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Clinical Effects of Scaling and Root Planing in Treatment of Patients with Amlodipine Induced Gingival Overgrowth

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ABSTRACT

Introduction: A multifactorial condition characterised by an increase in size is called gingival enlargement. Most common form is drug induced gingival enlargement. Different treatment options to manage gingival overgrowth are categorised as non-surgical approach and surgical approach. Non-surgical mechanical periodontal treatment is gold standard of periodontal therapy and first recommended approach to control of periodontal infections.

Objective: To determine clinical effect of scaling and root planing (SRP) in treatment of patient with amlodipine induced gingival overgrowth.

Methods: A pretest post-test study was conducted from January 2021 to December 2021 among 19 subjects recruited by convenience sampling who exhibited amlodipine induced gingival overgrowth of grade 1-2 (Miller's and Damm index). The probing depth (PD) ≤7mm and clinical attachment level (CAL) ≤4 mm were evaluated on upper and lower anterior teeth on labial aspect, before and after SRP at one month, three months, and six months. Plaque index (PI), Gingival index (GI) were also evaluated before and after SRP at one month, three months, and six months.

Results: Statistically significant reduction was found in terms of GOS, PD, gain in CAL, PI, GI after treatment with SRP at one month, three months, and six months. However, results were not statistically significant in intragroup comparison post-treatment at one month, three months, and six months in terms of CAL, GI, and PI.

Conclusions: Scaling and root planing, has showed significant improvement in reduction of gingival overgrowth, probing depth, clinical attachment level, plaque index and gingival index as compared to pretreatment.

Keywords: Amlodipine; calcium channel blockers; gingival overgrowth; scaling and root planing.

INTRODUCTION

Gingival overgrowth is increase in size of gingiva.[1] Several factors that cause gingival enlargement can be hereditary, inflammatory enlargement, gingival overgrowth associated with systemic diseases and conditions, and those resulting from systemic administration of specific drugs.[2]

Calcium channel blockers (CCB) are reported to interfere with aesthetics, mastication, speech, and access for oral hygiene, resulting in periodontal diseases and dental caries.[3] These drugs affect various target tissues while acting secondarily on gingival connective tissues causing oral clinico-histologic manifestations.[4]

Clinical manifestation of gingival enlargement frequently appear within one to three months after treatment with associated medication.[5] Examination of drug-induced gingival overgrowth (DIGO) cases reveal two components: fibrotic, caused by drug, and inflammatory by bacterial plaque.

Treatment options can be categorised as non-surgical approach and surgical approach. Non-surgical approach like scaling and root planing (SRP) has substantial effect on reduction of probing depth (PD), gain in clinical attachment level (CAL) and decreased inflammation, thus improving overall clinical efficacy.[6] Therefore, non-surgical approach reduces inflammatory component whereas surgical approach eliminates fibrotic component and persists after non-surgical therapy.[7] Therefore, aim of this study was to determine the clinical effect of scaling and root planing in treatment of patients with amlodipine induced gingival overgrowth.

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METHODS

A pretest post-test study (non-randomised trial) was conducted in patients with amlodipine induced gingival overgrowth reported to the Department of Periodontology and Oral Implantology, People's Dental College and Hospital, Sorhakhutte, Kathmandu, Nepal for a duration of one year from January 2021 to December 2021. Ethical approval (Ref. 1.CH No 24. 2077/2078) was obtained from Institutional Review committee (IRC) of People's Dental College and Hospital. Patients were recruited by convenience sampling technique. The sample size was computed using the formula:

$$n = \frac{(Z_\alpha + Z_\beta)^2 S^2}{d^2}$$

Where, $Z_\alpha = 1.96$ at 95% confidence level; $Z_\beta = 1.28$ at 90% power; s = standard deviation of gingival overgrowth reduction; $d = (X_1 - X_2)$ mean difference between gingival overgrowth reduction. Thus, n = 16.84. Adding 20% for expected dropout rate, the desired sample size was 16+3 = 19.

Patients age 40-60 years taking amlodipine at regular doses for at least or more than three months, Miller's and Damm, grade 1-2 gingival overgrowth score in at least six upper or lower anterior teeth, controlled hypertension (≤140/90 mm Hg), Probing depth: ≤7mm, Clinical attachment level: ≤4mm were included in the study. The exclusion criteria included subject with concomitant systemic disorder known to affect the gum such as diabetes mellitus, endocrine disorders, leukaemia thrombocytopenic purpura and immunodeficiency states, under drugs such as anticonvulsant, immunosuppressant and other calcium channel blockers, under oral contraceptives, sexual hormones and pregnant female, undergone periodontal treatment within six months prior to the initiation of the study, and under orthodontic treatment.

Periodontal examination of all patients was carried out by a single examiner. After selection of the study subjects and obtaining informed consent, impressions of the respective arches were taken and occlusal stents were prepared in anterior teeth. Following clinical parameters such as Plaque Index (PI), Gingival Index (GI), PD, CAL, Gingival overgrowth score (GOS) were recorded prior to and after treatment procedure. Measurements of the variables were done by UNC-15 periodontal probe.

The degree of gingival overgrowth was assessed in both vertical and horizontal dimension at each papilla (gingival unit) on facial aspect of upper and lower anterior teeth. Dental papillae (either five maxillary or five mandibular or both) were evaluated in anterior region, which were calculated from midpoint of one tooth to midpoint of adjacent tooth from one side canine to another side. Miller's and Damm index (GOI),[8,9] was used to assess the gingival overgrowth in both vertical and horizontal dimension. This index measures the overgrowth of the gingival tissue vertically from cementoenamel junction to the free gingival margin (Figure 1a). The horizontal dimension was measured from the enamel surface, at the interdental contact point, to the outer papillary surface (Figure 1b).

The grades for vertical measurement[8,9] were scored as: Grade 0 - Normal gingiva, Grade 1 - Minimal enlargement ≤2mm in size, with gingiva covering the cervical third or less of the anatomic crown; Grade 2-Moderate enlargement 2-4 mm in size and or gingiva extending

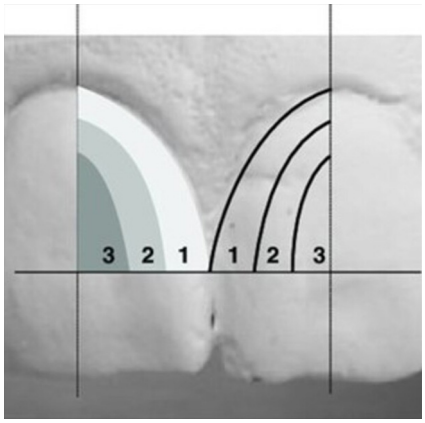

Figure 1a: Measurement of vertical dimension (Miller's and Damm index).

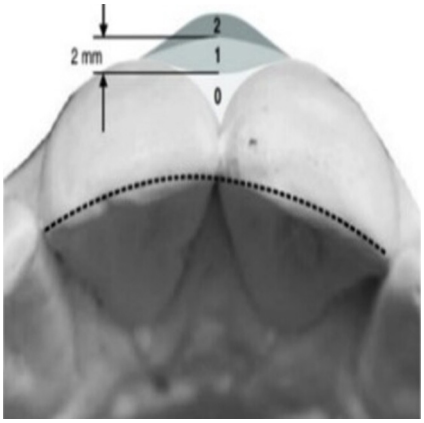

Figure 1b: Measurement of horizontal dimension (Miller's and Damm index).

Figure 2a: Scaling with ultrasonic scaler

Figure 2b: Root planing done with curette.

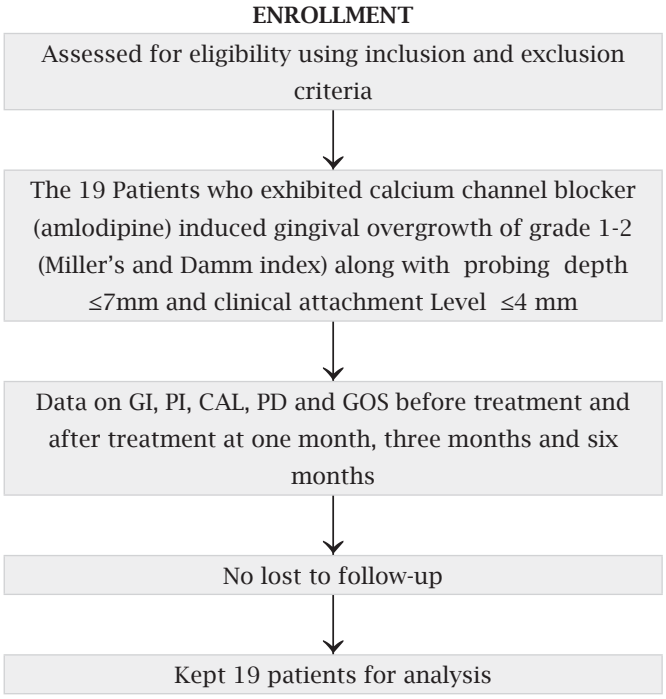

Figure 3: The CONSORT flow diagram.

into the middle third of the anatomic crown. Scores were obtained for the buccal papilla, according to this criteria,[8,9] Grade 0 - Papillary thickness of less than 1 mm; Grade 1 - Papillary thickness between 1-2 mm; Grade 2 - Papillary thickness greater than 2 mm.

All subject underwent full mouth scaling with ultrasonic scaler and were recalled after one week for complete SRP with Gracey curettes under local anaesthesia (Figure 2a, 2b). All clinical and outcome variables namely, PI, GI, PD, CAL, and GOS were recorded before and after treatment at one month, three months, and six months.

Paired t-test used for the comparison of mean difference between two sets of observation: mean value of PI score, GI score, PD, CAL, and GOS. The P value <0.05 was considered to be statistically significant. For the selection of tests for quantitative data, normality test was done using Shapiro-Wilk test which showed that the data was normally distributed.

RESULTS

Total of 19 patients were enrolled in the study. A total of 19 patients completed their follow-up visits at one month, three months, and six months (Figure 3). The age range of the study participants was 40 years to 60 years, with the mean of 50.32±7.97 years. Out of 19 patients, 11 (57.9%) were male and 8 (42.1%) were female.

Statistically significant difference was found in the PI score between before treatment and at one month, three months, and six months post-treatment with P value of 0.001. However, statistically significant difference was not found between post-treatment scores at one month

Table 1: Table showing mean Gingival Overgrowth Score before treatment, after treatment at one month, three months and six months.

Gingival overgrowth Score	Comparison	Mean difference	P value
Before treatment 3.66±0.42	At one month 3.49±0.45	0.16±0.07	0.001
	At three months 3.32±0.47	0.33±0.09	0.001
	At six months 3.13±0.49	0.52±0.11	0.001
At one month 3.49±0.45	At three months 3.32±0.47	0.16±0.10	0.001
	At six months 3.13±0.49	0.35±0.12	0.001
At three months 3.32±0.47	a six months 3.13±0.49	0.18±0.08	0.001

Paired t-test <0.05 for statistically significant.

with that of three months and six months and score at three months with that at six months.

Statistically significant difference was found in the GI score between before treatment and at one month, three months and six months post-treatment with P value of 0.001. However, significant difference was not found between post-treatment score at one month with that of three months and six months and score at three months with that at six month. Statistically significant difference was found in PD between before treatment and at one month, three months, and six months post-treatment with P value of 0.001. Also, statistically significant difference was found in the PD between post-treatment score at one month with that of three months and six months and score at three months with that at six months with P value of 0.001.

Statistically significant difference was found in the CAL between before treatment and at one month, three months, and six months post-treatment with P value of 0.001. However, statistically significant difference was not found in the CAL between post-treatment score at one month with that of three months and six months and score at three months with that of six months. Statistically significant difference was found in the GOS between before treatment and at one month, three months and six months post-treatment. Also, statistically significant difference was found in the post-treatment score at one month with that of three months and six months and score at three months with that at six months with P value of 0.001 (Table 1).

DISCUSSION

Gingival overgrowth is a serious side effect that accompanies the use of Amlodipine. Despite the popularity and wide acceptance of the calcium channel blockers by the medical community, their oral impact is rarely recognized or discussed.[1] The main oral side effect is Amlodipine induced gingival overgrowth. There are several approaches for the management of gingival overgrowth. This study was accomplished with the objective to evaluate the clinical effect of scaling and root planing in treatment of amlodipine induced gingival overgrowth.

Non-surgical management of gingival enlargement is usually a treatment of choice in patients with mild to moderate gingival overgrowth.[11] Therefore in this study, Miller's and Damm, grade 1-2 enlargement, were treated whereas grade 3 were excluded because it requires extensive surgical procedure. Grading for gingival enlargement was based on Miller's and Damm index which is modified from the original Angelopoulos and Goaz index for the enhanced assessment of gingival overgrowth.[12] The rationale behind choosing this index was, its ease of use, reliability, affordability and less time consuming.

In this study, results demonstrated statistically significant reduction in terms of GOS, PD, and gain in CAL after treatment with SRP at one month, three months, and six months. However, the results were not statistically significant in the intragroup comparison at one month, three months, and six months in terms of CAL, PI, and GI.

Hancock et al. 1992 reported that a reduction of gingival overgrowth can be obtained by removal of plaque, through scaling and root planing along with meticulous home care without withdrawal of the drug.[13] Similarly, in this study after SRP, without drug

withdrawal, plaque index reduces to mean score 0.79 at six months from pretreatment score of 1.60 which shows positive correlation with decrease in degree of gingival overgrowth.

At the end of the observation period, the GO score decreased by 0.53 from a pretreatment score of 3.66 in the anterior teeth, which is 14.5% of gingival overgrowth reduction as compared to Kantarci et al. 1999[14] where they observed approximately 40% improvement in gingival overgrowth and inflammation values after SRP and closed curettage. The probable cause for more reduction in their study might be due to the additional curettage procedure done, as compared to this study.

The lack of inflammatory component after SRP at one month, three months and six months parallels the decrease of vertical gingival growth and consequently the significant decrease of periodontal pockets or pseudopockets. Therefore, in this study after SRP, more reduction in vertical dimension of gingival overgrowth was found as compared to horizontal dimension. However, statistically significant difference was not found in CAL during post treatment comparison between one month, three months, and six months, though the PD reduction was significant at one month, three months and six months post-treatment. It might be probably because of reduction of pseudopocket rather than true pocket.

The results after non-surgical therapy of DIGO described in the literature are conflicting. Some authors Aimetti et al. (2005),[15] Montebugnoli et al. (2000)[16] concluded that non-surgical approach including supra-, subgingival SRP were adequate in treating DIGO. Aimetti et al. (2008),[17] demonstrated that the clinical control of inflammation and gingival overgrowth by means of non-surgical periodontal treatment, such as SRP resulted, decrease in inflammatory infiltrate and change in connective tissue composition, histologically.

In contrast, other investigators Seymour et al. (1991),[18] and Hall (1997)[19] demonstrated that non-surgical periodontal therapy such as SRP, provided some benefit to the patient, but failed to completely prevent or resolve gingival overgrowth which is similar to this study, where individual plaque control improved throughout the therapy, and further, the GO, PD, CAL significantly decreased in all the patients. However, firm growth still remained in the lower anterior region at six months which may probably because of protruding gingival morphology, teeth malpositioning, flat surface of lower anterior teeth leading to improper food shedding, and inadequate plaque control due to distorted gingival morphology.

The limitations of this study were: it lacks a control group, subjects were treated with scaling and root planing only but drug substitution and surgical interventions were not performed. Further, this study was done on limited population visiting dental hospital, which may not represent the entire population.

CONCLUSION

Professional mechanical removal of the dental plaque and calculus through scaling and root planing has showed significant improvement in reduction of gingival overgrowth, probing depth, clinical attachment level, plaque index, gingival index as compared to pretreatment. Hence non-surgical approach such as scaling and root planing should be considered as the first treatment option for drug induced gingiva overgrowth.

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