Novel index for the evaluation of wound healing following erupted tooth extraction.

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INTRODUCTION

Understanding healing of the alveolar process is crucial for immediate implant, alveolar ridge preservation and guided bone regeneration procedures. Several different scales have been proposed to evaluate tissue healing after tooth extraction, but none seem to provide an objective evaluation of multiple factors with dichotomous scores (0-1) providing an overall score for the different stages of healing.

OBJECTIVES

The objective of the present study is to propose and apply a novel index for the evaluation of wound healing following erupted tooth extraction which would allow clinicians to properly monitor the results of oral surgery procedures.

MATERIALS AND METHODS

Healthy patients in need of a single tooth extraction were enrolled and re-examined at 7, 14 and 21 days after the extraction using the novel index proposed and obtaining, for each follow-up, a score from 0 to 10 based on dichotomous factors (0-1).

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THE SCORE

Factors	Pain (VAS 6-10)	Pain (VAS 0-5)	Present	Absent	Red tissue	Pink Tissue	Score
Pain	0	1					0/1
Intraoral Edema			0	1			0/1
Fibrin			0	1			0/1
Granulation tissue			0	1			0/1
Spontaneous pain			0	1			0/1
Pain upon palpation			0	1			0/1
Bleeding upon palpation			0	1			0/1
Suppuration upon palpation			0	1			0/1
Alveolitis			0	1			0/1
Color of tissue					0	1	0/1
TOTAL							Minimum 0 Maximum 10

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MOUTH OPENING

By analyzing the collected data, it can be stated that, regarding the maximum mouth opening, there was no statistically significant variation in recalls: on average, the opening remained essentially the same.

ALVEOLAR SOCKET DIAMETERS

Concerning the size of post-extraction sockets, both mesio-distal and bucco-lingual, a statistically significant decrease in the mean diameters can be observed starting from T2 (14 days) and T3 (21 days) when compared to T0 (immediately post-extraction). When observed chronologically, as expected[18], there is a gradual decrease in mesio-distal bucco-lingual diameters, consistent with the gradual healing and closure of the post-extraction socket. There is no statistically significant difference between follow-ups separated by only seven days, while there is a statistically significant difference between the 7 days and the 21 days follow up.

The presence of two cases at 21 days identified as "good healing", corresponding to patients who experienced either a complication (alveolitis) or prolonged signs of inflammation (redness, pain, swelling), suggests that the onset of complications such as alveolitis or a more sustained inflammatory reaction over time may worsen socket healing in the initial phases while, over time, excellent healing is achieved although a slower rate of healing can be observed. Therefore, there is a "delay in healing" caused by certain variables. [19, 20]

It is also important to highlight that one of the healings valued as “excellent” at the third follow-up (21 days), was downgraded to "good" as per overall healing score. This suggests that, with similar complications, each patient may react differently, sometimes "accelerating" the healing process and effectively overcoming the previously hypothesized "delay in healing."

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Conclusions

In conclusion, based on the findings reported in this study, the proposed scale has the potential to indicate the clinical status of the post-extraction wound in an objective manner and provide useful information on overall wound healing: this potential needs to be confirmed through a validation system and comparison with already published healing indexes using a higher number of clinical cases.

Future objectives include repeating the described experiment with longer follow up times by including a radiographic evaluation of the hard tissue healing and designing a validation system for the proposed scale, applying it to a larger sample size and al-lowing integration of the index in procedures which are sensitive to early healing quality and early complications thus providing a predictive tool that could assist the dentist in every day clinical practice.

Healing Score	T1	T2	T3
Poor	0	0	0
Bad	2	0	0
Good	8	6	2
Excellent	0	4	8

Patients	T1	T2	T3	Sum of scores
A1	4	7	8	19
B1	7	10	10	27
C1	7	9	10	26
D1	4	7	8	19
E1	8	8	10	26
F1	6	8	10	24
G1	6	10	10	26
H1	7	8	10	25
I1	8	10	10	28
J1	6	8	10	24