Attachment 2

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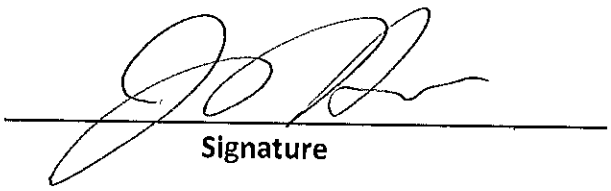

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BODY PAIN REPORTING IN TRICARE ELIGIBLE BENEFICIARIES WITH OROFACIAL PAIN

By

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A thesis submitted to the Faculty of the
Orofacial Pain Graduate Program
Naval Postgraduate Dental School
Uniformed Services University of the Health Sciences
in partial fulfillment of the requirements for the degree of
Master of Science
in Oral Biology

June 2015

Naval Postgraduate Dental School
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CERTIFICATE OF APPROVAL

MASTER'S THESIS

This is to certify that the Master's thesis of

James Mark Hawkins

has been approved by the Examining Committee for the thesis requirement for the Master of Science degree in Oral Biology at the June 2015 graduation.

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2015

ABSTRACT

BODY PAIN REPORTING IN TRICARE ELIGIBLE BENEFICIARIES WITH OROFACIAL PAIN

James Mark Hawkins
Certificate in Orofacial Pain, Orofacial Pain Department, 2015

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INTRODUCTION: The United States military is a unique population, subject to multiple conditions which may heighten the risk for developing both orofacial pain and widespread pain. Patients with complaints of orofacial pain often have other body pain problems, yet do not report these to their providers. Uncontrolled pain at any location, if not managed, can significantly impact the prognosis of an orofacial pain complaint.

OBJECTIVE: Determine, in a Tricare population, the prevalence of pain complaints (by location) throughout the entire body.

METHODS: A retrospective chart review was conducted on 423 consecutive new patients evaluated at the Naval Postgraduate Dental School Orofacial Pain Center from August 01, 2013 to July 31, 2014. As is standard clinical procedure, patients were given 3 opportunities to report their pain on a whole body pain map: (1) prior to evaluation (Pt1), (2) following an explanatory statement by their provider on the relationship between pain and prognosis (Pt2), and (3) during directed pain inquiry of specific body regions (Pro). The pain map was divided into 9 anatomical regions that were assessed for the presence of pain after Pt1, Pt2 and Pro.

RESULTS: Initially, 60.5% of patients did not report all pain locations (Pt1) and 30.5% still did not report all pain after the explanatory statement (Pt2). After Pt1, Pt2 and Pro the most commonly reported number of pain regions was five (17.0%). 91.5% of patients reported multiple pain regions. Head pain (beyond the face) was the most frequently under-reported region.

CONCLUSIONS: Most patients had multiple pain complaints outside the chief complaint, yet the majority did not report these until multiple forms of assessment were utilized. These data encourage the use of a pain map, a verbal pain explanation and directed pain questioning to more accurately capture pain location and facilitate multidisciplinary care.

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LIST OF ABBREVIATIONS

ANS ..... Autonomic Nervous System

CI .....Confidence interval

CNS .....Central nervous system

COFP .....Chronic orofacial pain

CS .....Central sensitization

FM .....Fibromyalgia

IBS .....Irritable bowel syndrome

IRB .....Institutional review board

MED .....Map Explanation Directed

NHIS .....U.S. National Health Interview Survey

NPDS ..... Naval Postgraduate Dental School

OFP .....Orofacial Pain

OPC .....Orofacial Pain Center

OR .....Odds ratio

PTSD .....Post traumatic stress disorder

Pt1 ..... Patient completed pain regions map prior to evaluation

Pt2 .....Pain regions reported after provider education about pain

Pro .....Pain regions reported after specific pain questioning

RR .....Relative risk

SAF ..... Singapore Armed Forces

SD .....Standard deviation

TBI .....Traumatic brain injury

TMD .....Temporomandibular Disorder

TMJ .....Temporomandibular Joint

INTRODUCTION

Pain is defined as "an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." (Mersky & Bogduk 1994). Pain is a common experience throughout society. More than 81% of the general population report at least one significant pain experience in their lifetime (James, Large, Bushnell & Wells 1991). Over a 12-month period, 73% of adults experienced headache, 56% had back pain, 46% had stomach pain, and 27% had dental pain (Sternbach 1986a). Most Americans experience an average of three to four different kinds of pain every year (Sternbach 1986b), with 16% of the general population experiencing pain within the last two weeks (Crook, Rideout & Brown 1984). Chronic pain is defined by some as any pain that lasts beyond three to six months, or the average time required for connective tissue to heal (de Leeuw & Klasser 2013). The prevalence of chronic pain ranges from 40% to 65% of the general population (Andersson, Ejlertsson, & Leden 1993; Gerdle, Bjork, Hernriksson & Bengtsson 2004).

Pain places a heavy burden on both the individual and society. It can lead to significant emotional and financial challenges for patients and their families (Lipchik, Smitherman, Penzien & Holroyd 2006). This includes absenteeism from work or school (Sternbach 1986b), as 40% of individuals reported missing one or more schooldays/workdays within the prior six months because of pain (Von Korff, Dworkin, LeResche & Kruger 1988). Although accurate statistics from national epidemiologic studies are not available, data suggest that nearly a third of the populations of industrialized nations currently suffer to some extent from chronic pain. This suffering costs billions of dollars annually for health care services, loss of work, decreased productivity, and disability compensation (Loeser, Butler, Chapman & Turk 2001).

Orofacial pain may be defined as pain and dysfunction that affect motor and sensory functions of the structures innervated by trigeminal nerve system (Bertrand, Johnson & Ehrlich 2002; de Leeuw & Klasser 2013). Anatomically, trigeminal and cervical (C1-C5) primary, small fiber afferent neurons (1st order) from the face, head, neck and shoulders synapse with 2nd order neurons at overlapping regions (laminae) in the brainstem's trigeminal subnucleus caudalis. These 1st order neurons convey impulses generated by high threshold nociceptive and low threshold metaboreceptive nerve endings for further processing throughout the brain. Nociceptors initiate impulses about tissue damage while metaboreceptors are stimulated by the spectrum of compounds generated by muscle metabolic activity. Additionally, large fiber 1st order neurons also synapse at more superior levels of the trigeminal nuclear column in the brain. This neuronal overlap by the 1st order neurons onto the trigeminal column is called convergence, and means that pain (and fatigue) in the face, head, neck and upper shoulder is trigeminally mediated and falls under the umbrella of orofacial pain. Orofacial pain conditions include headaches, neurologic, musculoskeletal, arthritic, and psychophysiologic disorders, as well as cancer, infection, autoimmune phenomena, and tissue trauma (de Leeuw & Klasser 2013). Management of orofacial pain conditions may involve a host of healthcare specialties, including dentistry, otolaryngology, neurology, neurosurgery, ophthalmology, physiatry, psychiatry, and psychology (Sharov & Benoliel 2015).

REVIEW OF LITERATURE

Orofacial pain characteristics

Orofacial pain (OFP) complaints are common in the general population. One survey of a large health maintenance organization found in the previous six months that 26 % of patients reported headaches and 12% of patients reported other facial pains (Von Korff, Dworkin, LeResche & Kruger 1988). Another study surveyed 45,711 American households and reported that nearly 22% of the general population experienced at least one type of orofacial pain in the past six months. This study, however, did not include headaches in its survey (Lipton, Ship & Larach-Robinson 1993).

One category of orofacial pain is termed temporomandibular disorders (TMD). TMD is a collective term that embraces a number of conditions involving the masticatory muscles, the temporomandibular joint (TMJ), and the associated structures (de Leeuw & Klasser 2013). Most patients with TMDs will recover with little to no care (Sato, Kawamura, Nagasaka & Motegi 1997), but a minority of cases will become chronically painful (Von Korff, LeResche & Dworkin 1993; Ohrbach & Dworkin 1998).

Chronic orofacial pain (COFP) is a common complaint that is often not accompanied by visible trauma or disease (Franco, Runho, Siqueira & Camparis 2012). Approximately 7% of the general population report chronic orofacial pain symptoms co-occurring with other somatic symptoms which tend to be unexplained by known organic pathology (Aggarwal, McBeth, Zakrzewska, Lunt & Macfarlane 2006). COFP rarely appears as an isolated complaint. In patients presenting to a primary care clinic with TMD, 76% reported pain outside the

masticatory system (John, Miglioretti, LeReshe, VonKorff & Critchlow 2003), and over 81% of patients reporting to an orofacial pain center had pain sources in tissues that were not innervated by the trigeminal system (Turp, Kowalski, O'Leary & Stohler 1998). A U.S. National Health Interview Survey (NHIS) of 189,977 people conducted from 2000-2005 found that 8,964 persons reported orofacial pain. Of those, 7,449 had at least one co-morbid pain complaint and over 5,200 persons had two or more co-morbid complaints (Plesh, Adams & Gansky 2011).

Provider knowledge of other pain sources beyond orofacial pain chief complaints is important, as trigeminal input into the central nervous system (CNS) is never interpreted in isolation. Nociceptive and metaboreceptive signals transmitted to the CNS, whether via the trigeminal thalamic tract, spinal thalamic tract (below the level of C5) or vagus nerve, cause autonomic nervous system (ANS) effects that modulate integrated cranial nerve responses. If pain sources beyond the trigeminal system are not controlled, then chronic cranial nerve mediated responses can affect continued activation of trigeminal nociceptive neurons and maintain orofacial pain conditions. Therefore, uncontrolled pain sources at any location can significantly impact prognosis of an orofacial pain complaint if not managed (de Leeuw & Klasser 2013).

Multiple conditions have been shown to coexist with orofacial pain complaints (Yunus 2008). Co-morbid conditions include fibromyalgia (FM), chronic fatigue syndrome, headache, panic disorder, gastroesophageal reflux disorder, irritable bowel syndrome (IBS), interstitial cystitis, multiple chemical sensitivity, sleep disorders, anxiety, depression, non-cardiac chest pain, and post-traumatic stress disorder (Aaron, Burke & Buchwald 2000). In a prospective study of over 2,700 individuals, the number of comorbid conditions was one of the strongest

predictors for the initial onset of TMD (Bair, Ohrbach, Fillingim, Greenspan, Dubner, Diatchenko, Helfeson, Knott, Maixner & Slade 2013). Another prospective cohort study assessing the general population showed that people with at least one pain condition (such as FM or IBS) other than TMD (but no TMD at baseline) were almost four times more likely than pain free individuals to develop TMD within three years (Von Korff, Le Reshe & Dworkin 1993). The presence of such co-morbid conditions differentiates orofacial pain patients from patients seeking routine dental care (de Leeuw, Klasser & Albuquerque 2005).

Fibromyalgia, a chronic disorder characterized by numerous tender points throughout the body, frequently coexists with TMD. Studies investigating this relationship have shown that 18% of patients with TMD meet FM criteria, and 75% of patients with FM satisfy the Research Diagnostic Criteria for TMD (criteria that provide standardized TMD diagnosis guidelines) (LeResche & Dworkin 1992; Hedenberg-Magnusson, Ernberg & Kopp 1997; Plesh, Wolfe & Lane 1996). Furthermore, although some TMD's represent a localized pain condition, data from two studies have suggested that many TMD's may be part of a widespread disorder. Aaron & colleagues (2000) compared 25 patients diagnosed with TMD to 22 healthy controls and discovered that TMD patients had a significantly higher number of tender points (5.2) than the healthy controls (0.9). Similarly, Plesh & colleagues (1996) assessed 40 patients diagnosed with TMD and found an average of 6.3 tender points among patients. Data suggest that some TMDs may represent a manifestation of a more global pain sensitivity disorder (Fillingim, Hollins, Sigurdsson & Maixner 1998; Lim, Smith, Bhalang, Slade & Maixner 2010).

Widespread pain is not only a coexisting condition with COFP, but may be a risk factor for its onset. A two-year prospective study of 1,329 eligible patients from a general medical

practice demonstrated that the presence of chronic widespread pain (Relative Risk (RR) 4.0, 95% Confidence Interval (CI) 2.2-7.4) was a strong predictor for onset of chronic orofacial pain (Aggarwal, Macfarlane, Farragher & McBeth 2010). A similar prospective study of over 2,700 patients reported preexisting body pain had a high predictive value for the onset of TMD (Bair, Ohrbach, Fillingim, Greenspan, Dubner, Diatchenko, Helfeson, Knott, Maixner & Slade 2013). In a study by John & colleagues (2003), it was shown that widespread pain was a risk factor for dysfunctional TMD pain in women (Odds ratio (OR) 1.9, 95% CI 1.2-2.8, p=0.003) (John, Miglioretti, LeReshe, VonKorff & Critchlow 2003). These findings are in concert with data from a Seattle-based health maintenance organization suggesting that pre-existing headache, backache, abdominal pain, or chest pain were predictors for the onset of facial pain (Von Korff, Le Reshe & Dworkin 1993). The same was true in an adolescent population by LeResche and colleagues (2007), where it was found a greater number of body pain complaints correlated with an increased risk of TMD onset (OR 3.2, 95% CI 1.7-6.1). In summary, widespread pain seems to be a predictor for the persistence of COFP, and may make the orofacial pain complaint more challenging to manage (Macfarlane & colleagues 2002; Wiesinger, Malker, Englund & Wänman 2009).

In light of the aforementioned findings, it appears that COFP shares several characteristics with other chronic pain conditions (Grossi, Goldberg, Perio, Locker & Tenenbaum 2008). Chronic pain conditions may share a common central nervous system pathophysiology termed central sensitization (CS) (Yunus 2008). CS is characterized by a generalized hyperexcitability of the central nervous system (CNS) and may lead to the development and maintenance of many chronic pain conditions (Sarlani & Greenspan 2005). CS may be initiated and maintained by persistent noxious input into the CNS and result in lowered nociceptive

thresholds so that non-painful stimuli are interpreted as painful. If the pathophysiology of CS persists, peripheral noxious input may no longer be necessary to maintain pain (Benoliel and colleagues 2011; Sarlani, Grace, Reynolds & Greenspan 2004). Additionally, patients may have a dysfunctional descending inhibitory control system and other maladaptive neuroplastic changes that may contribute to heightened pain sensitivity (Sarlani & Greenspan 2005).

The presence of other medical conditions that affect centrally mediated pain in a patient with trigeminal pain may limit the therapeutic options and compromise orofacial pain treatment outcomes (de Leeuw, Klasser & Albuquerque 2005). In order to provide optimal care to patients and reduce the risk of chronic orofacial pain, providers must therefore consider the presence of concurrent pain conditions and utilize a multidisciplinary treatment approach that appreciates the impact of co-morbid pain disorders (Grossi, Goldberg, Perio, Locker & Tenenbaum 2008). Thus, it is critical to fully understand all noxious input entering into the CN5, including the patient's coexisting pain conditions, in order to determine interdisciplinary treatment needs. Evaluation tools such as pain maps that assist patients in disclosing all body pains will help determine the appropriate referrals needed to attain optimal pain management.

Patient pain reporting

While many patients with orofacial pain describe their pain within the boundaries of traditional trigeminal dermatomes, few patients verbalize pain outside of the facial area during their evaluation. One possible explanation is a bias in which patients do not see the need to report pain outside of the facial area to a dentist, whose primary responsibility is viewed as treating pain within the facial region alone (Turp, Kowalski & Stohler 1997). A second theory is that patients may be so accustomed to living with their other daily pains that they are not

concerned about reporting them (Wright 2000). Thirdly, patients may be receiving treatment by other healthcare professionals for their additional pain complaints and not feel compelled to report these diagnoses and treatments to their orofacial pain provider (Turp, Kowalski & Stohler 1997). Lastly, patients' knowledge and beliefs may affect pain reporting. For example, patients' may hesitate or be afraid to report all pain to a provider, as they may believe this will be viewed as complaining and result in substandard care. They may also desire to be viewed as a "good patient", and therefore may not want take their providers time by reporting multiple complaints (Fink 2000). Every reason noted may be influenced by the likelihood that most patients do not understand the prognostic implications other body pain may have on their orofacial pain complaint.

The opposite perspective is also true, as many dentists do not assess for pain locations beyond the face (Turp, Kowalski & Stohler 1997), or their attention is diverted away from other problems by focusing attention solely on the location of the chief complaint (Pauker, Kopelman & Lechan 1995). The same mindset may also apply to other healthcare disciplines. As in dentistry, most medical providers are trained to focus on their area of expertise and do not attempt to assess patient complaints outside of these areas (Bowers, Esmond, Lutz, & Jacobson 2003). This limited investigation of body pains can be problematic and lead to overlooking crucial information about the patient's overall pain and/or other health problems. Such omissions can significantly impact the provider's diagnostic and therapeutic decisions, and may lead to diminished pain management related outcomes (Turp, Kowalski & Stohler 1997).

The problems posed by incomplete reporting galvanized the use of "pain charts" (Palmer 1949) or "pain maps" (Cummings & Routan 1987) for evaluating pain patients. These

tools consist of front and rear line drawings of the human body, on which patients are asked to draw the location and distribution of their pains. Graphic pain tools have high intra- and inter-observer agreement (Ohnmeiss, Vanharanta & Guyer 1995) and good test-retest reliability with a correlation coefficient of 0.85 (Margolis, Chibnall & Tait 1988). Pain drawings have been found to be useful in the investigation of many different locations of body pain, as well as beneficial for diagnostic, therapeutic, prognostic, and research purposes (Turp, Kowalski, O'Leary & Stohler 1998).

Many studies have shown pain maps to be more effective than verbal or written questioning in eliciting both orofacial and other body pain complaints. In an evaluation of 140 female patients with TMD, Turp, Kowalski, and Stohler (1997) discovered patients would frequently mark body pains beyond the facial region on a pain map, but did not verbally report them. For example, 37% of patients who reported head pain other than TMD on a pain map did not report this pain to their provider verbally. In a similar fashion, 52% of patients with neck pain, 82% with shoulder pain, 96% with arm pain, 100% with chest pain, 95% with abdominal pain, 83% with back pain, and 96% with leg pain did not verbally report such pain even though they had marked it on the pain map.

A second study used a similar assessment for 532 patients reporting for an orofacial pain evaluation. Once again, patients were much more likely to report pains using a pain map as compared to what they identified via verbal report. Results indicated that 30% of patients with neck pain, 20% of patients with shoulder pain, 20% of patients with back pain, 10% of patients with leg pain, and 7% of patients with arm pain reported their pain only on a pain map and not verbally to their provider (Franco, Runho, Siqueira & Camparis 2012).

While pain maps are considered more precise than verbal descriptions of pain site(s), their use does not guarantee that patients will report all body pains. Two studies of OFP patients reported that patients do not disclose all pain locations on pain maps, particularly pains above the clavicle. Results indicated that 22% of patients with head pain (Franco & colleagues 2012), 73% of patients with face pain, 7% of patients with neck pain, and 5% of patients with shoulder pain (Turp & colleagues 1997) failed to report these pain complaints on a pain map, instead reporting these by verbal description alone. Additionally, a study of chronic pain patients presenting for evaluation at a rehabilitation center showed that only 58% of a patient's pain was reported on a pain map (Cummings & Routan 1987). Possible barriers to a patient reporting their pain on a pain map may include a lack of visibility of the specific anatomical area(s) where a patient may have their pain, ethnicity/ gender/age-related features not expressed on the pain map, embarrassment by lack of clothing on the pain map, and/or size of anatomic areas on the pain map specific to their complaint(s) (von Baeyer, Lin, Seidman, Tsao & Zeltzer 2011). These results indicate the importance of verbally questioning the patient to attain maximum pain site(s) reporting.

Orofacial pain among the military population

The volunteer United States military is a unique population that represents a cross section of various ethnicities and socio-economic groups. This group is subject to multiple conditions specific to the military service lifestyle including, but not limited to multiple household moves, high stress work environments, deployments to war zones, and war-related injuries. These conditions may lead to heightened risk for developing both orofacial pain and

widespread pain (Uhac & colleagues 2006). In addition, research indicates that the common age of orofacial pain prevalence ranges from 18 to 45 years of age (Von Korff, Dworkin, Le Resche & Kruger 1988), which is the predominant age range of active duty military personnel.

A descriptive study of a Singapore Armed Forces (SAF) orofacial pain population suggested that TMD-type orofacial pain patients within the military seldom presented with orofacial pain symptoms alone. In this study, 140 patients referred to the SAF TMD and Craniofacial Pain clinic were compared with 130 controls that presented to the general dentistry clinic for a regular check-up. Each group received a shoulder, neck, head and facial muscle palpation exam. The results suggested that SAF orofacial pain patients had a significantly higher distribution of pain than the control group: neck pain (42% vs 0%), shoulder pain (34% vs 0%), ear pain (24% vs 0%), and sternocleidomastoid pain (59% vs 2%), respectively (Lee, Tay & Tan 1995). Results showed that SAF patients who presented with TMD had a significantly higher prevalence of other pain complaints than did other SAF members without TMD pain.

A second descriptive study performed at a major U.S. military medical center by Mazzeo and colleagues (2004) had similar findings. In this study, 59 OFP patients were compared to 44 control patients seeking an annual dental examination. Each group was asked to fill out the Multidimensional Pain Inventory, Pittsburgh Sleep Quality Index, Symptoms Checklist-90-Revised, and a co-morbid condition inventory upon arrival. Results demonstrated that OFP patients had significantly more pain and pain related dysfunction, sleep disturbance, and co-morbid conditions than the control group.

Evolution of pain management

Engel's (1977) introduction of the bio-psychosocial model highlighted the need to look beyond a patient's chief complaints when assessing pain. Currently, research is rapidly expanding our understanding of pain and its co-morbidities and re-shaping the way diagnoses and treatment should be rendered (Klasser & Greene 2009). In order to deliver optimal care, it is imperative that pain medicine groups critically reassess their clinical approaches (Loeser & Cahana 2013).

The Orofacial Pain Center (OPC) at the Naval Postgraduate Dental School (NPDS) in Bethesda, Maryland opened in 2001. Since then, the staff regularly (at least annually) meets to assess the clinic protocols in light of emerging evidence-based principles for the evaluation and management of orofacial pain. For example, in early 2013 the Center added the Pittsburgh Sleep Quality Index and the Perceived Stress Scale into its intake forms based upon how sleep and stress issues can affect pain diagnosis and management. Early in 2013, to enhance the likelihood of capturing the entire dimension of body pains afflicting its patients, the Center changed how it uses pain mapping. The following revisions were adopted:

- 1) the body pain map in the intake questionnaire on page four of the exam form was enlarged to provide more space for detailing all pain locations
- 2) the addition of a standardized statement that the provider reads to the patient after reviewing the pain complaints previously detailed by patient on the pain map. This statement emphasizes the importance of knowing all body complaints for diagnosis and

treatment purposes, and allows the patient to reconsider their condition and disclose any pain complaints that may have been initially omitted

The present study aims to determine the number of pain regions throughout the body in patients who presented to the OPC, a tertiary military orofacial pain clinic.

METHODS

To better define the patient population in a military tertiary referral based orofacial pain clinic, the principal investigator received permission to conduct a retrospective chart review from the Walter Reed National Military Medical Center Institutional Review Board (IRB) on 05 NOV 2014.

The records of 423 consecutive patients who were evaluated for orofacial pain complaints at the NPDS OPC between August 01, 2013 and July 31, 2014, were reviewed. Patients who use the OPC include active duty military service members (Air Force, Army, Marine Corps, Navy), family members and retirees. Only age, gender, beneficiary status, and ethnicity were collected. No personable identifiers were obtained.

Orofacial Pain Center Evaluation Process

1. All patients referred to the Orofacial Pain Clinic received a clinic questionnaire to complete before an evaluation by a provider. The questionnaire was developed by the OPC staff to elicit general medical, dental, and mental health history information and is reviewed and updated on a yearly basis. To obtain information on the patient's pain history, this form included:
    a. A pain map on page four of the exam form with instructions to "Outline/draw the location(s) of ANY AND ALL BODY PAIN that you are experiencing". The color of the writing utensil used by the patient to complete the initial pain map drawing was designated Pt1. *(see Appendix A)*
    b. Specific questions asking the patient if they are experiencing pain in any of the

following anatomical regions: 1) head, 2) face, 3) neck and/or shoulders, or 4) any areas below the shoulders.

2. Following completion of the clinic questionnaire, an orofacial pain provider reviewed the questionnaire responses with the patient during a structured interview. After reviewing the pain map section of the questionnaire, the provider read the following standardized educational statement to the patient:

   "You have spent time completing paperwork helping us know more about you and your pain, including a pain map. An accurate pain map can be an important tool to assist in the diagnosis and management of orofacial pain. Can you think of any other body pains you may have not already drawn on the pain map? If so, would you please use this pen and draw the location/sites of any other areas of pain." Patients were then be given an opportunity to draw additional pain complaints, if applicable, on the pain map using a different colored writing utensil than the original drawing. This second set of markings were designated Pt2.

3. The provider reviewed the remainder of the questionnaire with the patient, including the section specifically asking the patient if they are experiencing pain in any of the following anatomical regions: 1) head, 2) face, 3) neck and/or shoulders, or 4) any areas below the shoulders.
4. After interview completion, the provider performed a standard orofacial pain clinical examination. This included at a minimum a cranial nerve exam, shoulder and cervical range of motion testing, mandibular range of motion measurements, palpation of masticatory, cervical and shoulder muscles and lymph nodes, and an intraoral examination.
5. If any additional pain complaints not previously marked on the pain map were

discovered, the provider marked those complaints on the pain map using a writing utensil of a third color. This was designated as Pro.

The procedures described above are performed as routine care in the OPC. All providers used the same evaluation forms and undergo periodic training so that baseline medical history and diagnostic data were collected in a relatively uniform manner. Concerning pain mapping, the providers used the various different colored markings made on the pain map (Pt1, Pt2 and Pro) to help explain to patients how different pain sources could affect treatment and prognosis.

Data Collection

The pain map in the questionnaire consisted of simple frontal and back views from head to toe without any labeling of specific body regions (*see Appendix A).* For research purposes these maps were divided into nine anatomical regions: 1=Head, 2=face, 3=neck, 4=shoulders, 5=arms, 6=chest, 7=abdomen, 8=back, 9=legs (*see Appendix B).* This division into regions is similar to what has been previously described (Turp, Kowalski, & Stohler 1997; Franco, Runho, Sequeira & Camparis 2012). During chart review a transparent overlay with these delineated regions was aligned over each patient's pain map. The number and locations of anatomical regions that contain Pt1, Pt2, and/or Pro were recorded on a data collection sheet for subsequent analysis.

Statistical Analyses

Continuous and ordinal data are presented as means with standard deviations (SD) and are compared between two groups using the two sample t-test: For three or more groups, one-way analysis of variance was used with Tukey's test for post-hoc pairwise comparisons. Categorical outcomes are presented as counts (N) with percentages (%), and were compared between groups using Fisher's exact test (two-tailed). Odds ratios are presented together with the 95% confidence interval (95% CI) for the OR. Data were examined using IBM/SPSS Statistics (version 21, IBM/SPSS, Chicago IL).

RESULTS

Pain Report by Age and Gender

A total of 423 records were reviewed, 238 (56.3%) were female and 185 (43.7%) were male. The mean age of the total sample was 39.2 years, 39.7 (range: 15-83) years for females and 38.6 (range: 15-81) years for males. The mean total (Pt1, Pt2 and Pro) number of painful regions reported by demographic are presented in Table 1.

		Gender							
		Female				Male			
		N	%	Mean	SD	N	%	Mean	SD
All Subjects		238	100%	4.5	1.9	185	100%	3.9	2.1
Ethnicity Groups	African American	40	17%	4.9	2.2	36	19%	3.9	2.1
	Asian	22	9%	4.6	1.3	6	3%	4.0	3.0
	Caucasian	137	58%	4.3	1.9	123	66%	3.9	2.0
	Hispanic	27	11%	4.5	1.9	14	8%	3.4	2.5
	Other	12	5%	4.4	1.8	6	3%	4.5	2.1
Beneficiary Groups	Air Force	22	9%	4.6	2.0	27	15%	3.8	2.2
	Army	61	26%	4.9	1.8	51	28%	4.0	2.2
	Family Member	96	40%	4.2	1.9	5	3%	2.6	2.5
	Marines	10	4%	5.0	2.3	19	10%	4.0	1.9
	Navy	29	12%	4.1	1.7	59	32%	3.9	2.0
	Retired	15	6%	4.7	1.7	20	11%	4.2	2.4
	Other	5	2%	4.2	1.5	4	2%	1.8	.5
Age Groups	<30	67	28%	3.7	1.8	47	25%	3.0	1.7
	30-39	58	24%	4.9	1.9	55	30%	4.3	2.1
	40-49	59	25%	4.9	1.7	58	31%	4.3	2.3
	50-59	32	13%	5.1	1.8	13	7%	4.2	2.3
	60+	22	9%	3.5	1.8	12	6%	3.3	1.8

Table 1 – Mean total (Pt1, Pt2 and Pro) number of painful regions reported by demographic

The total number of painful regions reported (after Pt1, Pt2 and Pro) differed significantly by gender and age. The <30 years and 60+ years old age groups reported significantly fewer painful regions than the other age groups, regardless of gender (Figure 1). Females reported significantly more painful regions than males (mean 4.5 vs. 3.9, p=0.004). Females from age 50-59 years reported the highest number of painful regions (mean = 5.09, SD = 1.84), while males below 30 years old reported the least and were the only group that averaged less than three painful regions (mean = 2.96, SD = 1.71). Females (71.0%) had significantly more head pain than males (53.0%) (OR 2.2, 95% CI: 1.5-3.3, p=<0.001). Females (66.4%) also had significantly more neck pain than males (50.3%) (OR 2.0, 95% CI 1.3-2.9, p=0.001). Males (13.0%) reported face pain as their sole complaint significantly more often than females (4.6%) (OR=3.1, 95% CI: 1.5-6.5, p=0.002).

Pain Report by **Evaluative Period (Pt1, Pt2, Pro)**

Analysis of pain reported at each of the three evaluative periods (Pt1, Pt2, Pro) revealed that 256 patients (60.5%) did not indicate all of their pain complaints on the pain map initially (Pt1). 124 patients (29.3%) reported additional pain at Pt2 and 129 patients (30.5%) had additional pain noted at Pro (Figure 2).

Figure 3 illustrates the percentage of patients that reported pain in an anatomical region at Pt1, Pt2 and Pro. Both trigeminal and non-trigeminal mediated pain was under-reported on the pain map (Pt1). Subsequent to Pt1, 31.4% of patients reported head pain (10.4% at Pt2, 21% at Pro), 17.5% of patients reported neck pain (11.1% at Pt2, 6.4% at Pro), 13.2 % of patients reported face pain (3.3% at Pt2, 9.9% at Pro), and 10.4% of patients reported shoulder pain

(7.8% at Pt2, 2.6% at Pro). For pain below the shoulders, 18.2% of patients reported leg pain (12.3% at Pt2, 5.9% at Pro), 11.3% reported back pain (8.7% at Pt2, 2.6% at Pro), and 7.5% reported arm pain (6.1% at Pt2, 1.4% at Pro) following to Pt1. When data from each evaluative period was combined (Pt1, Pt2 and Pro), the most frequently reported painful regions were the face (95.8%), head (63.1%), legs (59.8%), neck (59.3%), back (54.1%), shoulders (39.7%), arms (31.1%), abdomen (11.1%), and chest (7.1%).

Figure 4 demonstrates the increased average number of painful regions reported by patients after each evaluative phase. At Pt1, one painful region was most commonly reported (20.1% of patients). After Pt2, three painful regions were most commonly reported (18.4% of patients). After Pro, five painful regions were most commonly reported (17.0%). In total, thirty-six (8.5%) patients noted pain in only one region, while eight patients (1.9%) reported pain in all nine regions. 91.5% of patients reported multiple painful regions. Thirty patients (7.1%) did not report any pain at Pt1. All 30 patients later reported at least one painful region (15 patients at Pt2, 25 patients at Pro).

Trigeminal and Other Body Pain

99.8% of patients reported at least one trigeminal mediated pain (head, face, neck, shoulders), but this was rarely the only complaint. For example, 95.8% of patients reported face pain, yet this was the lone complaint in only 8.3%. 60.0% of patients reported head and face pain, but this was the sole complaint in only 6.9%. Of the 16.1% of patients that reported head, face, neck and shoulder pain, 88.3% also reported pain below the shoulders. Overall, 326 patients (77.1%) reported at least one painful region below the shoulders.

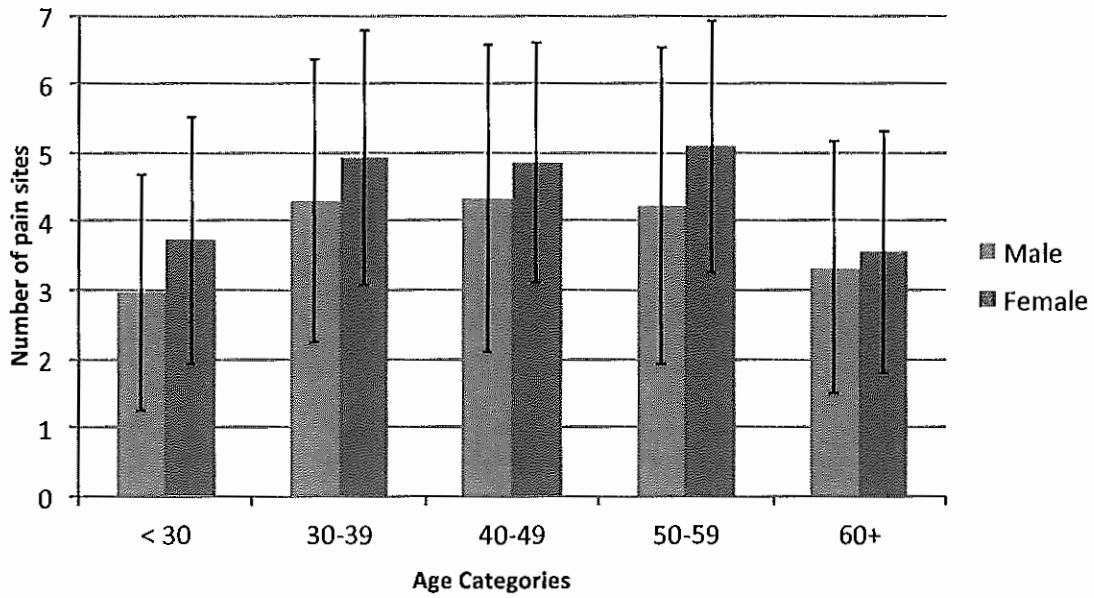


Figure 1- Number of painful regions reported by age and gender (mean ± SD)

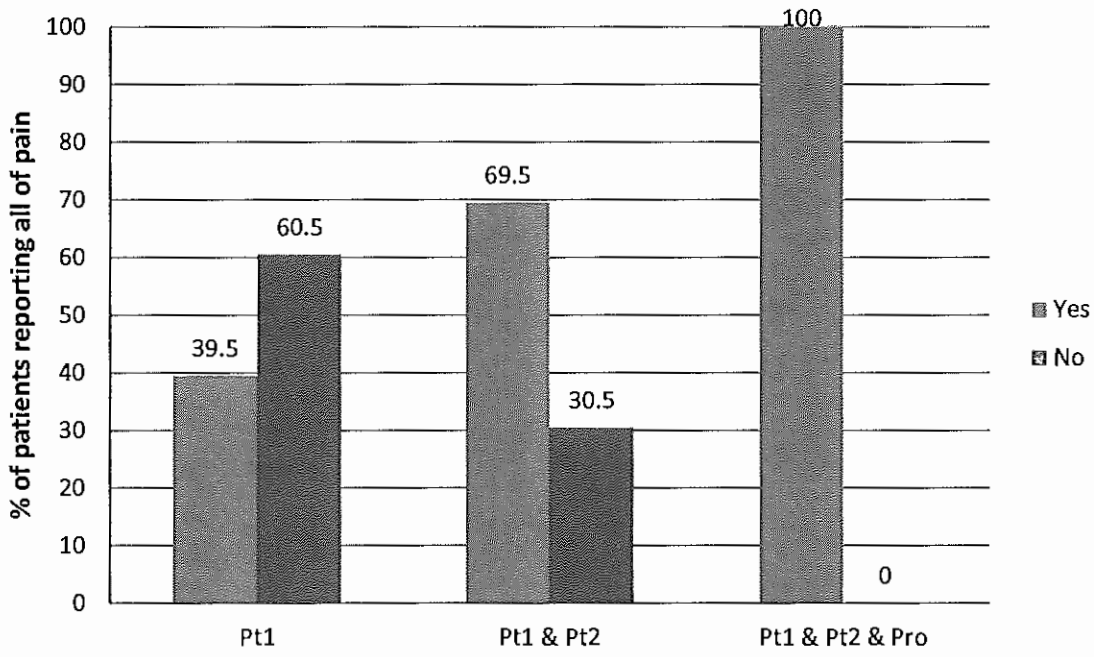


Figure 2 – Percentage of patients that reported all painful regions after Pt1, Pt2 or Pro

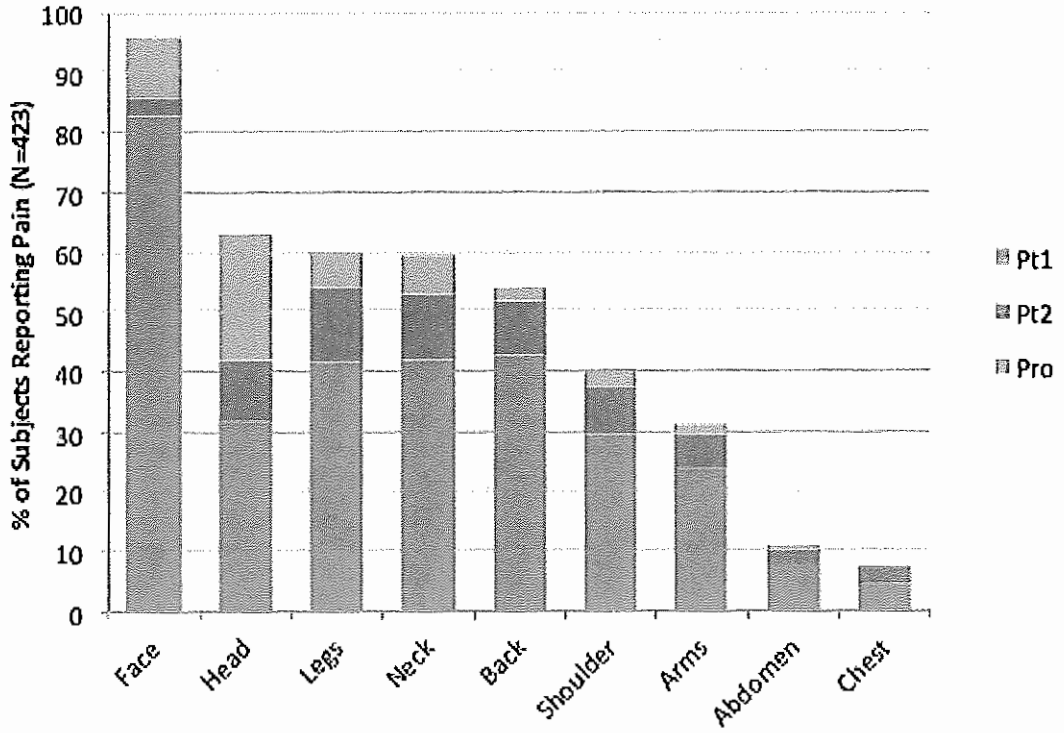


Figure 3 – Regional pain locations reported at Pt1, Pt2 and Pro

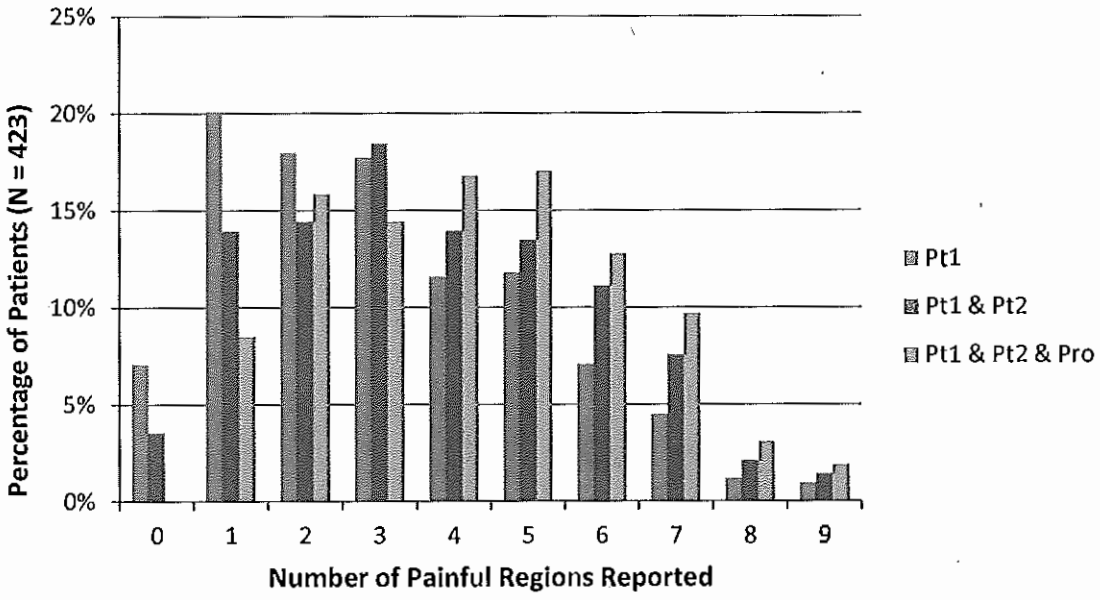


Figure 4 – Number of painful regions reported after Pt1, Pt2 and Pro

DISCUSSION/CONCLUSION

The main finding in this study was that a majority of Tricare patients referred to a specialty clinic for an orofacial pain evaluation had multiple painful regions, many of which were outside of the orofacial region. The majority of these patients did not report all of their pain complaints initially, but instead noted these only after various inquiries by a provider.

Pain prevalence and demographics

Chronic pain patients rarely have pain that is confined to one location. 91.5% of patients in this study reported multiple painful regions, which is similar to other chronic pain populations. For example, a U.S. National Comorbidity Survey suggested up to 87% of patients with chronic spinal pain had at least one other chronic condition (Von Korff, Crane & Lane 2005). Specific to an orofacial pain population, most patients in this study (77.1%) reported pain that extended beyond the orofacial region, which is similar to what was reported previously (John, Miglioretti, LeReshe, VonKorff & Critchlow 2003; Plesh, Adams & Gansky 2011; Turp, Kowalski, O'Leary & Stohler 1998).

This study also investigated gender, beneficiary status and ethnic differences in co-morbid pain reported across the adult age span. While no associations were noted regarding either beneficiary status or ethnic differences, both age (30-59) and female gender were associated with increased pain report. The trend between age, gender and pain report (ie. middle aged females report more pain regions) was similar to other TMD populations (Howard 1991). However, this military population had a larger proportion of males, as well as an older

age of peak pain reporting, than described in other populations. Increased male prevalence in this study versus previously studied populations may be explained by the large male predominance (85.4% male vs. 14.6% female in 2012) in the U.S. active duty military population (Department of Defense 2012). A possible explanation for the older age of peak pain in the military may be due to the high prevalence of training and combat related trauma military members experience with increased years of service. The noted decrease in pain once a person is 60+ years old may be related to retirement from military service and removal from military related traumas and stressors. This new environment may provide a healthier setting in which the person can rehabilitate and experience less pain. Another possible explanation for the decreased pain report may be due to cognitive decline that can take place with aging. This cognitive decline may make pain reporting problematic and lead to a less than accurate pain report.

Similar to previous studies, females reported significantly more pain than males (4.5 vs. 3.9 regions), although this difference may not have been clinically significant. Females reported significantly more head and neck pain than males, which had also been observed previously (Rasmussen, Jensen, Schroll & Olesen 1991; Fejer, Kyvik & Hartvigsen 2006). It was interesting to note that males reported facial pain as their only complaint significantly more often than females, which was similar to findings by Plesh and colleagues (2011). These findings may be attributed to well-documented pain-related differences between men and women, to include increased pain sensitivity and greater pain reporting in women (Hashmi & Davis 2014).

While earlier research has shown possible ethnic differences in orofacial pain patients' report of co-morbid pain (Plesh, Adams & Gansky 2011), this study did not find any significant

differences between ethnicities, nor did it find any significant differences in beneficiary status. This may be partially explained by the dependable social support and medical care that the military affords all of its members, regardless of ethnicity or status, compared to society as a whole. Further longitudinal studies would be needed to provide better insight into these possible differences.

Pain reporting

As previously reported (Turp, Kowalski & Stohler 1997; Franco, Runho, Siqueira & Camparis 2012), many patients hesitate to report pain outside of their chief complaint to their medical or dental provider. The data from this investigation strongly agree and demonstrate that pain is under-reported by the patients who sought care for an orofacial pain problem. A substantial amount of patients (60.5%) did not report all of their pain complaints initially on the pain map (Pt1). Thirty patients reported no pain initially. It was not until the provider utilized additional methods, to include an explanatory statement on the relationship between pain and prognosis (Pt2) and directed pain inquiry of specific body regions (Pro), at multiple points throughout the appointment that most patients provided a more accurate pain account.

Previous studies have postulated body pain underreporting exists because the patient perceives a lack of relevance to their orofacial pain chief complaint, yet additional explanations may exist. For example, prior to being evaluated by an orofacial pain provider, patients are often asked to complete a detailed intake questionnaire that requests a significant amount of information and requires considerable time to complete. A patient may feel overwhelmed with this task and not be able to physically and/or emotionally be able to complete it. Similarly,

when prioritizing time and energy, a patient may purposefully or inadvertently omit completing the pain map, or simply place less significance on noting other pain complaints compared to providing information specific to the chief complaint pain. Another possible reason for not reporting a pain complaint is that it may stem from a sensitive topic the patient does not want to discuss. For example, a study by Curran and colleagues (1995) noted that while 68.9% of orofacial pain patients anonymously reported a history of sexual or physical abuse, only 8.9% of patients reported this to their orofacial pain provider on the intake form. Therefore, if a pain is linked to a traumatic incident, a patient may be less likely to report this. This may be particularly relevant in a military population, as one study reported that up to 40% of female veterans have been victims of military sexual trauma, and many of these same individuals (95.4%) reported at least one additional non-military related sexual trauma (Kelly, Skelton, Patel & Bradley 2011).

While pain in any body region can play an essential role in the initiation and/or maintenance of orofacial pain, regions innervated by the trigeminal nerve are of increased importance due to trigeminal neural convergence and sensitization within the trigeminal subnucleus caudalis. In the present study, head pain was the most under-reported painful region. Patients also greatly underreported neck pain, though not as often as head pain. This underreporting can have significant prognostic implications for orofacial pain/TMD. This was demonstrated in a recent study by Nilsson and colleagues (2013), which found that both preexisting headache and headache intensity were predictors of TMD onset. Preexisting headache was highly associated with TMD development (OR 9.4), and as a patient's average headache intensity increased, the possibility of developing TMD increased (OR for moderate headache = 5.5, OR for severe headache = 10.1). This same study also found preexisting neck

pain increased the odds of developing TMD (OR 4.0). Findings from this study reinforce the importance of an orofacial pain provider having knowledge of patients' additional pain complaints, particularly those mediated by the trigeminal nerve, in order to obtain a precise diagnosis and formulate a rational management plan. This ideally would include proper management and/or referral for the patient's pre-existing head and/or neck pain in order to improve the prognosis of the patient's facial pain complaint.

While the percentage of orofacial pain patients that reported trigeminally mediated pains in this study is similar to that of other orofacial pain populations (Turp, Kowalski & Stohler 1997; Franco, Runho, Sequeira & Camparis 2012), the percentage of patients reporting pain below the shoulders was greater than twice the amount reported in a prior study utilizing a pain map and single pain inquiry (Franco, Runho, Sequeira & Camparis 2012). When a provider considers the impact of higher order CNS convergence, ANS mediated cranial nerve motor responses, and central sensitization discussed previously, it is obvious that painful regions below the shoulders can have a significant impact on the prognosis of an orofacial pain complaint and should be optimally evaluated and managed. This was demonstrated in a study by Wiesinger and colleagues (2009), which showed that chronic spine pain increased the odds of developing TMD by 11.3.

Given the diversity of patients that may present for evaluation at an orofacial pain clinic, different subgroups may report their pain most accurately when queried by varied methods (tools) at multiple time points (timing) throughout the appointment. A large subgroup of patients may report their pain location(s) when prompted visually by a pain map (M) accompanied by a written instruction directing the patient to draw any and all pain complaints.

This is a very simple tool that has been utilized successfully in studies across multiple ages and cultures. Yet not all patients respond to this style of prompting. A second subgroup of patients may not understand the prognostic implications of unreported pain, or may have simply forgotten to mark a region(s) for a variety of other reasons. A standardized explanatory (E) statement (Pt2) on the relationship between pain and prognosis may benefit this subgroup by serving as an encourager and/or reminder to report all pain complaints. Also, time spent communicating with the patient may help establish greater patient-provider rapport and lead to more accurate pain reporting. A third subgroup of patients may need assistance from their provider in recalling and/or reporting their pain(s), whether due to cognitive impairment, fear of over-reporting pain to their provider, an intense focus only on the chief complaint pain, or various other reasons. This group may benefit most from directed (D) pain inquiry of specific body regions (Pro).

It is apparent from the responses of these different subgroups that "tools & timing" is very important in facilitating maximal pain reporting from orofacial pain patients. Hence, we propose the Map Explanation Directed (MED) method as a new standard of care for pain location assessment. To the authors' knowledge, this is the first study to utilize three pain location inquiry methods at three points in time to assess a patient's pain location(s).

While this study has several strengths, several limitations also exist, to include: 1) Pain duration, frequency, and intensity were not collected. These data would have provided additional insight into the patient's pain progression and the possible degree a central sensitization that may have occurred. For example, increased orofacial pain intensity was associated with an elevated risk of having one or more chronic pain conditions (Visscher &

colleagues 2015). Furthermore, determining chronicity may have helped the provider understand whether the pain region outside of the orofacial pain complaint was a risk factor for the development of orofacial pain or vice-versa, or whether they merely co-occurred. Anecdotally, the majority of patients treated at the OPC report their pain to be chronic, but further objective assessment of chronicity would provide more precise measures.

2) Co-morbidities known to be associated with and possibly risk factors for chronic pain (depression, anxiety, sleep disturbance, genetic and epigenetic vulnerabilities, ANS reactivity, other medical diagnoses, etc) were not assessed in this study (Diatchenko, Slade, Fillingim & Maixner 2006; Mcmillan, Wong & Zheng 2010; Slade & colleagues; de Leeuw & Klasser 2013). These may have impacted both how many pain regions a patient had, as well as how likely a person was to report their pain.

3) Data on orofacial pain comorbidities prominent in a military population and known to be related to chronic pain and altered pain processing such as post-traumatic stress disorder (PTSD) and traumatic brain injury (TBI) (Geuze & colleagues 2007) were not collected. A study on Croatian war veterans reported that PTSD patients are at very high risk for the development of TMD (Uhac & colleagues 2006), and 70% of veterans with a TBI have head, back and/or neck pain (Taylor and colleagues 2012). The likely prevalence of these comorbidities in the study population may help explain the high prevalence of orofacial pain and body pain.

4) Patients may still not have revealed all of their areas of pain despite the given opportunities. Possible reasons for this include concern over job related consequences, fear of being perceived as weak, belief that others do not understand their pain, not wanting to receive sympathy or pity from others, and not wanting others to overreact to their pain (Machin, De & Williams 1998; Matthias, Miech, Myers, Sargent & Bair 2014). Additionally, the presence of cognitive impairment related to combat or training trauma in a subgroup of evaluated patients may have

led to less effective communication of their pain (Clark, Bair, Buckenmaier, Gironda & Walker 2007).

5) Use of large anatomical regions when reviewing a patient's pain map may have led to overestimation of the extent of a patient's pain, as a mark of any size caused an entire segment to be viewed as positive for pain (Turp, Kowalski, O'Leary & Stohler 1998).

Chronic orofacial pain management involves identifying pain risk factors a patient may possess and addressing all aspects that are modifiable for that individual. Co-morbid pain is an often-present risk factor that can limit the management efficacy of orofacial pain/TMD. Patients with this disease cannot be viewed and successfully managed under a simplistic dental treatment model (Raphael & Marbach 2001; Velly & Fricton 2011). While there is not a sole medical or dental specialty that has the expertise to provide comprehensive care for these complicated patients, co-morbid pain is a potentially modifiable risk factor that may improve within the right care system.

Consistent with recommendations made by a numerous studies, this study also supports the observation that chronic orofacial pain patients should receive treatment within a multidisciplinary care model due to the high frequency of multiple pain regions and commonly associated psychological comorbidities (Madland & Feinmann 2001), as this will maximize the likelihood of a superior outcome for the patient and provider (Lim, Maixner & Khan 2011). This parallels recommendations from the Department of Defense and Veterans Affairs guidelines developed by the U.S. Military Pain Task Force, which advocates for a multidisciplinary, integrated approach to pain management (Clark, Bair, Buckenmaier, Gironda & Walker 2007; Matthias, Miech, Myers, Sargent & Bair 2014). While it is naïve to think that treatment of a

patient's coexisting pain will always equate to successful orofacial pain management, it is imperative nonetheless that other pain complaints be addressed if optimum orofacial treatment potential is to be realized.

In summary, the majority of Tricare patients seeking treatment for their orofacial pain had several additional pain complaints, many of which were below the shoulders. A high proportion of these patients did not report all of their pain complaints on a pain map. Since the presence of additional pain can have significant impact on the diagnosis, treatment, and prognosis of a patient's pain, it is recommended that the new standard of care for assessing pain location is to utilize the MED method (pain map, patient **e**xplanation, and **d**irected pain questioning) at multiple time points throughout the evaluative process (prior to meeting the patient, early and late in the interview process, at the conclusion of the examination) in order to provide a patient the greatest opportunity to report their pain complaint(s), if applicable. This will lead to a more accurate pain assessment and facilitate essential multidisciplinary care.

Appendix A

OPC History and Intake Form: Part 1

Orofacial Pain Center
Naval Postgraduate Dental School
Navy Medicine Manpower Personnel,
Training and Education Command
8901 Wisconsin Ave
Bethesda, MD 20889
Com (301)295-1495 or 295-6832
DSN 295-1495 or 295-6832
FAX (301)295-2070

Orofacial Pain Examination Form

June 2013

Please complete pages 1-8 and circle choices whenever available.

Name _____ Exam Date_____

Sponsor SSN _____ DOB _____ Gender: M F

Active Duty / Retired / Family member Age_____
Ethnicity_____

Branch of Service _____ Rank / Rate _____

Phone (H) (____)_____ (W) (____)_____ (Cell) (___)_____

Address _____

City _____ State _____ Zip _____

Email _____

Are you enrolled in? TRICARE Prime TRICARE Extra TRICARE Standard Medicare

Do you have other Insurance? Y N Insurance Company _____

Insurance Policy Number _____

The provider who referred you for this evaluation? _____

Is this evaluation for one of the following: Medical/Physical evaluation board

Second opinion

Litigation/legal issue

Name _____

Why are you here? Describe your pain or problem(s):

_____

_____

_____

BP ___/___

Pulse ____

Resp ____

CO2 ____

When and how did your pain /problem(s) start? _____

_____

_____

Who have you seen for your pain /problem(s)? Please circle: Dentist, Primary Care Provider, Neurology, ENT, Pain Clinic, Physical Therapy, Chiropractor, Other _____

_____

_____

What treatments and//or medications have you received for you pain problem(s)?

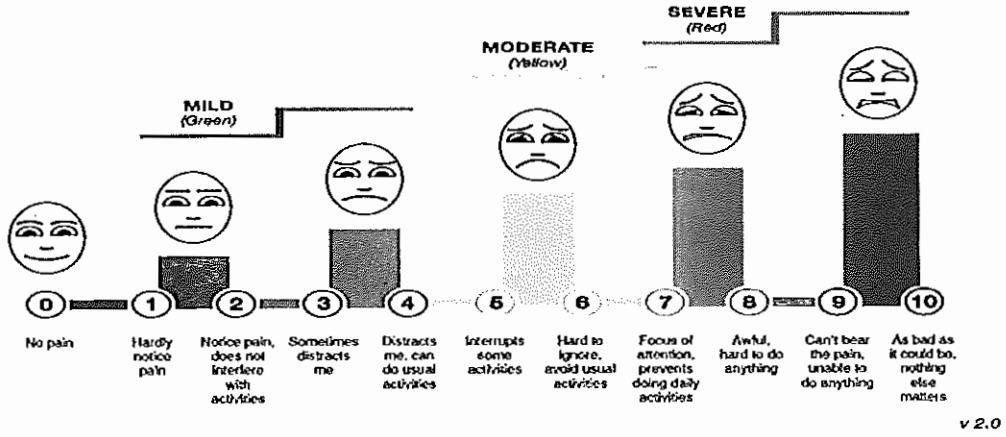
_____

_____

Circle the word(s) that describe your pain or problem(s)?

Sharp Burning Electric-like Aching Throbbing Dull Pulsing Pressing Stabbing Tingling

What is your level of pain from <u>the painful area that is the main reason for your visit</u>?



Please mark your pain level on the lines below using the above reference.

	No discomfort		Worst pain imaginable
1. Today	0	_____	10
2. At its Worst	0	_____	10
3. On Average	0	_____	10

Any pain free days? Yes No When were you last completely pain free? _____

Please Rate Your Pain Interference

4. In the past 6 months, how much has your pain interfered with your daily activities?

No Interference Unable to perform any activities
0_____10

5. In the past 6 months, how much has your pain changed your ability to take part in recreational, social and family activities?

No Interference Unable to perform any activities
0_____10

6. In the past 6 months how much has your pain interfered with your ability to work including housework?

No Interference Unable to perform any activities
0_____10

7. About how many days, in the last six months, have you been kept from your usual activities (work, school and/or housework) because of your pain? _____

What does your pain limit you from doing?

_____

_____

_____

Pain Modifiers:

What starts your pain? _____

What makes your pain worse? _____

What makes your pain better? _____

Does anything else happen when your pain is present (swelling, change in vision, nausea, etc.)? _____

_____

What do you think is wrong or causing your pain/problem (s) and what do you think needs to be done about it?

_____

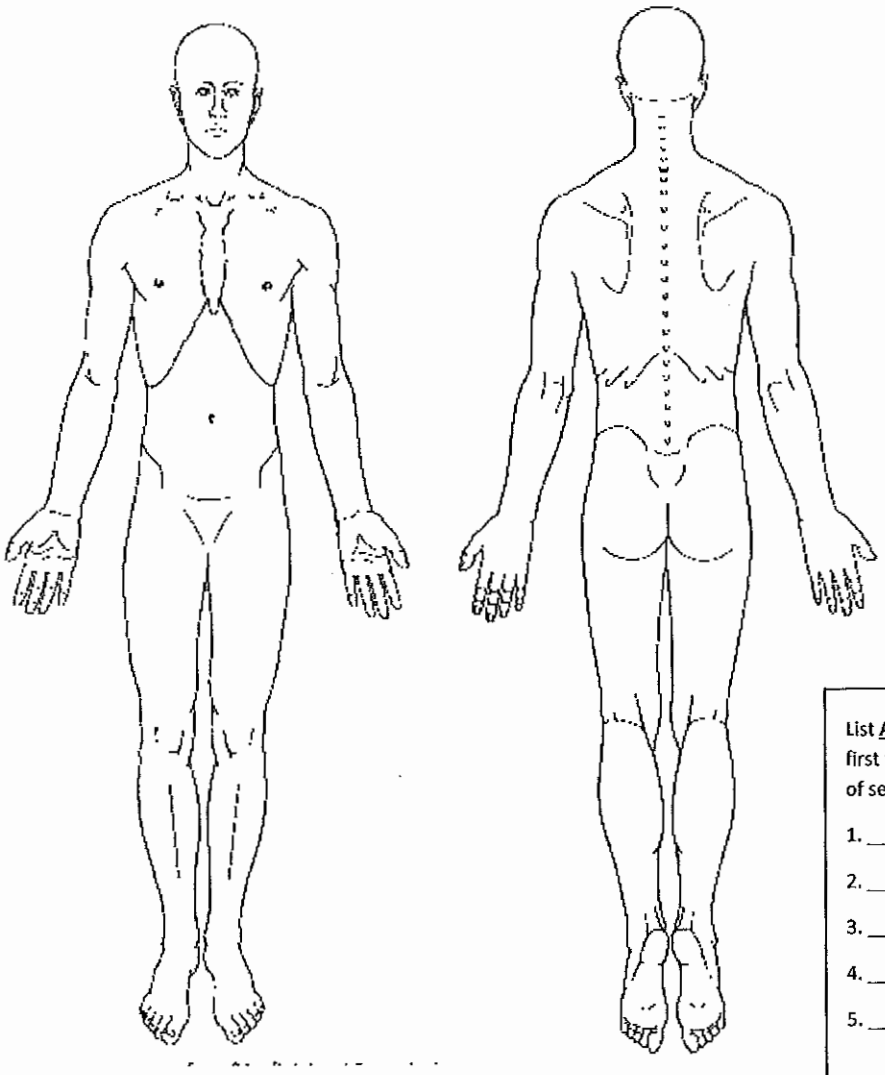
_____

Why did you decide to seek care at this time?

_____

_____

Outline/draw the location(s) of **ANY AND ALL BODY PAIN** that you are experiencing.



Pt 2

Pro

List **ALL** of your pain problems (worst pain first then add others in decreasing order of severity):

1. _____
2. _____
3. _____
4. _____
5. _____

Which pain occurred first?

What is your overall level of total body pain?

Please mark your levels of overall body pain on the lines below.

	No discomfort		Worst pain imaginable
1. Today	0	_____	10
2. At its Worst	0	_____	10
3. On Average	0	_____	10

Any pain free days? Yes No When were you last completely pain free? _____

Medical History

Medical Conditions: _____

Allergies: _____

History of hospitalizations? _____

History of injury or trauma? Yes No _____

Have you ever had a traumatic brain injury (TBI) or a concussion? Yes No

If yes, when? _____ how did it occur? _____

If yes, did it happen on a military deployment? Yes No

Current prescription medications: _____

_____

Current non-prescription medications: _____

Herbal/Dietary supplements and Vitamins: _____

History of family medical conditions (parents, siblings, etc.)? _____

Personal Information

Nicotine Y N How long? _____ cigarettes _____/day cigars_____ pipe _____ snuff _____

Alcohol Y N beer ____/day wine _____ glasses/day liquor ____ drinks/day

Caffeine Y N cups(cans)/day _____ coffee tea soda chocolate

Water Y N _____ glasses or bottles/day

Do you skip any meals? Yes No Which? Breakfast Lunch Dinner

Weight: _____lbs Height: ____ft___inches Neck size:____inches Any recent weight gain/loss? Yes No

Exercise level: None Slight Moderate Active Any activity limitations? Yes No

Please estimate how many hours a day (0 to 24 hours) that your teeth touch in any contact. _____

Do you clench or grind your teeth? Yes No Don't know

If yes, how do you know? self-aware told by dentist told by others

Do you? bite your nails chew gum protrude tongue hold the tongue to the roof of the mouth
other habits: _____

Please rate your levels of:

	None		Worst possible
Stress	0	_____	10
Anxiety	0	_____	10
Depression	0	_____	10
Anger	0	_____	10

Have you ever thought of harming yourself? Yes No

Personal/Family History

Occupation: _____

Marital status: Single Married Separated Divorced

Children: Y N If yes, list ages _____

Are there any special needs or circumstances involving you, your family members or your job? Yes No

_____

_____

Do you have any history of the following or similarly threatening, stressful or frightening life events? Yes No

Abuse - at any age (physical, emotional or sexual), childhood neglect, physical or sexual assault, motor vehicle accident, deployment to a conflict zone, panic attacks, near drowning, other _____

_____

_____

_____

Have you been told that you have post-traumatic stress symptoms (PTSS) or post-traumatic stress disorder (PTSD)?

Yes No If yes, when? _____

Headaches

Do you have problems with headaches? Yes No For how long? _____

Any family history of headaches? Yes No

Do you have more than one kind of headache? Yes No If yes, how many kinds? _____

Please describe each type of headache you experience.

	#1	#2	#3
Where on your head does the headache occur?			
Average pain level 0 (no pain) to 10 (worst ever)			
How often do they occur? (daily, weekly, monthly)			
When do they occur? (morning, evening, etc.)			
How long do they last? (secs, mins, hours, days)			
What starts (triggers) your headache?			

With your headache, do you experience? nausea vomiting light sensitivity sound sensitivity

dizziness aura(altered sensations) other _____

Do you experience any of the following?

Neck pain? Yes No _____ Neck sounds? Yes No _____

If yes, when did it start? _____ When is it the worst? _____

Pain from areas below your shoulders? Yes No If yes, where? _____

Dizziness or lightheadedness? Yes No _____

Ear problems? Yes No fullness stuffiness ringing sounds pain _____

Numbness or tingling? Yes No around mouth head/face arms/fingers legs/toes other

_____

Jaw pain? Yes No _____

Tooth pain? Yes No _____

Changes in your bite? Yes No _____

Altered jaw movement(s)? Yes No _____

Jaw joint (TMJ) sounds? Yes No If yes, is it? popping clicking grating/grinding other _____

Did jaw joint (TMJ) sounds begin before your pain started? Yes No unsure

Have there been any changes in the jaw sounds? _____

If you have jaw pain or stiffness, when is it the worst? with awakening morning noon afternoon evening

Does your jaw problem affect your ability to eat? Yes No _____

Sleep History

How many hours do you sleep? Average night _____ Good night _____ Bad night _____

How long does it take to fall asleep? Average night _____ Good night _____ Bad night _____

Do you have a regular/consistent sleep schedule? Yes No _____

Do you snore or have a history of sleep apnea? Yes No _____

Do you sleep using a CPAP &/or an oral device for sleep apnea? Yes No _____

Is your obstructive sleep apnea mild moderate severe

What position do you fall asleep in? side back stomach

Do you have problems with nightmares? Yes No If yes, are they recurring? Yes No

What are the words that best describe your sleep? Good Fair Poor Sound Light Restless

Do you consider your sleep to be restful or restorative? Yes No _____

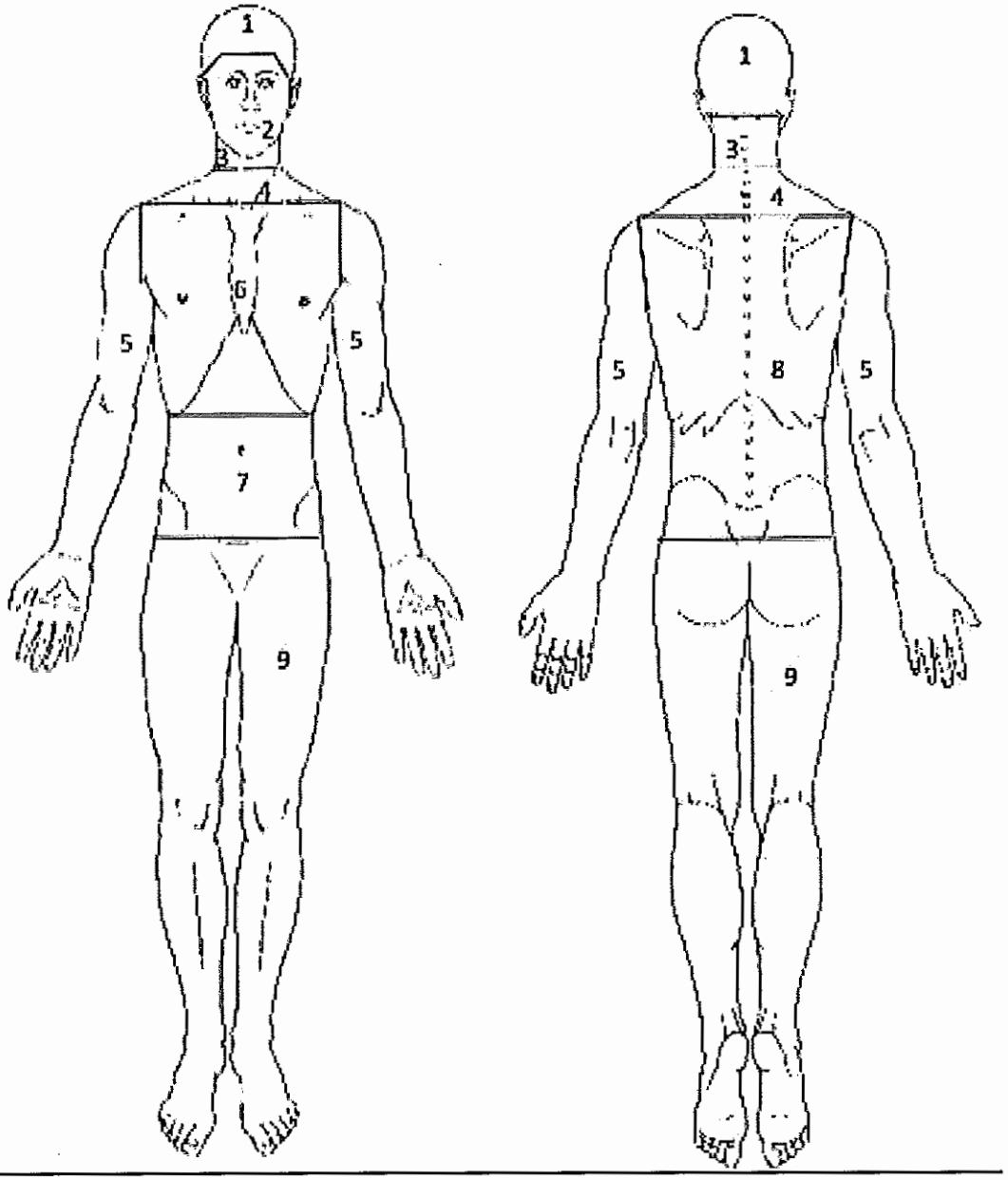
Please check the most appropriate box concerning your sleep during the last 4 weeks.

	No, not in last 4 weeks	Yes, less than once a week	Yes, 1 or 2 times a week	Yes, 3 or 4times a week	Yes, 5 or more times a week
Did you have trouble falling asleep?					
Did you wake up several times a night?					
Did you wake up earlier than you planned?					
Did you have trouble getting back to sleep after you woke up too early?					

Please list any additional information that you feel is important for us to know about you, your pain complaint or other aspects of your visit.

Appendix B

Pain Map Overlay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