Implementing a Tailored Approach for the Hand-Injured Patient

A Prospective Study on the Evolution of the Posttraumatic Psychic Distress

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ABSTRACT

Mutilating hand injuries are frequently associated with the development of psychic impairments such as posttraumatic stress disorder, depression, regression of the personality, and refusal of the disease. The psychic distress acts as a source of disability that outweighs the functional loss, causing impairments that may prevent a full recovery after the accident. The present study highlights the need for nurses to be familiar with the emotional response in the patients, to implement a specialized and comprehensive approach and detect stress points that may require early intervention.

Key Words

Caregivers, Hand injuries, Posttraumatic stress disorders, SCL-90

The acute injury to the hand is acknowledged to be a trauma carrying not only physical consequences but also deep psychic reverberations.[1-3] First were Mendelson et al[4] in 1986 to show the high percentage of early posttraumatic stress symptoms affecting hand-injured patients: up to 94% of individuals experienced nightmares, flashbacks, affective liability, and concentration/attention problems within the first 3 months after the accident. Despite the fact that the impairments were reported to decrease along with the restoration of the function, several subsequent studies lightened the proportion of the long-term psychic issues of severe hand injuries: the development of posttraumatic stress disorder (PTSD)[5] and depression[6] in a quarter of patients within the first year, frequently accompanied by regression of the personality and refusal of the disease.[7] In this view, the distress acts as a source of disability that outweighs the functional loss, causing impairments that may prevent a full recovery after the accident.[7] These observations have progressively placed the need to be aware of the psychic sequelae of physical trauma to provide the most appropriate care.[8,9] Among health care professionals, nurses are figures of utmost importance in the detection of any impairment in the recovery process; they should be familiar also with the emotional response in the patients, to implement a specialized and comprehensive approach and detect stress points that may require early intervention.[10]

Currently, literature that addresses the evaluation of the psychic impairments of the hand-injured patient is quite limited, and prospective evaluations regarding long-term posttraumatic implications are few. With the present study, we aimed to implement a dedicated nurses' training through the analysis and knowledge of the evolution of the psychic distress consequent to hand injuries over time.

METHODS

Patient Population and Study Questionnaires

A consecutive recruitment of patients took place between January 1 and June 30, 2009, at the Hand Surgery Unit of the University Hospital of Padua (Italy). The study site is a tertiary academic center serving a population of approximately 0.4 million, with an annual census of 58,000 hospitalizations per year. We included adult (age >18 years) Italian-speaking patients with an acute traumatic injury to the hand requiring inpatient urgent surgical treatment. Major trauma (complete amputation of hand(s)/finger(s)) was excluded because of the significantly higher incidence of depressive syndrome in the long term.[4,11] Exclusion criteria also included self-inflicted injuries, chronic mental illness, cognitive impairments, and history of alcohol/drug abuse.

Patients were asked to complete the Italian adapted version of the Symptom Checklist-90-Revised (SCL-90-R) 3 times during the first year after the accident (30-180-365 days). The SCL-90-R is a multidimensional self-report inventory consisting of 90 items covering 10 dimensions of psychic distress: phobic anxiety (PHOB), anxiety (ANX), depression (DEP), somatization (SOM), obsessive-compulsivity (O-C), paranoid ideation (PAR), interpersonal sensitivity (INT), hostility (HOS), psychoticism (PSY), and insomnia (SLEEP). It is a well-validated system for

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the psychopathological evaluation of the individual.[12,13] Each item describes a physical or psychic symptom that is rated on a 5-point scale ranging from 0 ("not at all") to 4 ("extremely"). The average value of all the 90 responses (the Global Score Index [GSI]) represents the general psychopathology index of the patient.

We used a self-rating scale to explore patients' pain perception for complete evaluation of the posttraumatic distress. The scale was numerical (11-point scale: 0 = "no pain at all" to 10 = "unendurable pain")[14] and rated pain perception of the last 24 hours. The assessment was made at each study time point. The threshold score for unacceptable pain was considered to be 4 or more.[14]

Patients received oral and written information about the study and were assured about confidentiality. Authors declare that the present study conforms to the provisions of the Declaration of Helsinki.

Statistical Analysis

Data were entered into a Microsoft Excel (Microsoft Corporation, Redmond, Washington) spreadsheet and analyzed using SPSS (version 15.0 for Windows; SPSS, Inc, Chicago, Illinois). The mean scores were calculated for each of the dimensions of the SCL-90-R and for the GSI to allow comparison. The scores obtained were analyzed with Student *t* test, 2-tailed, to examine differences in ratings between paired observations. Independent *t* tests were used to analyze the differences between independent groups (sex and hand dominance). A *P* value of less than .05 was considered to be statistically significant.

RESULTS

Demographics

Among 37 eligible patients, 3 declined participation and 2 dropped out because of acute medical problems. A total of 32 patients were followed up for 12 months after the accident (Table 1). The mean age was 45.7 (SD = 16.4, range 19-67) years. Twenty (62.6%) were men and 12 (37.4%) were women. At the time of accident, 27 individuals (84.4%) were employed, 3 (9.4%) were unemployed, and 2 (6.2%) were retired or students. The mechanism of injury included machine versus operator in almost all cases (n = 26; 81.4%) (heavy industry: n = 11; building: n = 8; and transport: n = 7); the remaining included domestic accidents (n = 4; 12.4%) (chopping wood: n = 2; repairing the house: n = 1; and hobby activities: n = 1) and traffic-related injuries (n = 2; 6.2%). The description of injury type and location in the cohort is reported in Table 2. In more than half of the cases (62.5%), the dominant hand was involved. The initial stay in hospital ranged from 1 to 8 days. In 5 patients (16%), a reoperation was required during the recovery process.

There were no differences between dropouts and participating patients regarding sex, age, length of stay at hospital, and type of accident and injury. One of the dropouts answered the first questionnaire at 30 days after the accident. The ratings did not differ significantly from the results of patients who completed the follow-up.

TABLE 1 Characteristics of the Hand-Injured Population

Characteristics	n	%
Men	20	62.6
Women	12	37.4
Age, mean ± SD	45.7 ± 16.4	
Dominant hand injured	20	62.5
Work status at accident time		
Employed	27	84.4
Unemployed	3	9.4
Retired/student	2	6.2
Mechanism of trauma		
Heavy industry	11	34.5
Building	8	25
Transport	7	21.9
Chopping wood	2	6.2
Traffic-related injury	2	6.2
House repair	1	3.1
Hobby activities	1	3.1

Psychopathological Assessment

The 10 dimensions of the psychic distress that were assessed with the SCL-90-R showed different trends over time. Table 3 shows the mean SCL-90-R component scores for the cohort. Within the first year, O-C, INT, ANX, HOS, PHOB, and PSY indexes decreased progressively without significant variations, PAR and SLEEP indexes did not show significant variation. The cohort of patients suffered from a significant ($P = .001$) increase in DEP and SOM indexes. Overall, the cohort reported a significant ($P < .05$) decrease of the GSI over the year.

The self-rated score for perception decreased during the first 6 months ($P < .05$), while no significant score changes occurred in the following period of observation (Table 4). Troublesome pain (score ≥4) was experienced by 6, 4, and 2 patients, respectively, at each study point. Injuries related to chronic invalidating pain in the long term were nerve damage and phalanx amputation.

Table 5 shows the univariate analyses between independent groups. There was a significant correlation between GSI score and dominant hand injuries ($P < .05$) at the 12-month follow-up.

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TABLE 2 Type and Location of Injury

	Thumb	Finger	Metacarpus	Carpus	Total, *n* (%)
Phalanx amputation[a]	2	5			7 (21.9)
Injured tendon(s)	3	6	1	2	12 (37.6)
Fracture(s)	1	4	1		6 (18.7)
Combination of injured tendon(s) and digital nerve(s)		1			1 (3.1)
Combination of injured tendon(s) and fracture(s)		2			2 (6.2)
Combination of more than 1 injured anatomical structure and soft tissue loss		2		2	4 (12.5)
Total, *n* (%)	6 (18.8)	20 (62.5)	2 (6.2)	4 (12.5)	32 (100)

[a]*Amputated phalanx was regularized.*

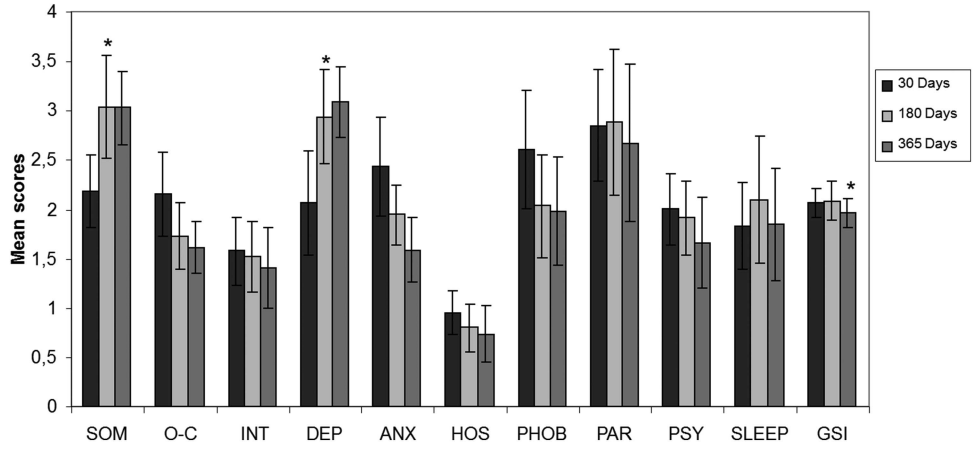
DISCUSSION

We know by daily work experience that the way a patient deals with a trauma of the hand is highly subjective and depends on several factors. Although it is well recognized that an injury with the expectation of a quick recovery is easier to accept than one seriously affecting hand function, the patient's response can be only partially attributed to the severity of the physical damage.[5-8] In particular, the differences in the individual's beliefs and perception may explain the variation in the compliance to treatment and rehabilitation, the emotional adjustment, and the eventual outcome.[15]

The results from our cohort accord with previously published literature concerning the progressive decrease of early-stage symptoms.[6,7] Nevertheless, the finding that neither paranoid ideation nor insomnia showed a significant reduction over time is a disagreement with previous studies by Grunert et al.[16] It was interesting to notice that, if specifically asked, patients reported the disappearance of flashbacks and nightmares after the first 3 months. This observation suggests that concerns for work situation or functional rehabilitation, typical late-onset issues, might be implicated in maintaining long-term sleep troubles.

Analyzing other late-onset posttraumatic sequelae, the significant increase in depression and somatization symptoms 1 year after first evaluation is consistent with previously published data by Williams et al.[17] The development of a depressive disorder has been correlated with the alteration of the victim's self-view: hand injuries bring aesthetic concerns of disfigurement and acceptability by others, with influence on social recovery and

TABLE 3 Assessment of the Specific Psychological Dimensions of the Symptom Checklist-90-Revised and of the Global Severity Index[a]



[a]*Results are expressed as mean ± standard deviation. The scores for the 10 psychopathological dimensions are the result of the mean of the items' score (0-4) (somatization, 12 items; obsessive-compulsivity, 10 items; interpersonal sensitivity, 9 items; depression, 13 items; anxiety, 10 items; hostility, 6 items; phobic anxiety, 7 items; paranoid ideation, 6 items; psychoticism, 10 items; and insomnia, 3 items). The Global Score Index is the average value of all the responses.*

[b]*$P < .05$.*

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TABLE 4 Assessment of Pain During the First Year After Hand Injury[a]

	30 d	180 d	365 d	30-180 d	180-365 d
Pain (score 0-10)	2.7 ± 0.9	2 ± 1.2	1.8 ± 1.3	$P < .05$	$P = .16$

[a]*Results are expressed as mean ± standard deviation. Student t test was used to assess the difference between different time points.*

life.[18] Specifically mutilations and amputations bring severe problems of intrusion and depression.[19] Also in our cohort, patients affected by phalanx amputation reported higher GSI and DEP scores at each study point (the injury group was too small to perform a statistical analysis of significance). The failed acceptance of the aesthetic outcomes of the trauma may result in phenomena of self-exclusion from social life out of the family circle, and avoidance of public exposure of the impairment, leading to a progressive loss of self-esteem. In this view, the patient's self-image and self-perception of body assume a social dimension. The psychic response to trauma can be also responsible for the development of dysfunctional behaviors; impairments like eating disorders, phobias (agoraphobia or social phobia), and alcohol/drug abuse are usually related to defense mechanisms (avoidance, repression, scission, and depersonalization) that patients may develop in the early posttraumatic stages.[19] All these characteristics are not directly assessed by the SCL-90-R but could be inferred by the alteration of some specific subscales (DEP, PAR, PHO, and O-C), letting health care professionals detect the need for a more specific psychiatric assessment. Particular attention should also be directed on the symptoms of PTSD for early diagnosis and treatment (*Diagnostic and Statistical Manual of Mental Disorders*, *Fourth Edition*, *Text Revision*, criteria—Table 6).[20] The SCL-90-R can serve as an easy and fast instrument to detect from subscales PHOB, DEP, SLEEP, ANX, SOM, and INT and sometimes HOS and PSY (for the possibility of depersonalization/derealization symptoms) factors that may address the diagnosis of PTSD. In general, patients who report some SCL-90-R psychic dimensions that exceed the normal cutoff in an early assessment are to be strictly monitored in behaviors and also in the therapeutic relationships with all health care professionals. Prevention of the axis I psychiatric disorders (major depression, anxiety disorders, and psychotic diseases) is one of the most important objectives in these traumatic life events, and the nursing team is addressed to be in the most direct affective relationship with the patients.[21]

TABLE 5 Univariate Analyses Between Outcome Scores and Independent Variables[a]

Overall GSI Score	30 d	180 d	365 d
Sex			
Men	1.91 ± 0.29	1.93 ± 0.21	1.89 ± 0.32
Women	2.13 ± 0.23	2.08 ± 0.28	1.84 ± 0.39
	$P = .25$	$P = .30$	$P = .58$
Dominant hand affected			
Yes	2.10 ± 0.21	2.11 ± 0.34	1.87 ± 0.41
No	2.07 ± 0.37	1.94 ± 0.30	1.72 ± 0.33
	$P = .62$	$P = .27$	$P < .05$

[a]*The Global Score Index is expressed as the mean of the average value of all the responses ± standard deviation (P value).*
[b]*Pain intensity on a 10-item scale.*

A strict monitoring of all the psychic symptoms and behaviors is mandatory not only to prevent major dysfunctions in the psychic sphere but also to avoid affections in the physical and rehabilitative dimensions.[22] Functional recovery from hand injury is not a passive process that relies solely on the technical capability of the health care professionals; the success of the rehabilitative program depends also on the individual patient's participation, compliance, and adherence, which rely on an adequate coping process. The coping strategy involves the perception of pain and its tolerability, the satisfaction for functional recovery and aesthetics results, and expectations from life after the therapeutic course.[20,23] Dysfunctions in the process of coping (frequently associated with depression, anxiety, or PTSD) can lead to a poorer global functional outcome for a lack of adherence to the treatment.[19] Patients' coping should be assessed with a temperamental/personality evaluation, which could be worth investigating in future studies.

As one of the most crucial posttraumatic issues, pain perception is a mandatory assessment in dealing with a traumatized patient.[20,24-26] Furthermore, hand-traumatized patients experience a combination of pain, loss of function, and aesthetics perception, with an overall pain toleration capability that appears to be compromised.[27] Therefore, an appropriate caring should include specific and adequate information about pain onset and its management. An appropriate education of the patient not only prevents the lack of adherence to the treatment[28] but also is important in consideration of the crucial role played by troublesome pain in the onset of a posttraumatic depressive syndrome.[25,26]

Another aspect of posttraumatic psychological impairments that have been largely discussed in the literature is

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TABLE 6 The *Diagnostic and Statistical Manual of Mental Disorders* (*Fourth Edition, Text Revision*) Diagnostic Criteria for Posttraumatic Stress Disorder

A. The person has been exposed to a traumatic event in which both of the following were present:
1. The person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others.
2. The person's response involved intense fear, helplessness, or horror. *Note*: In children, this may be expressed instead by disorganized or agitated behavior.
B. The traumatic event is persistently reexperienced in 1 (or more) of the following ways:
1. Recurrent and intrusive distressing recollections of the event, including images, thoughts, or perceptions. *Note*: In young children, repetitive play may occur in which themes or aspects of the trauma are expressed.
2. Recurrent distressing dreams of the event. *Note*: In children, there may be frightening dreams without recognizable content.
3. Acting or feeling as if the traumatic event was recurring (includes a sense of reliving the experience, illusions, hallucinations, and dissociative flashback episodes, including those that occur on awakening or when intoxicated). *Note*: In young children, trauma-specific reenactment may occur.
4. Intense psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
5. Physiological reactivity on exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event.
C. Persistent avoidance of stimuli associated with the trauma and numbing of general responsiveness (not present before the trauma), as indicated by 3 (or more) of the following:
1. Efforts to avoid thoughts, feelings, or conversations associated with the trauma
2. Efforts to avoid activities, places, or people that arouse recollections of the trauma
3. Inability to recall an important aspect of the trauma
4. Markedly diminished interest or participation in significant activities
5. Feeling of detachment or estrangement from others
6. Restricted range of affect (eg, unable to have loving feelings)
7. Sense of a foreshortened future (eg, does not expect to have a career, marriage, children, or a normal life span)
D. Persistent symptoms of increased arousal (not present before the trauma), as indicated by 2 (or more) of the following:
1. Difficulty falling or staying asleep
2. Irritability or outbursts of anger
3. Concentration difficulties
4. Hypervigilance
5. Exaggerated startle response
E. Duration of the disturbance (symptoms in criteria B, C, and D) is more than 1 month.
F. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
Specify if:
Acute: if duration of symptoms is less than 3 months
Chronic: if duration of symptoms is 3 months or more
Specify if:
With delayed onset: if onset of symptoms is at least 6 months after the stressor

the relevance of the employment status after the accident. Different authors report different opinions about this topic; where some believe that patients fail to respond to treatment when there are litigation and compensation issues involved,[29-31] others find that these issues do not play a significant role regarding the psychological outcome and that such problems also do not contribute to a failure to return to work.[32,33] In our cohort, 9 patients (27% of the 33 who were employed at accident time) were involved in employment litigation. More than half had injuries to the dominant hand, a condition that was associated with a significantly higher GSI. This observation suggests that individuals whose working capabilities are undermined by a functional damage on their dominant hand experience a worse life situation than other patients. Moreover, we observed that in almost all cases of accidents that occurred

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at workplace, patients are afraid to come back to work and develop a barrier that prevents full return. In these cases, a progressive exposure to the workplace, eventually with the help of a psychologist, can prevent the onset of depression and impairment of personal contacts.[6]

Overall, the most important aspect in the subjective response to a traumatic event is what is generally known as resilience. An appropriate solid self-structure let the individual analyze the changes to the self-image in a proper way, avoiding difficulties in the recovery process.[6,16] However, previous traumatic experiences might seriously undermine the ability of response of the individual who become emotionally unable to absorb the current shock.[16] The self-image derives from many different components: self-perception, subjective perception, and social perception.[19] Therefore, sudden changes require a facing intervention of the individual on several psychological aspects, concerning self-esteem, distress for social appearance, and anxiety for public attention.[20,21] In the end, the whole life of the patient is involved, from minimal daily functions to working activities, relationships, sexual function, etc.

CONCLUSION

Hand injury represents, for a patient, a sudden change of the body image with both psychic and emotional implications, resulting in substantial impairment in personal, social, and occupational functioning. The importance of health care professionals in detecting these impairments is widely stressed in revised literature.[5,9,10,19] The awareness of the crucial role played by nurses, first-line care givers, acts as a motivational support to implement the professional quality through the knowledge of psychological and humanistic issues that are linked to physical therapy. The objective is to provide a bridge with the many different professional figures involved in the complex management of hand-traumatized patients, implementing a customized care plan for an optimal recovery.

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