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The Long-term Psychological Sequelae of Orofacial Injury

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Summary

Significant subsets of patients who experience orofacial injury are at risk for developing adverse psychological sequelae such as PTSD and depression. If undetected and untreated, the psychopathology can become recalcitrant and burden the social and vocational functioning of the patients and greatly diminish their quality of life. The hospital encounter and follow-up care visits provide the oral and maxillofacial surgeon with opportunities to screen for emerging psychological problems. Several screening instruments are available to assist the surgeon in identifying individuals at risk for subsequent mental health problems. Facilitated referrals to mental health services can be a practical approach for improving comprehensive medical care for vulnerable individuals and for reducing the potential morbidity of these covert, but disabling, sequelae.

Introduction

A growing body of literature has begun to define the variety of psychological difficulties that traumatic injury can precipitate (1)(2)(3)(4). Common reactions to traumatic events include unwanted reexperiencing of the event, depression, hyperarousal, anxiety, and a persistent sense of current threat. In many instances, the affected individuals are resilient and will manifest only short-lived stress reactions that diminish over time without requiring medical or psychological assistance. Nevertheless, in a distinct subset of injured individuals, the constellation of symptoms may be severe enough to meet the diagnostic criteria for Post-Traumatic Stress Disorder (PTSD)(5). PTSD is a very debilitating anxiety disorder that can occur after exposure to a terrifying event in which grave physical harm was incurred or threatened (6)(7). Characterized by feelings of fear, helplessness, or horror, the condition is differentiated by the presence of several symptom clusters and elements best summarized by the mnemonic TRAUMA (8): a) A Traumatic event occurred in which the person experienced, witnessed, or was confronted by actual or threatened serious injury, death, or threat to the physical integrity of self or other and, as a response to such trauma, the person experienced intense helplessness, fear, and horror; b) The person Reexperiences such traumatic events by intrusive thoughts, nightmares, flashbacks, or recollection of traumatic memories and images; c) Avoidance and emotional numbing emerge, expressed as detachment from others; flattening of affect; loss of interest; lack of motivation; and persistent avoidance of activity, places, persons, or events associated with the traumatic experience; d) Symptoms are distressing and cause significant impairment in social, occupational, and interpersonal functioning (patients are Unable to function); e) These symptoms last more than 1 Month; f) The person has increased Arousal, usually manifested by startle reaction, poor concentration, irritable mood, insomnia, and hypervigilance.

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Although post-trauma psychopathology can follow any type of trauma exposure, direct exposure such as intentional injury is more likely to be associated with psychiatric sequelae than an indirect exposure to traumatic events(7). In fact, consensus guidelines from the National Institute of Mental Health identify survivors of violence as a group at high risk for development of PTSD and related comorbid conditions (9). This recommendation is grounded in the findings of traumatic stress investigators who report the prevalence of chronic post-trauma PTSD to range from 10% to 30% (3),(10) at 12 months post injury. More recently, through a nationwide study involving 69-acute care hospitals across the US, Zatzick et al. (2007) determined that over 20% of moderately to severely injured adults had symptoms consistent with a diagnosis of PTSD 12 months after their injury admission (4). The prevalence of other post-trauma psychopathology is less well known, however, with major depressive episode, generalized anxiety disorder, and substance abuse among the most common comorbid disorders with PTSD. In their review of the area, O'Donnell et al. (2003) found that depression was a common occurrence following injury (2). The few studies examining comorbid PTSD and depression following injury generally indicate that both disorders frequently co-occur, with between a half to a third of injury survivors with PTSD having a comorbid diagnosis of depression (11)(1). The nature of the relationship between PTSD and depression after trauma is complicated. While, both disorders can develop independently after an event, it is also clear that having a previous depressive disorder is a risk factor for the development of subsequent trauma-related PTSD (12)(13). These complex relationships underscore the importance of assessing for both PTSD and depressive symptomatology following traumatic injury (14).

Persons experiencing intentional orofacial injuries may be particularly vulnerable to the development of chronic post-traumatic stress disorder (15) and depression because these injuries often are intentional (16) and because any resultant disfigurement could serve as an ongoing reminder of the event(17). Unfortunately, the development of long term problems such as chronic PTSD and/or depression in orofacial injury survivors is an area which has only recently begun to attract interest in the clinical research community. In an attempt to clarify long-term psychological sequelae, Sen, Ross & Rogers (2001) surveyed one-year psychological outcomes of 147 hospital admissions for orofacial injury (18). Attrition rates were high (over 65%), and while the investigators did not formally assess PTSD, they found that 30% of the sample reported persisting high levels of anxiety and depression over the year. This lack of information on the evolution of PTSD and depressive chronicity in orofacial injury survivors has important clinical implications because of the missed opportunities for screening and initiating early psychological interventions to prevent the development or escalation of subsequent mental health problems.

To build a knowledge base on long-term psychological sequelae, this chapter will focus on our findings relative to post-traumatic psychological outcomes in cohorts of orofacial injury patients seeking medical care at two trauma centers in Los Angeles – the King-Drew Medical Center (KDMC) and the LA County-USC Medical Center (LA-USC). While the samples differ in important ways - most particularly, participants in the LA-USC had to have a concurrent substance abuse problem to be eligible for inclusion in the study – distinctive shared characteristics of the two samples make them especially informative regarding the prevalence and sequelae of traumatic exposure in this commonly involved, but largely under-studied, vulnerable patient population. These distinctive shared characteristics include gender (predominantly male), ethnicity (predominantly African-American and/or Hispanic), limited access to ongoing medical care, and the predominance of intentional physical assault as the trauma of interest. In terms of psychological effects, the prospective studies had three main goals. First, we sought to determine the severity of traumatic stress symptoms in the patient cohorts, twelve months post orofacial injury. Second, in exploratory analyses, we investigated the rates of likely chronic PTSD positive cases one year after the injury. Third, we sought to look at level of depressive symptoms and their trajectory in the LAC-USC sample where this

data was obtained. Our overarching objective was to corroborate the findings observed in general trauma settings by determining whether chronic psychopathology was a significant problem in adults recovering from an orofacial injury.

KDMC Study

Our study cohort of 336 patients was recruited from the pool of adult patients presenting with orofacial injuries to a Level I trauma center in Los Angeles between August 1996 and May 2001 (19)(20). Although the spectrum of injury included the mouth, mandible, midfacial, and frontal regions, patients needed to have at least one fracture involving the mandible to be eligible for the study. All patients had a similar spectrum of facial injury severity; patients with severe injuries such as avulsive gunshot injuries were excluded. Patients with altered mental status attributable to head injuries or who were mentally incompetent were also excluded, as were patients who were unable or unwilling to return for follow-up care. The study procedures were approved by local institutional review boards and informed consent was obtained from participants.

Concomitant to the surgical treatment, consenting patients were interviewed by research staff using structured questionnaires that included items regarding sociodemographic characteristics and various psychosocial measures. In addition to baseline data collected at the time of admission and discharge, four post-discharge patient surveys were administered at the various recall appointments. The first survey was conducted within 10 days of hospital discharge; the second at the 1-month recall appointment, the third approximately 6 months post-discharge, and the fourth approximately 1 year post-discharge.

The Posttraumatic Disorder Scale (PDS;(21)) was used to capture lifetime exposure to traumatic events, immediate psychological response, and the subsequent experience of symptoms of PTSD. The PDS was developed specifically as a brief instrument that would help to provide a reliable level of self-reported PTSD symptoms; the structure and content of the PDS mirrors the DSM-IV diagnostic criteria for PTSD (5). Levels of responses on the scale can be used to suggest likely PTSD diagnosis resulting from the injury with high levels of sensitivity and specificity (22), although subsequent formal diagnostic interviewing is required before a reliable valid clinical diagnosis can be made. To accommodate the time constraints of a trauma setting, the initial 12 categories of lifetime traumatic exposure were combined into 7 conceptual categories (e.g. serious accident, natural disaster, assault (including sexual assault), imprisonment, life-threatening illness, witnessing sudden or violent death, other life threat).

To establish the levels of traumatic symptoms 1 year after a facial injury and to identify predictors of high rates of chronic PTSD symptoms, the total score on the 12-month PDS was utilized as the primary dependent measure here; for a secondary analyses, likely positive/negative PTSD diagnostic classifications were made utilizing symptom levels, reports of immediate terror, helplessness, or perceived life threat at the time of the event, and a subsequent decline in role functioning, as specified by Foa (21). The absolute levels of PDS symptoms at each assessment time point were established. To determine the likely proportion of participants with PTSD from the orofacial injury, twelve month PDS responses were scored utilizing the heuristic proposed by Foa (21) to classify cases into probable PTSD positive or negative status.

Of the initial study cohort of 336 patients with orofacial injuries, twelve month data were available on 193 participants (57%). Subjects returning for their 12 month follow-ups were predominantly young adult (71% between 18-39 years) ethnic minority (primarily African-American and Latinos) males (87.6%). Most of the patients were single (82.4%), unemployed (68.4%), and 33.2% had not graduated from high school. As expected, PTSD symptoms, manifested by the PDS scores, decreased significantly throughout the year ($F(2, 372) = 10.98$,

$p < 0.001$); nevertheless, psychological distress scores continued to be high for many individuals. Mean PDS score for the 193 participants at 1 month was 14.14 (SD 11.97) and at 12 months was 10.43 (SD 11.31). At the 12 month follow-up, 44 of the returning participants (22.78%) endorsed symptoms consistent with a current PTSD diagnosis on the self-report measure.

With regard to the exposure characteristics of the facial injury, only high levels of pain reported by patients at the 10 days follow-up visit were related to greater severity of PTSD symptoms at 1 month. Prior psychological disturbances, as reflected in lifetime and current mental health needs as well as lifetime social service need and social service use were significant predictors of high rates of chronic PTSD symptoms at the 1 year follow-up. Similarly, prior exposure to a traumatic event and high rates of stressful life events in the prior year were strongly predictive of higher PTSD symptoms from the orofacial injury. Perceived social support at the time of the injury was not related to the subsequent development of PTSD; however, a paucity of coping resources in the initial days after the injury, as reflected in not having anyone to count on for instrumental support, not having anyone to count on for emotional support and/or needing more emotional support, and unmet social service needs, were related to higher levels of PTSD symptoms at 12 months. Finally, high scores on the PDS at 1 month were significantly related to high PTSD scores at 12 months.

LAC-USC Study

To extend our findings, we conducted similar psychological assessments as part of a randomized controlled trial to test the effectiveness of behavioral interventions addressing antecedent substance use behaviors in patients with orofacial injury. A cohort of 218 patients was recruited from the LA-USC Medical Center between January 2005 and June 2008. In addition to the criteria used in the KDMC study, eligible patients needed to report regular use of alcohol or illegal drugs in the 6 months prior to enrollment. Following surgical treatment for their facial injuries, participants who were randomized assigned to receive customary care with either motivational interviewing or standard information on substance use behaviors. Similar to the previous study, participants underwent regular assessments including follow-ups at 6 months and 12 months. To reflect the true longitudinal course of PTSD symptoms in recovery, we report the findings only on the educational group here.

Psychological responses to the circumstances of the orofacial injury were captured by the Posttraumatic Disorder Scale (PDS), described above, at the various assessment time points. In addition, the Center for Epidemiologic Studies Depression Scale (CES-D)(23) was used as a measure of depressive symptoms. This 20 item self-test measures depressive feelings and behaviors during the past week and was designed for use in non-clinical settings. Items are scored on a 0-3 scale and totaled. The scale has moderate sensitivity and specificity with formal diagnostic interviews of clinical depression (24). High scores on the CES-D indicate high levels of distress. A score ≥ 16 suggests a clinically significant level of psychological distress (25). In a general population, about 20% would be expected to score in this range.

Of the initial study cohort of 100 patients with orofacial injury in the education condition, twelve month data were available on 58 participants (58%). Similar to the previous study, the sample was predominantly young (mean age = 31.1 years), single (60%) males (91%) who were ethnic minorities (74%). The mean PDS score at the time of hospital admission was 16.94 (SD=13.2). By the 12 month interval, the mean PDS score had dropped to 13.44 (SD=11.1). The reduction in symptoms over time was marginally significant ($p < .07$); these scores are slightly higher than the sample described above. Mean CES-D scores at baseline were 21.4 (SD=12.7) and 15.54 (SD=11.8) at 12 months. While this reduction in depressive symptoms over time was statistically significant ($p < .05$), the overall rates of depressive symptoms endorsed by this sample are still high, and close to the score 16 cut-off point. This data suggests

many in the sample were experiencing clinical levels of distress that warranted further evaluation. Based on self-report, 42 participants (42%) met the screening criteria for acute PTSD at the 1 month follow-up assessment. At 12 month follow-up, 17 of the returning individuals (30%) reported symptoms on the PDS suggesting a likely diagnosis of PTSD resulting from the orofacial injury. Of course, formally diagnostic interviewing would be required to make a valid clinical diagnosis.

Generalizability of our studies

Our studies(19;26-30), among the first systematically to investigate psychological sequelae in facial injury patients for extended periods of time, have several strengths. Unlike previous limited attempts to clarify post-injury psychopathology, we were able to recruit relatively large samples of subjects in public hospital settings. Our prospective studies utilized standardized instruments for repeat assessments conducted over a 1 year period. The sociodemographic characteristics of our subjects, primarily young, single, adult males who were ethnic minorities with limited education and employment correspond closely to the profiles of facial injury patients seen at other urban trauma centers. Hence, these features make our investigations particularly informative regarding the psychological needs of high-risk individuals seeking treatment for facial injuries at our urban trauma centers.

The limitations of our studies also merit mention. First, PTSD and depression symptoms and status were rated based on responses to self-report instruments, rather than diagnostic interviews. Characteristic of services studies that aim to include large patient samples in acute care settings, we were forced to weigh the benefits of collecting self-report data from a relatively large sample against the limitations in data interpretation accruing from this method of data collection. Clearly, a replication of our study using interview assessments would be a valuable addition. Nevertheless, the concordance of the self-report versions of the PDS with PTSD diagnosis made using the Structured Clinical Interview for DSM-III-R (22) has been reported to be 79% (28) with a sensitivity of 82% and a specificity of 76.7%. With regards to the assessment for depression, Boyd et al. (24) found, in a community study of 720 subjects, that the sensitivity for major depression as determined by Research Diagnostic Criteria (RDC) was low (64%) but specificity was high (94%) using a cutoff score of 16. Thus, we have some confidence that our results would be replicated with the use of more elaborate interview assessments.

The high number of individuals lost to follow-up is also an issue. To some extent, this attrition likely reflects the transient, limited economic resources in our sample. Many participants were homeless, did not have phones or stable addresses, drifted in and out of prisons or moved around frequently and were generally difficult to locate for the long-term follow up interviews. Our experiences are not unlike the general difficulty in recruiting and following trauma survivors noted by other trauma investigators. Several researchers have suggested that many traumatized individuals use avoidance (e.g. refraining from follow-up health care visits) as a primary coping strategy; thus, involvement in a research protocol on long-term psychopathology is in direct contrast to this avoidance and may account for our difficulty in retaining subjects over a 1-year period. These challenges are illustrated by the study by Roy-Byrne et al.(31) who approached 546 emergency room admissions for facial injury to participate in a prospective study on psychological outcomes. Only 56 individuals (10.25%) agreed to participate in their study and of these, only 32 (57.14%) were available for the 3 month follow-up visit. While we did not have the same difficulties with recruitment, our follow-up numbers reflect a similar difficulty in following people over time, especially for the long-term follow up assessments.

Implications for Clinical Practice

Collectively, our studies begin to illuminate how the experience of orofacial injury can lead to adverse mental health conditions. While the majority of individuals do recover from the traumatic injury, a significant minority (> 20%) will experience high acute stress symptoms that sustain or escalate in the months following the traumatic incident to develop into longer-term psychological disorders. This level of psychopathology is similar to the range noted by O'Donnell et al. (3) in their review of general trauma survivors. Although there was a significant reduction in the self-reported depressive symptoms over time, the levels were relatively high both shortly after the traumatic incident as well as 12 months post-injury.

As manifest by the traumatic stress literature, injury can disable people in terms of their physical, mental and/or social functioning (32)(33). Not only does poor mental health appear to be one of the most common disabling sequelae of traumatic injury, it is the outcome which may hold the most promise for modification by appropriate psychosocial interventions. An individual's own ability to cope with physical impairment, as well as his/her broader social situation, offers opportunities to reduce the extent to which the physical injury can result in disability. By providing people with psychological and social resources that assist their coping responses to the injury, psychosocial interventions may be able minimize the risk of subsequent orofacial injury resulting in recalcitrant mental, vocational and social disability. The hospital admission for injury management provides a strategic opportunity for identifying individuals at risk for adverse psychological sequelae and engaging them with mental health services. Targeted mental health interventions and psychological debriefings during this window of opportunity may prevent the crystallization of abnormal stress reactions into entrenched psychiatric sequelae.

A growing body of literature indicates that individuals with psychopathology such as PTSD may respond to psychotherapeutic and psychopharmacological treatments. For example, the work of Bryant et al (34) and Foa et al (35) have shown that early cognitive behavior therapy (CBT) interventions delivered in the days and weeks after injury can help to diminish PTSD symptom development. Other investigators such as Hidalgo et al (36) suggest that selective serotonin reuptake inhibitors and tricyclic antidepressants are efficacious treatments for PTSD. Depression is also responsive to treatment, both pharmacological (37) and psychological (38), although relapses are frequent. Similarly, the investigations of Gentilelo et al (39) suggest that motivational interviewing (MI) interventions may have utility in decreasing alcohol use in trauma survivors. Taken together, these studies underscore the potential promise of early psychological interventions in the prevention and treatment of post trauma psychopathology.

Inasmuch as oral and maxillofacial surgeons are typically the primary care-providers during the recovery period from an orofacial injury, they are uniquely situated to screening and refer at-risk patients for psychological evaluation and treatment. Assessment of orofacial injury patients for the risk of developing trauma-related psychopathology can be achieved by simple screenings administered around the time of hospital discharge or during the one-month follow-up visit when patients return for removal of their maxillomandibular fixation. The one month follow-up assessment is particularly useful because many of the transient stress reactions will have diminished by then. A number of screening instruments, such as the PDS and CES-D as well as others described in the screening chapter in this volume (chapter 3), exist that can identify individuals at risk for posttraumatic psychopathology following injury. Sources like the National Center for PTSD's website <http://www.ptsd.va.gov/professional/pages/screening-ptsd-primary-care.asp> are good resources for screening strategies. The total score on these screening measures can be used to classify respondents as being either at 'low risk' or 'at risk' of developing subsequent psychological sequelae. The process of screening and discussion of mental health and well

being during care of the physical injury may also increase awareness of patient's awareness of psychological health and improve their readiness to engage in any necessary mental health interventions. Patients deemed "at-risk" can be provided by the surgical team with facilitated referrals to mental health providers in the hospital for follow-up assessments and care.

In summary, a significant subset of patients who experience orofacial injury are at risk for developing psychological sequelae such as PTSD and depression. If undetected and untreated, the psychopathology can become recalcitrant and burden the social and vocational functioning of the patients and greatly diminish their quality of life. The hospital encounter provides the oral and maxillofacial surgeon with opportunities to screen for emerging psychological problems. Several screening instruments are available to assist the surgeon in identifying individuals at risk for subsequent mental health problems. Facilitated referrals to mental health services can be a pragmatic approach for improving comprehensive medical care for these populations and reducing the potential morbidity of these covert, but disabling sequelae.

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