



Psychological aspects of mutilating hand injuries

Therese M. Meyer, PhD

*Department of Psychology, Center for Neuromuscular Sciences, Memorial Medical Center,
701 N. First Street, Springfield, IL 62781, USA*

A mutilating hand injury and subsequent disability do not occur in physiological isolation. Health care professionals providing treatment to individuals sustaining such injuries must be aware of the variety of psychological and social problems that arise in the face of such a potentially disabling injury. As such, the long-term, functional outcome of a mutilating injury can be greatly improved if the hand surgeon adopts a biopsychosocial perspective [1].

The hand plays an immense and integral role in an individual's vocational, avocational, and social functioning. The hands, more than any other appendage, provide us with independence, competence, and a sense of autonomy. The upper extremities are used as a means of productivity; employability; and expression of sexuality, affection, aggression, and communication, leading Klapeke et al to comment that "amputation or mutilation of the hand is a tremendous physical and psychological trauma that can precipitate powerful conflicts regarding loss of autonomy, guilt/punishment, and potency" [2]. A hand injury is particularly threatening to an individual who relies upon fine motor skills to perform work-related tasks. Consider the impact of a disabling hand injury for the carpenter, chef, dentist, or surgeon. There is potential for a hand injury to destroy a career and threaten quality of life [3].

In addition to the immense functional role of the hands, the hands are vital aspects of the subjective body image. Given the readily visible nature of the hand, a disfigured hand is easily observed and evaluated by others, resulting in the individual becoming acutely aware of any associated social stigma. A perception of stigmatization may inter-

fere with an individual's willingness to pursue social relationships or interactions [4]. Injuries resulting in a mutilation or amputation of hand or arm "deal a blow to the person's inner image that reverberates through their entire psyche" [5]. Thus, in addition to the functional loss, the individual must come to terms with a change in their self-image. If the individual's identity is heavily determined by body image and bodily integrity, a mutilating hand injury may lead to significant adjustment problems beyond the acute adjustment to functional loss [6]. Furthermore, heightened sensitivity to a disfigured hand may complicate functional recovery. For example, if an individual cannot tolerate the sight of their disfigured hand or tolerate allowing others to view it, they may be at risk for failure to comply with or attend therapy sessions, or they may avoid returning to work.

The purpose of this article is to identify the psychological impact on the individual and family after a mutilating hand injury. We describe frequent psychological reactions, the occurrence of psychological disorders, factors that affect adjustment, strategies to promote positive adaptation, and options for treatment of psychological disorders when they occur. The chapter concludes with a discussion of special issues in mutilating hand injuries, including pain management, the pediatric patient, and replantation issues.

Injury-related issues

It is frequently the assumption among health care professionals that severity and extent of injury plays a predominant role in the individual's psychological, social, and occupational adjustment to that injury. There is, however, limited correlation between tissue damage and functional loss

E-mail address: meyer.therese@mhsil.com.

and the psychological adjustment to traumatic injury [7–11]; there is limited correlation between mutilating hand injuries and psychological adjustment as well. Lee et al examined the relationship between severity of hand injury and subsequent psychological, social, and occupational adjustment and found no correlation [12]. They concluded that even though health care professionals tend to place significant importance on the severity of a physical injury in attempting to predict psychological and social adjustment to injury, it is not the sole or necessarily the most significant determinant of long-term recovery and reintegration into society.

It is more beneficial to focus on the individual's perception and attribution of how the injury was sustained when attempting to predict or understand psychological adjustment. Although much of what is known on this topic is derived from research on other traumatic injuries [13,14], there is indication that attribution of responsibility for an injury plays a significant role in adjustment to injury and disability. As stated by Johnson, "if a worker is injured on the job, the nature and severity of that worker's anger at the injury is going to be related to whether he or she views the injury as a random, unpreventable event or as the result of neglect or negligence on the part of the employer" [15]. Negative emotional reactions (anger, depression, anxiety) may be heightened if the traumatic injury was the perceived result of someone's uncaring negligence or malicious act and thus could have been avoided [16].

Litigation issues have been viewed by health care professionals as potentially complicating the process of psychological adaptation to a mutilating hand injury, particularly in work-related, traumatic injuries [17]. Such issues may further cloud the patient's perception of injury and disability and the health care providers' perception of the patient's motivations and the interpretation of their behavior. Hand surgeons can be placed in a difficult position when litigation issues enter into the diagnosis, treatment, and prognosis of work-related injuries. Although there is often considerable concern among practitioners that litigation may play a substantial role in the adjustment to and functional presentation of a traumatic hand injury, Grunert et al reviewed the relevant research and concluded that compensation and litigation issues do not play a significant role in regard to psychological outcome [18]. Grunert et al concluded that problems in psychological adjustment are not maintained by the presence of litigation

and that such problems do not contribute to a failure to return to work before the resolution of litigation issues [18]. In addition, there was no relationship between return to work and potential size of settlement. All participants in this investigation were diagnosed with post-traumatic stress disorder (PTSD) and, as a result, received psychological intervention within several months of their injury. The investigators concluded that this early intervention likely played a key role in the absence of relationship between litigation, psychological symptom maintenance, and return to work.

Such research argues against a biasing focus on litigation issues when interpreting patient behavior. Modlin maintains that, whereas abuse of the system is likely to occur in a small fraction of work-related injuries, the concept of "compensation neurosis" (psychological symptoms being subconsciously or volitionally maintained by litigation issues) "is based on inadequate and conflicting data, clinical anecdotes, and biased observation" [19].

Psychological responses to a mutilating hand injury

Individuals experiencing a mutilating hand injury likely experience intense emotional reactions as a result of their injury, subsequent treatment, and immediate or long-term disability. Reactions may be experienced as a wide range of emotions including anxiety, depression, guilt, fear, frustration, sadness, and anger, among others [15]. Such a range of emotions is normal, and strong emotional reactions should not necessarily be viewed as abnormal. Whether the affective response warrants a clinical diagnosis depends on the severity, duration, and the incapacitating nature of the response. Mutilating hand injuries can be associated with psychological disturbances such as acute stress disorder (ASD), PTSD, other anxiety disorders (panic and obsessive-compulsive disorders), major depression, pain disorders, and adjustment disorders [20]. Assessing the individual's psychiatric history can help determine the likelihood that a diagnosable disorder will occur. Pre-injury personality dysfunction and presence of psychopathology have been correlated with poorer postinjury adaptation [15,21] and should be assessed as a possible risk factor to optimal adjustment.

There is little research available regarding the prevalence of psychological/psychiatric disturbances among individuals with mutilating hand injuries. There is, however, extensive research

regarding the prevalence of psychiatric disturbances in individuals with a new amputation. The rate of clinically diagnosable depression occurring among individuals with recent amputation is approximately 30% [20,22–24]. Shukla et al assessed individuals with a recent amputation and found that a large number of these individuals experienced depressed mood, tearfulness, sleep problems, and anxiety [25]. Individuals with mutilating hand injuries may be prone to similar emotional difficulties. A consistent finding has been that depression after physical injury or illness is associated with decreased functional ability [26–28] and that once functional ability improves through surgical intervention and rehabilitation, symptoms of depression also improve [29].

In an investigation into the psychiatric aspects of replantation surgery after a variety of digital, upper limb, and lower limb amputations [21], investigators found that symptoms of psychiatric disorder are often mixed, including symptoms of anxiety and depression. Anxiety was found to be the most frequent and persistent symptom postoperatively. Sources of acute anxiety were the accident being perceived as a life-threatening event, disrupted bodily integrity, and threat of loss of the body part. Feelings of depressed mood and sadness were also common but were mild and short lived. In only a minority of cases did the symptoms of depression persist beyond 1 week and necessitate psychiatric treatment. Feelings of depression were associated with perception of loss, usually regarding the threatened body part or threat of loss of lifestyle or relationships.

Symptoms of PTSD and ASD (a disorder symptomatically identical to PTSD but diagnosed when the individual is less than 1 month post-traumatic event) commonly occur as a result of severe traumatic hand injuries. There is indication that up to 94% of individuals experiencing a severe hand injury experience symptoms associated with one of these disorders [30]. These disorders are probably the most frequent psychiatric diagnoses for individuals who have experienced a traumatic hand injury. Symptoms of ASD or PTSD include recurrent flashback memories; nightmares and other sleep disturbances; being easily startled; cognitive, emotional, and behavioral avoidance of stimuli representative of the traumatic event; feelings of anxiety, detachment, depression, or guilt; and cognitive difficulties affecting memory and concentration [31].

In one of the few investigations examining factors contributing to emotional distress in the early

stages of traumatic hand injury, the occurrence of the traumatic event itself was found to be one of the core factors contributing to distress. Symptoms of ASD, such as flashback memories and re-experiencing the event, were detected in 25% of the injured individuals. Adding to the degree of emotional distress were practical problems in daily functioning, dependence on others, involuntary decrease in activity level, unknown functional prognosis, the uncertainty of persistent pain, and the disfigured appearance of the hand [32].

In another study [30], the acute (2 months or less postinjury) psychological impact of a traumatic hand injury was examined. Ninety-four percent of the individuals screened experienced one or more symptoms associated with ASD or PTSD, with the most common symptoms being nightmares and flashback memories. Other acute psychological symptoms included mood swings, cognitive difficulties (impaired concentration and attention), concerns regarding disfigurement, phantom limb sensations, and fear of dying. These symptoms generally resolved or were significantly alleviated by 1 month postinjury. Although flashback memories and nightmares continued, they were greatly diminished by the second month postinjury.

Promoting healthy adjustment to injury

The assumption cannot be made that all individual's who have undergone a mutilating hand injury will experience an episode of adjustment-related difficulties. These individuals are not doomed to experience depression, ASD, or PTSD. Although variation in mood and affect undoubtedly occur as the individual comes to terms with the injury, assumptions about the expected course of adjustment should be avoided. The course of adjustment will vary greatly among individuals, as will the factors that influence their adjustment. For some individuals, impaired functioning is the primary concern; for others, disfigurement of the hand is primary; for yet others, financial concerns take precedence.

Regardless of the primary concerns for the individual, there are strategies in which a health care provider can promote positive adjustment for persons with a mutilating hand injury. Promotion of a healthy adjustment should begin as soon after the injury as possible [30]. The hand surgeon is likely one of the first health care providers to have contact with the injured individual. For that reason, it is important that the attending surgeon begin

to create “a realistic picture of acute and long-term goals for the patient and family” [20]. Immediate and long-term physical and psychological adjustment is influenced by the surgeon’s interactions with the patient before and after surgery. Positive pre- and postsurgical interactions foster faith in the physician, set the stage for patient compliance with medical recommendations, and increase satisfaction with care [20]. Patients should be provided with a very realistic but hopeful perspective on what life will be like after a mutilating hand injury or amputation. As aptly stated by Pulvertaft [33], the surgeon should not “be unduly optimistic and give promises that cannot be honoured. *There are ways in which we can combine sympathy with truth.*” The attending surgeon can further promote optimal adjustment by referring the individual to a mental health professional who specializes in traumatic physical injuries and disability. There is considerable evidence that early psychological intervention after traumatic injury can substantially reduce psychological morbidity and maladaptive coping [18,30] and facilitate more rapid return to work [15,18,34]. Such a referral can facilitate the process of forming an adaptive perspective on injury, recovery, and eventual return to a satisfying lifestyle. It is beneficial for the patient to understand that many of their emotional reactions to the traumatic event and subsequent injury are not abnormal. Discussing these reactions with a trained professional can reduce the associated distress and potentially prevent further long-term psychological difficulties. The rationale for such a referral should be provided to the patient so that they do not feel identified as being maladjusted or “crazy.” It can be suggested to them that a referral to a mental health professional is being arranged so that they may be better able to cope with and adapt to the residual physical difficulties and associated emotional consequences of their injury [15].

Psychological intervention should focus on promoting the patient’s strengths and discouraging dependence, feelings of victimization, or loss of personal control. Early on, discussions may focus on practical issues (dealing with pain, lost wages, stress on family, the effect of the injury on their lives, and stress of hospitalization). Eventually, discussions can turn to providing assistance to the patient in formulating realistic plans for the future, including employment, education, relationships, and continuing to be a productive member of society. Such discussions are important in re-establishing feelings of self-worth that may have been challenged as a result of a disabling injury [20].

In the world of coping research, it has been repeatedly indicated that not all coping strategies are created equal when dealing with illness, injury, and traumatic life events. Coping strategies typically regarded as “engaging” in their approach have been consistently found to be associated with more positive psychological adjustment, whereas coping strategies regarded as “disengaging” in nature have been consistently associated with less positive adjustment. Engaging strategies include determining positive meaning in the event, active problem-solving, and perceiving control over the situation. Disengaging coping strategies include a perception of helplessness, lack of control, catastrophizing, and emotional and behavioral avoidance [35]. For example, in a study of adaptation to lower extremity amputation, Gallagher and MacLachlan determined that finding “something good” as a result of amputation was associated with more positive ratings of adjustment to limitations and physical capabilities [36]. They further concluded that identifying a positive outcome, regardless of what form that may be, is an important factor in positive adjustment. In many cases, the acutely injured patient may not be able to perceive anything positive resulting from their injury. Over time and with subtle suggestion, however, patients may be able to identify consequences of their injury that may be viewed as a positive outcome.

Specific psychological intervention strategies

Fortunately, for the individual who is experiencing significant difficulties in their adjustment to a mutilating hand injury—either immediately or long-term—there are psychological interventions available that have proven efficacy. The sooner the problem is identified and appropriate treatment is initiated, the more likely the individual is to recover and return to normal psychosocial functioning. In the case where a referral for mental health services is indicated, it is important to convey to the individual that mental health services are an aspect of the overall treatment program and not a “last resort” [16].

When an individual is identified by health care personnel as experiencing mood or affective difficulties as a result of injury, the advised initial step is to obtain a psychological or psychiatric evaluation. According to Johnson, “among the benefits of conducting psychological assessments of injured hand patients are the following: 1) To communicate a sense of care and interest in the patient; 2)

To obtain accurate diagnostic information regarding issues of malingering, pre-existing psychologic conditions, and identification of factors amenable to treatment; 3) To aid in decisions regarding possible surgery; 4) To individualize medical treatment so that health care does not become impersonal and interpersonally distant; 5) To facilitate psychologic intervention, particularly in cases of pain and post-traumatic stress disorders; 6) To expedite an early return to work and decrease the overall period of disability that could result from untreated psychologic problems following the injury; 7) To identify sources of non-compliance; and 8) To allow patients the opportunity to thoroughly tell their stories” [15].

Once the evaluation is completed, the mental health professional can plan and implement the appropriate interventions. Such interventions should include psychotherapy or psychotropic medications [6,15]. It has been suggested [15] that psychotropic medications be used sparingly and only in cases in which the individual is struggling to such an extent that overall functioning is hindered or impeded. Medications may include an antidepressant or anxiolytic agent, but, in extreme cases, neuroleptic medication may be indicated [15].

Psychotherapy may involve training the patient in self-management strategies (relaxation, anger control, cognitive restructuring) to address pain, anxiety, and depressed mood. Psychotherapy may need to address issues of loss, the potential for chronic disability, and existential issues that arise as a result of a traumatic injury, such as fairness in the world, perceived control over life events, and the meaning of life [16]. The appropriate intervention should be individualized according to the patient’s pre-injury personality, type of trauma experienced, previous trauma-related experiences, and the reactions of others to the injury [16].

The treatment of ASD and PTSD after an upper-extremity injury is probably the most well researched and discussed. Schwartz and Prout highlight that in PTSD, treatment should occur early and should be short term, with a particular focus on returning the individual to a pre-injury level of functioning; the “normalization” of the emotional reactions; adaptive coping; and decreasing emotional, cognitive, and behavioral avoidance [26]. Various cognitive-behavioral treatment strategies (systematic desensitization, graded exposure, in vivo exposures) have demonstrated tremendous success in the treatment of PTSD

[37]. Such strategies are focused and short term, thus facilitating rapid return to a previous level of psychological functioning.

Work-related injuries and the occurrence of PTSD may present a particular challenge. One of the cardinal symptoms of PTSD is avoidance of stimuli that remind the individual of the injury. In work-related injuries, this avoidance may include the work environment. Although surgical and rehabilitative efforts may have been deemed a success, many employees traumatically injured on the job fail to return to work because of psychological factors [34]. Grunert et al described a cognitive-behavioral treatment protocol in which they were able to achieve a 61% return to work for patients diagnosed with PTSD after a work-related severe hand injury [34]. This rate dramatically improved when graded work exposure and on-site job evaluations (88.9% and 83.3%, respectively) were incorporated into the treatment protocol.

Based on research and clinical experience, Grunert et al propose that coping skills, confrontation of the trauma, and reprocessing be used to manage most of the injured worker’s emotional reactions [34]. To promote return to work, they suggest that a “hierarchy of exposure techniques be attempted. Early return to work site is an economical approach that can be used as a means of screening for those patients with severe avoidance reactions. Then for those patients unable to return to work, graded work return should be attempted. If this too is unsuccessful, we suggest the use of an on-site job evaluation to accomplish desensitization.”

Special issues in mutilating hand injuries

Pain in mutilating hand injuries

Pain has been identified as one of the most acutely stressful aspects of traumatic injuries and their treatment—particularly if the pain is perceived as poorly controlled or unavoidable [16]. The problem presented by pain should be addressed in a timely manner in the treatment of a mutilating hand injury, lest it negatively influence the immediate and long-term functional outcome.

Poorly managed pain can lead to maladaptive psychological and emotional reactions such as anger, anxiety, phobic reactions, and somatization, which can lead to less adaptive physical and functional recovery [38,39]. In addition, the connection between pain and depression has been

clearly established [15,39]. Apprehension about the uncontrollable or possible long-term nature of pain is not uncommon [39]. There is indication of a connection between pain and the experience of symptoms associated with PTSD. In a case report [40], the occurrence of PTSD was a result of the pain associated with a traumatic eye injury rather than the injury itself. In this case, the intense and poorly managed pain was not an additional stressor but was the traumatic element that led to PTSD.

In a study examining work-related upper-extremity disorders, disability, and pain [38], investigators concluded that when an individual has difficulty coping with pain and loss of functioning, prolonged disability may result. Poor pain tolerance along with persistent pain and heightened reactivity may account for more frequent requests for surgical interventions. Unfortunately, with such individuals, additional surgery may fail to satisfactorily resolve pain complaints and associated disability.

In the case of amputation after a hand injury, phantom limb sensations and phantom limb pain are very real events for the individual. There is indication that at least 90% of individuals with amputation experience phantom limb *sensations* [41]. Although such sensations may not be painful, they can be emotionally distressing for the individual. Over time, these sensations typically remit in frequency and intensity [42]. Encouraging patients to view these sensations as a normal experience in the face of amputation can be reassuring to the individual. Phantom limb *pain*, which occurs in greater than 60% of amputations [42,43], has been identified as a potential risk factor for poor adaptation postamputation [44]. Phantom limb pain can be distressing for the individual. Unremitting and severe phantom limb pain may have adverse consequences for the individual's psychological functioning, possibly leading to drug abuse, clinical depression, and severe anxiety. Fortunately, because of improved surgical techniques and advanced pharmacologic pain management, severe and uncontrollable phantom limb pain is nearly an issue of the past [45].

The pediatric patient

There is limited research regarding the psychological aspects of a mutilating hand injury in pediatric patients. There is, however, extensive information regarding the psychological impact of amputations and other traumatic injuries in a

pediatric population. Much of this information can be applied to the care of the pediatric patient with a mutilating hand injury.

Although it would seem to be an accurate assumption that an amputation or mutilating hand injury would be a substantial emotional insult to a child or adolescent, many pediatric patients adapt psychologically fairly well after traumatic injury and are able to obtain favorable functional outcomes [46]. Some children and adolescents experience significant coping and adjustment difficulties following these traumatic injuries, however [47].

There have been a number of risk and protective factors identified as contributing to a pediatric patient's overall adjustment to traumatic injury. These factors include the child's developmental level and emotional age, pre-injury personality functioning and ability to cope with stressors, intellectual abilities, perceived responsibility for the injury, past experience with medical and surgical interventions, parental reaction and adjustment to the injury, level of attachment to the primary caregiver, and extent of expected functional impairment and physical disfigurement [46].

Misattributions of responsibility are more likely in the younger the child. Children are prone to interpreting the cause of the injury as punishment for bad behavior [46,53]. Such attributions should be discussed at a developmentally appropriate level with the young patient. It is also fairly common for young children to display developmentally regressed behavior—becoming more dependent and wanting of attention—after a traumatic injury and during subsequent hospitalization [47,48]. Such behaviors should be briefly tolerated, normalized with parents and treatment team members, and then age-appropriate behaviors should be encouraged and reinforced while regressed behavior is discouraged or ignored.

The role of the parents and family in the child's adjustment to injury, subsequent hospitalization, and treatment deserves emphasis. The reaction of this primary source of support greatly influences the child's reaction and adjustment [48,49]. In an investigation examining the factors influencing the psychological adjustment of children with limb deficiencies [49], demographic variables and extent of limb loss were not predictive of symptoms of depression, anxiety, or self-esteem. Rather, these indicators of psychological adaptation were influenced by family dynamics and other sources of social influence (friends, teachers, and classmates). The researchers concluded that "parental distress

and marital discord were found to be significant risk factor predictors; conversely, family support and perceived social support from parents, classmates, teachers, and friends were found to be significant protective factor predictors of adaptation.” Involving these sources of social influence in the pediatric patient’s process of recovery can reap substantial rewards with regard to psychological adaptation. Providing the parents and the patient with support and frequent communication plays a large role in reducing the child’s anxiety in the short term and facilitating compliance to medical recommendations in the long term [47–49]. In addition, designating a treatment team member to have contact with school personnel and potentially visit the child’s classroom can facilitate successful return and reintegration to school.

Replantation issues

Replantation procedures after a mutilating hand injury present unique issues beyond those presented by a mutilating hand injury alone. In addition to experiencing the hand injury as a life-threatening event, these individuals are typically admitted to the hospital as emergencies, with decisions regarding surgical interventions rapidly occurring. As a result, there is minimal opportunity for psychological or emotional preparation. As with other mutilating hand injuries, replant patients experience significant disruption in body image and bodily integrity. The replanted hand or digit may be perceived as foreign or altered because of its appearance or changes in sensation. Because of the visibility and functional importance of the hand, the individual must confront potential social stigma and the potential for functional impairment with subsequent loss in vocational, avocational, and interpersonal pursuits [27].

The hand surgeon is advised to consider the psychological characteristics of the individual before determining that replantation is the most appropriate option [27,50,51]. Situations in which replantation may be contraindicated because of psychological issues include self-inflicted amputations or if the individual is insufficiently motivated or is unable to comply with rehabilitative efforts and recommendations [27]. McCabe encourages the involvement of the patient, when feasible, in the replantation decision [52]. He suggests that patients are more likely to be satisfied with their care when given the opportunity to participate in decision-making, which would then lead to more favorable treatment outcomes. Obtaining a

psychiatric or psychological evaluation may be particularly helpful in instances in which the psychological factors present as particularly complex or convoluted. Such an evaluation may provide guidance to the hand surgeon regarding potential psychological factors that would negatively influence the functional outcome of a replantation procedure [27].

Summary

The immediate and long-term outcome of a mutilating hand injury can be positively influenced by health care professionals adopting a biopsychosocial perspective toward treatment and management. Such an injury produces a psychological and social impact that should be openly and candidly addressed with the injured individual and with the family. The earlier and the more skillfully these issues are addressed, the more likely it is that psychological factors will not impede functional outcome.

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