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FORGIVENESS AND OROFACIAL PAIN

by

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A thesis submitted to the Faculty of the
Orofacial Pain Graduate Program
Naval Postgraduate Dental School
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DEDICATION

To Breeanne, Mikayla, Zachary, Aubrey, Libby, Sabrina, Kaitlynn, Lance, and
Kaleb

I can never express my gratitude for your support in making this possible.

DISCLAIMER

The views presented here are those of the author and are not to be construed as official or reflecting the views of the Uniformed Services University of the Health Sciences, the Department of Defense, or the U.S. Government.

ABSTRACT

Forgiveness and Orofacial Pain

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Introduction: Unforgiveness is a maladaptive cognitive style defined by the tendency to retain negative feelings toward individuals, situations, or even self. It has been associated with various chronic pain conditions, including low back pain, fibromyalgia, and chronic widespread pain, all of which are associated with temporomandibular disorders (TMDs).

Objective: The primary objective of this study was to determine the prevalence of unforgiveness in TMD pain patients referred to a tertiary Orofacial Pain Center. The secondary objective was to determine how forgiveness/unforgiveness relate to the type of TMD diagnosis, insomnia, pain severity, anxiety, depression, and sleep disturbance.

Methods: This is a preliminary report of a retrospective chart review study examining data gathered from all new patients aged 18 years and older seen at the Orofacial Pain (OFP) Center at the Naval Postgraduate Dental School during their initial intake exam from 12 January 2022 through 15 June 2022 (N=30). Forgiveness, assessed with the Heartland Forgiveness Scale (HFS), was compared to pain and other self-reported measures to include demographic, affective, and functional characteristics.

Results: Overall HFS score suggested a high level of forgiveness for self, others, and situations. Situational HFS scores were negatively correlated with anxiety ($p < 0.05$) and depression ($p < 0.01$). Pain severity, pain duration, age, and insomnia scores were not significantly correlated with any HFS scores pending further analysis.

Conclusions: In this retrospective chart review of military associated OFP patients, direct correlation was noted between situational unforgiveness and anxiety/depression. No statistical correlation was noted between pain characteristics, age, or insomnia. Because anxiety and depression are predictors for the development of OFP, further investigation is warranted to discover any potential relationships and the extent thereof, particularly in the military environment.

TABLE OF CONTENTS

LIST OF TABLES	x
LIST OF ABBREVIATIONS	xi
CHAPTER 1: Introduction	1
Background	1
Chronic Pain.....	1
Orofacial Pain	2
Biopsychosocial Model of Pain	3
Forgiveness/Unforgiveness-	4
Forgiveness Measurements-.....	4
Sequelae-.....	4
Treatment-.....	5
Orofacial Pain and Unforgiveness	5
Potential relationship	5
Rationale	6
Objectives	7
CHAPTER 2: Materials and Methods	8
Study Design.....	8
Data Collection	8
Data Source.....	8
Study Subjects.....	8
Inclusion/Exclusion Criteria	9
Measures	9
Demographic and Health History Questionnaire.....	9
Pain Measures.	9
Generalized Anxiety Disorder (GAD-7).....	10
Patient Health Questionnaire-9 (PHQ-9).....	10
Insomnia Severity Index (ISI).....	10
Heartland Forgiveness Scale (HFS).....	11
Diagnosis:	11
Data Management	12
CHAPTER 3: Results	13
CHAPTER 4: Discussion.....	15
CHAPTER 5: Conclusions	17
APPENDIX A.....	26

Heartland forgiveness scale	26
Generalized Anxiety Disorder 7-item (GAD-7) scale ²²	30
Patient Health Questionnaire (PHQ-9)	31
Insomnia Severity Index (ISI) ²⁴	33
REFERENCES	34

LIST OF TABLES

Table 1. Heartland Forgiveness Scale Scores	18
Table 2. Correlations Among Primary Study Variables	19
Table 3. Demographic Characteristics	20
Table 4. Pain and Emotion Characteristics	21
Table 5. McGill Pain Descriptors (N=30)	22
Table 6. Primary Diagnosis Frequency.....	23
Table 7. Affect and Sleep Dysfunction.....	24
Table 8. Additional Forgiveness Questions	25

LIST OF ABBREVIATIONS

AAOP	American Academy of Orofacial Pain
AAOPG	AAOP Guidelines
AVG	Average
CLBP	Chronic Lower Back Pain
DC/TMD	Diagnostic Criteria for Temporomandibular Disorders
FM	Fibromyalgia
GAD-7	Generalized Anxiety Disorder-7
HFS	Heartland Forgiveness Scale
IASP	International Association for the Study of Pain
ISI	Insomnia Severity Index
NPDS	Naval Postgraduate Dental School
OFP	Orofacial Pain
OPC	Orofacial Pain Center
OPPERA	Orofacial Pain: Prospective Evaluation and Risk Assessment
OPPR	Orofacial Pain Patient Registry
PHQ-9	Patient Health Questionnaire-9
PHS	Public Health Service
SD	Standard Deviation
TFS	Trait Forgivingness Scale
TMD	Temporomandibular Disorder
TMJ	Temporomandibular Joint
US	United States

VAS

Visual Analog Scale

WRNMMC

Walter Reed National Military Medical Center

CHAPTER 1: Introduction

BACKGROUND

Chronic Pain

Pain has been defined by the International Association for the Study of Pain (IASP) as “An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.”¹ Chronic pain has been defined as “persistent or recurrent pain lasting longer than 3 months” representing pain that continues beyond the normal healing period.² Per the Centers for Disease Control, chronic pain affects between 11 and 40% of the general population in the United States with significant variation in population subgroups.³

Gaskin and Richard estimated that pain costs the United States between \$261 and \$300 billion in healthcare-related costs annually with an additional \$299 to \$335 billion in lost productivity.⁴ They concluded that these costs exceeded those of major economically damaging illnesses including heart disease, cancer, and diabetes.

The available treatment modalities for chronic pain are natural extensions of the contributing factors. While the entire scope of treatment modalities available for chronic pain is beyond the scope of this thesis, some of the main treatment options include conventional medical treatments such as physical therapy, pharmacology, psychological therapy, and surgery, as well as non-conventional therapies such as acupuncture, massage, and dietary modification.

Orofacial Pain

According to the American Academy of Orofacial Pain *Guidelines for Assessment, Diagnosis, and Management* (7th edition) (AAOPG) orofacial pain (OFP) “refers to pain associated with the hard and soft tissues of the head, face, and neck.” OFP categories include, but are not limited to, dental pain, neurovascular pain, musculoskeletal pain, neurogenic pain, psychophysiological pathology and chronic cancer pain.² The most common OFP conditions outside of dental pain are temporomandibular disorders (TMDs). TMDs are “a group of musculoskeletal and neuromuscular conditions that involve the temporomandibular joints (TMJs), the masticatory muscles, and all associated tissues, and they have been identified as a major cause of non-dental pain in the orofacial region.”² These include joint pathologies, myalgias, myofascial pains and tendinopathies.

OFP is common, with one survey of 45,711 US households showing that about 22% of the populace reported one or more types of OFP in the last six months. TMJ pain has been calculated at 5.3%, and cheek or face pain was purported to be 1.4%.⁵ More recently, Jackson, et al., reported that in low- and middle-income countries temporomandibular disorders have a prevalence of 35% in the general population.⁶

Both OFP in general and TMDs specifically have been demonstrably associated with multiple other comorbid conditions including chronic fatigue syndrome, fibromyalgia, headache, post-traumatic stress disorder, gastroesophageal reflux disorder, panic disorder, multiple chemical sensitivity, irritable bowel syndrome and more.² All of

these conditions have been linked to depression and anxiety as well as psychological trauma.⁷ Indeed, anxiety and depression are understood to be risk factors for TMDs.⁷

Biopsychosocial Model of Pain

Medicine has attempted to manage pain within a biomedical model approach which emphasizes the physical injury or malady as the ultimate source of pain and discounts the mind and society as potential influencers of pain. This model denotes pain in the absence of any physical injury or malady as psychosomatic.⁷ In 1977, however, Dr. Engle published a challenge to the biomedical model calling for a model that takes into account psychological and sociological issues, as well as physical ailments and injuries, as significant influencers of pain, particularly influencing chronic pain.⁸ He titled this the biopsychosocial model.

Kandasamy and Greene explained the resulting new biopsychosocial model by breaking the word itself in to three distinct entities. The biological entity includes the pain that is perceived by the patient due to physical ailments and injuries. The psychological entity accounts for psychological distress as well as the consequences, particularly behavioral consequences of the pain. Those behavioral consequences must be considered within a social context influencing patients' interpersonal relationships with friends, families, health providers, and, we would add, employers.⁹

In exploring this biopsychosocial model, the Orofacial Pain: Prospective Evaluation and Risk Assessment (OPPERA) study, which examined the interplay of biopsychosocial, epidemiological, genetic, and environmental risk factors and the prevalence and chronification of TMDs, discovered that if a patient had elevated pain sensitivity and psychological distress, they were more likely to develop TMDs, to have

persistent TMD at five year follow up, and to have other chronic overlapping pain conditions, among other findings.^{10, 11}

Forgiveness/Unforgiveness-

Worthington and colleagues defined unforgiveness as “a combination of delayed negative emotions (i.e., resentment, bitterness, hostility, hatred, anger, and fear) toward a transgressor.”^{12, 13, 14} “Forgiveness,” in contrast, “is conceptualized as a coping mechanism that helps to relieve common sources of stress but also has direct and indirect (through stress) effects on health and nervous and endocrine function.”¹⁵ Worthington, et al., list three types of forgiveness: forgiveness of others, self-forgiveness, and intergroup forgiveness. Each of these types of forgiveness have their own measures.^{12, 13, 14}

Forgiveness Measurements-

In a systematic review, Fernandez Capo, et al., reported forgiveness to have over 45 options to choose from for measuring the forgiveness of others, self, situations, organizations, and God.¹⁶ They reviewed and rated each of the measures according to availability, reliability, and validity on a 10-point scale and grouped them according to dispositional, dyadic, or episodic forgiveness. The Heartland Forgiveness Scale (HFS) and the Trait Forgivingness Scale (TFS) were the highest-ranking dispositional forgiveness measures. The apparent advantage of the HFS over the TFS seems to lie in that it breaks out forgiveness of self, of others, and of situations. The HFS was selected for this study based on its validity and reliability.¹⁶

Sequelae-

Depending on the focus of specific studies, the terms “forgiveness” or “unforgiveness” are used which requires distinction to properly understand the available literature. Unforgiveness has been shown to have detrimental effects on numerous aspects of health to include a positive correlation with chronic pain conditions such as chronic low back pain (CLBP)¹⁷ and fibromyalgia (FM).¹⁸ Carson, et al., concluded that patients reporting inability to forgive others may experience more severe pain and psychological distress mediated by increased state anger.¹⁷ Offenbächer, et al., found lower levels of forgiveness in fibromyalgia patients than in controls.¹⁸

Treatment-

Offenbächer, et al., have found that reduction of unforgiveness through a “holistic and spiritual therapeutic process” led to decreases in stress and pain associated with FM.¹⁵ This is consistent with the work of Lee and Enright who found that increasing patients’ level of forgiveness through a series of individualized learning sessions and quizzes improved their FM health.¹⁹ Both studies hypothesized reduction of stress as potential mechanism by which improvements were made

OROFACIAL PAIN AND UNFORGIVENESS

Potential relationship

If unforgiveness affects other pain conditions, it is reasonable to hypothesize that it affects OFP. However, there is very scant research directly correlating unforgiveness/forgiveness and OFP, if any. On the 28th of October 2022 a Google Scholar search of “orofacial pain unforgiveness” yielded 2 results, neither of which addressed any specific

relationship between OFP and unforgiveness. The same search on PubMed yielded zero results. Similarly, a PubMed search for “orofacial pain” “forgiveness” yielded three irrelevant references with 48 irrelevant references from Google Scholar.

Rationale

This study is innovative, as no other study has assessed the prevalence of unforgiveness symptoms and how these symptoms may present in orofacial pain patients. It provides a retrospective cross-sectional view examining the presence of unforgiveness symptomatology in patients who present with orofacial pain at the Orofacial Pain Center (OPC) in Bethesda, Maryland. The prevalence of unforgiveness symptomatology will also be compared between TMD patients presenting with masticatory muscle pain and intracapsular pain. The knowledge gained from this proposed study should provide a more in-depth understanding of the influence of how unforgiveness symptomatology can present in chronic TMD patients.

This study retrospectively assessed the prevalence of self-reported unforgiveness in patients diagnosed with chronic TMD by the OPC at the Naval Postgraduate Dental School (NPDS). There has been increasing evidence to support the co-occurrence of unforgiveness and chronic pain conditions such as fibromyalgia, low back pain, and chronic widespread pain.¹⁵ However, no studies were found in the peer-reviewed literature that explored the prevalence of unforgiveness in chronic TMD/OFP.

We ask whether there is a significant presence of unforgiveness in TMD patients treated in the NPDS’s OPC. The purpose of this study is to assess the presence and severity of unforgiveness symptoms in chronic TMD patients using the Heartland

Forgiveness Scale (HFS). In addition, Generalized Anxiety Disorder-7 (GAD-7), the Patient Health Questionnaire-9 (PHQ-9), and the Insomnia Severity Index (ISI) will be used to evaluate the potential influence of anxiety, depression, and sleep disturbance associated with unforgiveness and TMD.

OBJECTIVES

The purpose of this study is to determine the burden of unforgiveness in Orofacial Pain Center-evaluated patients and to quantify the relationship between unforgiveness and possible TMD covariates. This will be accomplished through the following two specific aims:

Specific Objective #1: Determine the prevalence and severity of unforgiveness in a random sample of OPC patients, the first of which was seen on 20 January 2022 and the last seen on 18 July 2022.

Specific Objective #2: Correlate the presence and level of unforgiveness with TMD type, pain severity, anxiety, depression, and sleep disturbance.

CHAPTER 2: Materials and Methods

STUDY DESIGN

This is a retrospective cohort study involving the examination of existing records and data from patient intake forms and questionnaires.

DATA COLLECTION

Data Source

Data for this study was obtained from the NPDS-OPPR and queried data collected from the “EXAM FORM Part-1” intake form. Additionally, data from their initial visit clinical note was assessed. The Naval Postgraduate Dental School Orofacial Pain Patient Registry (NPDS-OPPR) was formed, under WRNMMC IRB approval (WRNMMC-0219-0248), to collect intake data for subjects seeking care at the NPDS Orofacial Pain Center (OPC). All registry subjects consented and agreed to have their data used for future research studies.

Study Subjects

The Pain Registry contains intake data from the initial examination for consented subjects aged 18 years and older that were seen at the OPC of the NPDS (Bethesda, Maryland, USA) beginning on 12 January 2022. The total enrollment of the Pain Registry is capped at 800 subjects. Subjects consist of the above-described military population.

Inclusion/Exclusion Criteria

Exclusion criteria include 1) a primary temporomandibular disorder diagnosis that does not fit in one of the following diagnostic categories: disorders affecting the TMJ and disorders affecting the muscles of mastication and 2) age under 18 years. All other patients with appropriately completed surveys will be included in the study.

Measures

The following demographic, health history, and psychologic measures are part of the standard OPC clinical assessment and are completed by all new patients (EXAM FORM Part I). The following data will be used in this study.

Demographic and Health History Questionnaire.

All subjects completed a brief demographic and health history questionnaire. Information recorded includes the exam date and subject descriptors; sex, age, status (i.e. active duty, family member, retired), race, ethnicity, branch of service, nicotine, alcohol, caffeine use, and marital status. Stress and anger were also measured on a 10-point visual analog scale (VAS).

Pain Measures.

The duration of pain was documented in months. Using the McGill Pain Questionnaire, patients graded "current", "average", and "worst pain intensity" on a VAS ranging from 0 to 10 (with 0 denoting "no pain" and 10 denoting the "worst pain imaginable"). If a patient responded with a range (e.g., worst pain 5-6/10), the larger

value (e.g., 6/10) was recorded. They were asked about any pain-free days and how many workdays were missed due to the pain. Additionally, they also rated overall pain today, worst pain, and average pain using a VAS.²⁰

Generalized Anxiety Disorder (GAD-7).

The GAD-7 assesses symptoms of generalized anxiety using 7 items covering the preceding two weeks. It is widely accepted and utilized and has a consistent record in clinical and research applications requiring psychometric measurement.^{21, 22}

Patient Health Questionnaire-9 (PHQ-9).

The PHQ-9 assesses the presence and severity of symptoms of depression using 9 items covering the previous two weeks ranging from not at all to nearly every day. The PHQ-9 has established test-retest reliability, internal consistency, and convergent validity.²³

Insomnia Severity Index (ISI).

The ISI assesses the severity of insomnia symptoms occurring both nocturnally and diurnally. It uses 7 items to assess sleep onset delay, severity of sleep maintenance issues, current sleep pattern satisfaction, daily functional interference, observed impairment due to sleep issues, and level of concern or distress induced by sleep issues. Items are graded on a scale from 0-4 with the overall score ranging from 0-28 with higher scores indicating more severe insomnia. It is widely used in clinical and research

settings and has been proven as a valid screening instrument to identify sleep disturbances in diverse patient populations.^{24, 25}

Heartland Forgiveness Scale (HFS)

The Heartland Forgiveness Scale measures an individual's tendency toward forgiving.^{16, 26, 27} It is comprised of 18 questions, which are measured in total, and broken down into 3 categories: Forgiveness of Self, Others, and Situations as follows.

- HFS Forgiveness of Self subscale (items 1-6)
- HFS Forgiveness of Others subscale (items 7-12)
- HFS Forgiveness of Situations subscale (items 13-18)

The scores assigned to items 1, 3, 5, 8, 10, 12, 14, 16, and 18 are identical to the answers provided by the individual taking the HFS assessment. However, the scoring for items 2, 4, 6, 7, 9, 11, 13, 15, and 17 is reversed. This means that an answer of 1 is assigned a score of 7, while an answer of 7 is assigned a score of 1. Detailed information regarding the scoring of individual items can be found in the appendix.

To calculate the overall HFS score, as well as the scores for HFS Forgiveness of Self, HFS Forgiveness of Others, and HFS Forgiveness of Situations, the values for the relevant items need to be summed up. It is important to note that appropriate items are reverse-scored when calculating these scores. The Total HFS score can range from 18 to 126, while each of the three HFS subscales can range from 6 to 42 in terms of scores.

Diagnosis:

A primary diagnosis will be noted for each subject and assigned to one of two diagnostic categories: disorders of the TMJ(s) and disorders of the muscles of mastication. This will be done according to AAOPG in conjunction with the Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) Axis I diagnoses.² Frequently patients meet the diagnostic criteria for multiple diagnoses. For instance, a patient might receive a diagnosis for both "disc displacement with reduction" and "myalgia". The clinician will judge which condition is most pertinent the chief complaint and record that condition as the first diagnosis.

Data Management

The data is stored on the password protected WRNMMC Orofacial Pain Center share drive. Only members of the research study team have access to this data.

CHAPTER 3: Results

Due to the ongoing nature of this study which will continue through the middle of the 2024 academic year, only preliminary results are presented in this report.

The statistical sample consists of 30 individuals. The average age of the sample is 36.6 years, with a standard deviation of 10.0. Regarding sex, 18 individuals (60%) are male, while 12 individuals (40%) are female. The distribution of race within the sample is as follows: 69.0% identify as White, 27.6% as Black, 0% as Asian, and 3.4% as “Other.” 13.8% of the sample identifies as Hispanic. 60% of the sample consists of enlisted personnel, while 40% are officers. In terms of branch affiliation, the breakdown is as follows: 30.0% Air Force, 30.0% Army, 3.3% Coast Guard, 6.7% Marines, 23.3% Navy, and 6.7% PHS (Public Health Service). 5 individuals (16.7%) within the sample report using nicotine. The average duration of nicotine use among these individuals is 7.75 years, with a standard deviation of 3.0. These data are shown in Table 3.

Specific Objective #1: Determine the prevalence and severity of unforgiveness in a random sample of OPC patients (N=30) the first of which was seen on 20 January 2022 and the last seen on 18 July 2022.

The prevalence of forgiveness as measured by the HFS is reported in Table 1. The different sub-scales of forgiveness from the HFS were relatively consistent across the samples. The total HFS score averaged 98.43 with a standard deviation of 19.1. All average scores were in the forgiving range, but multiple subjects reported scores well below the “unforgiving” threshold.

Because the HFS does not evaluate whether an individual is actually holding a grudge we asked a few additional questions as noted in Table 8.

Specific Objective #2: Correlate the presence and level of unforgiveness with TMD type, pain severity, anxiety, depression, and sleep disturbance.

With only 4 patients with non-musculoskeletal orofacial pain (otalgia, odontalgia, neuropathy, and subluxation) and 26 muscle-related conditions, there was not enough data to do a proper comparison between specific diagnoses.

Table 2 shows the correlations among the primary study variables. Situational forgiveness correlates negatively with both anxiety screener scores and depression screener scores. No statistically significant correlation was noted between pain intensity rating and any forgiveness sub-scores.

CHAPTER 4: Discussion

Interestingly, only situational forgiveness correlated with depression and anxiety in the study. Situational forgiveness, as conceptualized within the Heartland Forgiveness Scale (HFS), refers to the willingness or ability of an individual to forgive specific circumstances or situations that have caused harm or offense. It focuses on the capacity to let go of negative feelings, resentment, or desire for retaliation in response to particular events or incidents.

The HFS assesses situational forgiveness as one of the dimensions of forgiveness, along with self-forgiveness and forgiveness of others. Situational forgiveness acknowledges that forgiveness can extend beyond interpersonal relationships and include broader contextual factors or specific events.

Within the context of the HFS, situational forgiveness is measured by examining an individual's responses to specific items related to forgiving particular situations. These items may assess the individual's inclination to release anger or grudges, show understanding or empathy toward the situation, and move forward without seeking revenge or harboring resentment.

The HFS provides a framework for understanding and measuring different aspects of forgiveness, including situational forgiveness, contributing to understanding forgiveness processes and their impact on individuals' emotional well-being and interpersonal relationships.

Potential reasons influencing a correlation between situational forgiveness and anxiety and depression scores include but are not limited to, a culture that encourages forgiveness of others and increasingly forgiveness of yourself for past transgressions and

mistakes. Such emphasis is found in common addiction recovery programs like Alcoholics Anonymous.²⁸ Even in the context of some of our most difficult traumas, there is a focus on forgiving all individuals involved and perhaps not as significant of an emphasis on letting a situation go. In our estimation, this may be particularly true in a professional culture as well as a military culture, where getting along and working together are paramount.

A better understanding of how these issues interact could provide insight into multiple military situations that can leave individuals harboring negative feelings like a deployment where they spend a significant amount of time away from loved ones, combat where they witness and even participate in potentially horrific events, loss of close friends, and even military sexual trauma. Additionally, with the growing awareness of mental health, and particularly mental health in the military, these data may provide insight into potentially contributing factors affecting anxiety, depression, and, ultimately, OFP.

This report is significantly limited by its preliminary nature which limits its sample size and power, particularly with regard to identifying the differences between primary diagnoses, patients with multiple diagnoses, the interplay between different subcategories of forgiveness, and the potential for sleep interaction among other factors.

Another limitation of this study is that the measures available measure the likelihood of forgiveness occurring and not whether forgiveness has actually occurred. Therefore, if a subject would normally forgive, they may still have one or two instances of unforgiveness which may affect depression and anxiety.

CHAPTER 5: Conclusions

In conclusion, HFS situational scores negatively correlated with anxiety and depression screener scores. This is consistent with existing literature.²⁹ No direct correlation was noted between HFS scores and pain levels in this initial analysis. These observations may contribute to a better understanding of how forgiveness contributes to an increasingly scrutinized military mental health culture, as well as any secondary ramifications like chronic pains like OFP. Furtherance of this study and future research are needed to identify additional correlations, potential causation, and potential treatments and their effectiveness.

Table 1. Heartland Forgiveness Scale Scores

	N=30	Range
HFS Total	98.43 (19.1)	48-136
HFS Forgiveness of Self	32.50 (8.1)	9-42
HFS Forgiveness of Others	33.13 (6.5)	21-42
HFS Forgiveness of Situations	32.80 (7.6)	15-42

Note. Means and Standard Deviations (SD) shown. HFS, Heartland Forgiveness Scale. Higher scores suggest the individual is MORE forgiving.

Table 2. Correlations Among Primary Study Variables

Characteristic	1	2	3	4	5	6	7	8	9
Age	-								
Pain (avg)	-0.213								
Duration	0.231	-0.235							
GAD7	0.324	0.197	-0.027						
PHQ9	0.18	0.237	-0.19	.811**					
ISI	0.212	0.173	0.85	.604**	.716**				
HFS total	-0.241	0.151	0.044	-0.262	-0.332	-0.06			
HFS self	-0.169	0.102	0.24	-0.121	-0.215	0.003	.884**		
HFS others	-0.268	0.244	-0.161	-0.146	-0.16	0.083	.819**	.588**	
HFS situations	-0.196	0.063	0.028	-.407*	-.471**	-0.225	.871**	.653**	.579**
	1	2	3	4	5	6	7	8	9

Note. with the same variables listed on the X axis as on the Y axis with the last 4 Y axis columns removed for clarity. * Denotes a P value of less than .05 with a ** denoting a P value of less than .01. Negative numbers denote negative correlation and positive numbers denote positive correlation with perfect correlation equal to one and no correlation equal to zero. GAD7: Generalized anxiety disorder, PHQ9: Patient History Questionnaire, ISI: Insomnia Severity Index, HFS: Heartland Forgiveness Scale

Table 3. Demographic Characteristics

	N=30
Age (years) – mean (SD)	36.6 (10.0)
Sex	
-- Male	18 (60%)
-- Female	12 (40%)
Ethnicity (% Hispanic)	13.8
Race (%)	
White	69.0
Black	27.6
Asian	0
Other	3.4
Rank (%)	
Enlisted	60
Officer	40
Branch (%)	
Air Force	30.0
Army	30.0
Coast Guard	3.3
Marines	6.7
Navy	23.3
PHS	6.7
Nicotine use (%)	5 (16.7%)
Years	7.75 (3.0)

Note. Means and Standard Deviations (SD) or % shown. PHS: Public Health Service Corps

Table 4. Pain and Emotion Characteristics

Pain severity (AVG)	4.40 (2.3)
Pain severity (Worst)	7.77 (1.9)
Pain severity (at screening)	4.03 (2.6)
Pain duration (months)	41.89 (57.1)
Stress (AVG)	5.63 (2.5)
Anger (AVG)	2.80 (2.6)

Note. Means and Standard Deviations (SD) or % shown. Pain severity, stress, and anger reported on a 0-10 numerical rating scale. Higher number indicates higher severity.

Table 5. McGill Pain Descriptors (N=30)

	Yes	No
Sharp	10	20
Burning	2	28
Electric-like	3	27
Aching	18	12
Throbbing	9	21
Dull	14	16
Pulsing	3	27
Pressing	11	19
Stabbing	2	28
Tingling	4	26

Note: Many subjects reported multiple pain descriptors.

Table 6. Primary Diagnosis Frequency

Descriptor	<i>N</i>
Masticatory Myalgia	14
Masticatory Myofascial Pain	5
Temporal Tendonitis	5
Arthralgia	1
Cervical Myofascial Pain	1
Neuropathy	1
Odontological Problem	1
Otalgia	1
TMJ Subluxation	1

Note. "N" represents the frequency or count of occurrences for each descriptor.

Table 7. Affect and Sleep Dysfunction

	N=30	Range
GAD-7	6.80 (6.1)	0-21
PHQ-9	6.50 (7.1)	0-27
ISI	10.73 (7.5)	0-26

Note. Means and Standard Deviations (SD) shown. GAD-7, Generalized Anxiety Disorder-7; PHQ-9, Patient Health Questionnaire-9; ISI, Insomnia Severity Index.

(Means on the GAD-7 and PHQ-9 fall in the 'mild' range for each measure)

Table 8. Additional Forgiveness Questions

Additional Forgiveness Questions	%YES
Do you have lasting negative feelings toward any situation?	36.7
Do you have lasting negative feelings toward anybody?	36.7
Do you have lasting negative feelings toward yourself?	30
Do you think your pain is affected by these negative feelings?	13.3
How long have you been experiencing these negative feelings (in years)?	3.03 (5.2)

Note. "N=30" represents the sample size.

APPENDIX A

Heartland forgiveness scale

Directions:

In the course of our lives negative things may occur because of our own actions, the actions of others, or circumstances beyond our control. For some time after these events, we may have negative thoughts or feelings about ourselves, others, or the situation. Think about how you **typically** respond to such negative events. Next to each of the following items write the number (from the 7-point scale below) that best describes how you **typically** respond to the type of negative situation described. There are no right or wrong answers. Please be as open as possible in your answers.

1	2	3	4	5	6	7
Almost Always False of Me		More Often False of Me		More Often True of Me		Almost Always True of Me

- ___ 1. Although I feel badly at first when I mess up, over time I can give myself some slack.
- ___ 2. I hold grudges against myself for negative things I've done.
- ___ 3. Learning from bad things that I've done helps me get over them.
- ___ 4. It is really hard for me to accept myself once I've messed up.
- ___ 5. With time I am understanding of myself for mistakes I've made.
- ___ 6. I don't stop criticizing myself for negative things I've felt, thought, said, or done.
- ___ 7. I continue to punish a person who has done something that I think is wrong.
- ___ 8. With time I am understanding of others for the mistakes they've made.
- ___ 9. I continue to be hard on others who have hurt me.
- ___ 10. Although others have hurt me in the past, I have eventually been able to see them as good people.
- ___ 11. If others mistreat me, I continue to think badly of them.
- ___ 12. When someone disappoints me, I can eventually move past it.
- ___ 13. When things go wrong for reasons that can't be controlled, I get stuck in negative thoughts about it.
- ___ 14. With time I can be understanding of bad circumstances in my life.
- ___ 15. If I am disappointed by uncontrollable circumstances in my life, I continue to think negatively about them.
- ___ 16. I eventually make peace with bad situations in my life.
- ___ 17. It's really hard for me to accept negative situations that aren't anybody's fault.
- ___ 18. Eventually I let go of negative thoughts about bad circumstances that are beyond anyone's control.

HFS Scoring Instructions

Four scores are calculated for the Heartland Forgiveness Scale (HFS):

- Total HFS (items 1-18)
- HFS Forgiveness of Self subscale (items 1-6)
- HFS Forgiveness of Others subscale (items 7-12)
- HFS Forgiveness of Situations subscale (items 13-18)

To score the HFS:

- Scores for items 1, 3, 5, 8, 10, 12, 14, 16, & 18 are the same as the answer written by the person taking the HFS. Scores for items 2, 4, 6, 7, 9, 11, 13, 15, and 17 are reversed. For example, an answer of 1 is given a score of 7 and an answer of 7 is given a score of 1. Refer to the tables below for more information about scoring individual items.
- To calculate the Total HFS, HFS Forgiveness of Self, HFS Forgiveness of Others, and HFS Forgiveness of Situations, sum the values for the items that compose each scale or subscale (with appropriate items being reverse scored). Scores for the Total HFS can range from 18 to 126. Scores for each of the three HFS subscales can range from 6 to 42.

Scoring

Items 1, 3, 5, 8, 10, 12, 14, 16, & 18

Person's Answer	Item Score
1	1
2	2
3	3
4	4
5	5
6	6
7	7

Reverse-Scoring

Items 2, 4, 6, 7, 9, 11, 13, 15, & 17

Person's Answer	Item Score
1	7
2	6
3	5
4	4
5	3
6	2
7	1

Interpreting HFS Scores

The Heartland Forgiveness Scale (HFS) is an 18-item, self-report questionnaire designed to assess a person's dispositional forgiveness (i.e., one's general tendency to be forgiving), rather than forgiveness of a particular event or person. The HFS consists of items that reflect a person's tendency to forgive him or herself, other people, and situations that are beyond anyone's control (e.g., a natural disaster).

Four scores are calculated for the HFS. There is a score for the Total HFS and a score for each of the three HFS subscales (HFS Forgiveness of Self subscale, HFS Forgiveness of Others subscale, and HFS Forgiveness of Situations). Scores for the Total HFS can range from 18 to 126. Scores for the three HFS subscales can range from 6 to 42.

Total HFS

One's score on the Total HFS indicates how forgiving a person tends to be of oneself, other people, and uncontrollable situations. Higher scores indicate higher levels of forgiveness, and lower scores indicate lower levels of forgiveness.

- **A score of 18 to 54** on the **Total HFS** indicates that one is usually unforgiving of oneself, others, and uncontrollable situations.
- **A score of 55 to 89** on the **Total HFS** indicates that one is about as likely to forgive, as one is not to forgive oneself, others, and uncontrollable situations.
- **A score of 90 to 126** on the **Total HFS** indicates that one is usually forgiving of oneself, others, and uncontrollable situations.

HFS Subscales

One's score on the three HFS subscales indicate how forgiving a person tends to be of oneself (HFS Forgiveness of Self), other people (HFS Forgiveness of Others), or situations beyond anyone's control (HFS Forgiveness of Situations). Higher scores indicate higher levels of forgiveness, and lower scores indicating lower levels of forgiveness.

- **A score of 6 to 18** on **HFS Forgiveness of Self, HFS Forgiveness of Others, or HFS Forgiveness of Situations** indicates that one is usually unforgiving of oneself, other people, or uncontrollable situations, respectively.
- **A score of 19 to 29** indicates that one is about as likely to forgive as to not forgive oneself, other people, or uncontrollable situations, respectively.
- **A score of 30 to 42** indicates that one is usually forgiving of oneself, other people, or uncontrollable situations, respectively.

Generalized Anxiety Disorder 7-item (GAD-7) scale ²²

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all sure	Several days	Over half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it's hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3
<i>Add the score for each column</i>	+	+	+	
Total Score (add your column scores) =				

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all _____

Somewhat difficult _____

Very difficult _____

Extremely difficult _____

Scoring GAD-7 Anxiety Severity This is calculated by assigning scores of 0, 1, 2, and 3 to the response categories, respectively, of “not at all,” “several days,” “more than half the days,” and “nearly every day.” GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Patient Health Questionnaire (PHQ-9)

Over the last 2 weeks, how often have you been bothered by any of the following problems? (Use "✓" to indicate your answer)

	Not at all	Several days	More than half the days	Nearly every day
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

FOR OFFICE CODING 0 + + +
 =Total Score:

If you checked off any problems, how difficult have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all ⑤	Somewhat difficult ⑤	Very difficult ⑤	Extremely difficult ⑤
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Interpretation of Total PHQ-9 Score
Total Score Depression Severity
1-4 Minimal depression
5-9 Mild depression
10-14 Moderate depression
15-19 Moderately severe depression
20-27 Severe depression

Insomnia Severity Index (ISI)²⁴

1. Please rate the current (i.e., last week) **SEVERITY** of your insomnia problem(s).

	None	Mild	Moderate	Severe	Very
Difficulty falling asleep:	0	1	2	3	4
Difficulty staying asleep:	0	1	2	3	4
Problem waking up too early:	0	1	2	3	4

2. How **SATISFIED**/dissatisfied are you with your current sleep pattern?

Very Satisfied				Very Dissatisfied
0	1	2	3	4

3. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc.).

Not at all Interfering	A Little	Somewhat	Much	Very Much Interfering
0	1	2	3	4

4. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

Not at all Noticeable	Barely	Somewhat	Much	Very Much Noticeable
0	1	2	3	4

5. How **WORRIED**/distressed are you about your current sleep problem?

Not at all	A Little	Somewhat	Much	Very Much
0	1	2	3	4

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