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Comparative evaluation of ultrasonic scaling versus modified flap operation in mild to moderate chronic periodontitis in adult patients

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Abstract

Background: The objective of this study was to compare the effectiveness of Modified flap operation versus scaling and ultrasonic scaling in adult chronic periodontitis

Methods: The study population included 10 subjects, who visited the out-patient department of periodontics, Govt. Dental College and Hospital Srinagar with complaint of bleeding and sensitivity, diagnosed as chronic periodontitis (Mild or moderate). After conducting routine examinations, Relative attachment and probing depth were measured. The measurement of Relative attachment was made with occlusal stent as guiding value. Probing depth was made with UNC-15 periodontal probe.

Results: Results showed that Patients with pocket depth (> 5mm) showed favourable results post flap surgery (modified flap operation) than patients with (>5mm) pcket depth who have undergone ultrasonic scaling.

Conclusion: For reduction of probing depth, surgical therapy provides a greater benefit than nonsurgical therapy in deep pockets. For attachment level, nonsurgical therapy provides a greater benefit for initial disease severity levels 1–3 mm and 4–5 mm, and surgical therapy for > 5 mm.

Keywords: scaling, modified flap operation, calculus, pocket depth

Introduction

The primary etiologic agents in periodontitis are bacterial plaque and calculus. Correlation of supragingival plaque and calculus with gingivitis and periodontitis has been demonstrated in several studies (Lindhe *et al.* 1973, 1975, Loe *et al.* 1965, Theilade *et al.* 1966) [1]. Scaling and root planing are widely used techniques in periodontal therapy to remove irritants from the surfaces of the teeth and also to reduce tooth surface roughness which may facilitate the accumulation of irritants (Waerhaug 1956). It has become increasingly evident that the most important aspect of periodontal therapy is the removal of all accretions from tooth surfaces exposed by periodontal disease (Aleo & Vandersall 1980, Axelsson & Lindhe 1978, Caton *et al.* 1982, Hughes & Caffesse 1978, Lindhe *et al.* 1973, 1975, Listgarten *et al.* 1978, Rosling *et al.* 1976, Theilade *et al.* 1966, Waerhaug 1978b). Chronic periodontitis can be treated by nonsurgical or surgical therapy, provided adequate plaque control is maintained during supportive phase of treatment [3]. Non-surgical therapy consisting of oral hygiene instructions and scaling and root planing, has consistently been shown to be one of the most effective means of treating periodontal disease [4-7].

In order to overcome the limitations of scaling and root planing in deep periodontal pockets, various surgical procedures have been used in periodontal therapy to attain access for instrumentation of diseased root surfaces and to reduce the depth of deepened periodontal pockets. Some of these procedures are designed to produce a reduced pocket depth through an apical displacement of gingival margin. This implies that the coronal portion of the root surface facing the periodontal pocket becomes exposed to the oral cavity as a result of the surgery. Gingivectomy [8] and apically displaced flap are examples of such procedures [9]. To minimize the post treatment exposure of the root surface, other surgical techniques have been developed with the aim of achieving a reduced pocket depth through regeneration of a connective tissue attachment to the diseased root surfaces. With these techniques, repair is supposed to occur from the “bottom” of the pocket in coronal direction resulting in a reduced

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pocket depth with minimal recession of gingival margin.

Materials and Methods

Sufficient number of subjects comprising of both the sexes and diagnosed with chronic generalized periodontitis with deep periodontal pockets (>5mm) between the age group of 25-50 years, were considered for the present study from the Outpatient Department of Periodontics, Government Dental College and Hospital Srinagar. The inclusion criteria included that, subjects who were diagnosed as suffering from generalized chronic periodontitis (mild to moderate) on clinical and radiological examination with deep periodontal pockets and Periodontal destruction was nearly similar in selected contralateral quadrants. Subjects who were willing to appear after every two weeks for maintenance during study period were included in the study. The subjects who had history of oral prophylaxis or antibacterial mouth wash in past three months or systemic disease i.e. diabetes, cardiovascular disease, females who were pregnant and nursing mothers and the subjects who presented mobility of teeth in selected quadrants were not included in the study. The study was performed for a 9 months. At initial examination, oral prophylaxis was performed and meticulous oral hygiene instructions were given. The patients were recalled after 21 days. At baseline, 10 subjects were selected with 5-7 mm periodontal pocket in at least 2 quadrants of the mouth. Split mouth design, with one quadrant of mouth as Control Group and another quadrant as Test Group was adapted. In the Control group, ultrasonic scaling was carried out and in test group, modified flap operation procedure was carried out. Sutures were removed after 1 week. Oral hygiene instructions and professional tooth cleaning were repeated once every 2 weeks during study period for both selected quadrants. The clinical assessment was carried out at baseline and 9 months to evaluate the respective treatments in both the groups. The indices used for clinical assessment were Probing pocket depth (UNC-15) [10], Relative attachment level (Acrylic occlusal stents) [10], customized acrylic stent which served as a fixed reference point for relative attachment level

Results

There was statistically significant difference between two groups. Table 1 and Table 2 showed that after 9 months post modified flap operation showed significant reduction in periodontal pocket and relative attachment level than ultrasonic scaling.

Table 1: Intra-group comparison of periodontal parameters in Control GROUP (SRP) at 1 month and 9 months with respect to baseline

Periodontal Parameters		N	Mean	SD	P-value
Pocket Probing Depth (mm)	Baseline	10	5.85	0.645	-
	9 Months	10	4.50	0.758	0.109
Relative Attachment Level	Baseline	10	11.05	0.609	-
	9 Months	10	10.15	0.696	0.206

SRP: Scaling and root planning

Table 2: Intra-group comparison of periodontal parameters in Test group (Kirkland flap) at 1 month and 9 months with respect to baseline

Periodontal Parameters		N	Mean	SD	P-value
Pocket Probing Depth (mm)	Baseline	10	6.20	0.994	-
	9 Months	10	3.90	0.848	<0.001*
Relative Attachment Level	Baseline	10	11.15	0.875	-
	9 Months	10	8.90	0.968	<0.001*

P-Value: <0.005; statistically significant.

Discussion

Chronic periodontitis is an inflammatory disease characterized by periodontal tissue destruction. The disease initiates as gingivitis caused by plaque accumulation and is followed by complex interaction between periodontopathic bacteria and various environmental and host resistance factors, which leads to extension of the inflammation to involve the periodontal attachment tissue [11]. It is generally accepted that mechanical debridement is at the core of any periodontal therapy, and can be achieved by non-surgical and/or by surgical therapy with instructions in self-administered oral health care measures. These measures are directed towards reducing bacterial load and altering the microbial composition towards flora associated with health. Jones *et al.* (1972) [12, 13] described differences in the step height level of calculus deposits from the root surfaces and reported that these varied between 5 to 56 μm . In order to detect these deposits, every μm^2 of the surface would need to be explored. They concluded that once a surface had been instrumented, it was not always possible to differentiate clinically among calculus, cementum, and dentin. Rabbani *et al.* (1981) [14] also noted that considerable amounts of calculus were found to be retained over areas judged clinically smooth. This result is in agreement with the present findings. In the present study, one group of teeth were scaled and root-planed only, while another group of teeth were planed for periodontal flap surgery (modified flap operation) until the surfaces were judged clinically smooth to a periodontal probe or #17 explorer. Although there was a significantly greater reduction of residual calculus in the group using flap surgery over teeth scaled alone, in neither group was complete calculus removal attained for all surfaces. Part of the rationale for periodontal flap surgery is to improve healing by facilitating access for, and subsequently achieving, a more thorough root planing. Waerhaug (1975) [15] reported that following flap surgery for access, deposits were found which had been left near the bottom of the pocket. Reasons for failure of complete removal of deposits with flap surgery have been described as bleeding, which obscures the field of operation close to the bottom of the pocket, and the fact that the plaque front and the tooth are of the same color (Waerhaug 1978) [16]. Although complete calculus removal was not accomplished on all surfaces with the flap procedure, the assessment of remaining calculus demonstrated that scaling in conjunction with a periodontal flap was significantly more effective than ultrasonic scaling alone. Rabbani *et al.* (1981) evaluated the effectiveness of subgingival scaling and root planing related to depth of pocket. Pockets less than 3 mm were the easiest sites for scaling and root planing, probing depths ranging from 3 to 5 mm were more difficult, and pockets deeper than 5 mm were the most difficult. This is in agreement with Waerhaug (1978), who stated that in pockets less than 3 mm, success could be expected, but the chances of failure increased in 3 to 5 mm pockets, while with probing depths greater than 5 mm, the chances of failure dominated. In this study, probing pocket depth and relative attachment level showed significant improvement at 9 months compared to baseline in test group (modified flap operation) than control group (ultrasonic scaling) concordant with Rabbani *et al* and waerhaug.

Conclusion

For reduction of probing depth, surgical therapy provides a greater benefit than nonsurgical therapy in deep pockets. When the objective is to increase attachment level,

nonsurgical therapy provides a greater benefit for initial disease severity levels 1–3 mm and 4–5 mm, and surgical therapy for > 5 mm.

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