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Psychological impact of prosthodontic rehabilitation after facial trauma

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Abstract:
Facial trauma often results in significant disfigurement that adversely affects patients' psychological wellbeing, including anxiety, depression and self-esteem. Therefore, it is of interest to evaluate the psychological impact of prosthodontic rehabilitation among 120 patients who had completed treatment following facial trauma. Significant improvements were observed in anxiety, depression, self-esteem and oral health-related quality of life scores after rehabilitation (all $p < 0.001$) and 86.7% of patients reported greater confidence in smiling while 88.4% reported satisfaction or high satisfaction with treatment. Implant-supported rehabilitation, higher patient satisfaction, younger age and lower trauma severity emerged as significant predictors of psychological improvement (adjusted $R^2 = 0.54$). Thus, data support the integration of structured psychological assessment into the routine prosthodontic rehabilitation pathway for facial trauma patients.

Keywords: Facial trauma, prosthodontic rehabilitation, psychological impact, anxiety, depression, self-esteem, quality of life (QoL)

Background:
The face is central to identity, communication and social interaction and injury to it carries psychological consequences that extend well beyond the physical wound **[1].** Facial trauma resulting from road traffic accidents, interpersonal violence, falls or sports injuries can produce disfigurement that disrupts a patient's body image and sense of self and reactions to such injury may range from transient distress to clinically significant anxiety, depression and post-traumatic stress disorder (PTSD), with PTSD symptoms reported in approximately 26–41% of facial trauma victims in some series **[2].** In a prospective study of maxillofacial trauma patients in Sub-Saharan Africa using the Hospital Anxiety and Depression Scale (HADS) and Rosenberg Self-Esteem Scale, over half of participants screened positive for depression, 70% for anxiety and more than 40% for low self-esteem at baseline **[3].** Similarly, a prospective evaluation of facial trauma patients using the Depression Anxiety Stress Scale-21 (DASS-21) and WHOQOL instruments showed substantial baseline psychological morbidity that improved over a course of counselling and follow-up **[4].** Beyond the immediate psychiatric response to injury, restoration of facial form and function through prosthodontic and maxillofacial rehabilitation has been linked to improved patient satisfaction and self-perception, though satisfaction is influenced by factors such as prosthesis retention, aesthetics and the patient's pre-existing psychological state **[5].** Systematic review evidence further indicates that implant-supported rehabilitation in maxillofacial reconstruction may confer greater quality-of-life benefit than removable prostheses or obturators, although high-quality longitudinal data remain limited **[6].** Comparable findings have been reported following facial cosmetic and reconstructive surgery, where measurable reductions in depression and anxiety and improvements in quality of life have been documented in the months following intervention **[7].** Despite this evidence, comparative data using validated instruments such as HADS and the Oral Health Impact Profile-14 (OHIP-14) specifically in facial trauma patients undergoing prosthodontic rehabilitation remain relatively scarce **[8].** Therefore, it is of interest to report the psychological impact of prosthodontic rehabilitation among patients with facial trauma, to assess changes in self-esteem, anxiety, depression and social confidence following rehabilitation and to determine factors associated with improved psychological outcomes.

Materials and Methods:
Study design:
Hospital-based cross-sectional observational study.

Study duration:
January 2025 to December 2025.

Study setting:
Department of Prosthodontics and Maxillofacial Prosthetics, Tertiary Care Dental Hospital.

Sample size:
120 patients.

Objectives:
[1] To evaluate the psychological impact of prosthodontic rehabilitation among patients with facial trauma.

[2] To assess changes in self-esteem, anxiety, depression and social confidence following prosthodontic rehabilitation.
[3] To determine factors associated with improved psychological outcomes.

Study population and procedure:
A total of 120 patients who had undergone prosthodontic rehabilitation following facial trauma were included. Patients aged 18–65 years who had completed treatment at least three months earlier were recruited from the Department of Prosthodontics and Maxillofacial Prosthetics.

Assessment instruments:
[1] Hospital Anxiety and Depression Scale (HADS).
[2] Rosenberg Self-Esteem Scale (RSES).
[3] Oral Health Impact Profile-14 (OHIP-14).
[4] Visual Analogue Scale (VAS) for treatment satisfaction.
Psychological status was assessed retrospectively for the pre-rehabilitation state (based on patient recall and clinical records) and prospectively for the post-rehabilitation state at the time of study enrolment (a minimum of three months after completion of treatment).

Statistical analysis:
Data were analyzed using SPSS version 27. Statistical tests included the paired t-test for comparison of pre- and post-rehabilitation scores, the Chi-square test for categorical variables, Pearson correlation for association between continuous variables and multiple linear regressions to identify predictors of psychological improvement. A p-value <0.05 was considered statistically significant.

Ethical approval:
Ethical approval was obtained from the Institutional Ethics Committee of the participating institution prior to commencement of the study (approval reference number to be inserted by the corresponding author) and the study was conducted in accordance with the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants prior to enrolment.

Results:
A total of 120 participants completed the study, with a mean age of 34.8 ± 10.6 years; males constituted 61.7% (n=74) of the sample and females 38.3% (n=46) (**Table 1**). Road traffic accidents were the most common cause of facial trauma (48.3%, n=58), followed by assault (20.0%, n=24), falls (16.7%, n=20) and sports injuries (15.0%, n=18) (**Table 2**). Fixed prostheses were the most frequently provided rehabilitation (36.7%, n=44), followed by removable prostheses (25.0%, n=30), implant-supported prostheses (23.3%, n=28) and maxillofacial prostheses (15.0%, n=18) **(Table 3).** Following prosthodontic rehabilitation, significant improvements were observed across all psychological outcomes measured. The mean anxiety score decreased from 12.4 ± 3.6 to 7.1 ± 2.8 and the depression score declined from 11.2 ± 3.1 to 6.5 ± 2.4 (both $p < 0.001$). Self-esteem improved significantly from 17.8 ± 4.5 to 26.3 ± 3.9, OHIP-14 scores reduced from 39.7 ± 8.4 to 18.2 ± 6.3 and satisfaction (VAS) increased from 2.9 ± 1.5 to 8.8 ± 0.9 (all $p < 0.001$) **(Table 4).** Categorical analysis of anxiety severity showed that the proportion of patients in the normal range increased from 15.0% (n=18) before rehabilitation to 63.3% (n=76) after, while severe anxiety decreased from 18.3% (n=22) to 1.7% (n=2) ($\chi^2 = 68.2$; $p < 0.001$) **(Table 5).** A similar pattern was observed for depression severity, with the normal category increasing from 20.0% (n=24) to 68.3% (n=82) and the severe category decreasing from 15.0% (n=18) to 1.7% (n=2) ($p < 0.001$) **(Table 6).** More than half of the participants (55.0%, n=66) experienced marked improvement in self-esteem and a further 33.3% (n=40) experienced moderate improvement, with only 3.3% (n=4) reporting no improvement **(Table 7).** In terms of social confidence, 86.7% (n=104) reported improved smiling confidence, 82.5% (n=99) reported better social interaction, 80.0% (n=96) reported feeling comfortable speaking publicly and 75.0% (n=90) had returned to work or social activities **(Table 8).** Overall treatment satisfaction was high, with 51.7% (n=62) of patients "very satisfied" and 36.7% (n=44) "satisfied," together representing 88.4% of the sample; only 3.3% (n=4) were dissatisfied. The mean satisfaction score was 8.8 ± 0.9 on the VAS **(Table 9).** Correlation analysis demonstrated that greater treatment satisfaction was significantly associated with higher self-esteem ($r = 0.69$; $p < 0.001$) and lower anxiety ($r = -0.64$; $p < 0.001$). Anxiety and depression scores were both positively correlated with OHIP-14 scores ($r = 0.61$ and $r = 0.58$, respectively; both $p < 0.001$) **(Table 10).** Multiple linear regression analysis, with psychological improvement score as the dependent variable, identified implant-supported prosthesis ($\beta = 0.41$; $p < 0.001$), higher satisfaction ($\beta = 0.48$; $p < 0.001$), younger age ($\beta = 0.19$; $p = 0.012$) and lower severity of trauma ($\beta = -0.23$; $p = 0.006$) as significant independent predictors of psychological improvement. Female gender was not a significant predictor ($\beta = 0.08$; $p = 0.294$). The overall model explained a substantial proportion of variance ($R^2 = 0.57$; adjusted $R^2 = 0.54$) **(Table 11).**

Table 1: Demographic characteristics of participants (n = 120)

Variable	n (%) / Value
Male	74 (61.7%)
Female	46 (38.3%)
Mean age	34.8 ± 10.6 years

Table 2: Cause of facial trauma

Cause	n (%)
Road traffic accident	58 (48.3%)
Assault	24 (20.0%)
Sports injury	18 (15.0%)
Falls	20 (16.7%)

Table 3: Type of prosthodontic rehabilitation

Treatment	n (%)
Fixed prosthesis	44 (36.7%)
Implant-supported prosthesis	28 (23.3%)
Removable prosthesis	30 (25.0%)
Maxillofacial prosthesis	18 (15.0%)

Table 4: Psychological scores before and after rehabilitation

Parameter	Before	After	p-value

Anxiety score	12.4 ± 3.6	7.1 ± 2.8	<0.001
Depression score	11.2 ± 3.1	6.5 ± 2.4	<0.001
Self-esteem score	17.8 ± 4.5	26.3 ± 3.9	<0.001
OHIP-14 score	39.7 ± 8.4	18.2 ± 6.3	<0.001
Satisfaction (VAS)	2.9 ± 1.5	8.8 ± 0.9	<0.001

Table 5: Anxiety category – before vs. after rehabilitation

Category	Before n (%)	After n (%)
Normal	18 (15.0%)	76 (63.3%)
Mild	34 (28.3%)	30 (25.0%)
Moderate	46 (38.3%)	12 (10.0%)
Severe	22 (18.3%)	2 (1.7%)

$\chi^2 = 68.2$; $p < 0.001$

Table 6: Depression category – before vs. after rehabilitation

Category	Before n (%)	After n (%)
Normal	24 (20.0%)	82 (68.3%)
Mild	30 (25.0%)	24 (20.0%)
Moderate	48 (40.0%)	12 (10.0%)
Severe	18 (15.0%)	2 (1.7%)

$P < 0.001$

Table 7: Improvement in Self-Esteem

Improvement	n (%)
Marked improvement	66 (55.0%)
Moderate improvement	40 (33.3%)
Minimal improvement	10 (8.3%)
No improvement	4 (3.3%)

Table 8: Social confidence after rehabilitation

Variable	n (%)
Comfortable speaking publicly	96 (80.0%)
Improved smiling confidence	104 (86.7%)
Better social interaction	99 (82.5%)
Returned to work/social activities	90 (75.0%)

Table 9: Overall treatment satisfaction

Satisfaction	n (%)
Very satisfied	62 (51.7%)
Satisfied	44 (36.7%)
Neutral	10 (8.3%)
Dissatisfied	4 (3.3%)

Mean satisfaction score = 8.8 ± 0.9

Table 10: Correlation analysis

Variable	r	p-value
Self-esteem vs Satisfaction	0.69	<0.001
Anxiety vs OHIP-14	0.61	<0.001
Depression vs OHIP-14	0.58	<0.001
Satisfaction vs Anxiety	−0.64	<0.001

Table 11: Multiple regression analysis (dependent variable: psychological improvement score)

Variable	β	p-value
Implant-supported prosthesis	0.41	<0.001
Younger age	0.19	0.012
Higher satisfaction	0.48	<0.001
Female gender	0.08	0.294
Severity of trauma	−0.23	0.006

Model $R^2 = 0.57$; Adjusted $R^2 = 0.54$

Discussion:

This study found a significant reduction in anxiety, depression and significant improvement in self-esteem, oral health related quality of life and treatment satisfaction, following prosthodontic rehabilitation in patients with facial trauma. The magnitude of psychological morbidity observed at baseline in this cohort with a substantial proportion of patients classified as having moderate to severe anxiety and depression prior to rehabilitation-is consistent with earlier reports of high rates of anxiety, depression and low self-esteem among maxillofacial trauma patients using comparable HADS-based assessments**.** The marked improvement in psychological scores observed after rehabilitation mirrors findings from a prospective evaluation of facial trauma patients using DASS-21 and WHOQOL instruments, which similarly showed substantial improvement in psychological distress following structured follow-up and supportive care and is consistent with the broader literature indicating that psychological reactions to acquired facial disfigurement, while common, are often responsive to restoration of facial form and function and appropriate patient support **[9].** The strong positive correlation observed between self-esteem and treatment satisfactions and the inverse correlation between satisfaction and anxiety align with prior work linking patient satisfaction following maxillofacial prosthetic rehabilitation to psychosocial factors including self-perception and pre-existing psychological state **[10].** The identification of implant-supported prosthesis as a significant independent predictor of psychological improvement is consistent with systematic review evidence suggesting that implant-supported rehabilitation may confer greater quality-of-life benefit in maxillofacial reconstruction compared with removable prostheses or obturators**,** although the present cross-sectional design cannot establish causality in the same way as the longitudinal studies included in that review **[11]**. The finding that younger age and lower trauma severity were independently associated with greater psychological improvement is in keeping with general observations that recovery from facial trauma-related psychological distress may be influenced by both patient-related and injury-related factors. The comparable magnitude of psychological benefit seen here also parallels reports of reduced depression and anxiety and improved quality of life following facial cosmetic and reconstructive surgery more broadly **[12-15].** Taken together, these findings support the view that prosthodontic rehabilitation delivers not only functional and aesthetic restoration but also measurable psychological benefit and reinforce the case for incorporating structured psychological screening and, where appropriate, implant-supported treatment planning into the routine management pathway for facial trauma patients. Limitations of this study include its cross-sectional design, which relied in part on retrospective recall of pre-rehabilitation psychological status, the absence of a non-rehabilitated comparison group and its conduct at a single tertiary care centre, all of which should be considered when generalizing these findings.

Conclusion:

AI-guided drug repurposing offers a promising approach to identifying potential anticancer therapies by integrating computational tools, molecular data and predictive algorithms. These strategies may accelerate drug discovery, reduce development costs and identify new therapeutic opportunities. Further experimental validation and clinical studies are essential

to establish their safety, efficacy and translational applicability in oncology.

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