EMOTIONAL DISTRESS AND MEDICATION USE IN TWO ACUTE PAIN POPULATIONS: JAW AND LOW BACK*

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ABSTRACT

The present study was undertaken to compare emotional distress and functional ability between two common acute pain populations - - jaw pain (JAW; n = 135) and low back pain (LB; n=71). Patient groups were evaluated and compared on a variety of biopsychosocial measures, including the Beck Depression Inventory, Multidimensional Pain Inventory, Characteristic Pain Intensity, and Ways of Coping Questionnaire. Specific diagnoses were assessed using the Structured Clinical Interview of the Diagnostic and Statistical Manual (DSM-IV) - I and II, and rates of Axis I and II diagnoses in these groups were further compared with base rates in the general population. Additionally, medication usage was evaluated to determine group differences. Results revealed that JAW patients had lower BDI and CPI scores, as well as a higher level of functioning on the Global Assessment of Functioning assessed by the DSM-IV. Both acute pain groups also had significantly more Axis I and II disorders than the general population. Additionally, it was found that the JAW group used more benzodiazepines, while the LB group used more Schedule II Narcotics. A logistic regression model created from these variables found a six-factor model, composed of the Characteristic Pain Intensity, MPI Coping Style Anomalous, Ways of Coping Problem-Solving, Global Assessment of Functioning, Anxiety Disorders, and Cluster C personality disorder diagnoses, that differentiated the JAW from the LB group. Overall, these findings suggest that the differences identified between these two groups should be considered in developing tailored treatments for individuals with acute low back and jaw pain.

Key Words: jaw pain, low back pain, biopsychosocial, psychopathology, medication, comorbidity

INTRODUCTION

Musculoskeletal pain is an increasingly costly and debilitating medical condition in industrialized countries. The abundance of literature on musculoskeletal pain focuses on chronic pain, with fewer studies focusing on the area of acute pain. As more is learned about both of these conditions, the importance of biopsychosocial factors in understanding pain is gaining greater recognition.^{1,2} Pain is now widely viewed as a biopsychosocial phenomenon, in which biological, psychological, and social factors dynamically interact to produce unique pain experiences across individuals. Investigations of these biopsychosocial factors of pain have also shown high rates of comorbid psychopathology.

Two of the most common pain conditions are low back (LB) pain and jaw (JAW) pain associated temporomandibular disorders (TMDS). TMD is typically characterized by three symptom clusters:³⁻⁵ 1) pain and tenderness of the muscles of mastication and the temporomandibular joint; 2) sounds in the joint such as popping, clicking, or crepitus of the jaw; and 3) limited mandibular movement. For JAW pain, a survey of 45,711 households found that 22% of the U.S. population experienced orofacial pain on more than one occasion during a 6-month period.⁶ Estimates also suggest that 65% to 85% of the U.S. population experience TMD symptoms at some point during their lives,⁷ and that 5% to 12% of the population have chronic TMD symptoms.⁶⁻⁹ While studies concerning the economic impact of TMD are currently limited, one study found that managed care treatment costs for patients with orofacial pain often ranged from \$12,000 to \$20,000 annually.¹⁰

LB pain refers to spinal and paraspinal symptoms in the lumbosacral region. The annual prevalence of LB pain in the United States is estimated at 15% to 20%, and the lifetime prevalence is between 60% to 80%.^{11, 12} In the workplace, LB pain is the most costly ailment, with an average cost of \$8,000 per claim, and accounts for one third of workers' compensation costs. More than 28% of the industrial workforce will have lost days of work as a result of this condition, and the estimated annual national bill for the care of LB pain is \$28 to \$50 billion.¹¹

Considerable research has been devoted to examining the relationship between chronic pain and various forms of psychopathology, as delineated by the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition

(DSM-IV).¹³ Extensive evidence points to a strong comorbid relationship between chronic LB pain and major depressive disorder (MDD), wherein as many as 45% of patients with chronic LB pain were found to have concurrent diagnoses of MDD, and up to 65% of these patients reported at least one lifetime episode of MDD.^{14 – 16} Further evidence suggests that those with both chronic LB pain and MDD use twice the sick days and incur twice the health care costs as those with either problem separately, and the presence of MDD has been found to complicate the treatment of back pain.¹⁷ Interestingly, Kinney and colleagues found chronic LB pain patients had higher rates of MDD, while acute LB pain patients were diagnosed with more Anxiety Disorders.¹⁵

This pattern of results has also been found in JAW pain patients. In one study assessing psychological disorders in 50 patients with chronic TMD and 51 patients with acute TMD, high rates of psychopathology were found in both groups that exceeded the base rates of the general population.¹⁸ In the acute group, anxiety disorders were the most widely diagnosed, followed by affective disorders, and substance abuse disorders, respectively. The chronic group was most frequently diagnosed with affective disorders, followed by somatoform disorders, and substance abuse disorders. Moreover, 80% of the acute TMD patients and 86% of the chronic TMD patients had at least one Axis I disorder before the onset of their TMD symptoms.

With the above data in mind concerning the high prevalence of both LB and JAW pain, as well as the often high comorbidity of psychopathology such as anxiety and depression, a number of important clinical research questions arise. Is emotional distress often overlooked because of pain and, therefore, under- treated? Is it possible that neurotransmitters linked to depression and anxiety are related to pain? If this is the case, is it possible that these medications may create an effective pain treatment? Literature and evidence exploring these possibilities is still quite limited for acute pain. Moreover, in the past, there has been a tradition to “lump” patients with the same medical diagnosis or set of symptoms together (such as different types of pain), and then treat them the same way, as though “one size fits all).” This approach has not been proven effective.²

With the above questions in mind, the present study was designed to better understand acute LB and JAW pain populations, and to investigate differences in their treatment with psychotropic and analgesic medications. The prevalence and severity of emotional distress in these two common acute pain populations were evaluated, and compared to estimates in the general population. In general, it was expected that the acute LB pain group would

have higher rates of depression-related disorders, while the JAW pain group would have higher rates of anxiety-related disorders. Both groups were expected to have higher rates of Axis I and Axis II disorders, as compared to rates in the general population. Finally, it was expected that the LB group would receive relatively more analgesic medication, while the JAW group would receive relatively more psychotropic medication.

METHOD

Subjects

Subject data were collected from two on-going NIH-Funded research programs, conducted at the University of Texas Southwestern Medical Center (UTSWMC) in Dallas, concerning LB and JAW pain. Both programs were similar in that they shared the same primary investigator and research team, and had similar methodology in recruitment of subjects and test methods.

Low back pain. Subjects were recruited from several orthopedic practices near UTSWMC. The LB sample (n = 71) was composed of 32 women (45.1%) and 39 men (54.9%), with a mean age of 41.4 years. Subjects were excluded if they had a significant pain-exacerbating physical condition (such as cancer or fibromyalgia) other than the low back pain, six or more DSM-IV Axis I diagnoses, current psychosis, or suicidal ideation. Inclusion criteria included: (a) no more than two months since acute LB pain onset; (b) constant daily pain when performing activities, from initial onset to current evaluation; (c) decreased ability to perform normal job requirements because of the pain; (d) no history of chronic episodic back pain (i.e., 2 or more disabling episodes at least 4-6 months apart during the past 2 years, with fluctuating low grade discomfort between episodes); (e) no current need for surgery. The surgery determination was made according to appropriate orthopedic practice, prior to consideration for the study. Specifically, every patient underwent appropriate tests, as well as a complete orthopedic and neurological evaluation for back pain. If these evaluations were positive (e.g., neurological findings on examination suggested a disc herniation, i.e., muscle weakness with particular pattern and hyposthesia), the patients were referred for possible surgical evaluations and were ineligible for the study.

Jaw pain. The JAW sample (n = 135) was composed of 107 women (79.3%) and 28 men (20.7%), with a mean age of 37 years and a range of 18 - 66 years. Recruiting sources included referrals from general dentists and oral surgeons in the Dallas/Fort Worth metropolitan area, advertisements in local newspapers, and fliers that were

posted at local universities. Inclusion criteria for the study included: (a) adults between the ages of 18 and 70 years; and (b) acute jaw or facial pain (defined as being present for less than six months). Potential subjects were excluded if they had a comorbid pain-exacerbating physical condition (such as cancer or fibromyalgia) or a history of jaw pain.

Procedure

Low back pain. To determine eligibility, potential subjects completed a screening packet, which contained an informed consent, a patient information form, and a voucher for a \$20 incentive for completing the packet. Patients who met inclusion criteria were contacted by phone and offered \$50 to participate in a more in-depth evaluation, at which point the study data were collected.¹⁹ These evaluations were conducted by licensed professionals at the Eugene McDermott Center for Pain Management at UTSWMC.

Jaw pain. On completion of the self-reported measures and the structured interview, subjects received physical examinations according to the Research Diagnostic Criteria (RDC).^{20, 21} Trained research personnel then administered a chewing performance evaluation to all subjects in which they chewed an artificial test food substance. Assessment was only for the presence or absence of myofacial pain. This determination was based on the administration of the Axis-I-Group 1a of the RDC examination form, which consists of palpation of 20 muscle sites involved in the diagnosis of myofacial pain, as well as on the subjects' responses to Question #3 on the RDC history questionnaire (that is, "Have you had pain in the face, jaw, temple, in front of the ear, or in the ear in the past month?").²¹ An oral surgeon knowledgeable in the RDC trained and periodically recalibrated the clinical research personnel. The assessment took approximately 2.5 hours. All subjects were paid \$70 for participating in the study.

Both studies collected similar measures and followed similar protocols. In both instances, clinical psychology research personnel (psychologists and masters-level counselors) reviewed the purpose and procedures with subjects before obtaining informed consent for the in-depth evaluation. After completing a packet of self-report measures, subjects were interviewed by research personnel according to the Structured Clinical Interview (SCID I and II) for the DSM-IV.

Measures

*Beck Depression Inventory-II (BDI-II).*²² This 21-item multiple-choice instrument has good psychometric properties in measuring behavioral signs of depression, with the following ranges of intensity: normal (0-9); mild

depression (10-15); mild to moderate depression (16-19); moderate to severe depression (20-29); and severe depression (30+).

*Characteristic Pain Intensity (CPI).*²⁰ The CPI is a measure of pain that derives the mean of visual analog scale scores for "pain right now," "worst pain," and "average pain." Scores range from 0 (least pain) to 100 (most intense pain), and is scored by calculating the mean of current pain, worst pain, and average pain scores, and then multiplying by 10.

General information questionnaire. Similar questionnaires were given to the LB and JAW populations, eliciting demographic data and information concerning general health, medications, onset of low back/jaw pain, and prior treatment for low back/TMD.

*Structured Clinical Interview for DSM-IV (SCID-I).*²³ The SCID-I is a structured interview designed to assess the presence or absence of current and past (or lifetime) DSM-IV Axis I disorders. For purposes of this study, SCID diagnoses were grouped into the following categories: current, past, and lifetime. A *Current* SCID-IV diagnosis was created from the compilation of all current diagnoses, (i.e., the patient at the time of the interview was experiencing the disorder). These diagnoses include: current, sub-current, and current & lifetime. A *Past* SCID-IV diagnosis was created from the compilation of all past diagnoses, (i.e., the patient was not at the time of the interview experiencing this disorder but had in the past). These diagnoses include: lifetime (defined by the absence of no current diagnosis) and sub-past. Finally, a *Lifetime* DSM-IV diagnosis was created from the compilation of both of these categories combined, (i.e., current, sub-current, current & lifetime, lifetime, and sub-past diagnoses). Several studies have found the SCID to have good test-retest reliability,²⁴ inter-rater reliability²⁵⁻²⁸ and validity.²⁸

*Structured Clinical Interview for DSM-IV Personality Disorders (SCID-II).*³⁰ The SCID-II consists of a 120-item questionnaire completed by the patient, followed by a semi-structured evaluation of positive answers by the evaluator. From this, DSM-IV personality disorder diagnoses are derived. Studies have found the SCID-II to have fair to good inter-rater reliability.^{24, 30, 31}

*Ways of Coping-Revised (WOC).*³² The WOC is a 66-item self-report measure of coping. Scores are obtained for five coping styles that can be categorized as adaptive or maladaptive. Higher scores on the adaptive

styles (*Problem-Solving* and *Seeks Social Support*) suggest better coping abilities, while lower scores on the maladaptive coping styles (*Blame-Self*, *Wishful Thinking* and *Avoidance*) suggest better coping abilities.

West-Haven-Yale Multidimensional Pain Inventory (MPI).³³ This self-report pain inventory measures several dimensions of pain perception and functional status among chronic pain patients, yielding eight subscales and an overall coping style: Dysfunctional, Interpersonally Distressed, Adaptive Coper, Hybrid, Anomalous, and Unanalyzable.

Medications. The medications of interest (analgesics and psychotropics) were collapsed into the following categories: non-steroidal anti-inflammatory drugs (NSAIDs), schedule II narcotics, schedule III narcotics, muscle relaxants, tricyclic anti-depressants, selective serotonin reuptake inhibitors (SSRIs), multireceptor anti-depressants, lithium, anti-convulsants, benzodiazepines, non-benzo sedatives, beta blockers, calcium channel blockers, and Tramadol.

Statistical Analyses

Chi-square analyses were conducted for all categorical variables, including SCID I and II diagnoses, MPI Coping Style, medication types, and the demographic variables of gender, marital status, and employment status. Independent two-tailed t-tests were used in evaluating the continuous variables of BDI-II and WOC scores, and the demographic variables of age, years of education, and pain duration. Finally, a multivariate logistic regression model was developed to determine which array of variables best differentiated the two acute pain groups.

RESULTS

Demographics

Descriptive analyses and frequency distributions were performed on the study sample and are presented in Table 1. Of the combined study population, 135 subjects (65.5%) had acute jaw pain (JAW), while 71 (34.5%) had acute low back pain (LB). Within the JAW group, there were 28 males (20.7%) and 107 females (79.3%). The LB group had 39 males (54.9%) and 32 females (45.1%). A significant difference was found between these two groups, with more females than males in the JAW group, $\chi^2(1)=24.782$, $p<0.01$. A comparison of ages of the two groups at intake indicated that the LB subjects had a significantly higher mean age ($M = 41.39$, $SD = 11.13$), as compared to the JAW subjects ($M = 37.36$, $SD = 11.98$), $t(203) = -2.314$, $p=0.022$. A significant difference was also shown

between the two groups for mean years of education, revealing that the JAW group had more years of education ($M = 15.52$, $SD = 2.13$) as compared to the LB group ($M = 14.49$, $SD = 2.92$), $t(206) = 2.878$, $p < 0.01$. With respect to race, there was a significant difference between the groups when assessed as Caucasian versus non-Caucasian, $\chi^2(1) = 10.214$, $p < 0.01$, wherein the JAW group contained a higher proportion of Caucasian subjects (80%) as compared to the LB group (59.2%). No significant difference was found between these two groups concerning duration of pain, marital status, or employment status. The majority of both the JAW and LB groups were working at the time of intake.

INSERT TABLE 1 ABOUT HERE

Comparison of JAW and LB Groups

Overall, it was found that subjects in the JAW and LB groups differed significantly from each other on many psychosocial and physical/functional variables (Table 2).

INSERT TABLE 2 ABOUT HERE

Coping. For the Ways of Coping (WOC) measure, LB subjects scored significantly higher on the adaptive style of Problem Solving, $t(204) = -3.33$, $p < 0.01$ (JAW $M = 41.38$; LB $M = 45.21$). LB subjects also scored higher on the maladaptive coping styles of: Wishful Thinking, $t(204) = -2.519$, $p = 0.013$ (JAW $M = 18.48$; LB $M = 20.54$), and Avoidance, $t(204) = -3.263$, $p < 0.01$ (JAW $M = 19.61$; LB $M = 22.31$).

The MPI was also used to assess coping styles. Comparison of the primary MPI coping styles of Adaptive (AC), Dysfunctional (D), and Interpersonally Distressed (ID) were compared to all other styles (Anomalous, Hybrid, and Unanalyzable) to evaluate significant differences between the JAW and LB groups (See Table 2). No significances were found. Moreover, analyses comparing the primary MPI coping styles (AC, D, ID) for differences between the two groups also yielded no significant differences.

Mood Measures. The LB group was characterized by significantly higher scores on the BDI, $t(202) = -2.410$, $p = 0.016$ (JAW $M = 8.56$; LB $M = 11.64$).

Self-Report Pain. The LB group was also characterized by significantly higher scores on the CPI, $t(192) = -4.655$, $p = .000$ (JAW $M = 51.38$; LB $M = 63.66$).

SCID Diagnoses of Psychopathology

Significant differences were found between the two groups on various SCID diagnosis of current psychopathology (these included current/current sub-threshold, and combined current/lifetime). Table 3 presents the significant differences, along with the associated odds ratios. As can be seen, the JAW group had significantly higher rates of the following Axis I diagnoses: Generalized Anxiety Disorder (GAD) and Somatoform Pain Disorder. The LB group had significantly higher rates of the following current Axis I and Axis II disorders: Dysthymia and Adjustment Disorder. There were no other significant differences between groups on any other type of psychopathology.

INSERT TABLE 3 ABOUT HERE

Past psychopathology was also evaluated using the SCID. Significant differences were found between the two groups as well (see Table 4). Specifically, the LB group had significantly higher rates of the following Axis I disorders: Specific Phobia, Social Phobia, Post-traumatic Stress Disorder (PTSD), and Stimulant Abuse.

INSERT TABLE 4 ABOUT HERE

Finally, the Global Assessment of Functioning (GAF) rating from the SCID revealed significant differences between the two groups; $t(201) = 9.286$, $p < 0.01$ (JAW $M = 76.21$; LB $M = 66.04$), indicating that LB had lower overall functioning levels.

Prevalence of Psychopathology in Pain Groups Versus the General Population

It was also deemed important to compare the prevalences of DSM diagnoses between the pain groups relative to the general population for disorders in which population estimates were available. These DSM-IV Axis I general population estimates were obtained between 2001 and 2003 from a nationally representative face-to-face

household survey that constituted the US National Comorbidity Survey Replication (NSC-R).³⁴ The World Health Organization World Mental Health Survey Initiative version of the Composite International Diagnostic Interview, based on DSM-IV criteria, was used as the case-identification instrument in the NSC-R study. To facilitate comparisons between JAW patients and the general population, confidence intervals were established around each prevalence estimate for the JAW group. Non-overlapping JAW confidence intervals and population estimates indicated a significant difference between the two groups (JAW and the general population). Formulas for statistics in Table 5 were as follows, where x = proportion of DSM-IV diagnoses in the given acute pain population and y = proportion of DSM-IV diagnoses in the general population: Standard Error (SE) = square root of $[x(1-x)/N]$; 95% Confidence Intervals = $[x - (1.96*SE), x + (1.96*SE)]$; and Odds Ratio (OR) = $y(1-x) / x(1-y)$. Analyses of the prevalence rates of DSM-IV Axis I (clinical) and II (personality) disorders (current and lifetime) and the general population revealed much higher rates psychopathology in JAW patients, as well as higher rates of personality disorders. As can be seen in Table 5, the prevalences of current, lifetime and current/lifetime, and lifetime DSM-IV Axis I and II versus the general population revealed that the JAW subjects received more DSM-IV Axis I diagnoses than persons in the general population. More specifically, the JAW group demonstrated higher rates of Major Depressive Disorder (MDD), Generalized Anxiety Disorder (GAD), as well as more Axis I disorders in general. On the other hand, the prevalence rate of Specific Phobia was found to be higher in the general population. Bipolar Disorder, Dysthymia, Panic Disorder, Agoraphobia, Specific Phobia, OCD, and PTSD rates found in the general population fell into the 95% C.I. of the JAW group estimates, and therefore were determined to not be significant.

INSERT TABLE 5 ABOUT HERE

Table 5 also presents a comparison of the prevalences of DSM-IV Axis II Personality Disorders in the JAW group and the general population. These general population estimates are based on data derived from the 2001-2002 National Epidemiologic Survey on Alcohol and Related Conditions.³⁵ Diagnoses were made using the Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM-IV Version. These comparisons indicate that JAW subjects received more DSM-IV Axis II Personality Disorder (PD) diagnoses than persons in the general

population. Specifically, the JAW subjects demonstrated higher rates of Avoidant PD, Histrionic PD, Obsessive-Compulsive PD, and more Axis II diagnoses in general. Antisocial PD, Dependent PD, Paranoid PD, and Schizoid PD general population estimates fell within the 95% C.I. for the JAW group, and therefore were not viewed as significant differences between the JAW group and the general population.

Table 6 presents comparable analyses for the LB pain group and the general population. As can be seen, the LB group demonstrated higher rates of Major Depressive Disorder (MDD), Post-traumatic Stress Disorder (PTSD), as well as more Axis I disorders in general. Bipolar Disorder, Panic Disorder, Agoraphobia, Specific Phobia, Social Phobia, OCD, and GAD general population estimates all fell within the LB 95% C.I. and, therefore, were interpreted as not significantly different.

INSERT TABLE 6 ABOUT HERE

Analyses of Axis II diagnoses revealed that the LB group had significantly more diagnoses of Obsessive-Compulsive PD than the general population. Antisocial PD, Avoidant PD, Dependent PD, Histrionic PD, Paranoid PD, Schizoid PD, and any Axis II diagnoses were not significantly different between the LB group and the general population because these diagnoses fell within the 95% C.I. for the JAW group psychopathology estimates.

In general, for both the JAW and LB groups, the most common disorders were found to be MDD, Axis I disorders in general, and OCPD; although it should be noted that 73.7% of the JAW group had an Axis I disorder compared to 59.2% of the LB group (and 26.20% of the general population). Also, 60.9% of the JAW group had OCPD, while only 27.1% of the LB group met criteria for this disorder (the general population estimate for OCPD was 7.88%).

Medications

Significant differences in medication usage were found between JAW and LB (see Table 7) on: Schedule II Narcotics and Benzodiazepines. No significant differences were found on any other medications.

INSERT TABLE 7 ABOUT HERE

Prediction of Pain Group: JAW versus LB

A primary intent of the current study was to differentiate the characteristic biopsychosocial differences between acute jaw pain from acute low back pain. It was therefore considered beneficial to determine which array of variables differentiated the groups, in order to identify a smaller hallmark model of variables. Such a model might allow for more tailored treatment for differing forms of acute pain. Variables selected for inclusion in the logistic regression model analysis were determined by statistical differences or trends that emerged from the baseline analyses. They included the CPI total score; the BDI total score; each MPI coping style, each WOC coping style; the GAF; use of a Schedule II Narcotic or Benzodiazepine; a possible Affective Disorder; a possible Anxiety Disorder; a possible Somatoform Disorder; a possible Substance Abuse Disorder; and a Cluster C Personality Disorder Diagnosis. In order to prevent criterion contamination, the presence of an Axis I or Axis II diagnosis were used instead of specific DSM-IV diagnostic disorders because, otherwise, the predictor variables would have been redundant.

The final model was analyzed using the SPSS version 12 Binary Logistic procedure. This procedure resulted in a six-factor model that correctly classified 91.7% of the JAW subjects and 86.0% of the LB subjects, for a total of 89.9% correctly classified. The predictor factors were the CPI, Anomalous coping style from the MPI, WOC problem-solving coping style, GAF, a diagnosis of an Anxiety Disorder, and a diagnosis of a Cluster C Personality Disorder (see Table 8).

INSERT TABLE 8 ABOUT HERE

DISCUSSION

The purpose of the present study was to examine the biopsychosocial differences between two common acute pain populations. It also extends the research literature by examining comorbid mental health disorders associated with common acute pain disorders more thoroughly, and comparing them to population base rates. Finally, this investigation added to a better understanding of the differences in treatment of acute pain with psychotropic and analgesic medications. There were a number of significant findings revealed on various psychosocial and physical/functional measures.

A significant difference was found for self-reported pain (the CPI) between the JAW and LB populations, revealing that the LB population communicated higher scores of pain intensity. One conclusion that can be drawn from these results is that, because LB pain affects the spine (which is the center of movement for the body), it may be more distressing because of likely decreased mobility. Additionally, possible associations between pain and unavoidable activity (i.e., walking, standing, sitting, etc.) may also explain higher CPI scores in the LB group. Significance was also found on several of the coping styles assessed by the WOC. It was found that LB subjects used Problem-Solving, (an adaptive coping style) significantly more than the JAW group, but LB patients also displayed more Wishful Thinking and Avoidance, which are maladaptive coping styles. This finding reveals that, while the LB pain group had significantly higher rates of an adaptive coping style, they are still impaired by significant maladaptive coping styles which might relate to their increased psychopathology and lower general functioning - - as evidenced by their lower GAF scores, increased past psychopathology, and higher BDI scores.

In terms of general psychopathology, it was found that the JAW group was more likely to have Axis I and II diagnoses than the general population, especially specific disorders like MDD, GAD, Avoidant PD, Histrionic PD and, most notably, OCPD. LB pain subjects were also more likely to have an Axis I disorder than the general population, especially specific disorders like MDD and PTSD. Such results indicate that these specific acute pain patients are more overwhelmed with psychopathology than the general population, which may perhaps affect/exacerbate their experience of pain. By noting the emotional distress experienced by JAW and LB pain groups, biopsychosocial treatments may be better oriented to the specific problems of these unique pain groups. For example, high rates of PDs were found in the JAW group. Knowledge of

how underlying PDs may help in successfully treating acute JAW pain patients before they evolve into chronic pain patients.

It is also important to note that the high rate of PTSD in the LB pain group might be explained as the result of an accident (such as a work-related fall), and its often debilitating effect. This can cause significant impairment and stress that seriously impairs and affects living, working, socializing, etc., activities. Perhaps, more importantly, in this finding was the revelation that the JAW group had several significantly more lifetime rates of psychopathology than the LB group, when compared to the general population. This was mainly for the presence of an Axis II disorder (i.e., Avoidant, Histrionic and, most notably, OCPD). Overall, these findings suggest differences in how JAW and LB patients handle their pain: JAW patients may tend to be more likely to experience pain as their dominant injury and interruption of their lives; while LB patients, even though they also experience pain, are more concerned with adjustment issues resulting from their pain, as opposed to pain itself. Past SCID analyses reflect that the LB group have more enduring psychopathology than the JAW group, and that LB pain-related psychopathology is likely to be more anxiety-related.

The logistic regression analysis of the various variables revealed a six-factor model which isolated the most significant variables that differentiate the JAW from LB pain groups (the CPI, Anomalous coping style on the MPI, WOC problem-solving coping style, the GAF, a diagnosis of an Anxiety Disorder, and a diagnosis of a Cluster C Personality Disorder). As discussed earlier, this model has major clinical implications for allowing a more tailored treatment program for different types of acute pain (in this case, JAW and LB).

Another important finding of this study was that more Schedule II Narcotics, an analgesic medication, were prescribed to the LB pain patients. Benzodiazepines, on the other hand, were used more with JAW pain subjects. This finding tends to support the earlier reported DSM diagnosis finding that the JAW group patients presented with more Somatoform Pain Disorders, revealing a relationship between psychopathology and acute JAW pain. This specific form of psychopathology may require the need for more psychotropic medication therapy. Relatedly, the greater analgesic treatment for the LB group fits with the assumption that the pain causing such significant adjustment problems is thought best to be treated by an aggressive pain medication. However, this assumption must be tempered by the fact that the LB group displayed more severe Axis I and Axis II psychopathology. This suggests

that, perhaps, psychotropic medication may be a helpful adjuvant to pain-relieving therapy in reducing the amount of chronic psychopathology in these patients.

In conclusion, the present study clearly demonstrated significant biopsychosocial differences between acute jaw pain and acute low back pain patients, as well as the general population. It was found that JAW and LB pain groups had significantly more Axis I and II psychopathology than the general population. LB pain was associated with more chronic psychopathology, as well as lower general functioning levels and maladaptive coping styles. Moreover, JAW pain was associated with more anxiety-related symptoms. LB pain exhibited more depressive symptoms, at least when assessing current psychopathology.

In the future, it may be helpful for physicians or psychologists to be aware of the differing qualities of acute jaw and acute low back pain for treatment. This would be helpful in understanding differences in acute pain groups, which may lead to more specific and beneficial biopsychosocial treatments. Moreover, individually-tailored interventions may prevent the development of more chronic problems, as has been recently demonstrated in a randomized controlled trial of jaw pain treatment by Gatchel and colleagues.³⁶

Of course, any study of this type is often associated with some limitations. For example, the sample consisted mostly of Caucasian and female subjects. This lack of diversity in the sample evaluated could possibly limit the generalizability of results. Also, difference in number of subjects between the two groups (there were more subjects in the JAW group) could also possibly affect generalizability of results. Nevertheless, the current investigation was the first of its kind to conduct a comprehensive evaluation of differences between two prevalent types of acute pain often seen in the primary care environment. Future studies will hopefully expand on the results.

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Table 1. Demographic Characteristics of JAW and LB (n=206)

Variables	JAW (n=135)	LB (n=71)	p
Gender (%)			0.001*
Male	28 (20.7)	39 (54.9)	
Female	107 (79.3)	32 (45.1)	
Ethnicity (%)			0.001*
Caucasian	108 (80.0)	24 (59.2)	
Non-Caucasian	27 (20.0)	29 (40.8)	
Latino	8 (5.9)	6 (8.5)	
African American	8 (5.9)	18 (25.4)	
Asian	8 (5.9)	3 (4.2)	
Other	3 (2.2)	2 (2.8)	
Marital Status (%)			0.484
Single	35 (25.9)	24 (33.8)	
Married / Living Together as Married	85 (63.0)	38 (53.5)	
Divorced or separated	14 (10.4)	9 (12.7)	
Widowed	1 (0.7)	0 (0.0)	
Employment Status (%)			0.686
Working	97 (71.0)	47 (74.6)	
Working	90 (66.7)	43 (60.6)	
Self Employed	7 (5.2)	4 (5.6)	
Not Working (NW)	38 (28.1)	16 (25.4)	
NW b/c of JAW	1 (0.7)	0 (0.0)	
NW b/c LB	0 (0.0)	8 (11.3)	
NW b/c of injury	2 (1.5)	0 (0.0)	
Training: school, vocational training	0 (0.0)	3 (4.2)	
NW income producing activities	0 (0.0)	1 (1.4)	
NW non-income producing activities	23 (17.0)	2 (2.8)	
NW before injury and still not working	12 (8.9)	4 (5.6)	
Denies work b/c employment factors	0 (0.0)	6 (8.5)	
Mean Education in Years (SD)	15.52 (2.13)	14.49 (2.92)	0.004*
Mean Age at Intake (SD) (JAW, n=135; LB, n=68)	37.36 (11.98)	41.39 (11.13)	0.022*
Mean Days of Pain (SD) (JAW, n=135; LB, n=70)	96.50 (47.34)	104.90 (492.85)	0.844
Mean Monthly Income Before Taxes (SD) (JAW, n=132; LB, n=54)	\$7,087 (\$2,960)	\$2,140 (\$11,528)	0.002*
Number of Adults Over 18 Living in the Home (JAW, n=135; LB, n=71)	1.99 (0.748)	1.17 (0.878)	0.000*

* This variable was found to be significant at $p < 0.05$

Table 2. Physical and Psychosocial Measures Examining JAW and LB groups

Measure	Group	Mean (SD)	t-score** (df), p-value
CPI (Pain measure)	JAW (n=135)	51.38 (16.502)	t(192) = -4.655, p = 0.000*
	LB (n=59)	63.66 (17.778)	
BDI (Mood measure)	JAW (n=135)	8.56 (8.296)	t(202) = -2.410, p = 0.016*
	LB (n=69)	11.64 (9.196)	
GAF (Mood Measure)	JAW (n=133)	76.21 (6.734)	t(201) = 9.286, p = 0.000*
	LB (n=70)	66.04 (8.445)	
WOC (Coping Measure)	JAW (n=135)		
	LB (n=71)		
Problem-Focused	JAW	41.38 (8.190)	t(204) = -3.330, p = 0.001*
	LB	45.21 (7.161)	
Seeks Social Support	JAW	17.08 (3.883)	t(204) = 1.069, p = 0.286
	LB	16.46 (4.031)	
Blame-Self	JAW	6.34 (2.531)	t(204) = -1.940, p = 0.054
	LB	7.06 (2.489)	
Wishful Thinking	JAW	18.48 (5.469)	t(204) = -2.519, p = 0.013*
	LB	20.54 (5.732)	
Avoidance	JAW	19.61 (5.429)	t(204) = -3.263, p = 0.001*
	LB	22.31 (6.006)	

* Significant at p < 0.05

** Two-tailed t-test

Table 3. JAW and LB Current (Current, Sub-threshold, and Combined Current/Lifetime) DSM-IV Axis I and Axis II Disorders using Chi Square Statistic (X^2), Degrees of freedom (df), p-value, Odds Ratio (OR), and 95% Confidence Interval (C.I.)

♦ All values are based on the presence or absence of SCID Axis I diagnosis

Variable	JAW (n = 135) ♦		LB (n = 71) ♦		X^2 (df) = X^2 statistic, p-value; OR [95% C.I.]
	%Jaw ¹	%Total ²	%LB ¹	%Total ²	
Dysthymia (Axis I)	1.5	1.0	8.6	8.4	X^2 (1) = 6.052, p = 0.014*, 6.141 [1.206 – 1.278]
GAD (Axis I)	23.3	15.3	10.1	3.5	X^2 (1) = 5.154, p = 0.023*, 0.371 [0.154 – 0.895]
Adjustment Disorder (Axis II)	0.8	0.5	11.4	3.9	X^2 (1) = 12.339, p = 0.000*, 17.032 [2.084 – 139.178]
Somatoform Pain Disorder (Axis I)	65.4	42.9	50.0	17.2	X^2 (1) = 4.544, p = 0.033*, 0.529 [0.293 – 0.953]

¹ Percent of subjects in only the group listed

² Percent of the total population (combined JAW and LB groups)

Table 4. JAW and LB Past (Lifetime and Sub-threshold Lifetime) DSM-IV Axis I Disorders#

◆ All values are based on the presence or absence of SCID Axis I diagnosis

Variable	JAW (n = 135) ◆		LB (n = 71) ◆		X ² (df) = X ² statistic, p-value; OR [95%C.I.]
	%Jaw ¹	%Total ²	%LB ¹	%Total ²	
Specific Phobia	0.0	0.0	2.9	1.0	X ² (1) = 3.894, p = 0.048*†
Social Phobia	0.0	0.0	4.3	1.5	X ² (1) = 5.785, p = 0.016*†
PTSD	0.0	0.0	12.9	4.4	X ² (1) = 17.8963, p = 0.000*†
Stimulant Abuse	0.0	0.0	2.9	1.0	X ² (1) = 3.838, p = 0.050*†

1 Percent of subjects in only the group listed

2 Percent of the total population (combined JAW and LB groups)

* Significance at the p<.05 level.

† Either JAW or LB did not meet criteria for the category and therefore there was insignificant data to calculate an OR

Table 5. JAW and LB Medication† Usage

Variables	JAW (n=135)		LB (n=71)		X ² (df) = X ² statistic, p-value; OR [95%C.I.]
	% Jaw ¹	%Total ²	% LB ¹	%Total ²	
Schedule II Narcotics	0.0	0.0	9.9	3.4	X ² (1) = 13.778, p = 0.000*†
Benzo- Diazapine	7.4	4.9	0.0	0.0	X ² (1) = 5.528, p=0.019*†

¹ Percent of subjects in only the group listed

² Percent of the total population (combined JAW and LB groups)

* Significance at the p<.05 level.

† Either JAW or LB did not meet criteria for the category and therefore there was insignificant data to calculate an OR

Table 6. Summary of Logistic Regression Analysis Predicting JAW and LB

Variables*	B	SE	Wald Statistic	Odds Ratio (OR)	95% Confidence Interval (C.I.)
CPI	0.079	0.023	11.551	1.082	1.034-1.133
MPI-Anomalous	3.132	1.481	4.470	22.927	1.257-418.215
WOC					1.006-1.201
Problem-Solving	0.094	0.045	4.335	1.099	
GAF	-0.238	0.053	30.457	0.788	0.711-0.874
Anxiety Disorder	-0.056	0.726	0.006	5.465	1.016-29.400
Cluster C Diagnosis	3.240	0.946	11.737	25.534	4.000-162.979

*Only significant ($p < 0.05$) variables were eligible for the factor-solution

Table 7. Prevalence Rates of DSM-IV Axis I and II Mental Disorders: A Comparison of the Acute Jaw Pain Group and General Population Estimates

Variables	JAW (n=135) ⁺			General Population Estimates	Odds Ratio (OR)
	% JAW	95% CI	Standard Error		
Axis I				** n = 9,282	
MDD*	45.9	37.49 - 54.31	0.043	6.70	0.085
Bipolar	2.3	-0.23 - 4.83	0.013	2.60	1.134
Dysthymia	1.5	-0.55 - 3.55	0.010	1.50	1.000
Panic Disorder	5.3	1.52 - 9.08	0.019	2.70	0.496
Agoraphobia	0.8	-0.70 - 2.30	0.008	0.80	1.000
Specific Phobia	4.5	1.00 - 8.00	0.018	8.70	2.022
Social Phobia	0.0			6.80	
OCD	1.5	-0.55 - 3.55	0.010	1.00	0.663
GAD*	23.3	16.17 - 30.43	0.036	3.10	0.105
PTSD	1.5	-0.55 - 3.55	0.010	3.50	2.382
Axis I* – Current or Lifetime Disorder	73.7	66.27 - 81.13	0.038	26.20	0.127
Axis II				*** n = 43,093	
Antisocial PD	0.0			3.63	
Avoidant PD*	21.1	14.22 - 27.98	0.035	2.36	0.090
Dependent PD	3.0	0.12 - 5.88	0.015	0.49	0.159
Histrionic PD*	8.3	3.65 - 12.95	0.024	1.84	0.207
OCPD*	60.9	52.67 - 69.13	0.042	7.88	0.055
Paranoid PD	9.0	4.17 - 13.83	0.025	4.41	0.466
Schizoid PD	0.0			3.13	
Axis II* - Current	56.4	48.03 – 64.77	0.043	14.79	0.134

⁺ All values are based on the presence or absence of a current, sub-current, current & lifetime, lifetime, and sub-threshold Structured Clinical Interview, or SCID, Axis I or Axis II diagnosis.

* Significant because General Population Estimate falls outside the 95% CI

** (Kessler, et al., 2005)

*** (Grant, et al., 2004)

Table 8. Prevalence Rates of DSM-IV Axis I and II Mental Disorders: A Comparison of the Acute Low Back Pain Group and General Population Estimates

Variables	LB (n=71) ⁺			General Population Estimates	Odds Ratio (OR)
	% LB	95% CI	Standard Error		
Axis I				** n = 9,282	
MDD*	50.0	38.37-61.63	0.059	6.70	0.072
Bipolar	4.3	-0.42-9.02	0.024	2.60	0.594
Dysthymia*	8.6	2.08-15.12	0.033	1.50	0.162
Panic Disorder	8.6	2.08-15.12	0.033	2.70	0.295
Agoraphobia	1.4	-1.33-4.13	0.014	0.80	0.568
Specific Phobia	11.6	4.15-19.05	0.038	8.70	0.726
Social Phobia	5.7	0.31-11.09	0.028	6.80	1.207
OCD	2.9	-1.00-6.80	0.019	1.00	0.338
GAD	10.1	3.09-17.11	0.036	3.10	0.285
PTSD*	17.1	8.34-25.86	0.045	3.50	0.176
Axis I* –Current or Lifetime Disorder	59.2	47.77-70.63	0.058	26.20	0.245
Axis II				*** n = 43,093	
Antisocial PD	5.7	0.31-11.09	0.028	3.63	0.623
Avoidant PD	1.4	-1.33 - 4.13	0.014	2.36	1.702
Dependent PD	1.4	-1.33 - 4.13	0.014	0.49	0.347
Histrionic PD	5.7	0.31-11.09	0.028	1.84	0.310
OCPD*	27.1	16.76-37.44	0.053	7.88	0.230
Paranoid PD	8.6	2.08-15.12	0.033	4.41	0.490
Schizoid PD	4.3	-0.42 - 9.02	0.024	3.13	0.719
Axis II –Current or Lifetime Disorder	23.9	13.98-33.82	0.051	14.79	0.553

⁺ All values are based on the presence or absence of a current, sub-current, current & lifetime, lifetime, and sub-threshold Structured Clinical Interview, or SCID, Axis I or Axis II diagnosis.

* Significant because General Population Estimate falls outside the 95% CI

** Kessler, et al., 2005)

*** (Grant, et al., 2004)