healthcare professionals be aware of the different cultural influences that may be affecting their patients in order to provide pain management interventions that are best suited to the individual, given their cultural background.

Effective management of COFP requires a multidisciplinary approach that integrates various healthcare disciplines. Interdisciplinary collaboration that includes but is not limited to dentists, neurologists, psychologists, and physical therapists addresses all dimensions of the patient's condition and ensures personalized management based on individual needs. This enhances outcomes by addressing the multifaceted nature of chronic pain (La Touche et al., 2015).

Recent advancements in understanding the genetic and environmental influences of COFP have underscored the importance of personalized treatment approaches. Current studies continue to identify biomarkers that can predict treatment responses, making possible more targeted and effective therapies (D'Adamo, Widdop, & Giles, 2021; Meira et al., 2023). It is worth noting that the successful application of this model requires multidisciplinary collaboration across the six major treatment areas of dentistry, pharmacology, physical therapy, social supports, psychology, and lifestyle/behavior changes. Without effective collaboration among health professionals in these disciplines, a holistic and fully personalized approach to managing a patient's COFP cannot be provided.

1.1.5 Interdisciplinary Collaboration

The interdisciplinary collaboration approach to COFP involves a team of specialists from different disciplines working in collaboration, though not always at the same time or location. The aim in this approach is to provide care that is integrated, comprehensive, and considers all factors that may be causing or impacting the patient's pain. For instance, oral surgeons and dentists may consider physical aspects like TMD or focus their explorations on dental occlusion, joint health, and structural issues. Neurologists may be on the team as well to diagnose and manage potential neuropathic pain and to make sure that any neurological abnormalities will be appropriately addressed.

1.1.5.1 Psychological Interventions

The biopsychosocial strategy to pain management necessarily includes psychological therapies such as CBT, MBSR, and ACT (defined in section 1.1.3). CBT assists patients in managing any psychological conditions that may be triggering or contributing to their chronic pain. By

introducing coping strategies, CBT can also help patients mitigate depression and/or anxiety related to their chronic orofacial pain, thereby improving their day-to-day quality of life. MBSR works as a mindfulness-based stress reducer, while the ACT therapy approach highlights aspects of acceptance and commitment. All these pain management strategies can be tailored to individual patients and have proven highly effective in managing pain (Vowles et al., 2014).

1.1.5.2 Physical Therapy and Rehabilitation

Along with psychologists, physical therapists play a crucial part in COFP management. Physical therapists are responsible for designing and/or recommending exercise programs that will reduce muscular tensions and help improve a patient's TMJ function. Various techniques may be applied, including posture correction, manual therapy, and/or neuromuscular re-education. All these strategies assist in pain alleviation, with the ultimate aim of restoring a patient's normal functioning. By including physical therapists on the multidisciplinary COFP management team, aspects related to a patient's musculoskeletal components of orofacial pain can be addressed (La Touche et al., 2015).

1.1.5.3 Pharmacological Management

The biopsychosocial model prioritizes non-pharmacological treatments over pharmacological ones. Nonetheless, various types of medications may still be required when applying a pain management plan that is comprehensive and considers all aspects of a patient's needs. For current COFP management, the most popular pharmacological treatments to date include the following: non-steroidal anti-inflammatories (e.g., Ibuprofen); muscle relaxants (e.g., Methocarbamol, Cyclobenzaprine, or Baclofen), which primarily function on the central nervous system (CNS) as antispastics; and Naproxen, which inhibits the cyclooxygenase enzyme. Also

commonly prescribed for chronic and neuropathic pain are antidepressants, which block norepinephrine and serotonin reuptake in synapses, thus enhancing postsynaptic receptor stimulation; and anticonvulsants (e.g., Pregabalin and Gabapentin), which inhibit the influx of calcium influx while releasing excitatory neurotransmitters. The most common pharmacological treatments involved in COFP management are muscle relaxants, non-steroidal anti-inflammatory drugs, and antidepressants (to treat neuropathic pain). The careful and appropriate use of pharmacological interventions helps both to mitigate a patient's pain intensity and to boost the efficacy of non-pharmacological therapeutic treatments.

1.1.5.4 Social Support and Education

Many different social factors can affect the management of chronic pain, including the management of COFP. The main social factors are a patient's living and working environment, family and social support, and social interactions. Treatment outcomes improve when patients and their families (or their support individuals) are educated about the cause(s), manifestation(s), and management of orofacial-related chronic pain. Additional resources and supports may be provided through education programs geared towards patients living with chronic pain. Relevant social support networks can help patients better understand and navigate the unique challenges involved in chronic pain management (Turk & Okifuji, 2010).

1.1.5.5 Behavioural and Lifestyle Modifications

An additional aspect of COFP management is encouraging patients to consider and practice healthier lifestyle choices, as these can positively affect pain management. Healthier choices that lead to lifestyle changes include stress management techniques, nutrition advice, and sleep hygiene. The aim in introducing and applying lifestyle interventions is to mitigate or even

eliminate factors such as lack of exercise, nutrient-deficiencies in a patient's diet, or inadequate sleep, with the overall intention of reducing the patient's pain.

The multidisciplinary, multifaceted, and comprehensive approach to pain management has shown better patient outcomes than single-discipline treatments. A recent study found that patients undergoing multidisciplinary care for COFP experienced major improvements both in pain reduction and in their everyday quality of life in comparison to patients who received dental care only (Greene et al., 2010). The evidence is clear that by applying the biopsychosocial model to the multifactorial aspects of COFP, clinicians and other healthcare providers are able to offer more personalized treatment plans. These not only optimize the health outcomes of patients but, equally as importantly, boost the patients' satisfaction levels with their care.

1.1.5.6 Dental-Specific Treatments

The dental-specific treatment services offered by qualified professionals is a crucial part in the comprehensive management of orofacial pain. The services may involve occlusal appliances specifically designed for the management of parafunctional habits (e.g., bruxism) and TMD. The personalized appliances can help prevent dental damage and also reduce pain caused by headaches and muscle tension. Additionally, medical stents can deliver targeted neuropathic gels to help relieve conditions like burning mouth syndrome and other chronic neuropathic pain, while interventional pain management modalities such as nerve blocks, trigger-point injections and Botulinum Toxin A injections may assist in assuaging pain and discomfort related to cervical or masticatory myalgia, migraines, neuropathic pain and other myofascial conditions. Along with offering varying degrees of pain relief, these injections may lead to better muscle

function for the affected patients and thus give them a better quality of life. Finally, dental-specific treatments include the benefits of educating patients, via discussion during the consultation and take-home materials, about different aspects of their condition and about orofacial health in general. Treatment of complex cases is best undertaken by the appropriate dental specialist, as it is beyond the scope of generalists.

1.1.6 Psychological Distress

Emotional turmoil, known as distress, often stems from challenging situations and pressures that are difficult for an individual to handle effectively. A distressed state may manifest through mood changes or feelings such as worry and sadness, all of which can affect an individual's health and impact his or her daily activities (Gershon et al., 2010; Honda et al., 2015).

COFP is a complex condition that is often exacerbated by psychological factors. Emotional strain can arouse feelings of anxiety and sadness, significantly influencing how people perceive and cope with pain. Research indicates that individuals facing even minor levels of distress often endure more intense pain and experience limitations in their daily activities (Honda et al., 2015; Goulet et al., 2019). Effective management of COFP thus requires addressing these and other psychological components in order to improve patient outcomes.

Indeed, the biopsychosocial model emphasizes the need to consider psychological factors in the management of COFP. Psychological issues such as varying levels of distress, adverse childhood experiences, pain catastrophizing, and perceived injustice can visibly and/or invisibly affect patients' experience of pain. By integrating methods from fields such as psychological treatments and care that considers past traumas, we can greatly enhance the well-being of patients.

1.1.6.1 Adverse Childhood Experiences

Adverse childhood experiences (ACE) are traumatic events that occur before the age of 18. They include issues directly or indirectly related to abuse, neglect, or general household dysfunction. Studies show that ACE can significantly impact a person's well-being, increasing his or her chances of developing persistent pain issues such as Chronic Overlapping Pain Conditions. Moreover, the stresses from early adverse experiences can lead to heightened sensitivity to pain and greater psychological distress in adulthood (Merrick, Ford, Ports, & Guinn, 2018). Managing COFP in individuals with a history of ACE often involves trauma-informed care to address these underlying issues.

1.1.6.2 Pain Catastrophizing

Pain catastrophizing refers to an exaggerated negative mindset towards pain, often involving feelings of helplessness and rumination over the pain. The Pain Catastrophizing Scale can be used to assess this inclination and has been associated with favourable results in the treatment of chronic pain. High levels of pain catastrophizing are associated with increased pain intensity and emotional distress, making it a significant factor in the experience of COFP (Petrini & Arendt-Nielsen, 2020; Quartana, Campbell, & Edwards, 2009; Sullivan et al., 2001).

1.1.6.3 Injustice Experiences

Perceived injustice is another critical factor affecting individuals with chronic pain. The Injustice Experience Questionnaire (IEQ) assesses feelings of unfairness and blame related to pain. High scores on the IEQ are associated with more severe pain and psychological distress, with perceived injustice exacerbating feelings of helplessness and anger. These feelings can then

further complicate the management of COFP (Pariseau-Legault, Vallée-Ouimet, Goulet, & Jacob, 2019; Sullivan et al., 2008).

1.1.7 University of Alberta Multidisciplinary COFP Clinic – Oral Medicine Graduate Program

The following information was gathered from Martin Parfitt, Dr. Paul Major and Dr. Ivonne A Hernandez. Martin Parfitt, a retired Physiotherapist, and Dr. Paul Major, Orthodontist, former director of the clinic and current Chair of the School of Dentistry. Both were involved with the Multidisciplinary Clinic since its early years.

The Multidisciplinary Clinic began as the TMJ Investigation Unit in 1983. The purpose of the clinic was to assist patients in their diagnosis and management of TMJ disorders. Initially, it was composed of Dr. David Hatcher, Oral and Maxillofacial Radiologist and Director of the TMJ Investigation Unit; Dr. E. Wayne Tunis, Oral and Maxillofacial Surgeon; and Dr. Denny Gilboe, Prosthodontist. The clinic was situated in the University of Alberta Hospital Dental Clinic. Dr. Keith Compton, Prosthodontist, replaced Dr. Gilboe in 1984. Martin Parfitt, Cynthia Blackman (Psychologist), and Dr. Paul Major joined in 1985. In 1986, Dr. Hatcher moved and Dr. Ken Glover, Orthodontist, was appointed as Acting Director. The clinic moved to the Dent/Pharm Building on the University of Alberta campus.

In 1988, Dr. Paul Major became Director of the clinic and changed its name to TMD / Orofacial Pain Clinic. In 1990, a Graduate Program (MSc in Medical Sciences) combined with a 24-month post-graduate residency in TMD / Orofacial Pain was created. The residency had four clinical days dedicated to the diagnosis and management of temporomandibular joint disorders

and orofacial pain. The Multidisciplinary Clinic became part of this program and ran on a bi-monthly basis until 2012.

The clinic was composed of the existing practitioners (Dr. Compton, Dr. Major, Dr. Tunis, Dr. Glover, Martin Parfitt, and Dr. Blackman). Dr. Mark Armstrong (Family Physician), Dr. Kathy Biggs (Pharmacist), and Janet Lockau (Dietitian) also joined the multidisciplinary team in the early 1990s. The multidisciplinary team met monthly, with a focus on challenging cases. The clinic was not only an opportunity to reach a diagnosis and develop a treatment plan based on the expertise of the various practitioners, but also a chance to share learning among the healthcare providers.

Dr. Paul Major remained Director until 2000, after which, Dr. Norman Thie, a former graduate student, took over the program as Clinical Director until 2014. The clinic relocated to the Kaye Clinic in 2013 and has run on a monthly basis since then. Sixteen graduate students completed the TMJ / Orofacial Pain Residency Program.

In 2015, the Oral Medicine Graduate Program was opened. The existing Multidisciplinary Clinic and regular clinic became part of the Oral Medicine Graduate Program. The Multidisciplinary Clinic has continued running on a monthly basis. The current director of the Orofacial Pain clinic part of the Oral Medicine Graduate Program is Dr. Reid Friesen. So far, the Oral Medicine Program has yielded six specialists.

Currently, the Multidisciplinary Clinic is composed of a Family Physician (Dr. Elaine Soong), an Oral and Maxillofacial Surgeon (Dr. Eugene Lam), a Psychologist (Justin Long), a Pharmacist (Nathan Beahm), an Oral Medicine Specialist (Dr. Reid Friesen), a dietitian (Janet

Lockaut), a Physiotherapist (Ed Steinberg), an Orofacial Pain Board-certified Dentist (Dr. Ivonne Hernandez), and four current residents of the Oral Medicine Program.

The criteria to triage patients to the MD Clinic include:

1) Persistent **Non-Odontogenic Pain**:

- Pain that continues after six months of root canal treatments and extractions.

2) **Unresponsive Musculoskeletal Complaints**:

- Musculoskeletal issues that have not improved with conservative treatments such as physiotherapy, oral appliance therapy, or local treatments including Botox injections.

3) **Complex Medical History**:

- Extensive medical history that may benefit from a comprehensive review of medications and/or surgical interventions, especially if there is an explicit or implicit psychological component.

4) **Chronic Orofacial Pain with Comorbidities**:

- Long-term orofacial pain accompanied by migraine headaches or other musculoskeletal complaints that have not been effectively managed.

5) **Undiagnosed or Ineffectively Treated Conditions**:

1. Any musculoskeletal, neurovascular, or neuropathic complaints that have been evaluated by multiple practitioners but remain undiagnosed or have only received unsuccessful "trial treatments."

6) **Special Consideration for Remote Patients**:

- Patients who do not fully meet the above criteria but live far away (more than 5 hours of driving or a flight) and may benefit from a multidisciplinary assessment.

Triaging is based on the information provided in the referral; however, this information is sometimes insufficient. Previously, the referral form was comprehensive, including details such as the list of medications, known mental diagnoses, and attempted therapies to address the current complaints. However, with the establishment of the Oral Medicine Program, the referral process was modified. Currently, the referral form offers only a few lines for the referring practitioner to describe the complaint. This same form is used for TMD, orofacial pain, sleep apnea, and oral lesions queries.

Appendix 8 presents list of past graduate students, and past MD practitioners involved in the Multidisciplinary COFP Clinic.

Despite the long history of activities mentioned above, the University of Alberta, School of Dentistry Multidisciplinary Orofacial Pain Clinic have never been evaluated.

1.1.8 Problem Statement

Chronic orofacial pain presents a significant challenge to patients, often requiring specialized multidisciplinary care. Despite the presence of the Orofacial Multidisciplinary Pain Clinic

(OMPC) at the University of Alberta, there remains a lack of comprehensive understanding regarding the clinic's referral pathways, diagnostic practices, and treatment modalities for medically complex patients. This study seeks to fill this gap by investigating the operational dynamics of the OMPC and exploring the relationships among physical, psychological, and socio-environmental factors impacting patients with chronic orofacial pain. By examining these aspects, the study aims to uncover the barriers patients face in accessing specialized care and to elucidate the interplay between chronic orofacial symptoms and psychological distress levels within this clinical setting.

1.1.9 Research questions

- What are the biopsychosocial characteristics and referral pathways of patients with chronic orofacial pain at a university multidisciplinary clinic?
- Is there a relationship between chronic orofacial pain symptoms, including TMJ pain and headache, and levels of psychological distress among patients with chronic orofacial pain conditions?

1.1.10 Objectives

- To determine the biopsychosocial characteristics and referral pathways of patients with chronic orofacial pain at a university multidisciplinary clinic.
- To examine associations between chronic orofacial pain symptoms (TMJ pain and headaches) and psychological distress.

1.1.11 Hypothesis

- There are significant associations between chronic orofacial pain symptoms (TMJ pain and headaches) and psychological distress, indicating that higher levels of psychological distress will correlate with increased severity of pain symptom.

CHAPTER 2 ANALYSIS OF REFERRAL PATHWAYS, DIAGNOSIS, AND TREATMENT PATTERNS IN A UNIVERSITY-BASED OROFACIAL MULTIDISCIPLINARY PAIN CLINIC.

This chapter provides an in-depth analysis of the OMPC's referral pathways, diagnosis, and current treatment options for COFP patients. Following a discussion of COFP prevalence and multifactorial characteristics, the chapter explains the study's design and patient chart data collection methodology. Important highlights include the patient population's clinical and demographic features and the psychological assessment tools employed (i.e., ACE, PCS, and IEQ scales). As well, this chapter presents an overview of the statistical analysis strategies utilized in evaluating associations between COFP and psychological distress symptoms. Based on these findings, the chapter provides detailed results, followed by a discussion pertaining to their implications in the management of COFP. An overview of the OMPC's interdisciplinary approach to pain management is also provided. The chapter closes with a mention of the study's limitations and suggests a few possible future research directions.

2.1 Introduction

The prevalence of multifactorial chronic diseases is increasing globally (Dennis et al., 2008). According to the World Health Organization (WHO) in 2019, International Classification of Diseases ICD-11 classifies chronic pain as disease rather than symptom. It is defined as pain that persists beyond normal healing time (i.e., more than 3 months) or is recurrent and lacks the acute warning function of physiological nociception (Merskey, 1986; Treede et al., 2015).

Chronic pain is divided by ICD-11 as primary and secondary. Figure 2.1 shows simplified ICD-11 classification of major pain condition. However, chronic pain lasting more than three months does not apply to OFP (orofacial pain) and HA (headache), which is defined as pain occurring for more than 15 days monthly and lasting for more than 4 hours a day for at least three months (Ananthan & Benoliel, 2020b). Chronic orofacial pain (COFP) is a multifaceted condition characterized by persistent pain in the face, mouth, head, or TMJs regions, that lasts more than three months. It includes disorders such as temporomandibular disorders (TMD), trigeminal neuralgia, and burning mouth syndrome, arising from musculoskeletal, neurovascular, nociplastic, and/or neuropathic origins (O'Connor et al., 2015). COFP is further complicated by significant psychological and social impacts (Zhu et al., 2020).

The biological and environmental factors in COFP involve immune system activation and inflammatory processes leading to pain and dysfunction in the temporomandibular joints and masticatory muscles. The extracellular matrix components degradation, particularly hyaluronic acid, plays an essential role in TMD pathogenesis, with low-molecular-weight hyaluronic acid promoting inflammation and chronic pain (Sitthipornvorakul, Klinsophon, Sihawong, & Janwantanakul, 2018). In addition, genetic predispositions and environmental influences, such as stress and trauma, contribute to the persistence and variability of COFP, necessitating personalized treatment approaches (Lawford, Walters, & Ferrar, 2016).

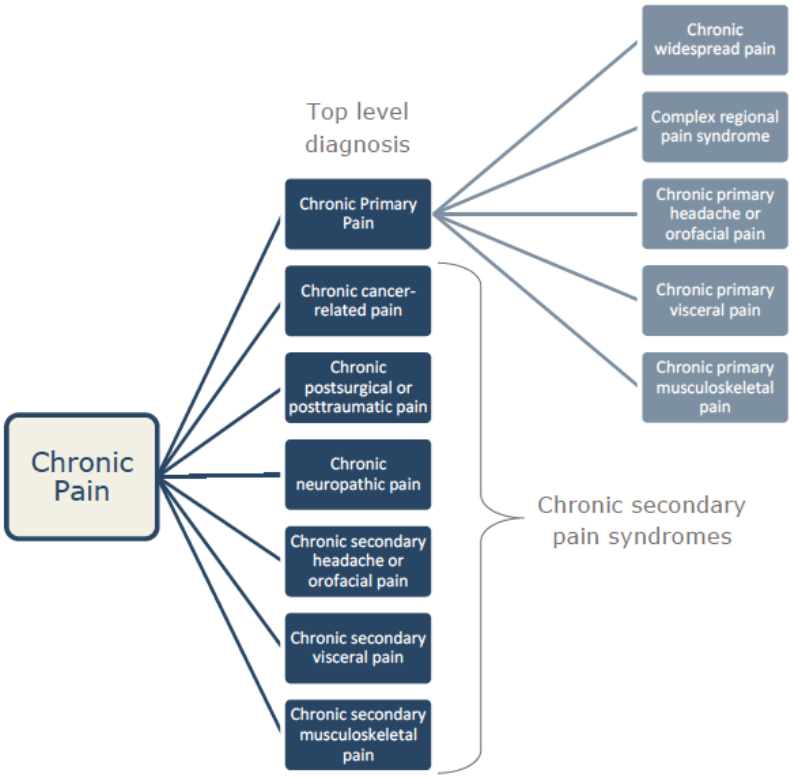

Figure 2-1A simplified classification of major pain conditions according to ICD-11 (Treede et al., 2019).

As **Figure 2-1** shows in the top-level diagnoses (in navy) include both primary and secondary chronic pain syndromes. First level diagnoses originating from chronic primary pain in pale navy. Chronic secondary pain first level diagnoses are not included in this figure, neither are 2nd or 3rd level diagnoses (Rankin, 2020).

Furthermore, neuroimaging studies have provided valuable insights into the brain's role in COFP. Diffusion-weighted imaging (DWI) and task-based functional MRI have revealed alterations in brain structure, function, and neurochemistry in COFP patients, particularly in pain-processing regions. In cases of idiopathic/atypical COFP such as atypical TMD myalgia (Moayedi & Hodaie, 2019) and trigeminal neuralgia (Zakrzewska & McMillan, 2011), there is evidence that they are centrally mediated, and thus neuroimaging can help shed light on the mechanisms underlying pain (Moayedi & Hodaie, 2019).

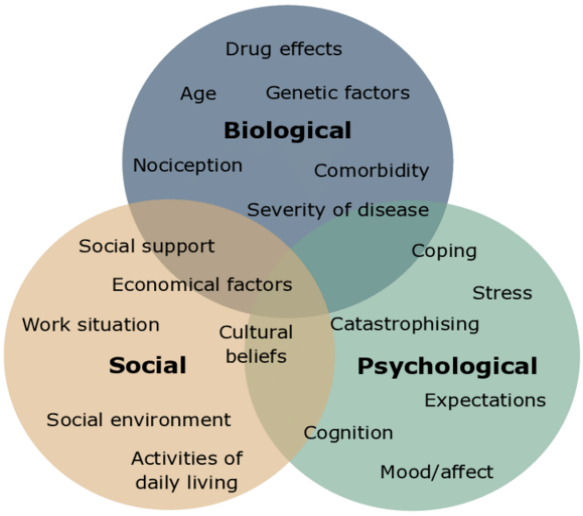

Figure 2-2 Updated biopsychosocial model of chronic pain (Fillingim, 2017; Gatchel, 2013)

The biopsychosocial model (Rankin, 2020) offers a comprehensive framework for understanding and managing COFP by integrating biological, psychological, and social factors **(Figure 2-2)**. This model recognizes the interplay of these distinct factors in pain perception and management, supporting a holistic therapy approach (Bertozzi et al., 2013; Jochimsen et al.,

2024). Therefore, multidisciplinary chronic pain clinics embody this approach, combining pharmacological treatments, psychological therapies, and social interventions to address COFP's complex and multifactorial nature **(Figure 2.2)**.

While pharmacological treatments target the biological aspects of pain via drug families such as anticonvulsants for trigeminal neuralgia and anti-inflammatory medications for TMD, psychological therapies, which includes cognitive-behavioral therapy (CBT), manage emotional and cognitive factors. Social interventions, e.g., patient education and support groups, address social support and resilience (O'Connor et al., 2015; Zhu et al., 2020). A bold amount of evidence underscores the effectiveness of an integrated biopsychosocial model, demonstrating the significance of multidisciplinary clinics in improving pain, function, and psychological well-being for patients receiving care (Hooker et al., 2024).

This study aims to provide a detailed analysis of the referral pathways, diagnosis, and management patterns of patients with COFP at a university orofacial multidisciplinary pain clinic (OMPC), as presented in Figure 2.3. By examining these factors, we pursue a better understanding of the characteristics and treatment journeys of these patients and identify potential areas for improving care delivery. In addition, we will evaluate the relationship between chronic orofacial pain symptoms, including TMJ pain and headache, and levels of psychological distress among patients with chronic orofacial pain conditions.

Psychological distress is commonly assessed by considering life events and cognitive evaluations. The Adverse Childhood Experiences (ACEs) test, Pain Catastrophizing Scale (PCS), and Injustice Experience Questionnaire (IEQ) are well-known tools used to measure distress and related psychological factors. For instance, individuals with high ACE scores often report

increased levels of suffering, including symptoms of depression, anxiety, and post-traumatic stress disorder (PTSD). A study featured in the American Journal of Preventive Medicine revealed that adults with high ACE scores were significantly more prone to experiencing health challenges (Felitti et al., 1998).

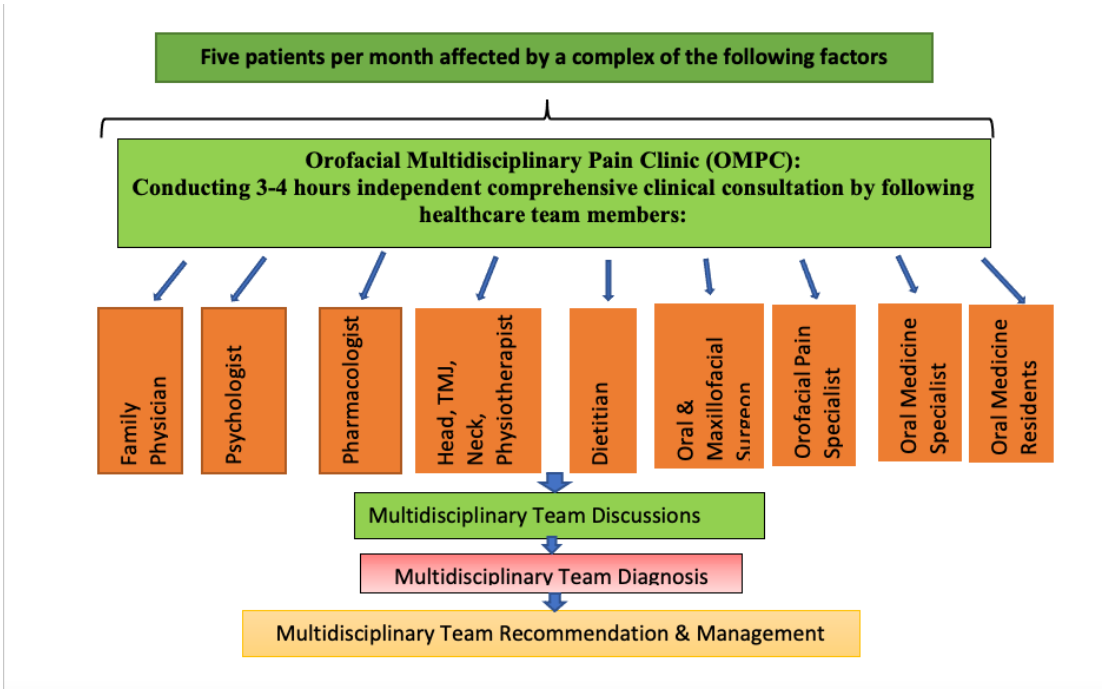

Figure 2-3 School of Dentistry Outpatient Chronic Orofacial Multidisciplinary Pain Clinic

Psychological distress is commonly assessed by considering life events and cognitive evaluations. The Adverse Childhood Experiences (ACEs) test, Pain Catastrophizing Scale (PCS), and Injustice Experience Questionnaire (IEQ) are well-known tools used to measure distress and related psychological factors. For instance, individuals with high ACE scores often report increased levels of suffering, including symptoms of depression, anxiety, and post-traumatic stress disorder (PTSD). A study featured in the American Journal of Preventive Medicine

revealed that adults with high ACE scores were significantly more prone to experiencing health challenges (Felitti et al., 1998).

High scores on the PCS are also associated with increased distress, such as heightened levels of anxiety and depression among those dealing with chronic pain. Catastrophizing can worsen the psychological effects of pain, creating a cycle of heightened pain perception and distress. A research article in the Clinical Journal of Pain points out that catastrophizing serves as a predictor of disability caused by pain and distress (Sullivan, Bishop, & Pivik, 1995).
The IEQ measures an individual's perceptions of unfairness regarding pain and injury. It evaluates notions of injustice and the severity and irreparability of loss in assigning blame to others. Through this questionnaire, researchers can better comprehend how feelings of injustice impact a patient's well-being and the psychological effects of injuries (Sullivan, Scott, & Trost, 2012). Additionally, higher scores on the IEQ are linked to increased distress, encompassing emotions such as anger, depression, and anxiety. The perception of injustice can worsen distress as well as impede recovery from injuries or illnesses. A study published in the Journal of Pain revealed that perceived injustice plays a role in pain experiences and psychological distress (Sullivan et al., 2012).

2.2 Materials and Methods

A retrospective medical chart review study was implemented, using patient charts from January 2018 to December 2023 from the Outpatient Chronic Orofacial Multidisciplinary Pain Clinic within the Oral Medicine Clinic Program, University of Alberta, Edmonton, Canada. The Orofacial Multidisciplinary Pain Clinic (OMPC) included a maximum of five patients every

month. Patient triaging was based on the information in the referral; however, the referrals were not always comprehensive, and some details were missing **(Table 2-1).**

Table 2-1 Outpatient Multidisciplinary Chronic Orofacial Pain Clinic Criteria for Patient Triaging

1	Non-odontogenic pain that persists after root canal and extractions.
2	Musculoskeletal complaints that have failed to respond to conservative treatment such as physiotherapy, oral appliance, and Botox injections.
3	Extensive medical history that may benefit from a review of medications and/or surgical intervention(s) AND with an explicit or implicit psychological component.
4	Several years of orofacial pain accompanied by migraine headaches, or orofacial pain and other musculoskeletal complaints that have been poorly managed.
5	Any complaint (Musculoskeletal, Neurovascular, Neuropathic) that has been examined by several practitioners but remains undiagnosed and/or with no proper treatment or only "trial treatments" that have failed.
6	Two or more of the above categories that are not completely full filled, however, patient is from far away (5+ hours of driving or flight).

A ten-step methodology for conducting medical clinical chart reviews, as outlined in **Table 2-2** (Vassar & Matthew, 2013) was followed.

Table 2-2 Summary of retrospective chart reviews (Vassar & Matthew, 2013)

1	Create well-defined, clearly articulated research questions
2	Consider sampling questions *a priori*
3	Operationalize variables included in retrospective chart review
4	Train and monitor data abstractors
5	Develop and use standardized data abstraction forms
6	Create a data abstraction procedure manual
7	Develop explicit inclusion and exclusion criteria
8	Address inter-rater and intra-rater reliability
9	Conduct a pilot test
10	Address confidentiality and ethical considerations

Implementing Vassar and Matthew's (2013) seminal study, we used well-defined research questions to guide the collection of core variables for this study **(Table 2-3)**.

The Diagnostic Criteria for Temporomandibular Disorders (DC/TMD), developed in 2014 and utilized in the present work, marks a major improvement in TMD standardized diagnosis. The DC/TMD adopts a "dual-axis" approach to TMD that considers not only the clinical features of the condition but also its psychosocial aspects. The first axis highlights the physical diagnosis obtained via a thorough clinical examination along with targeted and relevant questionnaires while the second axis looks at the patient's psychosocial condition.

The Axis II Assessment Protocol stresses the evaluation of an individual's psychosocial functioning with regard to their pain, especially in relation to Temporomandibular Disorders (TMD), as being critically important (Schiffman et al., 2014) . Evaluating a patient's behavioral, emotional, and cognitive experience of their pain should be done in addition to evaluating the physical source of the pain. Four domains can be assessed with the Axis II tool, namely: PHQ-4 (emotional functioning), JFLS (disease-specific physical functioning), GCPS (pain intensity subscale), and GCPS (general physical functioning using the pain interference subscale). Additionally, domains that straddle Axis I-specified behavior and that may be of use to healthcare providers or researchers are also included. It is worth noting that the Axis II Assessment Protocol suggests that any instrument used for assessments under the protocol should be valid, feasible, and reliable (Schiffman et al., 2014).

PHQ-4 Overview (Schiffman et al., 2014):

Under the Axis II Assessment Protocol, the PHQ-4 (Patient Health Questionnaire-4) is an important instrument used for screening. The PHQ-4 has been developed as a detector tool for psychological distress caused by depression and/or anxiety. As such, the PHQ-4 is considered by

healthcare professionals and researchers to be a valid and reliable instrument that is appropriate for all clinical environments and settings.

Scoring and Interpretation (Schiffman et al., 2014):

• If a patient generates a score of 7 or higher, this may be a sign of moderate levels of psychological distress. The patient should be observed over time to determine whether their distress increases or decreases.

• If a patient generates a score of 10 or higher, this may be a sign of severe psychological distress. The patient should undergo immediate further assessment and be provided with a referral to an appropriate clinician.

Context and Importance (Schiffman et al., 2014):

As one of several Axis II tools for assessing biopsychosocial factors related to pain perception and expression, the PHQ-4 represents an important strategy for gauging psychological and emotional aspects. Using this and other tools provided under the Axis II protocol is vital to gaining a more in-depth understanding of the different factors contributing to pain perception. Such an enhanced understanding can then help healthcare providers to develop more targeted approaches to pain management and overall treatment planning. Along with the aforementioned instruments, the Axis II protocol includes tools that can assess disability, pain intensity, and various functions that may be impacted by TMD. Again, the aim in adopting and applying this method is to gain a more wholistic evaluation of the patient in order to formulate the optimal intervention for that particular patient.

This multifactorial and comprehensive strategy to pain management not only makes the diagnosis more accurate, but also assists in the crafting of a personalized treatment plan.

Since its inception, the DC/TMD has shown high levels of reliability in relation to a broad cross-section of the population. It has also been validated in its application in several research studies. When used in clinical practice, the DC/TMD has shown diagnostic consistency and allows for easier communications between healthcare professionals, leading to overall better patient outcomes (Schiffman et al., 2014).

All completed patient charts were included in the descriptive analysis. Inclusion and exclusion criteria were established for the statistical analysis addressing the second objective of the study. Ethics approval was obtained from the University of Alberta Research Ethics Board (Pro00112133_REN3).

Although the original TMJ program at the University of Alberta was established in 1983, we focused on the 2018-2023 timeline to ensure the homogeneity of the data cohort. During the COVID-19 outbreak, the Orofacial Multidisciplinary Pain Clinic (OMPC) paused operations for six months (March-August 2020) and did not return to full functionality until September 2020. Patient charts were available in both hard copy and online formats through the University Electronic Health Record System.

Table 2-3 Study variables

Number of variables	Variables
1	Alberta Health No (PHN)
2	Sex
3	Age
4	Province
5	Smoke tobacco
6	Alcohol
7	Referring practitioner
8	Recreational drugs
9	Travel distance (Km) – Categorical
10	Waiting time (Day)- Categorical
11	Number of clinicians seen before OMPC
12	Number of clinicians seen the patient in OMPC
13	Number of receiving referrals from OMPC
14	Chief complaint
15	History of chief complaint
16	Medical history- Combinations
17	Mental health disorders
18	Cranial nerve disturbance
19	Extraoral examination findings
20	Intraoral examination findings
21	TMJ pain- Categorical
22	Headache /pain scale- Categorical
23	Current medication
24	Allergies
25	OMPC diagnosis (24 variables)- ICD-9/ ICD-10/ agnosis-1
26	OMPC Treatment pattern (8 variables)
27	Psychological scales /ACE/PCS/IEQ

OMPC: Orofacial Multidisciplinary Pain Clinic**; Km:** Kilometer; **ICD:** International Classification of Diseases **COP:** International Classification of Orofacial Pain; **ACE:** Adverse Childhood Experiences; **PCS:** Pain Catastrophizing Scales; **IEQ:** Injustice Experience Questionnaire.

2.2.1 Data Collection

The charts reviewed include a comprehensive set of questionnaires (Appendix 4) completed by the patient and the clinical team before and during the orofacial multidisciplinary assessment. The package includes the patient's consent for assessment by the clinical professionals listed on the form; chief complaint(s); history of chief complaint(s); demographic information (sex, age, address of residence and distance of address to the OMPC); social history (tobacco smoking, alcohol consumption, recreational drug use); referring health provider type; date that the referral was received and visit date at the OMPC (these dates were used to calculate the waiting time); medical history, including mental health and psychological disorders, cranial nerve disorders, TMJ pain, headaches, number of health providers seen by the patient prior to the OMPC assessment, potential previous diagnosis(es), intra- and extra-oral assessments, current/past medications, and potential allergy(ies). The distance travelled by the patient was calculated using the patient's residential postal code and Google Maps. The driving distance to the Kaye Edmonton Clinic (T6G 1Z1) was also calculated. The final diagnosis of each patient was obtained from the patient records, along with the correspondence (letter) sent to the referring clinician.

Data were accessible only to the primary investigator and a research assistant approved by the University of Alberta Research Ethics Board. A mid-process pilot test confirmed data accuracy, revealing no discrepancies. Data were transferred to password-protected Microsoft Excel and stored on an encrypted USB. SPSS (version TBD) was used for descriptive statistical analysis.

2.2.2 Statistical Analysis

For the statistical analysis in this study, only patient charts from February 2020 to December 2023 were included. Charts prior to February 2020 were excluded because they did not include the three psychological scales (ACE, PCS, and IEQ) introduced at the OMPC in February 2022. Patients who declined to be assessed for these psychological scores during the psychological interview were also excluded from the statistical analysis. TMJ pain and headaches were used as core symptoms of chronic orofacial pain to examine potential associations with psychological distress.

Demographics, chronic orofacial pain symptoms (TMJ pain and headaches), and psychological distress scales were described using number (n), percentage (%), mean, standard deviation (SD), and median. The associations between response variables (TMJ pain, headache) and exploratory factor variable scores (ACE, PCS, and IEQ) **(Table 2-4) (Appendices 5-6-7)** were tested by applying the Pearson's chi-square test or the Fisher's exact test when small sample sizes of one or more cells [$n < 5$] were observed. Statistical significance was set to p-value < 0.05. Chi-square tests inform whether response variables are associated (yes or no) with factors variables. To quantify the association between levels of the response variables and categories of explanatory variables, logistic models were further applied after aggregation of categories, as informed by the data.

Table 2-4 Psychological Scores

No	Psychological Scales	Score Ranges	Score Categories
1	ACE: Adverse Childhood Experiences	Score: 0-10	Low risk: 0 Intermediate risk: 1-3 without health condition(s) High risk: 1-3 with health condition(s) OR ≥4
2	PCS: Pain Catastrophizing Scale	Score: 0-52	Low:1-14 Moderate:15-25 High: ≥26
3	IEQ: Injustice Experiencing	Score: 0-48	Low: <19 Moderate: 19-29 High: ≥30

The PCS measures negative mental states that may occur either during anticipated painful experiences or actual ones. In general, the higher the PCS score, the higher the pain perception and the more entrenched the chronic pain (Sullivan et al., 1995). The PCS thus introduces a psychological aspect in relation to individuals' experience of their pain and how they manage it. The IEQ also assesses the psychological components attached to pain perception by injecting a measure of unfairness or injustice into the suffering. Like the PCS, the higher the IEQ scores, the worse the pain and treatment outcome (Sullivan et al., 2008). A patient's perceptions of unfairness in their suffering can result in chronic emotional distress, impeding recovery (Scott et al., 2013). These findings regarding past traumatic experiences and perceptions of injustice in relation to the patients' personal pain experience demonstrate the importance of developing pain management strategies that include trauma-informed approaches.

2.3 Results

A total of 288 patient charts assessed by the outpatient orofacial multidisciplinary pain clinic (OMPC) team from January 2018 to December 2023 were included. **Tables 2-5** presents a descriptive statistical analysis of the demographic and biopsychological characteristics of the selected patients with chronic orofacial pain. As shown in the table, the patients ranged in age from 13 to 93 years, with a mean (SD) age of 46.69 (16.5); 82.6% were female, and 94.4% resided in Alberta (the other two main provinces of residence were Saskatchewan and British Columbia). The patients self-reported current/past tobacco smoking, alcohol consumption, and recreational drug use at rates of 15.3%/21.0%, 58.3%, and 15.3% /8.3%, respectively. Data on waiting time and travel distance to the OMPC were also collected and analyzed, along with the patient's medical history, which included information on mental health and psychological disorders, cranial nerve disorders, TMJ pain, headaches, number of health providers seen prior to assessment, intra- and extra-oral assessments, current/past medications, and potential indicated allergy(ies), diagnosis(es) (**Tables 2-6)**, and recommended management. **(Table 2-7).**

The descriptive statistics for the study variables on TMJ pain and headaches reveal notable patterns among the total number of 162 participants. For TMJ pain, 10.49% (n=17) reported no pain, 6.17% (n=10) reported mild pain, 37.04% (n=60) experienced moderate pain, and 46.30% (n=75) reported severe pain, indicating that moderate to severe TMJ pain was most common. Similarly, for headache severity, 32.72% (n=53) reported no headaches, 5.56% (n=9) had mild headaches, 24.69% (n=40) experienced moderate headaches, and 37.04% (n=60) reported severe headaches. Mild pain was reported by a small percentage of individuals, specifically 6.17% for TMJ pain and 5.56% for headaches.

Table 2-5 Biopsychosocial Factors			
Variable	**Category**	**N**	**(%)**
Sex	Female	237	82.3
	Male	101	17.4
	Missing	1	0.3
	Total	288	100.0
Age	Mean (46.7)		
	SD (16.5)		
	Minimum (13)		
	Maximum (93)		
Province	Alberta	272	94.1
	British Columbia	2	0.7
	Saskatchewan	9	3.2
	Others	5	2.0
	Total	288	100.0
Smoking Tobacco	Yes	44	15.3
	No	179	62.2
	Past smoker	61	21.1
	Missing	4	1.4
	Total	288	100.0
Alcohol Consumption	Yes	168	58.3
	No	115	40.0
	Missing	5	1.7
	Total	288	100.0
Recreational Drug Use	Yes	44	15.3
	No	215	74.7
	Past users	24	8.3
	Missing	5	1.7
	Total	288	100.0
Referring Practitioner	Dentist	171	59.4
	Dental specialist	46	16.0
	Family physician	63	21.9
	Medical specialist	3	1.0
	Others	4	1.4
	Missing	1	0.3
	Total	288	100.0
How Many Clinicians Seen Patient before OMPC	One	9	3.1
	Two	46	16.0
	Three	75	26.0
	Four	44	15.3
	> 4	110	38.2
	Missing	4	1.4
Allergies	Yes	163	56.6
	No	119	41.3
	Missing	6	2.1
	Total	288	100.0

Table 2-5 CONT: Biopsychosocial Factors

Variable	Category	N	(%)
Waiting Time for First OMPC Appointment (Day)	0-30	23	8.0
	31-90	72	25.0
	> 90	188	65.3
	Missing	5	1.7
	Total	288	100.0
Traveled Distance to OMPC (Km)	0-15	89	30.9
	16-50	81	28.1
	51-100	22	7.6
	101-200	28	9.7
	>200	68	23.6
	Total	288	100.0
Number of Clinician Seen During OMPC	8	87	30.2
	<8	193	67.0
	Missing	8	2.8
	Total	288	100.0
Number of Clinician Recommended by OMPC	No referral	23	8.0
	One referral	113	39.2
	More than one referral	141	49.0
	Missing	11	3.8
	Total	288	100.0
Chief Complaint	TMJ pain	117	40.6
	Headaches	4	1.5
	Talking or eating	9	3.1
	Ear pain	4	1.4
	Mouth opening/closing	83	28.8
	Locking/ Limitation		
	Sleep difficulties	28	9.7
	Combination	36	12.5
	Missing	7	2.4
	Total	288	100.0
History of Chief Complaint	TMJ pain	28	10.0
	Musculature pain	4	1.0
	Migraine headaches	2	0.7
	Other headaches	2	0.7
	Neck pain	1	0.3
	Sleep difficulties	3	1.0
	Family history TMD	1	0.3
	Combination	238	83.0
	Missing	9	3.0
	Total	288	100.0

Table 2-5 CONT: Biopsychosocial Factors			
Variable	**Category**	**N**	**(%)**
Medical history	Heart disease	7	2.4
	Blood pressure	2	0.7
	Respiratory disease	3	1.0
	Kidney/Urinary disorder	1	0.3
	Cancer	4	1.4
	Muscle/ Bone/Connective tissue disorder	10	3.5
	Infectious disease	1	0.3
	Head/Eye/Nose/Throat	4	1.4
	Dermatology problem	1	0.3
	Anxiety/Depression	11	4.0
	Eating disorder	1	0.3
	Combination	220	76.4
	Missing	23	8.0
	Total	288	100.0
Mental Health Disorder	Anxiety	52	18.1
	PTSD	9	3.1
	Depression	20	7.0
	Bipolar	1	0.3
	Insomnia	11	3.8
	Combination	99	34.4
	Not applicable	96	33.3
	Total	288	100.0
Cranial Nerves Examination	Trigeminal neuralgia	20	6.9
	Neuropathic pain	52	18.1
	Paresthesia	5	1.7
	Facial pain (PIFP)	13	4.5
	Combination	2	0.7
	Not applicable	196	68.1
	Total	288	100.0
Extraoral Examination	No abnormality	272	94.5
	Abnormal	11	3.8
	Missing	5	1.7
	Total	288	100.0
Intraoral Examination	Soft tissue	44	15.3
	Teeth decay	1	0.3
	Teeth attrition	11	3.8
	Teeth sensitivity	3	1.0
	Missing teeth	67	23.3
	Periodontal disease	1	0.3
	Combination	114	40.0
	Missing	47	16.3
	Total	288	100.0

Table 2-6 OMPC Diagnosis- ICD-9 729.1; ICD-10 M79.1			
Variable	**Category**	**N**	**(%)**
Myalgia	Masticatory muscles	42	14.6
	Cervical	27	9.4
	Masticatory and Cervical muscles	155	53.8
	Not applicable	63	21.9
	Missing	1	0.3
	Total	288	100.0
Arthralgia	Yes	97	33.7
	No	190	66.0
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to arthritis	Yes	7	2.4
	No	280	97.2
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to systemic arthritis	Yes	1	0.3
	No	284	98.6
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to disc displacement	Yes	102	35.4
	No	183	63.5
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to disc displacement with reduction	Yes	24	8.3
	No	263	91.3
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to disc displacement with reduction, with intermittent locking	Yes	13	4.5
	No	274	95.1
	Missing	1	0.3
	Total	288	100.0
TMJ pain attributed to disc displacement without reduction	Yes	10	3.5
	No	276	96.2
	Missing	1	0.3
	Total		
TMJ pain to degenerative joint disease	Yes	59	20.5
	No	227	78.8
	Missing	1	0.3
	Total	288	100.0

Table 2-6 CONT: OMPC Diagnosis- ICD-9 729.1; ICD-10 M79.1			
Variable	**Category**	**N**	**(%)**
TMJ pain attributed to subluxation	Yes	28	9.7
	No	257	89.2
	Missing	1	0.3
	Total	288	100.0
Classical trigeminal neuralgia	Yes	15	5.2
	No	271	94.1
	Missing	1	0.3
	Total	288	100.0
Classical trigeminal neuropathic pain	Yes	12	4.3
	No	275	95.5
	Missing	1	0.3
	Total	288	100.0
Idiopathic trigeminal neuropathic pain	Yes	28	9.7
	No	259	89.9
	Missing	1	0.3
	Total	288	100.0
Glossopharyngeal neuralgia	Yes	0	0.0
	No	287	99.7
	Missing	1	0.3
	Total	288	100.0
Glossopharyngeal neuropathic pain	Yes	0	0.0
	No	287	99.7
	Missing	1	0.3
	Total	288	100.0
Primary migraine headaches:	Yes	55	19.1
	No	231	80.2
	Missing	2	0.7
	Total	288	100.0

Table 2-6 CONT OMPC Diagnosis- ICD-9 729.1; ICD-10 M79.1			
Variable	**Category**	**N**	**(%)**
Primary tension-type orofacial pain	Yes	36	12.5
	No	250	86.8
	Missing	1	0.3
	Total	288	100.0
Primary trigeminal autonomic cephalalgia:	Yes	0	0.0
	No	287	99.7
	Missing	1	0.3
	Total	288	100.0
Burning mouth syndrome (BMS)	Yes	18	3.1
	No	268	93.1
	Missing	2	0.6
	Total	288	100.0
Persistent idiopathic facial pain (PIFP)	Yes	9	3.2
	No	278	96.5
	Missing	1	0.3
	Total	288	100.0
Parafunctional habits	Yes	122	42.4
	No	164	57.0
	Missing	2	0.6
	Total	288	100.0
Others (28 conditions)	Yes	72	25.0
	No	213	74.0
	Missing	3	1.0
	Total	288	100.0
Persistent idiopathic facial pain with somatosensory changes	Yes	15	5.2
	No	270	93.8
	Missing	3	1.0
	Total	288	100.0
Trigeminal postherpetic neuralgia	Yes	1	0.4
	No	284	98.6
	Missing	3	1.0
	Total		

Table 2-7 OMPC Management

Variable	Category	N	(%)
Oral Appliance Therapy	Yes	204	70.8
	No	83	28.9
	Missing	1	0.3
	Total	288	100.0
Physiotherapy Chiropractic	Yes	198	68.8
	No	89	30.9
	Missing	1	0.3
	Total	288	100.0
Interventional Pain Management	Diagnosis injection	2	0.7
	Trigger point injection	12	4.2
	Botox injection	144	50.0
	Not applicable	130	45.1
	Total	288	100.0
Laboratory Investigation	Blood test	18	6.4
	Smear test	10	3.6
	Not applicable	260	90.0
	Total	288	100.0
Image Investigation	Panoramic	151	52.4
	CBCT	50	17.4
	MRI	29	10.1
	CT Scan	7	2.4
	Ultrasound	5	1.7
	Not applicable	44	15.3
	Missing	2	0.7
	Total	288	100.0
Pharmacologic Management	TCA	20	6.9
	SSRI/SSNR/Triptan	13	4.5
	Topical NSAID/Compound Topical	46	16.0
	Gabapentinoids Drugs	6	2.1
	Muscle Relaxant /Baclofen	9	3.1
	Clonazepam	3	1.0
	Combined Drugs	135	46.9
	Not Applicable	56	19.4
	Total	288	100.0
Dental Procedure Recommendation	Yes	38	13.2
	No	260	86.8
	Total	288	100.0
Referral to Specialist	Yes	145	50.3
	No	143	49.7
	Total	288	100.0

In terms of the ACE (Adverse Childhood Experiences) scores, 14.81% (n=24) declined to answer, 17.28% (n=28) were categorized as low-risk, and 67.90% (n=110) were considered high-risk For PCS (Pain Catastrophizing Scale) scores, 14.81% (n=24) declined to answer, 29.63% (n=48) were at low risk, another 29.63% (n=48) were at moderate risk, and 25.93% (n=42) were at high risk. Regarding the IEQ (Injustice Experience Questionnaire), 14.81% (n=24) declined to answer, 37.65% (n=61) were at low risk, 26.54% (n=43) were at moderate risk, and 20.99% (n=34) were at high risk.

It is noteworthy that a substantial proportion of individuals (14.81%, n=24) declined to answer the ACE, PCS, and IEQ variables. These individuals were not included in the inferential analysis. Based on the chi-square test and Fisher's exact test, no statistically significant associations were found between the response variables (TMJ pain, headache) and the exploratory factor variable scores for ACE, PCS, and IEQ.

A binomial logistic regression was conducted to determine if individuals at moderate or high risk according to ACE, PCS, or IEQ were more likely to experience moderate or severe TMJ pain or headaches compared to those at low risk. The results, presented in **Table 2-8,** indicate significant associations in individuals with a moderate risk of PCS had 3.7 times higher odds of experiencing moderate to severe TMJ pain compared to those with a low PCS risk. Additionally, individuals with a high risk of PCS had 3.9 times higher odds of experiencing moderate to severe headaches compared to those with a low PCS risk. Furthermore, individuals with a high risk of IEQ had 2.8 times higher odds of experiencing moderate to severe headaches compared to those with a low IEQ risk.

Table 2-8 Binomial Logistic Regression Results

Outcome	Explanatory	Score level	OR	95 % CI	p-value
TMJ pain	Ace score	Low risk	1 (reference)		
		High risk	1.18	(0.40, 3.55)	0.763
	PCS score	Low risk	1 (reference)		
		Moderate	**3.67**	**(1.09, 12.35)**	**0.036***
		High risk	1.22	(0.46, 3.27)	0.690
	IEQ score	Low risk	1 (reference)		
		Moderate	1.51	(0.52, 4.40)	0.450
		High risk	0.94	(0.33, 2.68)	0.915
Headache	Ace score	Low risk	1 (reference)		
		High risk	1.80	(0.74, 4.33)	0.192
	PCS score	Low risk	1 (reference)		
		Moderate	1.40	(0.62, 3.16)	0.411
		High risk	**3.91**	**(1.50, 10.17)**	**0.005***
	IEQ score	Low risk	1 (reference)		
		Moderate	1.76	(0.78, 3.96)	0.174
		High risk	**2.76**	**(1.08, 7.05)**	**0.034***

(*) Indicate significant associations.

2.4 Discussion

This study illustrates the interplay between the biopsychosocial chronic model and the OMPC, as displayed in the **Figure 2-4** flowchart. Our findings indicated that the OMPC applied the biomedical pharmacological method for treating patients with chronic pain, and that this approach had either no or relatively little positive effect. In light of these findings, the present study focused more on the model's psychological elements related to COFP, using the ACE, PCS, and IEQ psychological scales. **ACEs** were first described by CDC-Kaiser in 1998, showing they can affect health outcomes, whether physical or mental, along with socioeconomic status, life opportunities, and behaviour (Boullier & Blair, 2018). The **PCS** reflects a patient's hyper-

negative mental perceptions of anticipated or actual pain (Sullivan et al., 2001), while the **IEQ** measures a patient's perceived sense of injustice regarding various aspects of their pain experience.

Sullivan et al. found that a patient's perception of injustice develops along the lines of appraisal. This can have various expressions, depending on which aspect is being appraised. Regarding a loss of functioning due to injury, the patient may express: "Most people don't understand how severe my condition is." Regarding attributing blame as part of the appraisal of injustice, the patient may express: "I am suffering because of someone else's negligence." Regarding the patient's sense that their pain experience is somehow unfair, they may express: "It all seems so unfair", and in relation to irreparable loss, the patient may express: "My life will never be the same" (Sullivan et al., 2008).

The results confirmed our hypothesis that there are significant associations between symptoms of COFP (TMJ pain and headaches) and psychological distress. Furthermore, the study showed that individuals who have a moderate risk of PCS have almost 4 times higher odds of experiencing moderate to severe TMJ pain compared to those with a low PCS risk, and that patients with a higher PCS score have almost 4 times higher odds of experiencing moderate to severe headaches compared to those with a low PCS risk. In addition, patients who experience a high risk of IEQ have 2.8 times higher odds of experiencing moderate to severe headaches compared to those with a low IEQ risk.

Our study, however, failed to find any association between ACE scores and chronic orofacial pain symptoms, TMJ pain, or headaches, despite showing more than twice the value score of the general population (67.9 % vs 30%). This finding is in contrast with the evidence in

literature, which revealed that individuals with high ACE scores reported intense pain and greater emotional distress, underscoring the need for trauma-informed care in managing COFP (Anda, Tietjen, Schulman, Felitti, & Croft, 2010; Sikorski, Mavromanoli, Manji, Behzad, & Kreatsoulas, 2023; T Jones, 2016). This discrepancy warrants further investigation to determine what caused this difference.

Additionally, our results indicate that a significantly higher number of females (82.3%) than males among the selected patients experienced COFP, a finding that is reflected in a bold amount of evidence from the literature. A systematic review and meta-analysis demonstrated that women had double the risk of developing TMD and COFP compared to men (Bueno, Pereira, Pattussi, Grossi, & Grossi, 2018).

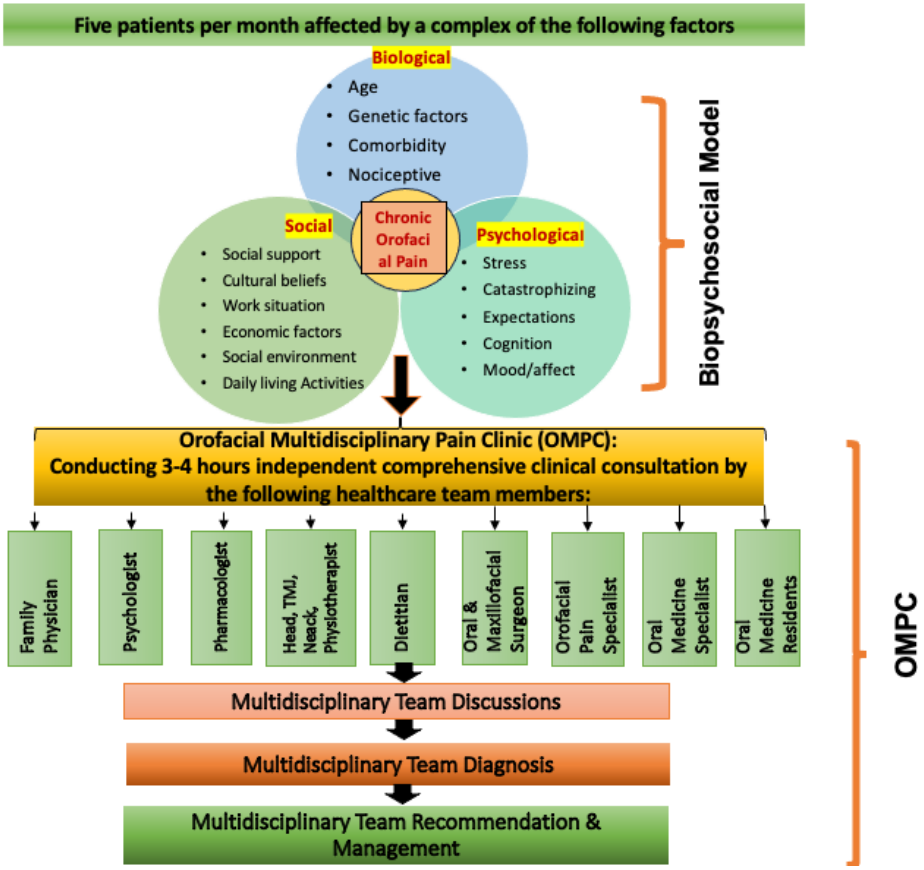

Figure 2-4 Biopsychosocial Chronic Orofacial Multidisciplinary Pain Clinic Flowchart

Similarly, a longitudinal study conducted in Sweden using data from 525,707 dental check-ups from 2010 to 2017 showed that women are at a significantly higher risk of developing COFP (Häggman-Henrikson et al., 2020).The biopsychosocial model emphasizes that pain is shaped by psychological and social elements. This model holds relevance for COFP, considering the interplay of such factors in facial and oral pain (Rankin, 2020). Understanding these influences aids in customizing gender interventions to enhance pain management outcomes for women.

Furthermore, women tend to experience pain conditions, like fibromyalgia, chronic fatigue syndrome and chronic pelvic pain, frequently. According to an article from Harvard Health, 70% of individuals dealing with pain are women, even though 80% of pain studies focus on male participants (Fillingim et al., 2009).

The differences in how men and women experience pain can be linked to factors such as life changes and genetics. Societal influences and psychological aspects like stress, trauma, and coping strategies may also play a role (Mogil, 2012). Women often encounter obstacles in accessing pain relief due to biases in research and treatment methods. This emphasizes the need for developing pain management strategies that consider gender differences (Bartley & Fillingim, 2013).

Our present study also illustrates the complexity of treating COFP patients who have a combination medical history. Patients suffering from long-term COFP, and other persistent pain issues often have a range of health conditions, making it difficult for clinicians to diagnose and treat the patient effectively. This complexity stems from a mix of backgrounds, mental states, and social influences, resulting in a multi-dimensional pain experience that demands comprehensive care strategies (Sessle, 2021; Zakrzewska, 2013). Chronic orofacial pain, such as

TMD, coexists with other chronic ailments like headaches, fibromyalgia, and irritable bowel syndrome (Sessle, 2021). Studies also show that COFP is frequently linked to health conditions such as depression and anxiety, which intensifies the perception of pain and further complicates treatment methods (Sessle, 2021; Zakrzewska, 2013)

The development of COFP is influenced by a broad range of factors as well as environmental triggers. Individual variations in how pain is felt, such as allodynia and hyperalgesia, suggest that an individual predisposition to pain is affected by these factors. Moreover, patients dealing with pain often exhibit sensory spread, where heightened sensitivity to pain extends beyond the initial injury site, making diagnosis and treatment more challenging (Zakrzewska, 2013). The medical backgrounds of patients with COFP can often involve seemingly unrelated health issues, such as respiratory disorders, heart problems, and sleep disturbances. The wide spectrum of health conditions not only plays a role in the nature of pain but also calls for an individualized and comprehensive treatment strategy that addresses both the primary pain issue and any related health issues (Journal of Headache and Pain 2019).

Chronic pain ailments like fibromyalgia and chronic fatigue syndrome are often accompanied by additional health disorders, making treatment more intricate. Research indicates that these conditions disproportionately affect women, with connections to genetic factors (Bartley & Fillingim, 2013). Individuals dealing with pain frequently have ailments such as depression and anxiety, which are not just outcomes but integral aspects of the pain experience. This coexistence emphasizes the need for treatment plans that encompass both pain management and mental well-being support (Mogil, 2012). Managing pain becomes more

challenging when multiple health issues are involved. Effective care necessitates an approach that considers not only the physical aspects but also the psychological and social dimensions of pain. To enhance results and optimize patient outcomes, it is essential to consider this method when creating treatment strategies (Bartley & Fillingim, 2013).

Moreover, patients with chronic pain often face significant challenges in accessing timely and effective healthcare. Two critical factors that exacerbate their condition are long waiting times to visit healthcare providers and distance from healthcare centers. These factors, when adverse, can significantly impact the management and outcomes of chronic pain, leading to worsening symptoms and decreased quality of life.

In our study, almost 30% of the selected patients had to travel more than 200 km to present to the university OMPC, and about 66% of the patients had to wait for more than 90 days for the OMPC assessment. Long waiting times for healthcare services can delay the diagnosis and treatment of chronic pain, leading to prolonged suffering and deterioration of the patient's condition. Studies have shown that extended waiting times are associated with increased pain intensity and higher levels of psychological distress among chronic pain patients (Liddy, Poulin, Hunter, Smyth, & Keely, 2017). The delay in receiving appropriate care can result in a more complicated clinical picture, making it harder to achieve effective pain relief (Jones & Phillips, 2019).

Furthermore, the uncertainty and frustration associated with long waiting times can exacerbate anxiety and depression, which are common comorbidities in chronic pain patients. These psychological factors can amplify the perception of pain, creating a vicious cycle that negatively impacts the patient's overall well-being (Liddiard, Raynor, DeJong, & Brown, 2023).

Additionally, the stress of waiting can undermine patients' confidence in the healthcare system, reducing their willingness to seek care in the future (Blythe & Ross, 2022).

Patients in rural or remote areas often face significant barriers to accessing healthcare services, including long distances to healthcare centers. This geographic barrier can lead to infrequent medical visits, delayed treatments, and poor adherence to prescribed management plans (White et al., 2021). A recent study showed that a lack of accessible healthcare exacerbates the chronic pain experience and limits the effectiveness of pain management strategies, and that patients who must travel long distances to receive care often experience worse health outcomes compared to those with easier access (Haeder, Weimer, & Mukamel, 2020). The logistical difficulties and costs associated with long-distance travel can discourage patients from attending regular follow-ups, leading to unmanaged pain and increased disability (Baldwin, 2019). Moreover, the strain of travel can itself be physically taxing, potentially aggravating pain symptoms (Zvolensky et al., 2020).

This is a retrospective study and one of the limitations is missing data. In this case, almost 15% of the participants failed to complete one of the psychological scales which had an effect not only in conclusions, but it is an aspect that warrants further investigation. Patient's mistrust in the healthcare system due to poor outcome interactions in the past and or fear of stigma may be factors playing a role in the refusal to complete these scales. This study was completed while the Covid-19 pandemic happened and the clinic was closed for 6 months, this certainly decreased the number of participants and some of the participants decline to attend even after the pandemic was over due to fear. Dentistry is a fee for service, so there might be

patients that meet the selection criteria and benefit from a multidisciplinary assessment; however, they were never referred to us due to financial barriers.

2.5 Conclusions

Our research findings show that when it comes to managing pain, focusing on the social aspects within the biopsychosocial model seems to have a more significant impact compared to relying solely on biomedical pharmacological methods, as seen in patients evaluated through the OMPC. Specifically, we noted a close association between psychological factors and symptoms of orofacial pain, such as TMJ discomfort, headaches, and distress. Individuals at risk of PCS were four times more likely to experience moderate to severe TMJ pain, while those with higher PCS scores had a similar likelihood of experiencing intense headaches.

Additionally, a higher risk of IEQ was associated with a threefold increase in the odds of experiencing moderate to severe headaches. Interestingly, despite the study population having higher ACE scores compared to the general population, no significant connection was found between these scores and chronic orofacial pain symptoms. Our study did, however, reveal a higher incidence of orofacial pain among females than males, consistent with existing research. This finding indicates that women are significantly more prone to developing conditions such as COFP and TMD. Furthermore, the biopsychosocial chronic pain model's emphasis on considering social factors in understanding pain is crucial for effectively addressing COFP concerns, particularly in women. Our findings highlight that the intricate nature of COFP is often intertwined with health issues such as depression and anxiety, which not only exacerbate the pain experience but also add complexity to treatment approaches.

Worth noting in the findings are the difficulties posed by long waiting times and considerable travel distances to health facilities. These factors intensify the patient's suffering and result in adverse health consequences stemming from postponed identification, intervention, and ongoing support. Addressing this issue calls for a healthcare approach aimed at enhancing accessibility, prompt treatment, and customized therapeutic plans to effectively manage chronic pain.

CHAPTER 3 DISCUSSIONS AND CONCLUSION

This chapter opens with a discussion of the OMPC's referral pathways, consultations, diagnoses, and treatment patterns, including an interpretation of the study's findings. The critical analysis involves a comparison of the key findings with those in the existing literature and stresses the findings' implications regarding the OMPC's potential future policy measures, clinical practice, and research directions. The clinic's referral pathways, challenges in diagnosing COFP, and multidisciplinary treatment effectiveness are all explored in detail. As well, the chapter discusses the various psychological elements that may be embedded within the patients' experience of COFP and notes how pain can impact and amplify the psychological distress of certain patients, and vice versa. The chapter also looks at the negative effects of long travel distances and wait times on patient outcomes. Following a brief discussion of the limitations of all these aspects of the study, the chapter closes by highlighting the critical need to provide integrated biopsychosocial strategies for the optimal management of COFP.

3.1 Discussion

This chapter highlights key findings regarding referral pathway analyses, consultations, diagnoses, and treatment patterns at the University of Alberta (U of A) Orofacial Multidisciplinary Pain Clinic (OMPC). The findings are viewed through the lens of published studies, while the impact of these findings on policy development, clinical practice, and potential research directions are also considered and discussed. To the best of our knowledge, the present study is the first to focus on the School of Dentistry Orofacial Multidisciplinary Pain Clinic at the U of A. The OMPC (formerly the TMJ Investigation Unit) opened in 1983, with the

stated intent of diagnosing and managing patients suffering from chronic orofacial and temporomandibular disorders.

The current best practice for managing chronic pain is a multidisciplinary team-work approach (Hylands-White, Duarte, & Raphael, 2017; Marttinen, Oura, Huttunen, Vartiainen, & Paananen, 2022). According to Gatchel et al. (2014), the biopsychosocial model of pain management advocates for a strategy that involves multiple health professionals, including physicians, psychologists, physiotherapists, etc., working together as a team to address the patient's needs and concerns (Gatchel, McGeary, McGeary, & Lippe, 2014).

The OMPC stands as the oldest – and the first – multidisciplinary orofacial chronic pain clinic in Canada. Run by the internationally respected U of A, the OMPC has on staff numerous pain and dentistry specialists who treat with exceptional expertise the referred patients suffering from chronic orofacial pain. Despite these high credentials, the clinic has for the most part flown under the radar of most academic health departments at the national and provincial levels (Force, 2019). For instance, the Canadian Pain Task Force's 2019 report entitled *Chronic Pain in Canada, Laying a Foundation for Action* (Force, 2019) stated that although chronic orofacial pain was surging, it was receiving little attention in the research field and that MCOPC's efforts to highlight chronic pain were being overlooked by the various levels of government as well as the broader medical community.

The U of A's multidisciplinary pain clinic has significantly evolved since it was first launched in 1983 at the university's hospital dental clinic. Initially, the pain clinic was staffed with a small group of health professionals whose aim was to manage chronic and complex TMJ disorders. By 1986, it had added a few more health provider specialists, including a psychologist

and physiotherapist, and had moved into the Dent/Pharm building on the U of A campus. A few years later, the clinic was renamed the TMD / Orofacial Pain Clinic.

In 1990, when the Graduate Program (MSc in Medical Sciences) combined with a 24-month post-graduate residency in TMD / Orofacial Pain of in 1990, the multidisciplinary clinic became part of the program and ran first on a bi-monthly basis until 2012 and then monthly. It also expanded to include even more health care disciplines, such as a pharmacist and family physician. In 2013, the clinic relocated to the Kaye Clinic, where a few years later it became part of the Oral Medicine Graduate Program. The OMPC today has six healthcare specialists on staff who continue the clinic's original mandate of diagnosing and managing treatments for desperate patients suffering from chronic orofacial pain.

After the OMPC, another management program for chronic pain sufferers of TMJ/OFP was opened in Toronto, Ontario, in 1984, called the Toronto Academic Pain Medicine Institute (TAPMI). Like the OMPC, TAPMI provides interdisciplinary health care to patients experiencing chronic pain. This institute is a collaboration of five Toronto-based pain centers, namely, the University Health Network, St. Michael's Hospital, Sinai Health, Women's College Hospital, and CAMH. Also like its predecessor, TAPMI adopts an integrated pain management approach that includes doctors and physiotherapists as well as social workers and psychologists. At TAPMI, the focus is on knowledge transfer between healthcare providers at different professional levels and from healthcare providers to patients and their families. Accordingly, TAPMI features self-management programs along with pain education classes that deeply inform the patients about their treatment options, such as interventional therapies (e.g., nerve blocks and injections), cognitive-behavioural therapies, and physiotherapy. Directing patients to specific community

healthcare providers and supporting those providers through mentorship is also a feature of the TAPMI system, ensuring a streamlined and personalized pain management experience for patients.

Evidence shows that chronic pain lasting more than three months becomes a distinct and separate medical problem rather than an isolated symptom (Hylands-White et al., 2017; Melzack & Wall, 1988). Prior to arriving at the OMPC, more than one-third (38%) of patients have seen four or more health providers. The lack of definitive diagnosis for their orofacial pain and subsequent lack of appropriate treatment or management bear silent witness to these patients' long-term suffering. In addition, evidence from the present study indicates that a significant percentage of patients (76.3%) reported a combination of systemic disease comorbidities. Specifically, 34.4% reported psychological suffering along with their orofacial pain, and 18.1% experienced at least one form of psychological distress such as anxiety. An astonishing 83% reported experiencing a combination of different types of orofacial pain, such as various kinds of headaches, persistent TMJ pain, masticatory muscle pain, and cervical pain. Numerous patients also reported other seemingly unrelated conditions such as sleep disorders and idiopathic pains other than orofacial.

The above findings agree with the assertion that chronic pain is a syndrome rather than an isolated symptom. As a syndrome, chronic pain is characterized not only by persistent physical pain, but also varying levels of disability and emotional issues, ultimately leading to social withdrawal symptoms in many cases. These manifestations co-exist and influence each other over time in an interaction termed "reciprocal determinism" (Bandura, 1978).

Until the early 1980s, the conventional biomedical approach to managing chronic pain with surgery and/or pharmacological treatments was the main intervention (Gatchel et al., 2014). However, this pain management strategy has since given way to the biopsychosocial model approach, which is considered by many healthcare professionals to provide more effective care for chronic pain disorders. The biopsychosocial model differs from the biomedical approach in that it takes into account the co-occurring psychological and social symptoms that accompany chronic pain (Engel, 1977; Gatchel et al., 2014).

In general, the biopsychosocial model of chronic pain asserts that pain is a deeply subjective experience (Gatchel et al., 2007). Therefore, pain is influenced by a myriad of factors in combination, such as physical pathologies and socioeconomic and psychological factors. All these subjective experiences affect how a patient reports his or her symptoms and level of disability (Gatchel et al., 2007). According to Gatchel et al. (2014), socioeconomic and psychosocial aspects can range from cognitive abilities, attention span, and emotional makeup, to family interactions and employment.

The present study identified a number of different referral pathways to the OMPC. The majority of the referrals were from the patient's attending dentist (59.4%), while the rest came from dental specialists (16%) or other medical practitioners (24%). The varying sources of the referrals shows the interdisciplinary aspect of orofacial pain treatment and management, thus underscoring the necessity for cooperation and collaboration among healthcare practitioners. It also indicates different awareness levels among these professionals concerning orofacial pain disorders. Other recent studies exhibit a similar referral pattern, showing that primary care physicians were the main referral source to pain clinics. For instance, Greenwood-Lee et al.'s

research uncovered that primary care referrals have become a major referral source to clinics specializing in chronic pain management (Greenwood-Lee, Jewett, Woodhouse, & Marshall, 2018).

This study also identified a considerable number of different neuropathic pain types among the OMPC's patient population. The prevalence of neuropathic pain is supported by recent Australian research that found 30% to 40% of patients suffering from neuropathic pain presenting to chronic pain clinics (Delcanho & Peck, 2018). The same study reported that the diagnostic process typically involved comprehensive assessments, including clinical examinations and imaging studies, underscoring the complexity of orofacial pain conditions. Based on their findings, the authors suggested that the delayed diagnosis observed in some cases points to a need for improved diagnostic criteria and training for primary care providers (Delcanho & Peck, 2018).

In the present study, a significant finding was the prevalence of temporomandibular disorders (TMD). This finding led to another, which was the higher prevalence of females suffering chronic orofacial pain in comparison to the number of males. Our finding accords with the existing literature on chronic pain, which reports that women tend to be highly susceptible to chronic pain conditions, including TMD. Interestingly, (Ryan et al., 2019) uncovered that among orofacial pain of non-dental origin, TMD is by far the most commonly reported type, with a two- to four-fold higher prevalence found in women aged 25 to 45.

The above-reported gender differences are better understood within the framework of the biopsychosocial model, as it takes into consideration how biology, psychology, and socioeconomic factors interact in the perception, treatment, and management of pain.

Accordingly, future research could consider management approaches and interventions that are gender-specific, in recognition that female patients with chronic orofacial pain have different needs than male patients. Investigations could include how psychosocial stressors, coping mechanisms, and hormonal changes affect women's pain experiences as well as their pain management and treatment outcomes.

Our study also found that main primary headaches, including migraine headaches, tension-type headaches, and Trigeminal autonomic cephalalgias, and some secondary headaches such headaches attributed to trauma or injury to the head and/or neck, posed an ongoing health issue for the clinic's chronic orofacial patients. This finding aligned with that of Wei et al. in their Trigeminal Autonomic Cephalalgias (TCA) study in a Multidisciplinary Tertiary Orofacial Pain Clinic. The authors confirmed the significant challenge of headaches in patients with chronic orofacial pain and the association of the history of headaches with orofacial pain, especially in patients with a history of migraine headaches (Wei, Moreno-Ajona, Renton, & Goadsby, 2019).

Furthermore, (Wei et al., 2019) reported treatment strategies at the clinic that were textbook multidisciplinary, with dental, psychological, and medical interventions integrated with rehabilitation. This approach follows (Engel, 1977) proposed biopsychosocial model of pain management, reflecting the various manifestations of chronic pain. The success level of different interventions, e.g., cognitive-behavioural therapy, medication management, or physical, was measured, with treatments that involved a combination of therapies reporting the highest success rates (Nees et al., 2020).

3.2 Interpretation of Findings

3.2.1 Referral Pathways and Clinical Implications

The diverse referral pathways mentioned above emphasize the critical importance of interdisciplinary education and communication. Increased clinician awareness of the multiple treatment options available both inside and outside their discipline along with standardized guidelines for the referral process would potentially result in earlier interventions and better outcomes for patients. Also, helpful would be educating health care providers, particularly primary care providers, on orofacial pain signs and symptoms, as this knowledge could lead to faster diagnosis and reduced waiting times for pain management.

In addition, incorporating additional relevant healthcare providers, such as an ENT specialist, neurologist, and social worker, into a multidisciplinary clinic would enhance the quality of care and reduce the prolonged waiting times for patients to receive referrals and appointments to rule out associated nasal, throat, ear, and brain pathological abnormalities. The social worker could further assist patients by facilitating access to a range of social services.

3.2.2 Diagnostic Challenges and Improvements

The main diagnostic challenges are delayed diagnosis and misdiagnosis, both of which underscore the importance of developing and following better diagnostic protocols. For instance, healthcare providers could improve their diagnostic accuracy by undergoing training programs to learn how to recognize orofacial pain and also how to appropriately manage it. Applying advanced technologies and diagnostic tools could result in more accurate and faster diagnoses.

3.2.3 Effectiveness of Multidisciplinary Treatment

Implementing multidisciplinary pain management programs that are comprehensive in scope is well-supported by positive patient outcomes, as mentioned in the referenced literature above as well as in the findings of the present study. Combining psychological, physical, and pharmacological therapies can greatly enhance results. Subsequent investigations could look at ways to determine optimal treatment combinations, especially pain management strategies that are more personalized, patient-centred, and patient-specific.

3.2.4. Psychological Distress and Chronic Orofacial Pain

The present study also found strong associations between psychological distresses and chronic orofacial pain, such as headaches and TMJ pain. The association was especially obvious in cases with higher PCS and IEQ scores. Specifically, those who had moderate or high PCS scores also had substantially higher chances of suffering moderate TMJ pain or severe headaches, while those with higher IEQ scores suffered more severe headaches.

The above findings highlight the need to consider psychological aspects when developing a management regime for chronic orofacial pain. Interventions that address psychological factors, e.g., cognitive-behavioral therapy (CBT), could help lessen the effects of perceived injustice and catastrophizing in relation to both pain severity and the patient's unique pain perception. Including psychological supports as a component in multidisciplinary treatment regimens will potentially enhance the pain management for the patient and boost their health outcomes.

Conversely, there was no obvious association between COFP-related headaches and TMJ pain and ACE scores, even though the value score for ACE was more than double that (67.9%) of the general population (30%). This finding contrasts sharply with previous research, which reported that patients with high ACE scores also experienced greater emotional distress and more intense pain, thus requiring trauma-informed pain management (Anda et al., 2010; Sikorski et al., 2023; T Jones, 2016). The difference in findings between our study and existing evidence should be further investigated to ascertain the reason behind the divergent results.

3.2.5 Impact of Waiting Times and Travel Distances

Patients with COFP faced obstacles to receiving timely and efficient care, including lengthy wait times and long travel distances to the pain clinic. These elements have the potential to worsen psychological distress and pain symptoms, which could have an overall negative impact on the patients' health as well as their ultimate treatment outcome. Treatment efficacy can be improved by cutting down on wait times and expanding access to care via telehealth, decentralized clinics or increasing the frequency of the OMPC to twice per month. In addition, a revised referral with more detailed and specific questionnaires related to the chief complaint symptoms would facilitate prioritizing the more urgent need cases through adequate patient triage. These remedies would also improve the patients' experience of their health journey.

3.3 Limitations

As this study was retrospective in nature, it had some limitations, such as missing data and potential biases. For instance, nearly 15% of the study participants did not complete at least one of the psychological scales. This likely would have had an impact on the conclusions and

also warrants further investigation to determine if it is about falling to recall, not clear of relevance, or/and patients' fear or mistrust (e.g., of their attending clinician or the health care system in general) played a role in their choosing to abstain from some or all of the psychological questionnaires.

Another limitation was that the research period for the study occurred during the COVID-19 pandemic, which seriously hampered clinic operations and lowered patient attendance. The closure of the clinic for a six-month period would likely have decreased the participant number. Indeed, several of the participants withdrew from the study out of fear of contracting the illness or chose not to attend the research sessions even after the pandemic was officially declared over. An additional element that should be taken into consideration is that dentistry in Canada nearly always involves a payment for services rendered. In this case, some patients who met the selection criteria and could have benefited from a multidisciplinary assessment might not have followed through with the clinic referral due to financial barriers. Additional research focusing on prospective designs and featuring a larger sample size than ours would be helpful for validating our findings.

3.4 Conclusions

Our findings for patients evaluated at the MCOPC stress the importance of considering psychological factors in managing COFP. Specifically, our findings indicate that focusing pain management on social and psychological aspects has a greater impact than focusing on pharmacological management strategies already unsuccessfully tried/managed before attending the OMPC, for instance. In particular, we uncovered a close connection between

psychological factors like distress and orofacial pain symptoms such as headache and TMJ discomfort.

As well, the robust associations we discovered between pain severity and IEQ/PCS scores further underscores the importance of providing integrated biopsychosocial strategies in patients' treatment plans. Patients with higher PCS risk were shown to have a four times greater likelihood of experiencing moderate or severe TMJ pain and intense headaches. Similarly, a higher IEQ risk gave patients a threefold greater chance of suffering moderate or severe headaches. Still, and despite the study population having higher ACE scores compared to the general populace, no significant connections were discerned between the ACE scores and symptoms of COFP.

Another finding was patient outcomes improved with better access to care and the implementation of gender-specific pain management plans. Orofacial pain had a much higher prevalence in females than males, as both the present study and the existing research attest. Hence, women are more likely than men to develop COFP, TMD, and related conditions. Also worthy of note is the biopsychosocial chronic pain model's focus on social factors. Our study likewise found that COFP typically presented with a myriad of other health issues, predominantly anxiety and depression. Suffering multiple health issues simultaneously not only worsens the patients' personal experience of their pain but also adds more layers to the treatment method complexity.

Embedded within our results were reports of the difficulties encountered by patients due to long waiting times and long travel distances to health care facilities. These unfortunate realities of the health care system and of Canadian geography only served to worsen the suffering of the

affected patients. Difficulties arose also due to problems obtaining and verifying identification and with the unfeasibility of ongoing support due to travel issues. Addressing these and similar problems requires a more vigorous health care focus on accessibility enhancement, along with standards for delivery of treatment and customized pain management plans that take insurmountably vast distances to treatment facilities into consideration. Despite its potential for improving patients' access to the OMPC, remote telehealth appointments are currently not feasible in the province of Alberta (AB). This is because the billing regulations are still lacking across AB for this specific type (telecare/telemedicine) of appointment.

3.5 Future Research Directions

The results of the present study found a clear and compelling association between TMJ pain/headaches and psychological distress in patients suffering from chronic orofacial pain. There was also a situation where 15% of the participants chose not to complete one or more of the psychological scales, the motivation for which needs to be further investigated. Moreover, although patients suffering TMJ pain/headaches also had a high ACE score, it was not statistically significant, which also warrants further investigation. The OMPC assesses patients presenting with trigeminal neuropathic pain as well, so future research could look for associations between this form of pain and psychological distress in order to better manage this condition. Subsequent research could also consider the following:

1. Evaluating the effectiveness of gender-specific pain management strategies and interventions
2. Employing a longitudinal study approach in order to determine long-term outcomes of multidisciplinary treatments.

3. Conducting research to further validate perceived associations between COFP and psychological stressors.
4. Examining the potential impact of telehealth on healthcare access and patient outcomes
5. Gaining a better understanding as why patients decline in completing psychological questionnaires.
6. Investigating the relationship between ACE score and COFP.

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APPENDIX 1: ETHICS APRROVAL

Approval Form

Date:	August 17, 2021
Study ID:	Pro00112133
Principal Investigator:	Reid Friesen
Study Title:	Analysis of Referral Pathways, Diagnosis, and Treatment Patterns in a University Orofacial Multidisciplinary Pain Clinic.
Approval Expiry Date:	Tuesday, August 16, 2022

Thank you for submitting the above study to the Health Research Ethics Board - Health Panel. Your application has been reviewed and approved on behalf of the committee.

Approved Documents:

Consent Forms

Letter of Information_August 16_2021.docx
Consent Form_ August 13_2021.doc

Protocol/Research Proposal

Clean Research Proposal_July 4 2021.docx

Other Documents

Letter of Introduction MD Clinic_July 4 2021.docx
TMD Clinical Examinarion 2_july 4 2021.png
MD Clinic Questionnaire_July 4 2021.docx
MD Package_July 4 2021.docx
TMD Clinical Examination 1_July 4 2021 .png
Past Medications Sheet_July 4 2021.doc
Oral Medicine Graduate Program Medical History_July 4 2021 .doc
data collection sheet document_July 18 2021.xlsx
Regular TMD Dysfunction Questionnaire-Child letterhead_ July 4 2021.docx
TMD Patient Information_July 4 2021.docx

The Health Research Ethics Board assessed all matters required by section 50(1)(a) of the Health Information Act. Subject consent for access to identifiable health information is required for the research described in the ethics application, and appropriate procedures for such consent have been approved by the HREB Health Panel. In order to comply with the Health Information Act, a copy of the approval form is being sent to the Office of the Information and Privacy Commissioner.

Any proposed changes to the study must be submitted to the REB for approval prior to implementation. A renewal report must be submitted next year prior to the expiry of this approval if your study still requires ethics approval. If you do not renew on or before the renewal expiry date (Tuesday, August 16, 2022), you will have to re-submit an ethics application.

Approval by the Research Ethics Board does not encompass authorization to recruit and/or interact with human participants at this time. Researchers still require operational approval as applicable (eg AHS, Covenant Health, ECSD etc) and where in-person interactions are proposed, institutional and operational requirements as outlined in the Resumption of Human Participant Research - June 24, 2020 must be met.

Sincerely,

Anthony S. Joyce, PhD.
Chair, Health Research Ethics Board - Health Panel

Note: This correspondence includes an electronic signature (validation and approval via an online system).

APPENDIX 2: ETHICS APRROVAL

Notification of Approval (Renewal)

Date:	July 22, 2021
Renewal ID:	Pro00112133_REN1
Principal Investigator:	Reid Friesen
Study ID:	Pro00112133
Study Title:	Analysis of Referral Pathways, Diagnosis, and Treatment Patterns in a University Orofacial Multidisciplinary Pain Clinic.
Approval Expiry Date:	July 21, 2023

Thank you for submitting this renewal application. Your application has been reviewed and approved.

This re-approval is valid for another year. If your study continues past the expiration date as noted above, you will be required to complete another renewal request. Beginning at 30 days prior to the expiration date, you will receive notices that the study is about to expire. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

All study-related documents should be retained so as to be available to the Health REB upon request. They should be kept for the duration of the project and for at least 5 years following study completion.

Approval by the REB does not constitute authorization to initiate the conduct of this research. The Principal Investigator is responsible for ensuring required approvals from other involved organizations (e.g., Alberta Health Services, Covenant Health, community organizations, school boards) are obtained, before the research begins.

Sincerely,

Anthony S. Joyce, Ph.D.
Chair, Health Research Ethics Board - Health Panel

Note: This correspondence includes an electronic signature (validation and approval via an online system).

APPENDIX 3: ETHICS APRROVAL

Notification of Approval (Renewal)

Date:	June 21, 2024
Renewal ID:	Pro00112133_REN3
Principal Investigator:	Reid Friesen
Study ID:	Pro00112133
Study Title:	Analysis of Referral Pathways, Diagnosis, and Treatment Patterns in a University Orofacial Multidisciplinary Pain Clinic.
Sponsor/Funding Agency:	University of Alberta Faculty of Medicine and Dentistry FOMD

	Project ID	Title	Grant Status	Sponsor	Project Start Date	Project End Date	Purpose	Other Information
RSO-Managed Funding:	View RES0062625	A Biopsychosocial Approach to Management of Orofacial Pain in a Multidisciplinary Clinic	Awarded		9/1/2022	3/31/2025	Grant	

Approval Expiry Date: Friday, June 20, 2025

Thank you for submitting this renewal application. Your application has been reviewed and approved.

This re-approval is valid for another year. If your study continues past the expiration date as noted above, you will be required to complete another renewal request. Beginning at 30 days prior to the expiration date, you will receive notices that the study is about to expire. If you do not renew on or before the renewal expiry date, you will have to re-submit an ethics application.

All study related documents should be retained so as to be available to the Health REB upon request. They should be kept for the duration of the project and for at least 5 years following study completion.

Approval by the REB does not constitute authorization to initiate the conduct of this research. The Principal Investigator is responsible for ensuring required approvals from other involved organizations (e.g., Alberta Health Services, Covenant Health, community organizations, school boards) are obtained, before the research begins.

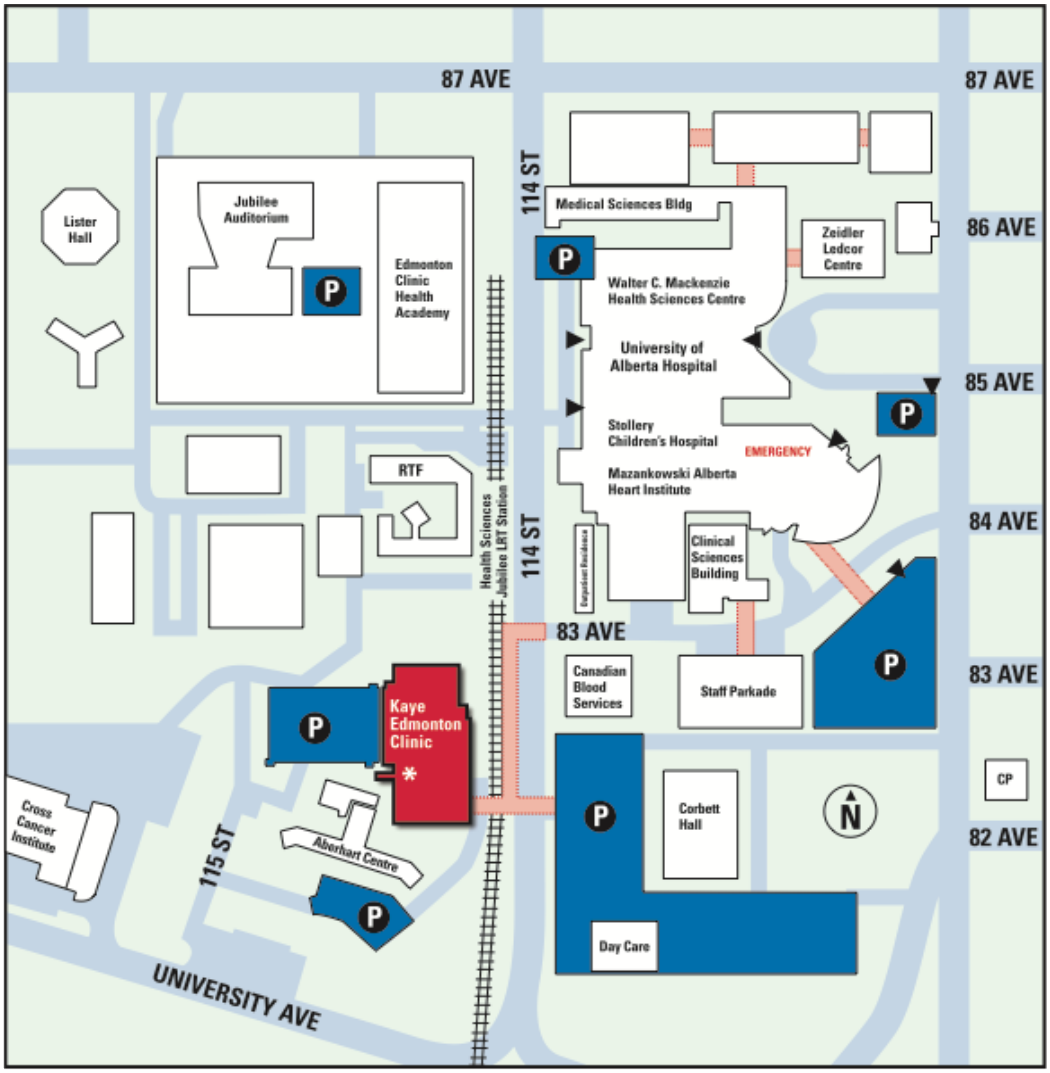
Sincerely,

Charmaine Kabatoff, Senior Officer, REB, for

Anthony S. Joyce, PhD.
Chair, Health Research Ethics Board - Health Panel

Note: This correspondence includes an electronic signature (validation and approval via an online system).

Appendix 4: Orofacial Multidisciplinary Pain Clinic Package



UNIVERSITY OF ALBERTA

THE GOVERNORS OF THE UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE AND DENTISTRY
SCHOOL OF DENTISTRY ORAL HEALTH CLINIC

GENERAL CONSENT

PLEASE READ THIS DOCUMENT CAREFULLY

Name of Patient:	Last Name		First Name	
Street Address:	Street			
	City	Province	Country	Postal Code
Birth Date:	MM/DD/YYYY		Student ID: (if applicable)	
1st Signing Authority (if applicable):	Last Name		First Name	
2nd Signing Authority (if applicable):	Last Name		First Name	
Emergency Contact:	Last Name		First Name	
Relationship:		Phone Number:		

By signing this General Consent, the undersigned agrees to the statements as set out below on their own behalf, or on the behalf of another individual in the case of a minor or an adult without capacity to consent for themselves (in any case, referred to throughout as the "Patient").

DISCLAIMER AND RELEASE OF LIABILITY

The Patient acknowledges that The Governors of the University of Alberta and the Faculty of Medicine and Dentistry, their administrators, officers, directors and staff, board members, agents, employees, volunteers, servants, representatives as well as the "Treatment Providers" (including undergraduate students, clinical graduate students, residents, registered dental assistants, registered dental hygienists, participants/providers of the Continuing Dental Education program and supervising faculty members) all together defined as the "University" **does not warrant or guarantee the results of any dental treatment**.

The Patient agrees that the University is not responsible for any "Claims" (defined as injury, death, loss, damage or expense of any kind sustained by the Patient as the result of dental treatment or the failure of the University to treat the Patient or due to any cause whatsoever, including without limitation such injury, death, loss or damage arising from battery, misrepresentation, breach of contract, breach of statute or other duty of care owed (including under the Occupiers' Liability Act (Alberta), negligence, breach of duty, fraud or such other misconduct or wrongdoing of the University). Further, **the Patient agrees to waive any and all Claims that the Patient has or may have in the future against the University**.

ACKNOWLEDGEMENT

The Patient acknowledges that the University operates the School of Dentistry Oral Health Clinic as part of its teaching and research activities, and that treatment may be provided by one or more Treatment Providers at the School of Dentistry Oral Health Clinic.

The Patient acknowledges that acceptance as a Patient at the School of Dentistry Oral Health Clinic is a privilege and not a right and is based upon the Patient's dental needs corresponding to the educational needs of the Treatment Providers.

The Patient acknowledges that undergraduate students providing treatment are not licensed or practicing dentists or dental hygienists but are students under the supervision of an appropriate licensed practitioner. All other Treatment Providers performing and/or supervising

dental treatments have the necessary registration, licensing or certification, as applicable in Alberta.

The Patient acknowledges that there are risks associated with or related to the initial dental evaluation and diagnosis to be received by the Patient. Further, the Patient is aware there are risks associated with or related to the dental treatment that may be recommended to the Patient by the Treatment Providers and the Patient acknowledges those risks and consequences of agreeing to and refusing treatment will be discussed with the Patient in detail, after which time the Patient will have an opportunity to ask further questions and clarify any concerns, prior to consenting or refusing such treatment in writing by signing the Consent to Treatment & Financial Agreement which will be provided.

The Patient acknowledges that a " Consent to Treatment & Financial Agreement must be signed prior to the commencement of any treatment acknowledging which treatment plan the Patient has chosen and the anticipated financial cost of the treatment plan.
The Patient acknowledges that the University may deem all or any portion of the Patients health information (e.g. charts, casts, radiographs, photographs, other medical information) and registration information (e.g. age, gender, ethnicity, other demographic information) to be of benefit in dental education and science. Full research ethics approval will be received through the appropriate Human Ethical Board prior to the start of the research study and additional, research specific consent forms will be obtained by the University if required by the Ethics Board. The University will, wherever possible, use de-identified information for these purposes.
The identification of individual health and registration information of a Patient participating in educational or research studies will be protected and kept in strictest confidence.

CONSENT TO TEST
In the event that a blood or body fluid exposure occurs to either the Patient or Treatment Provider during the course of treatment in the School of Dentistry Oral Health Clinic, the Patient understands and agrees to comply with the School of Dentistry Oral Health Clinic Blood/Body Fluid Exposure policy & procedure. This may include, but is not limited to, initial and follow-up testing as well as any other initial or follow-up care required by the nature of the exposure.

TERMINATION OF TREATMENT
The University reserves the right, in its sole discretion, to terminate the treatment of the Patient for any reason whatsoever, including:
- the Patient' s treatment needs no longer correspond to the educational needs of the Treatment Providers, or
- the Patient' s treatment needs are treated and resolved where the dental condition is stable, or
- the Patient' s treatment needs become more complex than originally anticipated by the Treatment Providers, or
- the Patient' s treatment needs are determined to be beyond what can be reasonably treated at the School of Dentistry Oral Health Clinic which may result in a referral to an appropriate licensed practitioner to continue and/or complete treatment, or
- the Patient' s record of compliance with appointment dates and/or times is deemed unsatisfactory, or
- the Patient is not complying or accepting of treatment recommendations or medical advice being offered by Treatment Providers, or
- the Patient is behaving in a disrespectful, inappropriate or combative manner or in a way that is contrary to the Clinic' s " Zero Tolerance for Abusive Behaviour" policy, or
- the Patient makes a video or audio recording in the School of Dentistry Oral Health Clinic without written permission from the University, or

- the Patient is intoxicated, impaired, or otherwise not fit for treatment.

In the event treatment is terminated, the Patient may be dismissed from the School of Dentistry Oral Health Clinic and agrees to pay the fees associated with the treatments received up to and including the date of termination of treatment or dismissal as a Patient.

HEALTH AND PERSONAL INFORMATION

The health information (e.g. charts, casts, radiographs, photographs, other medical information) and registration information (e.g. name, date of birth or HealthCare number) collected is required to determine the Patient' s eligibility as a patient for the School of Dentistry Oral Health Clinic and to provide the Patient with diagnostic and treatment services. The health and registration information is used for the education of Treatment Providers and/or for research purposes. The health and registration information is collected under the authority of section 20(b) of the Health Information Act - directly related to and necessary to carry out an authorized purpose under section 27.

The confidentiality of this health and registration information, as well as the Patient' s privacy, is protected by the provisions of the Health Information Act. If the Patient has any questions about this collection and use of health and registration information, they are to contact the School of Dentistry Risk & Privacy Unit.

Protection of Privacy - All personal information provided is collected under the authority of Section 33(c) of the Alberta Freedom of Information and Protection of Privacy Act ("FOIP Act") as well as Section 20(b) of the Health Information Act ("HIA") and will be protected under part 2 of the FOIP Act and part 6 of the HIA. The information collected will be used for the purposes of providing dental care and clinic administration. Please direct any questions about this collection to:
School of Dentistry, Risk & Privacy Unit
5-470 Edmonton Clinic Health Academy (ECHA)
11405 - 87 Avenue NW
Edmonton, AB T6G 1C9
(780) 492-6638
dentrpu@ualberta.ca

UNFORESEEN EVENTS

If any unforeseen event or condition should arise in the course of the treatment that calls for judgment or emergency actions on the part of the Treatment Providers, in addition to or different from those contemplated prior to commencing the treatment, the Patient authorizes Treatment Providers to do whatever the Treatment Providers may deem advisable.
The University shall not be held responsible for failure to provide or continue treatment where the fulfillment of any treatment is delayed or prevented by revolution or other disorders, war, acts of enemies, strikes, floods, fires or other casualty, natural catastrophes including disruptive storm activity, public health emergencies including epidemic and/or pandemic events including but not limited to COVID-19, disruption due to construction activities, labour disputes including boycotts, government acts or omissions, breakdown in communication or internet services, judicial orders, civil commotion, damage to property outside of the control of the University, or without limiting the foregoing, by any other cause not within the control of the University.

CONSENT

The Patient has read and understood this General Consent, and the Patient has taken the

necessary time to review the General Consent and either discussed and clarified any parts or sections of the General Consent with the Treatment Providers prior to signing this General Consent or chosen not to do so. The Patient accepts the provisions in this General Consent as being binding upon signing.
The Patient hereby consents to and authorizes the Treatment Providers to perform diagnostic services, collect registration and health information, and offer treatment as deemed necessary. The Patient understands that the Patient may withdraw consent at any time.
For any questions or concerns related to this General Consent, including upcoming appointments, please contact Patient Services at (780) 407-5550 or dentappt@ualberta.ca .

CONFIRMATION AND SIGNATURE
I confirm that I have capacity to understand this General Consent and am signing this General Consent freely and voluntarily.
I am signing this General Consent: on my own behalf, as I am 18 years of age or older
on my own behalf, even though I am under 18 years of age (mature minor)

I acknowledge I am under 18 years of age, but I wish to make my own healthcare related decisions. As such, the Treatment Providers will assess my capacity and my ability to provide consent to treatment as a mature minor. I understand that I will only be able to make my own healthcare decisions if the Treatment Providers determine that I am a mature minor and I have capacity to do so. I confirm that I am of the belief that I am able to comprehend the risks and benefits, as well as, the consequences of any treatment. I have read and understood the provisions in this General Consent, or the provisions have been read and explained to me by the Treatment Providers. By signing this General Consent, I am directing the Treatment Providers to discuss all treatments, as well as risks and benefits arising from those treatments, and consequences of consent or refusal, directly with me or such other individuals as I may direct them to speak to.

on behalf of a minor patient for whom (select appropriate Signing Authority below): I am the legal guardian who has full legal rights for the minor patient; I am the legal guardian who has co-decision making legal rights for the minor patient, as the result of a Guardianship Order and/or Parenting Order or such other instrument granting me the legal rights to make decisions on behalf of the minor patient, and I acknowledge that the other co-decision maker will also have to sign this General Consent before treatment can proceed.

I acknowledge that I may have to provide the School of Dentistry Oral Health Clinic with supporting documentation to confirm my authority to provide consent on behalf of the minor patient and that if documentation is not provided to the satisfaction of the clinic, that treatment may be denied or discontinued.

on behalf of an adult patient without the capacity to consent for themselves as (select appropriate Signing Authority below): an attorney pursuant to a Power of Attorney or Enduring Power of Attorney; an agent pursuant to a Personal Directive; a supporter pursuant to a Supported Decision-Making Authorization or Order; a co-decision maker pursuant to a Co-Decision Making Order; a guardian pursuant to a Guardianship Order; another type of decision maker who has legal authority in Alberta to make healthcare decisions with regard to the Patient.
I acknowledge that I may have to provide the School of Dentistry Oral Health Clinic with supporting documentation to confirm my authority to provide consent on behalf of the Patient and that if

documentation is not provided to the satisfaction of the clinic, that treatment may be denied or discontinued.

The Patient reads and understands English: ___YES ___NO

(If the response to the above is NO please select YES to the first statement below, once the General Consent has been interpreted and explained to the Patient, then identify the individual responsible for the interpretation/explanation after the subsequent statement. Please document the name of the interpreter below).

This General Consent was interpreted and explained to the Patient. ___YES

This General Consent was interpreted and explained to the Patient by: U of A Staff___ Family Member___ Family Friend___

_____

Name of Interpreter

SIGNED THIS _____ day of _____, 20___, at EDMONTON, ALBERTA.

_____ _____

Signature of Patient (1st Signing Authority, if required) Signature of Witness (SoD Faculty/Staff)

_____ _____

Signature of Patient (2nd Signing Authority, if required) Printed Name of Witness (SoD Faculty/Staff)

UNIVERSITY OF ALBERTA

FACULTY OF MEDICINE AND DENTISTRY
SCHOOL OF DENTISTRY, ORAL HEALTH CLINIC

Oral Medicine Graduate Program
Edmonton Clinic – Level 8
11400 University Ave.
Edmonton, AB T6G 1Z1
Tel: 780.407.5561
Fax: 780.407.5701
oral.med@ualberta.ca

+Oral Medicine Graduate Program
Multidisciplinary Management Team

Appointment Date: _____Time: _____

What to Bring

- Please **review and complete all forms enclosed. All completed forms must be mailed or faxed (fax 780-407-5694) at least one week prior to your appointment** (you can send the forms when complete; however we need the forms at least one week prior to the appointment).
- Please bring any bottles (in the original package) of vitamins, herbs that you may be taking, as the dietician may want to look at the ingredients.
- If you have an existing splint or dental appliance, please bring it with you.
- Clinic policy for the comfort and efficiency of everyone involved, please refrain from cell phone use during the appointment. You might want to consider bringing water or a small snack with due to the length of the appointment

Information regarding your appointment

- Please arrive 30 minutes before your scheduled appointment. Present at the 8th floor, Kaye Edmonton Clinic and check in at the main reception desk.
- This is to ensure that all paperwork and payments are complete before you are escorted into the clinic.
- You can expect to be in the clinic for 3 to 4 hours.
- **All minor patients must be accompanied by a parent or legal guardian.**
- You will receive a call to confirm your appointment.
- If you are not able to keep your scheduled appointment, please notify us at least 7 days prior to your appointment at 780.407.5561, so that appointment time can be offered to someone else.

Billing Information

- The initial examination fee is $395 and the fee for seniors is $315
- Payment in full is required at the beginning of the appointment and can be made with debit card or credit card.
- You will receive a receipt, as well as a dental claim form, if you have dental insurance. Please bring your dental insurance information with you so we can complete the claim form properly.
- We do not accept assignment from your insurance company. Fees might be associated with follow appointments and the same process will be in place for collection of those fees.

UNIVERSITY OF ALBERTA

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Oral Medicine Program
Edmonton Clinic – Level 8
11400 University Ave.
Edmonton, AB T6G 1Z1
Tel: 780.407.5561
Fax: 780.407.5701
oral.med@ualberta.ca

QUESTIONNAIRE

You are going to be assessed at our Oral Medicine Program. In order to gain a better understanding as how your pain and complaints affect you, we would like you to answer the following questionnaire. Taking as a reference the past month, please circle the best option for the following questions

Patient name ..... ***Date*** .....

1) Have you had difficulty chewing any foods because of problems with your jaws, teeth, or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

2) Have you had difficulties opening or closing your mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

3) Have you had painful aching in your mouth, face or ear?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

4) Have you had a sore jaw?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

5) Have you had headaches because of problems with your jaws, teeth, or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

6) Have you found it uncomfortable to eat any foods because of problems with your jaws, teeth, or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

7) Have you felt that talking was painful because of problems with your jaws, teeth or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

8) Have you been worried by jaw or dental problems?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

9) Have you been self - conscious because of your jaws, teeth, or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

10) Have jaw or dental problems made you miserable?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

11) Have you felt tense because of problems with your jaws, teeth, or mouth?
..... Never ..... Hardly ever ..... Occasionally ..... Fairly often ..... Very often

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FACULTY OF MEDICINE & DENTISTRY
SCHOOL OF DENTISTRY, ORAL HEALTH CLINIC

ORAL MEDICINE PROGRAM
PAST MEDICATIONS

NAME: _____ TODAY'S DATE: _____

NAME OF MEDICATION	MG (STRENGTH)	DOSAGE (TIMES PER DAY)	DATE STARTED AND STOPPED	PURPOSE	DID IT HELP	REASON FOR STOPPING

UNIVERSITY OF ALBERTA
FACULTY OF MEDICINE & DENTISTRY
School of Dentistry

ORAL MEDICINE PROGRAM
MEDICAL HISTORY FORM

Name:_____**Alberta Heath No.**_____
Last **First** **MI**

Date of Birth: _____ **Height**_____ **Weight**_____

PLEASE CIRCLE YOUR RESPONSES (*YES, NO, DK (DON'T KNOW)* TO INDICATE IF YOU HAVE, HAVE NOT OR DO NOT KNOW IF YOU HAVE HAD ANY OF THE FOLLOWING DISEASES OR PROBLEMS.

Do you have any of the following diseases or problems?

YES NO DK Active Tuberculosis
YES NO DK Persistent cough greater than 3 weeks in duration
YES NO DK Cough that produces blood
YES NO DK Been exposed to anyone with Tuberculosis

If you answered yes to any of the 4 items above please stop. Talk to your student dentist or someone at the reception desk.

GENERAL MEDICAL INFORMATION:

YES NO DK Are you now, or have you been in the past year, under the care of a physician?

YES NO DK Have you had any serious illness, operation, or been hospitalized in the past 5 years? If yes, how long ago?
_____

YES NO DK Have you had an organ transplant? If yes, please specify: **HEART KIDNEY LIVER LUNG OTHER (Specify):**_____

YES NO DK Have you had open heart surgery? If yes, please specify: **VALVE BYPASS (CABG) OTHER (Specify):**_____

YES NO DK Have you had an orthopedic total joint (e.g. hip, knee, elbow, finger) replacement?

YES NO DK Have you ever had any radiation therapy or chemotherapy for a growth, tumor or other condition?
- ☐ Radiation: Explain:_____
- ☐ Chemotherapy: Explain:_____

YES NO DK In the last 2 years, have you taken or are you now taking steroids (e.g. Cortisone)? Please specify:

Steroid Medication	**Dosage/Frequency**	**Length of Period Taken** *(Days, Weeks, Months, Years)*	**If no longer taking, when was the medication discontinued?**

Have you taken, are you taking or are you scheduled to begin taking?

YES NO DK -Oral bisphosphonates (Alendronate (Fosamax, Fosamax Plus D), Etidronate (Didronel), Ibandronate (Boniva), Risedronate (Actonel), Tiludronate (Skelid))?

YES NO DK -Intravenous bisphosphonates (Clodronate (Bonefos), Pamidronate (Aredia) or Zoledronic Acid (Reclast, Zometa))?

YES NO DK Do you use or have you used tobacco (smoking, snuff, chew, bidis)? (Specify):
- ☐ **PAST (Specify type): SMOKING SNUFF CHEW BIDIS**
- ☐ **CURRENTLY (Specify type): SMOKING SNUFF CHEW BIDIS**

Specify amount per day: _____ For how many years:
_____
How interested are you in stopping? **VERY SOMEWHAT NOT INTERESTED**

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Oral Medicine Graduate Program
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Edmonton, AB, Canada T6G 1Z1
Tel: 780-407-5561
Fax: 780-407-5701
www.dent.ualberta.ca

JAW DYSFUNCTON (Minor) QUESTIONNAIRE

Since you may be experiencing **jaw pain**, the more information (ie: how your life has been, and continues to be, impacted) is necessary to assess and track your progress. Though very personal, the answers to the following questions will only be included in your personal records.

Please circle the number that best describes how your jaw pain has interfered with the following in the last month:

1. MOOD
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
2. SLEEP
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
3. NORMAL WORK / SCHOOL WORK (inside and outside the home)
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
4. USUAL RECREATIONAL ACTIVITIES (sports, hobbies, gym…)
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
5. CARRYING ON A CONVERSATION
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
6. EATING HARD OR CHEWY FOODS (steak, bagels, carrots, nuts, apples…)
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
7. EATING SOFT FOODS (mashed potatoes, yogurt, scrambled eggs, porridge…)
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
8. DRINKING LIQUIDS
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)
9. YAWNING
   0 1 2 3 4 5 6 7
   (No interference) (Complete interference)

Signature_____ Date _____

ORAL MEDICINE GRADUATE PROGRAM
PERSONAL INFORMATION

Name: _____ Date of Birth: _____ / _____ / _____ (M/D/Y)

Address: _____ City: _____ Province: _____

Postal Code: _____ Occupation: _____

Home Phone: _____ Work Phone: _____

AHC#: _____

Indicate Gender assigned at birth: Male Female I identify as: _____

Referred By: _____

Name of person to contact in case of emergency: _____

Address: _____ Relationship to you: _____

Home Phone: _____ Work Phone: _____

BILLING INFORMATION

Do you require insurance forms to be completed? YES NO

Insurance Company: _____

Policy #: _____Certification #_____

Responsible Party for account (if not patient): _____

PROFESSIONAL COMMUNICATION

Name of Family Physician: _____

Address: _____ City: _____

Postal Code: _____ Telephone #: _____ Fax #: _____

Name of Family Dentist: _____

Address: _____ City: _____

Postal Code: _____ Telephone #: _____ Fax #: _____

OFFICE POLICY

It is the policy of this Clinic that the patient is responsible for his/her account. You will be required to pay for treatment at the time it is rendered. We will provide claim forms for you in order that you may be reimbursed by your insurance company.

Rev August 2019

Mental Health Brief Questionnaire

Hello!

My name is Justin Long, and I'm a Mental Health Therapist who you will be meeting when you come for the Multidisciplinary Program of the Oral Medicine Graduate Program. Mental health might sound like an strange profession to be at a dental pain clinic, however, studies in Neuroscience indicate that things like overall well-being, sleep, attention, trauma, and anxiety sometimes can influence how your brain processes pain signals, and that's where I come in!

I would appreciate if you would take a few minutes in advance of the clinic to complete these five short questions so that we can do our best to make the best use of your time when you are there.

I look forward to meeting you soon,

Justin

---

1. Place checkmarks on the below chart to indicate how, *on an average day*, your pain changes as the day progresses from Midnight (far left) to Noon (middle) and into the next night (far right).

	Midnight to 3 AM	3 to 6 AM	6 to 9 AM	9AM to Noon	Noon to 3 PM	3-6 PM	6 to 9 PM	9PM to Midnight
Pain is Severe	☐	☐	☐	☐	☐	☐	☐	☐
Pain is Moderate	☐	☐	☐	☐	☐	☐	☐	☐
Pain is Mild	☐	☐	☐	☐	☐	☐	☐	☐
Pain is Absent	☐	☐	☐	☐	☐	☐	☐	☐

2. Please list any medications or supplements that you are finding useful in helping with the pain?
   Click or tap here to enter text.

Appendix 5: Adverse Childhood Experience (ACE) Score

Adverse Childhood Experience (ACE) Questionnaire

Finding your ACE Score ra hbr 10 24 06

While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household **often** …
   Swear at you, insult you, put you down, or humiliate you?
   or
   Act in a way that made you afraid that you might be physically hurt?
   Yes No If yes enter 1 _____

2. Did a parent or other adult in the household **often** …
   Push, grab, slap, or throw something at you?
   or
   Ever hit you so hard that you had marks or were injured?
   Yes No If yes enter 1 _____

3. Did an adult or person at least 5 years older than you **ever**…
   Touch or fondle you or have you touch their body in a sexual way?
   or
   Try to or actually have oral, anal, or vaginal sex with you?
   Yes No If yes enter 1 _____

4. Did you **often** feel that …
   No one in your family loved you or thought you were important or special?
   or
   Your family didn't look out for each other, feel close to each other, or support each other?
   Yes No If yes enter 1 _____

5. Did you **often** feel that …
   You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you?
   or
   Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
   Yes No If yes enter 1 _____

6. Were your parents **ever** separated or divorced?
   Yes No If yes enter 1 _____

7. Was your mother or stepmother:
   Often pushed, grabbed, slapped, or had something thrown at her?
   or
   Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?
   or
   Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
   Yes No If yes enter 1 _____

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
   Yes No If yes enter 1 _____

9. Was a household member depressed or mentally ill or did a household member attempt suicide?
   Yes No If yes enter 1 _____

10. Did a household member go to prison?
    Yes No If yes enter 1 _____

Now add up your "Yes" answers: _____ This is your ACE Score

Appendix 6: Pain Catastrophizing Scale (PCS)

Pain Catastrophizing Scale (Copyright 1995, 2001, 2004, 2006, 2009 Michael JL Sullivan, PhD)
Everyone experiences painful situations at some point in their lives. Such experiences may include headaches, tooth pain, joint or muscle pain. People are often exposed to situations that may cause pain such as illness, injury, dental procedures or surgery.

We are interested in the types of thoughts and feeling that you have when you are in pain. Listed below are thirteen statements describing different thoughts and feelings that may be associated with pain. Using the scale, please indicate the degree to which you have these thoughts and feelings when you are experiencing pain.

	Not at all	To a slight degree	To a moderate degree	To a great degree	All the time
I worry all the time about whether the pain will end	0	1	2	3	4
I feel I can't go on	0	1	2	3	4
It's terrible and I think it's never going to get any better	0	1	2	3	4
It's awful and I feel that it overwhelms me	0	1	2	3	4
I feel I can't stand it anymore	0	1	2	3	4
I become afraid that the pain will get worse	0	1	2	3	4
I keep thinking of other painful events	0	1	2	3	4
I anxiously want the pain to go away	0	1	2	3	4
I can't seem to keep it out of my mind	0	1	2	3	4
I keep thinking about how much it hurts	0	1	2	3	4
I keep thinking about how badly I want the pain to stop	0	1	2	3	4
There's nothing I can do to reduce the intensity of the pain	0	1	2	3	4
I wonder whether something serious may happen	0	1	2	3	4

Appendix 7: Injustice Experience Questionnaires (IEQ)

IEQ

Name: _____ Age: _____ Gender: _____ Date: _____

When injuries happen, they can have profound effects on our lives. This scale was designed to assess how your injury has affected your life.

Listed below are twelve statements describing different thoughts and feelings that you may experience when you think about your injury. Using the following scale, please indicate how frequently you experience these thoughts and feelings when you think about your injury.

0 – never **1** – rarely **2** – sometimes **3** – often **4** – all the time

1. ☐ Most people don't understand how severe my condition is.
2. ☐ My life will never be the same.
3. ☐ I am suffering because of someone else's negligence.
4. ☐ No one should have to live this way.
5. ☐ I just want to have my life back.
6. ☐ I feel that this has affected me in a permanent way.
7. ☐ It all seems so unfair.
8. ☐ I worry that my condition is not being taken seriously.
9. ☐ Nothing will ever make up for all that I have gone through.
10. ☐ I feel as if I have been robbed of something very precious.
11. ☐ I am troubled by fears that I may never achieve my dreams.
12. ☐ I can't believe this has happened to me.

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...Total

Appendix 8: List of graduate students, and MD practitioners involved in the Multidisciplinary COFP Clinic.

Residency in TMD / Orofacial Pain

1 Dr. Lorne Kamelchuk

2 Dr. Bjliana Trpkova

3 Dr. Brian Nebbe, Dr. Karen Hesse

4 Dr. Norman Thie

5 Dr. Stacie Saunders

6 Dr. Ivonne Hernandez

7 Dr. Pablo Kimos

8 Dr. Darrell Boychuk

9 Dr. Michele Wilson

10 Dr. Ines Guedes

11 Dr. Marlon Moldez 12 Dr. Mireya Senye

13 Dr. Enrique Castro

14 Dr. Mohamed Al - Saleh

15 Dr. Vandana Singh

16 Dr. Yasser Khaled

Oral Medicine Graduate Program

1 Dr. Vandana Singh

2 Dr. Reid Friesen

3 Dr. Yahya Fiteih

4 Dr. Luiz Viegas

5 Dr. Tareq Aldajani

6 Dr. Ahmed Kandari

Current Oral Medicine Graduate Residents

1 Dr. Patricia Hernandez

2 Dr. Parvaneh Badri

3 Dr. Salima Sawani

4 Dr. Jonathan Chu

Past Practitioners

Barry Ulmer (Chronic pain association of Canada

Dr. Cynthia Blackman (Psychologist)

Shao Lee (pharmacist)

Will Leung (Pharmacist)

Cathy Biggs (Pharmacists)

Dr. Mark Armstrong (Family Physician)

Martin Parfitt (physiotherapist)

Dr. Keith Compton (Prosthodontist)

Dr. David Hatcher (radiologist)

Dr. Brian Knight (Anesthesiologist)

Dr. Atull Khullar (psychiatrist)