

## "Patient's Perception For Aesthetic And Functional Concern After Management Of Pan Facial Trauma."

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### Abstract

#### Background

Facial soft-tissue injuries are common in emergency department and carry substantial aesthetic, functional, and psychological implications. Early management prioritizes life-saving measures, yet the quality of initial wound handling strongly influences long-term quality of life. Understanding differences between patient and clinician perceptions of healing is essential for optimizing treatment and counselling. This study evaluated aesthetic outcomes using patient- and observer-rated POSAS scores and assessed functional sequelae over a 3-month period following facial soft-tissue trauma.

#### Methods

A prospective observational study was conducted on 92 patients aged  $\geq 16$  years presenting with traumatic facial soft-tissue injuries. Aesthetic outcomes were assessed using the Patient and Observer Scar Assessment Scale (POSAS), while functional outcomes including nerve impairment, contracture, hair loss, and altered expressions were evaluated according to injured facial subunits by patient only. Follow-up examinations were performed at 1 week, 1 month, and 3 months. Statistical analysis included the Friedman test, Wilcoxon signed-rank test, and Cochran's Q test, with significance set at  $P < 0.05$ .

#### Results

The study included 92 patients, predominantly male (71.74%) and largely from rural areas (63.04%). The most common age group affected was 20–29 years (19.57%). Lacerations were the leading injury type (56.52%), forehead (25%) and eyelid (22.83%) were the most frequently involved facial regions. Road-traffic collisions accounted for the highest proportion of injuries (23.91%).

Patient POSAS scores improved significantly from 5.10 at 1 week to 3.15 at 1 month and 2.25 at 3 months ( $P < 0.001$ ). Observer scores showed a similar pattern (5.29  $\rightarrow$  3.35  $\rightarrow$  2.35,  $P < 0.001$ ), and remained consistently higher than patient scores at all follow-ups ( $P < 0.01$ ). Functional sequelae were minimal: 88.04%, 86.96%, and 89.13% had no impairment at 1 week, 1 month, and 3 months, respectively. Scar contracture occurred in 3–4% of cases, and localized hair loss in 7–9%, with no significant change over time.

#### Conclusions

Facial soft-tissue injuries predominantly result in aesthetic rather than functional sequelae, and patient and observer perceptions differ consistently throughout healing. Early stabilization remains the priority in acute care; however, meticulous soft-tissue handling during initial management when feasible significantly contributes to superior long-term aesthetic outcomes. Incorporating both clinician-based and patient-reported assessments supports more accurate evaluation and enhances patient-centred clinical decision-making.

**Keywords** – Aesthetic, scarring, disfigurement, functional impairment.

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### I. Introduction

Oral & Maxillofacial trauma is commonly encountered in emergency department and may involve facial bone fractures and soft tissue injuries. Facial soft tissue injuries can result in significant aesthetic, functional, and psychological consequences and account for approximately 10% of all emergency department visits <sup>(1)</sup>. These injuries encompass abrasions, hematomas, lacerations, avulsions, and gunshot wounds. <sup>(2)</sup> and are managed according to established principles of trauma and wound care <sup>(2)</sup>. Wound healing occurs either through primary closure, in which wound edges are approximated, or secondary closure, where healing progresses from deeper tissues to the surface <sup>(3)</sup>. Primary closure is generally preferred due to reduced scarring; however, scar tissue differs structurally and functionally from normal skin <sup>(4)</sup>. Scar assessment scales facilitate systematic

evaluation of scar characteristics, and comprehensive assessment requires both clinician-based and patient-reported evaluations<sup>(5,6)</sup>.

Trauma in the head and neck region may involve superficial or deeper anatomical structures.<sup>8</sup> Lacerations are the most prevalent soft tissue injury, accounting for approximately 50% of cases. facial trauma often causes emotional distress related to concerns of scarring, function impairment and disfigurement.<sup>14,9</sup>

Oral & Maxillofacial trauma often necessitates a multidisciplinary approach.<sup>15</sup> Prompt and accurate management is essential, as delayed treatment can worsen edema, increase scar formation, hinder primary wound closure, and raise the risk of infection from prolonged environmental exposure.<sup>16</sup>

This study was aimed to compare clinician and patient evaluations of aesthetic outcomes and to assess functional sequelae following facial soft tissue injuries with follow-up performed at 1 week, 1 month, and 3 months after the injury. By approximately 3 months, facial soft-tissue wounds have typically healed, and any lasting complications are generally apparent. The study included patients aged 16 years or older with traumatic facial soft tissue injuries who understood the study protocol and agreed to follow-up.

### **Evaluation -**

**Aesthetic outcome** - In this study, the aesthetic results of facial injuries were assessed using the POSAS<sup>(5)</sup>. The POSAS consists of two components. The Patient Scar Assessment Scale (PSAS) measures patient-reported factors such as pain, itching, thickness, colour, stiffness, and irregularity of the scar. The Observer Scar Assessment Scale (OSAS) evaluates vascularity, pigmentation, thickness, surface irregularity, pliability, and the scar's surface area. Each item is rated from 1 ("similar to normal skin") to 10 ("the worst possible scar"), and the total score represents the sum of the six items<sup>(16)</sup>. Observers also provide an overall impression score ranging from 1 to 10. Ideally, these assessments are compared with the appearance of healthy skin located at the same anatomical region as the scar<sup>(16)</sup>.

### **Functional evaluation-**

Functional evaluations were carried out according to the specific site of injury. Standardized frontal and profile photographs of facial subunits were used to guide the assessment process<sup>(17)</sup>. Each facial subunit was examined for functional impairments such as nerve injury, hair loss, scar contracture, and altered facial expression. The evaluation of functional damage included the following:

- Sensory and motor nerve impairment:

All five branches of the facial nerve were examined. The temporal branch was assessed by observing forehead muscle contraction during eyebrow elevation. The zygomatic branch was tested by checking the patient's ability to open and close the eyes. The buccal branch was evaluated by having the patient smile. The marginal mandibular branch with ability to depress lower lip. The cervical branch was examined by observing contraction of the platysma muscle<sup>(17)</sup>. Sensory evaluation of the trigeminal nerve was performed by testing its divisions using light touch, two-point discrimination, and a cold metal instrument for temperature sensation.

- Scar contracture:

Scar contracture after trauma and changes in facial expressions due to scar were observed.

- Hair loss –

Scarring in hair-bearing regions such as the eyebrows, moustache, or beard may lead to permanent hair loss<sup>(5)</sup>. Any loss in these areas was documented.

## **II. Results**

A total of 92 participants were enrolled in this prospective observational study (Table 1). The cohort consisted predominantly of males (71.74%), followed by females (28.26%). The most common age group was 20–29 years (19.57%), followed by 30–39 years (18.48%) and 40–49 years (16.30%). Most participants belonged to rural areas (63.04%), while (36.96%) were from urban regions. Among soft-tissue injuries, lacerations were most common (56.52%), followed by abrasions (30.43%) and contusions (13.04%). The anatomical distribution of injuries is shown in Table 2. The forehead (25.00%) was the most frequently affected region, followed by the eyelid (22.83%) and chin (13.04). Abrasions were most common on the forehead (32.14%) and cheek (25.00%), while contusions were most frequent on the eyelid (50.00%). These findings suggest that exposed and protruding facial regions, particularly the forehead and eyelid, were more susceptible to trauma.

Table 1: Demographic and injury characteristics of the study participants (n = 92).

Variables	Characteristics	n (%)
<b>Gender</b>	Male	66 (71.74)
	Female	26 (28.26)
<b>Age</b>	<20 years	10 (10.87)
	20-29 years	18 (19.57)
	30-39 years	17 (18.48)
	40-49 years	15 (16.30)
	50-59 years	13 (14.13)
	60-69 years	09 (9.78)
	70-79 years	07 (7.61)
	80-89 years	03 (3.26)
<b>Region</b>	Urban	34 (36.96)
	Rural	58 (63.04)
<b>Cause of injury</b>	Collision in road traffic accident	22 (23.91)
	Fall	50 (54.35)
	Workplace injury	08 (8.70)
	Assault	07 (7.61)
	Hit by bike	05 (5.43)
<b>Type of injury</b>	Laceration	52 (56.52)
	Abrasion	28 (30.43)
	Contusion	12 (13.04)

Graph 1: Comparison of Patient and Observer Scar Assessment Scale (POSAS) scores at different time intervals.

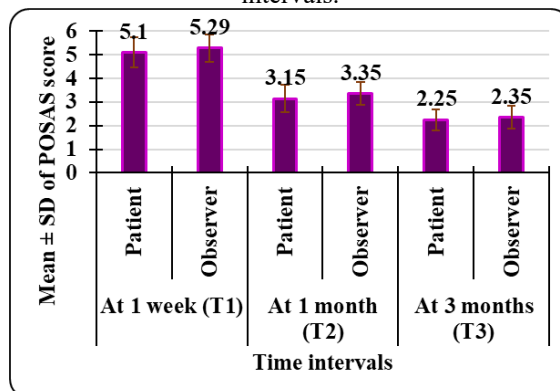
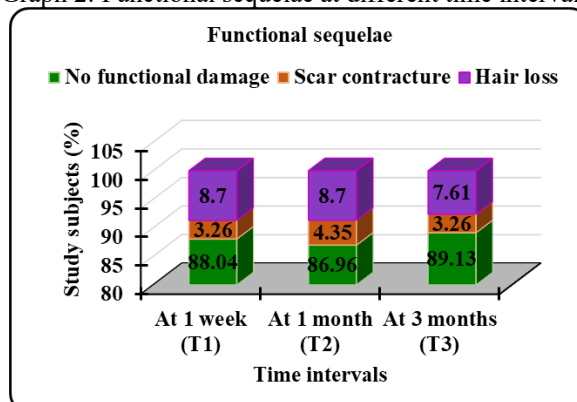


Table 2: Anatomical distribution of soft tissue injuries by facial subunit.

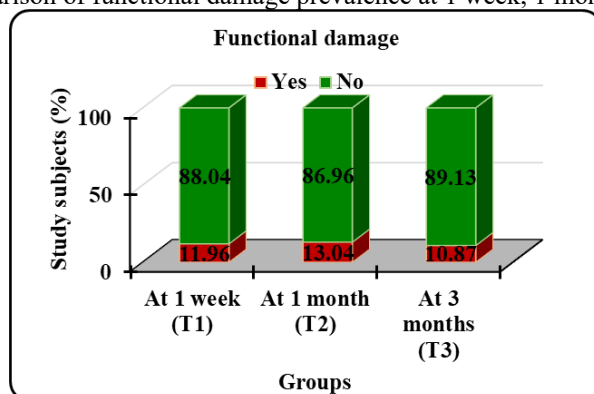
Facial subunit	Laceration n (%)	Abrasion n (%)	Contusion n (%)	Total n (%)
Forehead	12 (23.08)	09 (32.14)	02 (16.67)	23 (25.00)
Nose	04 (7.69)	03 (10.71)	00 (0.00)	07 (7.61)
Eyelid	10 (19.23)	05 (17.86)	06 (50.00)	21 (22.83)
Cheek	04 (7.69)	07 (25.00)	02 (16.67)	13 (14.13)
Upper lip	07 (13.46)	02 (7.14)	02 (16.67)	11 (11.96)
Lower lip	05 (9.62)	00 (0.00)	00 (0.00)	05 (5.43)
Chin	10 (19.23)	02 (7.14)	00 (0.00)	12 (13.04)
<b>Total</b>	<b>52 (100.0)</b>	<b>28 (100.0)</b>	<b>12 (100.0)</b>	<b>92 (100.0)</b>

Graph 2: Functional sequelae at different time intervals.



Aesthetic function assessed using the POSAS (Table 3, Graph 1) showed progressive improvement over time. Patient scores declined from  $5.10 \pm 0.63$  at 1 week (T1) to  $3.15 \pm 0.57$  at 1 month (T2) and  $2.25 \pm 0.44$  at 3 months (T3). Observer scores similarly decreased from  $5.29 \pm 0.57$  at T1 to  $3.35 \pm 0.48$  at T2 and  $2.35 \pm 0.48$  at T3. Observer scores were significantly higher than patient scores at all intervals (T1:  $Z = -4.243$ ,  $P < 0.001$ ; T2:  $Z = -4.243$ ,  $P < 0.001$ ; T3:  $Z = -3.000$ ,  $P = 0.003$ ). Intra-group analysis using the Friedman test showed significant improvement in POSAS scores for both patients ( $\chi^2 = 179.838$ ,  $P < 0.001$ ) and observers ( $\chi^2 = 184.000$ ,  $P < 0.001$ ). Pairwise comparisons with the Wilcoxon signed-rank test and Bonferroni correction confirmed significant differences between all follow-up intervals ( $P < 0.017$ ), with the greatest improvement occurring between 1 week and 1 month

Graph 3: Comparison of functional damage prevalence at 1 week, 1 month, and 3 months.



Functional sequelae (Table 4, Graph 2) were minimal. At 1 week, (88.04%) showed no functional impairment, while scar contracture (3.26%) and hair loss (8.70%) were noted. At 1 month, (86.96%) had no functional damage, (4.35%) had scar contracture, and (8.70%) had hair loss. By 3 months, (89.13%) had normal function, with scar contracture (3.26%) and hair loss (7.61%). Overall functional damage prevalence remained similar across intervals: (11.96%) at 1 week, (13.04%) at 1 month, and (10.87%) at 3 months (Table 5, Graph 3). Cochran's Q test showed no significant difference ( $Q = 3.000$ ,  $P = 0.223$ ). Overall, facial soft-tissue injuries most commonly involved exposed facial regions and were predominantly lacerations, while scar appearance improved significantly over time and functional sequelae remained minimal and non-progressive during the 3-month follow-up.

Table 3: Comparison of Patient and Observer Scar Assessment Scale (POSAS) scores at different time intervals.

Time intervals	POSAS score				Inter-group comparison (Wilcoxon Signed Ranks test)
	Patient		Observer		
	Mean + SD	Min-Max	Mean + SD	Min-Max	
At 1 week (T1)	$5.10 \pm 0.63$	4 - 6	$5.29 \pm 0.57$	4 - 6	$Z = -4.243$ , $P = 0.000 (<0.05)$
At 1 month (T2)	$3.15 \pm 0.57$	2 - 4	$3.35 \pm 0.48$	3 - 4	$Z = -4.243$ , $P = 0.000 (<0.05)$
At 3 months (T3)	$2.25 \pm 0.44$	2 - 3	$2.35 \pm 0.48$	2 - 3	$Z = -3.000$ , $P = 0.003 (<0.05)$
<b>Intra-group comparison</b> (Friedman Test)	$\chi^2 = 179.838$ , df = 2, $P = 0.000 (<0.05)$		$\chi^2 = 184.000$ , df = 2, $P = 0.000 (<0.05)$		
Pairwise comparison (Wilcoxon Signed Ranks test with Bonferroni correction)	<b>T1 and T2:</b> $Z = -9.359$ , $P = 0.000 (<0.017)$		<b>T1 and T2:</b> $Z = -9.359$ , $P = 0.000 (<0.017)$		
	<b>T1 and T3:</b> $Z = -9.038$ , $P = 0.000 (<0.017)$		<b>T1 and T3:</b> $Z = -9.359$ , $P = 0.000 (<0.017)$		
	<b>T2 and T3:</b> $Z = -9.110$ , $P = 0.000 (<0.017)$		<b>T2 and T3:</b> $Z = -9.592$ , $P = 0.000 (<0.017)$		

Table 4: Functional sequelae at different time intervals.

Time intervals	Functional sequelae			
	No functional damage n (%)	Scar contracture n (%)	Hair loss n (%)	Total n (%)
At 1 week (T1)	81 (88.04)	03 (3.26)	08 (8.70)	<b>92 (100.00)</b>
At 1 month (T2)	80 (86.96)	04 (4.35)	08 (8.70)	<b>92 (100.00)</b>
At 3 months (T3)	82 (89.13)	03 (3.26)	07 (7.61)	<b>92 (100.00)</b>

Table 5: Comparison of functional damage prevalence at 1 week, 1 month, and 3 months.

Time intervals	Functional damage		Total n (%)
	Yes n (%)	No n (%)	
At 1 week (T1)	11 (11.96)	81 (88.04)	92 (100.00)
At 1 month (T2)	12 (13.04)	80 (86.96)	92 (100.00)
At 3 months (T3)	10 (10.87)	82 (89.13)	92 (100.00)
<b>Cochran's Q test</b>	Cochran's Q = 3.000, df = 2. P = 0.223 (>0.05), Not significant		

### III. Discussion-

When a patient presents to the emergency department following facial trauma, management begins with primary stabilization according to the ABC principles of trauma care—airway, breathing, and circulation. Once hemodynamic stability is ensured, a systematic evaluation is carried out to assess both soft- and hard-tissue injuries. Fractures are ruled out through focused examination and imaging, and subsequent investigations guide accurate diagnosis and treatment planning. Traumatic facial injuries, occurring either in isolation or alongside skeletal fractures following road traffic collisions (41.3%) , falls at home (19.57%) are frequently encountered .

Given the complexity of facial anatomy, these injuries pose a risk of both aesthetic deformity and functional impairment. In our study we noticed majority male patient (71.74%) compared to (28.26%) female patients similar to a study by Khare and Galinde<sup>18</sup> and Gaur et al.<sup>1</sup>, who reported similar gender distributions. and mainly from rural region (63.04%) , 20–29 years (19.57%) most commonly noticed to have injury .In facial region , forehead was found to be most frequent (25%). Lacerations were commonly observed on the forehead (23.08%), eyelid (19.23%), and chin (19.23%) , consistent with earlier reports by both groups.

Aesthetic sequelae at 3 months were primarily associated with lacerations and included hypopigmentation, hyperpigmentation, and scar thickening. Abrasions predominantly healed with hypopigmentation, while contusions showed no persistent aesthetic effects. POSAS served as the primary tool for evaluating scar quality, capturing both patient and observer perspectives. Scar progression in this study, reflected by patient-rated POSAS scores decreasing from 5.10 at 1 week to 3.15 at 1 month and 2.25 at 3 months, parallels findings by Shao et al.<sup>17</sup>, who documented nearly 40% scar improvement within three months. The use of POSAS is supported by validation studies by Draaijers et al.<sup>15</sup> and van de Kar et al.<sup>15</sup>, confirming its reliability and appropriateness for evaluating linear and traumatic scars. Both scores demonstrated progressive improvement from the first to the third month, consistent with expected scar maturation and useful for patient counselling. Patients consistently rated their scars higher than observers across all time points, despite clear improvement. This disparity likely reflects heightened sensitivity to early postoperative changes such as localized inflammation, tissue stiffness, and altered sensation—factors that influence patient perception but may not be fully evident on clinical examination.

These observations highlight the value of integrating patient-reported outcomes into routine scar assessment. Doing so provides a more holistic understanding of recovery, encompassing both objective changes and subjective experiences that influence psychological and social well-being.

Functional deficits remained minimal throughout follow-up, with 87–89% of participants reporting no impairment at any time. Scar contracture occurred in only 3–4% of cases, and hair loss affected 7–9%, showing slight improvement over time. These findings emphasize that whereas cosmetic changes are relatively common, significant functional impairment following soft-tissue facial trauma is infrequent.

Integrating patient perception into routine follow-up is crucial for setting realistic expectations, guiding individualized management strategies, and addressing the psychological impact of facial scarring. A combined approach—merging objective assessment with patient-centred dialogue—optimizes both aesthetic and functional outcomes and enhances overall patient satisfaction with recovery after all a person's appearance serves as an emotional pillar of confidence.

### IV. Conclusion –

Taken together, facial soft-tissue injuries carry significant aesthetic, functional, and psychological consequences. Incorporating both patient and observer perspectives enables more accurate outcome assessment and supports clearer clinical decision-making. A key clinical insight from this study is that treatment priorities shift over time: in the emergency setting, life-saving measures appropriately take precedence, but once the patient is stabilized, scar appearance becomes central to long-term satisfaction. Therefore, when feasible and without compromising acute care, early attention to precise soft-tissue handling and closure can significantly improve final aesthetic results.

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