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Research Article

**CAUSES AND RISK FACTORS OF DELAYED
MAXILLOFACIAL REGION SURGICAL WOUNDS HEALING
(A PROSPECTIVE STUDY)**¹Dr. Rubina Sheikh, ²Dr. Iqra Awais, ²Dr. Saiha Muneer¹Dental Section Punjab Medical College, Faisalabad²De'Montmorency College of Dentistry, Lahore**Abstract:**

Objective: This prospective study was undertaken to identify specific risk factors that provided delayed incisional healing on the 7th day in the maxillofacial region.

Study Design: A Prospective Study.

Place and Duration: In the Maxillofacial Department of Mayo Hospital, Lahore for one year duration from November 2016 to November 2017.

Methods: Six risk factors for wound healing in the late maxillofacial region were studied. 32 patients in the study group were compared with risk factors (mean age 43.5 years) and healthy subjects without risk factors in the control group (mean age 45.9). Post-operative clinical evaluation of the wound was performed on days 3, 5, 7, 9 and 11, and tissue samples (skin, crown and oral mucosa) were histologically performed on days 0 and 7 based on histological parameters. The tissue sample taken perioperatively from the margins of healthy tissue was used as a control of tissue healing on postoperative 7th day.

Findings: There was a statistically significant relationship between the collagen tissue pattern and the collagen tissue mature and early amount ($p < 0.05$) between the study and control groups on the seventh day after the operation. There was also a strong correlation with histological recovery status in the clinical evaluation.

Conclusion: Patients with risk factors were found to have weaker injuries than those without risk factors.

Key words: Risk groups, Delayed wound healing, maxillofacial region.

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INTRODUCTION:

The alteration of wound healing is a common clinical problem, which is the result of sporadic collagen and unrevealed susceptible constrains. A poor wound may be the result of numerous local or systemic factors. Determination of predisposed conditions is important and useful for postoperative management. In the maxillofacial region, deep clinical wound healing occurs within 3-5 days and within 5 to 7 days mucosal healing takes place. From the third day on, in collagen synthesis a quantitative rise occurs and until the second week it continues. However, there is no change in the quality of collagen fibril. 10, the wound has a much higher tensile strength and then becomes increasingly stronger. Thus, on the seventh day of wound healing, a tissue sample may provide a reasonable histological estimate of the process. The purpose of this analysis was to determine the healing of the wounds in the maxillofacial region on the 7th postoperative day and to identify the factors affecting the delayed scarring of the wound or prevent additional complications. In addition, the early diagnosis of patients likely to have a bad clinical outcome will allow them to be better informed about their prognosis and allow doctors to change treatment strategies at an early stage of wound healing.

MATERIALS AND METHODS:

This prospective study was held in the Maxillofacial Department of Mayo Hospital, Lahore for one year duration from November 2016 to November 2017. Based on this approved ethical protocol, all surgical patients in the jaw region [10-65 years of age] who have written legal or written consent and who have had enough histological material available or available for this prospective study. We reviewed six known risk factors for delayed wound healing. Factors include diabetes mellitus, local malignancy, immunosuppressive drugs (eg cytotoxic drugs) and local radiotherapy. In this study, 32 (32) patients with jaw-facial surgery were evaluated. The study patients had multiple reasons responsible for the late recovery of the wound. Control patients had no risk factors and apparently healthy. (Table 1)

TABLE 1: DISTRIBUTION OF PATIENTS BY PATTERN OF DISEASES

Pattern of diseases	Frequency	%
Squamous cell carcinoma	11	34.4
Ameloblastoma	5	15.6
Multiple fracture (RTA)	4	12.5
Verrucous carcinoma	2	6.3
TMJ ankylosis	2	6.3
Ossifying fibroma	1	3.1
Chondrosarcoma	1	3.1
Keratocyst	1	3.1
Cementifying fibroma	1	3.1
Dentigerous cyst	1	3.1
Giant cell granuloma	1	3.1
Keratocystic odontogenic tumour	1	3.1
Cemento ossifying fibroma	1	3.1
Total	32	100.0

For all variables, a number of diagnostic variables such as age, gender, and incision field were considered. The history, physical examination and standardized criteria described earlier were used to identify 6 common possible factors causing late wound healing. To confirm the infection, swab specimens for culture and sensitivity were routinely taken 6 days postoperatorio.⁹ and specific histological examinations were performed for specimens 10. Standard incisions were applied for various procedures and preoperative healthy marginal tissue specimens were used as controls to compare treatment on 7 days. Postoperative surgical wound examinations were performed on days 3, 5, 7, 9 and 11 and special attention was paid to the following points; wound location, incision length, color, local temperature, systemic temperature, swelling, sensitivity, secretion, separation of the wound, stitch abscess. a checklist of wound healing Elbanna Haneya M, G and Dervis Tolba Kawther Olfat A. Participating local and general criteria modified according to inadequate wound healing used. Score fractions assigned to a score of 2 are calculated for

redness, swelling, sensitivity, secretion, opening, abscess suture, high systemic temperature at each 38 ° C under a high temperature above 38 ° C. 9 points with higher scores showing worse healing of wound. The improvement was assessed as satisfactory (3-5), regular (6-9) and poor (> 9).

On perioperative and postoperative 7th day, six wound healing histological parameters were examined microscopically according to granulation

texture, collagen fiber orientation, inflammatory infiltrate, early collagen amount and collagen pattern. At the first stage of wound healing, early collagen and granulation tissue are noted. Mature collagen fibers forming horizontally oriented fascicles on day 7 are a good indication for treatment. In contrast, large amounts of granulation tissue exhibit a delayed recovery of inflammatory infiltrates in abundant amounts with vertical orientation of limited mature collagen and reticulated collagen (Figure 1-4).

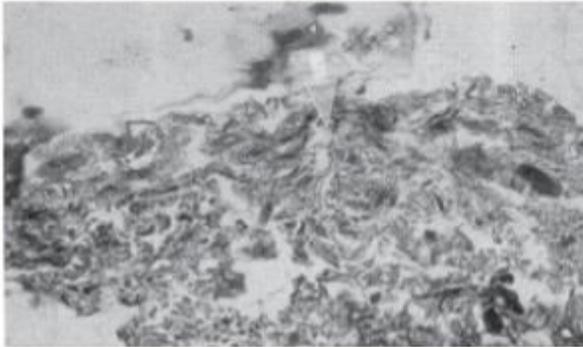


Fig 1: Photomicrograph of skin of 7th postoperative day showing reticular collagen, vertically oriented along the scar line, inflammatory cells moderate. Delayed wound healing. (Masson's Trichrome stain x 100).

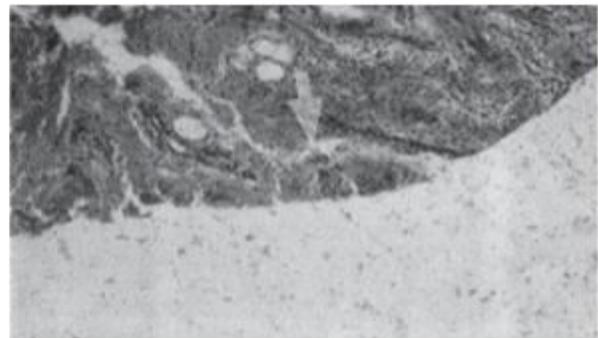


Fig 3: Photomicrograph of mucosa of 7th postoperative day showing reticular collagen, vertically oriented. Delayed healing. (H & E stain x 200).

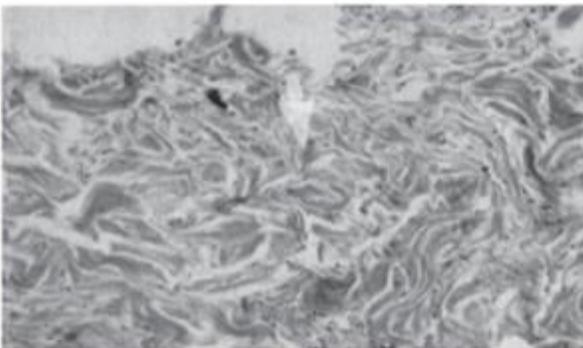


Fig 2: Photomicrograph of skin of 7th postoperative day showing horizontally oriented fascicle type of profound darkly stained collagen fibre. Good healing. (Masson's Trichrome stain x 400).



Fig 4: Photomicrograph of scalp tissue of 7th postoperative day wound showing profound horizontally oriented fascicle type of collagen fibre. An example of good healing. (H & E stain x 100).

All data and information were analyzed by computer with SPSS software.

RESULTS:

The experimental subjects mean age was slightly lower than controls (43.5 and 46.01 years, $t = 0.620$, respectively). There was no major obvious difference in age between the two groups. Similarly, the analysis showed no major obvious variations in patient's two groups, but the mean age of female

patients is slightly higher than that of male patients. 11.8% of patients participating in the study had an infection indication. Nevertheless, there was no infection sign in the control group. 30.01% of the patients participating in the study had no systemic disease and 71.06% had systemic disease. The most common systemic issue was malnutrition at various

stages (47.0%). Mild (17.6%), moderate (17.6%) and severe malnutrition (11.8%). The chemotherapy and

radiotherapy done in 5.9% and 11.8% in diabetes mellitus (Table 2).

TABLE 2: DISTRIBUTION OF PATIENTS BY CONSIDERED RISK FACTORS

Any systemic disease	Study subjects				Total	
	Group I (study)		Group II (Control)		No	%
	No.	%	No.	%		
Nil	5	29.4	15	100.0	20	62.5
Diabetes mellitus	2	11.8	0	0.0	2	6.3
Mild malnutrition	3	17.6	0	0.0	3	9.4
Moderate malnutrition	3	17.6	0	0.0	3	9.4
Severe malnutrition	2	11.8	0	0.0	2	6.3
History of radiotherapy and chemotherapy	1	5.9	0	0.0	1	3.1
History of chemotherapy	1	5.9	0	0.0	1	3.1
Total	17	100.0	15	100.0	32	100.0

The association of matrix between the selected variables and the healing score shows negative results with vast difference. Better correlation with younger age, male sex, and patients with minimal surgical incidence, with risk factors showing better healing in patients with low risk factors. However, the association was not significant statistically (Table 3).

TABLE 3: CORRELATION MATRIX BETWEEN HEALING SCORE AND SELECTED VARIABLES

Parameters	Healing score	Age in years	Sex	Length of Incision (cm)	Risk factors
Healing score on 7 th day	-	-	-	-	-
Age in years	-0.082	-	-	-	-
Sex (0=female, 1=male)	0.198	-0.067	-	-	-
Length of incision (cm)	-0.346	-0.232s	0.154	-	-
Risk factors (0=none, 1=present)	-0.409*	-0.104	-0.313	0.055	-

*Correlation is significant at the .05 level (2 tailed)

Histological findings of the patients showed that the overall distribution of the control and study had a similar microscopic pattern at the beginning, but that the histological pattern was different on the seventh day of the follow-up. Arbitrary punctuation. There was a statistically significant relationship between the collagen tissue pattern and mature and early collagen tissue relative amount between study and control subjects ($p < 0.005$). Study (Table 4).

TABLE 4: PERCENTAGE DISTRIBUTION OF PATIENTS BY HISTOLOGICAL FINDINGS

Parameters	Study (n=17)		Control (n=15)		P value
	XXInitial	7th day	XXInitial	7 th day	
Amount of granulation tissue					
Profound	0.0	0.0	0.0	6.7	p>0.05
Moderate	0.0	17.6	0.0	20.0	
Scanty	0.0	64.7	0.0	20.0	
Absent	100.0	17.6	100.0	53.3	
Inflammatory infiltrate					
Plenty	0.0	5.9	0.0	0.0	p>0.05
Moderate	0.0	58.8	0.0	40.0	
Few	100.0	35.3	100.0	60.0	
Collagen fibre orientation					
Vertical	0.0	47.1	0.0	35.3	p>0.05
Mixed	0.0	47.1	0.0	33.3	
Horizontal	100.0	5.9	100.0	33.3	
Pattern of collagen					
Reticular	0.0	35.3	0.0	0.0	p<0.05
Mixed	0.0	52.9	0.0	60.0	
Fascicle	100.0	11.8	100.0	40.0	
Amount of collagen (Early)					
Profound	0.0	17.6	0.0	6.7	p<0.001
Moderate	0.0	64.7	0.0	6.7	
Minimal	0.0	11.8	0.0	86.7	
Absent	100.0	5.9	100.0	0.0	
Amount of collagen (Mature)					
Minimal	0.0	88.2	0.0	13.3	p<0.001
Moderate	0.0	5.9	0.0	26.7	
Profound	100.0	5.9	100.0	60.0	
Healing score	20.0	11.9±2.5/20 (9.0-18.0)	20.0	15.5±3.2/20 (8.0-19.0)	

The additional analysis showed that the histological pattern mean value was lower significantly between the study patients (12.2 ± 2.4) and the control group (16.05 ± 4), and the average variation was constant statistically (p < 0.001).

DISCUSSION:

Good wound healing is rapid at an early age and is known to be normal in middle age unless it is linked with other disease. It makes it a problem to evaluate if healing is slow due to other systemic factors or aging. For this reason, different age groups were included for the control and study group and gender matched. The findings of this study were compared with the results of previous studies. For men, this study was not important in terms of good treatment, but it has been documented that the recovery of sex hormones is modular and men are endangered to late healing. Trends in this gender require further

research. The average length of the incision was 18.01 cm for the study group and 12.4 cm for the control group. The difference in the mean was constantly different. However, to find healing for any relationship state selected as the length of the incision variables, the correlation matrix was made between score improvement and selected variables. Although it is not statistically significant, it deserves more research. This early reference is to a small cut healer. In the histological evaluation of the wound, it was found that various microscopic characteristics showed the exact histological state of wound healing. 17 of 32 patients had a risk factor in the study group;

fair healing noted in 14 patients and good healing noted in only one compared to 15 control patients without risk factors observed in 10 patients. There was inadequate healing in 4 patients. It can be said that the previous results of poor healing in the study group were observed only on the seventh day after the operation. After 7 days of work, the healing condition requires more follow-up to comment on the late recovery status of the study group. In addition, in the clinical evaluation, the normal color was found earlier in the study group than in the study group in the non-risk group of the control group. Similar cases were found throughout the follow-up period in the control group, which showed that itching, swelling and tenderness were strongly correlated with histological recovery status, operative factor, etc.

CONCLUSION:

Although it is not possible to assess all risk factors for wound healing as severely, surgical trauma, this study clearly showed that the risk factors in the study group were significantly less vulnerable than the control group without risk factors.

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