

Research Article



Assessing the Change in Clinical Indices of the Chronic Periodontal Disease Before and After Surgical Treatment Implementing the Full Thickness Flap

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ABSTRACT

This article addresses the assessment of change in the indices of the periodontal ailment before and after the surgical treatment using a full thickness flap. Variations clutched to gingiva, which are a consequence of the periodontal diseases, are highlighted. Along with perceiving the response to treatment, this clinical study that aims at evaluating the indices associated to such cases of the frontal mandibular region. The study included 20 patients affected with a chronic periodontitis of mid-levelled nature to advanced phases. The average of whose ages holds the mean of 42.95 years. Indices have been recorded include: Probing Pocket Depth (PPD), Sulcus Bleeding Index (SBI) (Mühlemann & Son, 1971) also known as Bleeding upon Probing (BuP), Plaque Index (PI) (Silness-Löe, 1964), Clinical Attachment Loss (CAL), and Tooth Mobility(TM) (Miller, 1985). *t*-Test has been implemented to study the differences in numbers for these aforementioned indices before the treatment and after it in six month at the probability value (*p*-value) of $p < 0.05$. In this study, the values of the five studied clinical periodontal indices decreased as can be summarized in the following: PI, SBI, PPD, and CAL have neighbored the statistically indicative value of $p = 0.00$, which has recorded after six month with the probability value of $p < 0.05$ in comparison of their counterparts before the practitioner's interference. However, TM has decreased after treatment due to inflammatory recess in the periodontal tissues but this has not been indicative for the remaining group of teeth.

Keywords: Clinical indices, Full thickness flap, Periodontal disease.

INTRODUCTION

Chronic inflammation of the periodontal tissues is considered to be a septic disease of fundamental association with the bacterial plaque, also referred to as plaque, and is labeled by inflammation in the gingiva extending all through the deep supportive ligaments. It causes a serious loss in the clinical attachment and the adjacent alveolar bone¹; it might also comprise severe fibromatosis gingivae a manifestation of macrogingivae, root furcation involvement, and an increase in the tooth mobility.²

Eloquently, patients suffering inflammations in periodontal regions that range from moderate to severe generally admit periodontal treatment endorsed with flaps where the sub gingival curettage leads to key changes in the microbial environment and improvement in the status of gingival.³ More of a word, this study beforehand has been conducted to the frontal region on the mandible which is pronounced as of specific importance where the incisors are vulnerable to a host of periodontal disease. Such array in diseases can be manifested by osseous loss and movement; both entail extraction of the teeth that is characterized as single-rooted. A state mentioned as so has its underpinnings on the patient's psyche expressed by the feeling of sudden approaching to later stages in their life. This is flown from the internal reflection of realizing such loss in the aesthetic side accompanied with pronunciation and functional aspects that are considered as of prime importance to human beings.

Research Objectives

To grasp more acquaintance of the clinical changes affecting the gingiva that are seemingly resultant from the periodontal disease, a few precautions have been the essential locomotive behind conducting such research. Other indispensable goals include establishing sound diagnosis, putting a suitable plan, and knowing the proper response to treatment. It is to offer the patient the best results that come in benefit reflected on their psychological, social, and economical life; that is, an immediate positive effect on the society as a parcel whole. Being stated, the principal objective of this clinical study can be summarized by assessing the indices of the periodontal disease hitting the frontal region of the mandible before treatment and after it in six months, which is escorted through disappearance of the inflammation manifestations subsequent to this periodontal inadequacy.

SUBJECTS AND METHODS

The backbone surround of this research is analytical in nature. It is conducted throughout including the flowing subsections.

Participants

The study is comprised of 20 patients whose ages mean is 42.95 with standard deviation amounting to ± 7.81 ; these patients are recurrent visitors to clinics in the Faculty of Dentistry at Damascus University within the period of one year extending from 2012 to 2013, and who are infected



with chronic periodontal disease of mild to severe nature. The disease itself has been diagnosed according the standards of the American Academy of Periodontology⁴ (AAP). There exist four teeth each of which includes a periodontal site or more with a probing depth of ≥ 4 millimeters (mm) or attachment loss of ≥ 3 mm. These need immediate treatment with surgical action to the periodontal region including full thickness flaps in the frontal area of the mandible. Informed consents have been secured from all patients in addition to the consent of the academic council at Damascus University to commence the research beforehand.

Clinical Test

Clinical indices have been measured in the periodontal region using the probe UNC15 to obtain five indices in a scrutinized process of five purposes. These will be itemed in the next explanation respectively.

Probing Pocket Depth

Pocket Probing Depth⁵(PPD) is sought by measuring the distance extending from the free gingival edge to the deepest point reachable by the probe end in the gingival sulcus; this is operationalized in four sites for ever tooth: vestibular, medial-vestibular, lateral-vestibular, and lingual.

Sulcus Bleeding Index

Sulcus Bleeding Index (SBI) devised by Mühlemann & Son, 1971, has also been reiterated at this second stage. Termed as BuP, what is known as Bleeding upon Probing⁶ is taken after waiting 15 - 20 seconds when finishing probing a certain surface. Then, bleeding is observed whether existent or not; the event is recorded for every site and coded (+) in its presence or (-) in its absence.

Plaque Index

Plaque Index (Silness-Löe, 1964) can be limited by defining the mess of dental plaque accumulated on the gingival edge of four surfaces: vestibular, medial-vestibular, lateral-vestibular, and lingual. This delineation is carried out using the probe and a mirror while the four values corresponding to every tooth are recorded to establish the final individual value after totaling all sums and dividing it by the number of the examined teeth. The resultant number will be considered the real mean value.

Clinical Attachment Loss

Clinical Attachment Loss has been registered at the Dentin-Enamel Junction to the deepest point in the periodontal pocket. However and in many cases, it would turn out to be difficult to distinguish the minute area of the enamel-dentin junction in an accurate investigation. More exigently, this junction might be hidden and covered by the gingiva itself leading to implementing splinted occlusal stent to achieve more accurate measures when evaluating the level of the attachment loss. Occlusal stents, as well, are considered conferring to a previous study⁷⁻⁸ calibrating the mean of marginal errors

in the measurement and other ensuing differences of quantification. This procedure is engaged in restricting the variables, which play a major role in the process of measurement such as the probing site and the probing direction. These two aforementioned features can be controlled by the sulci engraved on the orifice stent framed upon gypsum object that has been formulated by an exact impression of the patient's jaw from acryl. The stent is trimmed and pressed to simulate the occlusal surfaces of the molars and it is spread on the vestibular and lingual surfaces of the mandibular frontal teeth by an amount of 2 mm approximately. This is followed by the preparation of the vertical sulci also simulating the regions where the probing will be conducted in four sites: lateral-vestibular, medial-vestibular, central vestibular surface, and central lingual surface. This entails taking the measurements via the manual probe UNC15 that enters the interproximal walls of the perpendicular sulci existent on the stent itself.⁹

Tooth Mobility

Tooth Mobility, the last index in this investigation that is termed TM after Miller, 1985, is depicted in the natural physiological movement that cannot be noticed through the bare eyes; this is categorized as degree-0. The next degree on the continuum of four is degree-1 featured by slight movement that can be felt. Degree-2 is highlighted by a moderate movement in the vestibular-lingual or medial-lateral direction clearly perceived by the bare eyes. The final stage in tooth mobility is jotted down as degree-3 with a rapid movement in all directions: the vestibular-lingual or the medial-lateral. It is associated with mobility in the vertical direction.

Nevertheless, after this hasty explanation of recording the five indexes, it would be viable to postulate that the accuracy of registered these numbers and dimensions comes to address the authenticity of research requirements. This has been sought throughout the previous stages, and it has been recurrently recorded onto the special form to every patient that is regulated as well and prepared in advanced to validate such recordings.

Teeth Coding

The form utilized in this current research comes in accordance to the general formula used via the World Dental Federation, Fédération Dentaire Internationale (FDI). For example, and the lower right central incisor is numbered (41) and the lower right lateral incisor is numbered (42) in the mandible right quadrant; moreover, the lower left central incisor is numbered (31) and the lower left lateral incisor is numbered (32) in the mandible left quadrant.

As with all coding systems, it would be viable to include the glimpses of its basics so that the reader can have a feasible reason to compare any consequent inconvenience to the frame mentioned below. The next figure traces this numbering.



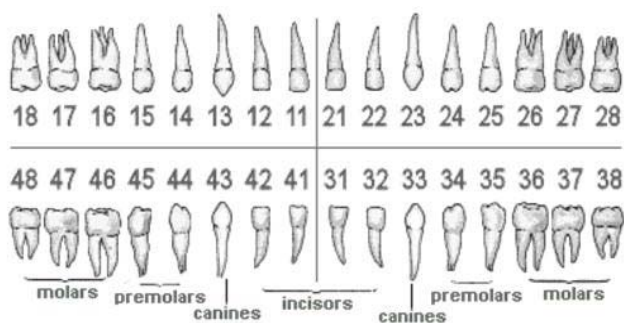


Figure 1: FDI quadrant numbering

<http://www.careforsmiles.com.au/smile-gallery/fdi/>

Furthermore, some patients have been excluded from the sample. These are the persons who suffer diseases in the systems affected directly by the surgical treatment and whose disease hinders such process such as (heart diseases, blood pressure, etc.). Other than these, individuals who suffer diseases affecting the bone structures such as (diabetes, osteoporosis, etc.) have also been excluded. The list has likewise encompassed those taking medicine that affect the metabolism within the bone structures such as Brufen and Doxycycline. Other types of patients have also been debarred from admitting the application of this research; smokers, alcoholics, and those at the menopause phase have also been excluded from the research sample.

Periodontal Treatment

The preliminary periodontal treatment has been carried out by providing the whole body of patients with the oral hygiene instructions to establish good oral health. Removal of the microbial plaque has also been the next step. After this, alginate dental impression has been imprinted to form the acrylic splint. Initial inoculation, then, has been placed into the patient followed by levelling the roots by manual tools. The ensuing 7 - 10 days have witnessed the surgical treatment where mucoperiosteal full thickness flaps are exposed to utilization. Scaling and granulomatous tissue removal inside the trabeculae have been made followed by levelling the roots, polishing, and smoothing them. Consequent to these procedures, the region has been cleaned by the physiologic serum, and surgical suture using non-absorbable silk threads of the size (0 -3); stitches are removed after one week. The recommendations, then, have been directed to patients specifically rinsing with chlorhexidine 0.12% twice a day for one week. No antibiotics or non-steroid anti-inflammatory drugs have been subscribed.

As for the follow-up phase, it has been steered three months after the surgical procedures have been administered to participants. These are to emphasize how essential oral hygiene is by raising the patients' awareness towards this measure to trail the mechanical oral health. The final session has been conducted six months after finalizing the surgical action when the indices are taken while the acrylic splint is used.

Statistical Study

t-Test is used in this research to examine the differences before the surgical action and after it in six months. The comparing probability value (p-value) is < 0.05, and the statistical package has been utilized to show these differences in both numbers and diagrams. The package used here is International Business Machines (IBM) corporation's Statistical Product and Service Solutions¹⁰ (SPSS) in its edition of August 13, 2013.

Indices Results

Following are the diagrams drawn after recording the results of the five periodontal indices before and after the treatment in the span of six months.

Probing Pocket Depth

PPD has decreased in all teeth and for all participants in the sample with statistic indication of 0.00 at p-value of < 0.05.

Nonetheless and though repeatedly displayed in the coming five charts, the reader is invited to rethink the difference in the sample as of the locus for further investigation in the field of chronic diseases related to periodontology. More of illustration can be depicted in how the patients cooperated in the study, so the nexus of what is postulated as sufficient therapy is conditioned by the individual "themselves" and how they are willing to continue the treatment and what accompanies this process. The numbers, then, can manifest the extent to which this treatment would convey the desired conclusions; this is discussed later.

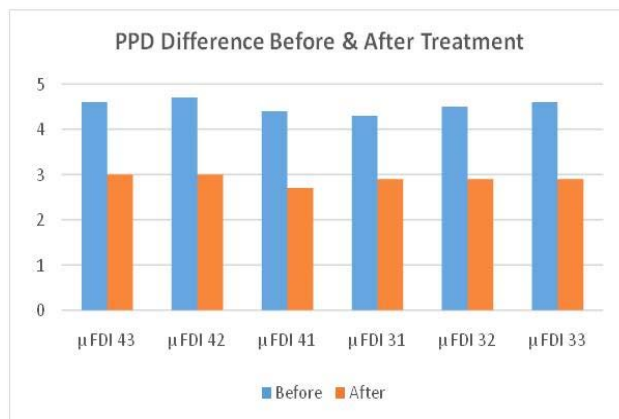


Figure 2: PPD differences before and after treatment

Sulcus Bleeding Index

SBI has decreased in all teeth and for all participants in the sample with statistic indication of 0.00 at p-value of < 0.05.

Plaque Index

PI has decreased in all teeth and for all participants in the sample with statistic indication of 0.00 at p-value of < 0.05.

Table 1: Means of PPD, SBI, PI, CAL, and TM before and after Treatment

PPD		SBI		PI		CAL		TM	
Before	After	Before	After	Before	After	Before	After	Before	After
4.58	2.96	1	0.19	0.67	0.65	11.19	9.65	0.321	0.196

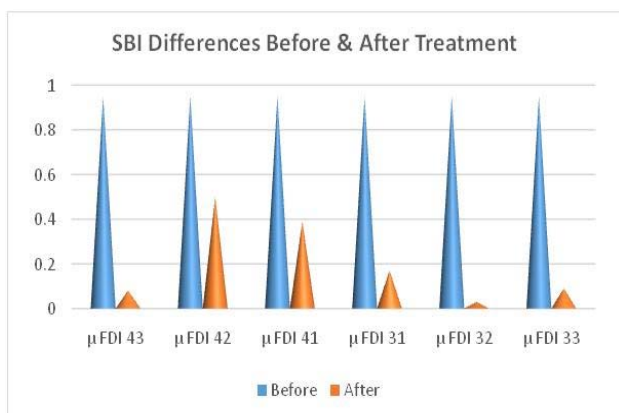


Figure 3: SBI differences before and after treatment

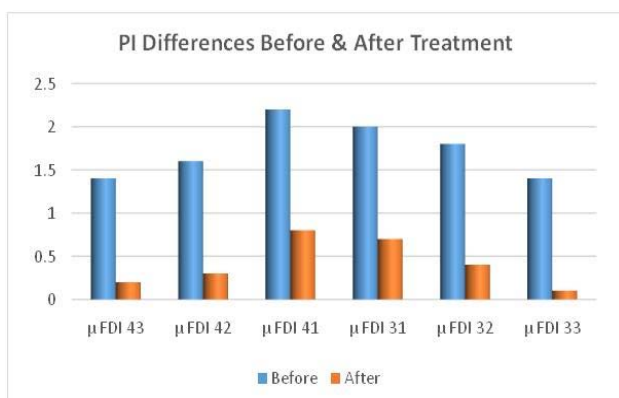


Figure 4: PI differences before and after treatment

Clinical Attachment Loss

CAL has decreased in all teeth and for all participants in the sample with statistic indication of 0.00 at *p*-value of < 0.05.

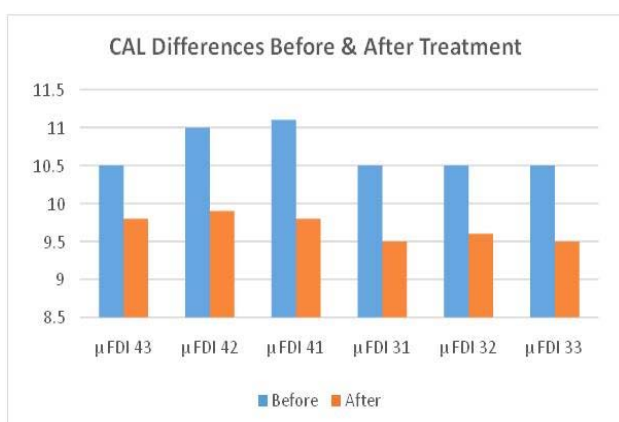


Figure 5: CAL differences before and after treatment

Tooth Mobility

TM index has decreased for the main reason of declining inflammation in the periodontal tissues. However, a

clear-cut indication in statistical values has not been adequate at this index. Some ensuing justification might be ascribed to the root nature of these selections of teeth. Still, the next table could suffice to provide additional highlight of such differences.

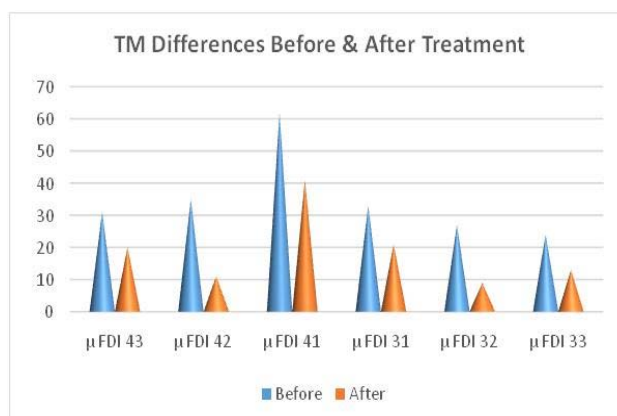


Figure 6: TM differences before and after treatment

Indices Comparison

The following table summarizes the means of the results reached at when completing the tests on the current sample.

DISCUSSION

Firstly, Probing Pocket Depth has decrease after the surgical action with the statistical indication 4.58 to 2.96 as in comparison to the PPD means before treatment that might be indicative of improvement in the health of periodontal tissues. Moreover, with a systematic review by Mayfield et al.¹¹, they compared between two schemes of treatment: surgical and non-surgical to assess the clinical indices. What is accentuated has been the superiority of the former over the latter in decreasing the probing depth in deep to relatively deep pockets.

In addition, Sulcus Bleeding Index has been reduced with a statistical indication of 1 to 0.19; the thing that is instantaneously posed against the means of before-treatment numbers taken previously. It is perhaps symptomatic to the retardation the any inflammatory signals abundant in the periodontal tissues leading to good health. A previous study proposes that the severity or rather acuteness of the disease and its effects as revealed clearer by the two indices of Bleeding upon Probing (BuP) and Probing Pocket Depth (PPD) and their reduction indicates diminution of the periodontal disease.¹² This is not separable of the following prime result concerning the dental plaque accumulation and its gradual disappearance as a good sign of remedial progress.

Thirdly, Plaque Index has advanced to fall at the statistical value from 0.67 to 0.65, which is indicative if compared to the mean before treatment. The mark might be clinched to the commitment of the patient towards the oral hygiene instructions. Henceforth, the improvement in periodontal tissues is met beneath. A preceding study by Armitage¹³ in 1996 comes to approve such funding; it is to reassure the fact that any clinical study to periodontal diseases is dependent on several indices such as PI to highlight the level of oral hygiene and its succeeding effects.

Fourthly, CAL mean has fallen after the surgical interference with a statistical value of 11.19 to 9.65 as compared to the mean of the numbers from the sample before this interference. A gain of this sort is probably associated to the backwardness of periodontal disease, which supports another systematic study of 589 scientific articles pointing that the treatment, whether surgical or via inoculation and scaling without this surgical action, is capable of gaining attachment in the periodontal ligaments and it would lead to decrease in the probing depth.¹¹

Finally, Tooth Mobility mean after the remedial process has declined from 0.321 to 0.196 after surgery. This is due to gradual disappearance in the inflammation at the periodontal sites. Nonetheless, there has not been a statistical indication to all teeth; the index of TM falls steadily from degree-1 to degree-0, and from two to one. An earlier investigation has shown that the periodontal treatments have lead, in all their types - inoculation, root levelling, scaling, or surgery using flaps such as Wideman's - to improvement in indices related to periodontal diseases when achronic type is involved at stake. This is after carrying out observation and follow-up during a span of six weeks to six years.¹⁴ Generally speaking, the amount of improvement being observed and followed through treatment is an approximate in various types of treatment neglecting the method in which such treatment is conducted.¹⁵

CONCLUSION

The decrease in the value of clinical indices for the periodontal defects before and after surgical treatment in six months is a principal indicative of the regression in the host of inflammatory manifestations. These are solely annexed to the periodontal disease. In addition, the improvement in the clinical case is probably reflective of the feasibility and beneficiary consequences of the surgical interference implementing full thickness flaps.

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