

Treatment of drug-induced gingival overgrowth by full-mouth disinfection: A non-surgical approach

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Abstract:

Background: Drug-induced gingival overgrowth is a common finding in the modern era. These gingival overgrowths are usually treated by various modalities namely substitution of drugs, surgical, and non-surgical treatment. The recent concept mainly involves full-mouth scaling and root planing (the entire dentition in two visits within 24 hours, i.e., two consecutive days) followed by chair side mouth rinsing by the patient with a 0.2% chlorhexidine solution for 2 minutes and brushing the tongue of the patient with 1% chlorhexidine gel. This is followed by an additional subgingival irrigation (three times, repeated within 10 minutes) of all pockets with a 1% chlorhexidine gel. **Materials and Methods:** Twenty patients between the ages of 20 and 50 years with drug-induced gingival overgrowth were treated using the full-mouth disinfection approach. The patients were evaluated at 3 months and 6 months after therapy. The data obtained for plaque index, bleeding on probing index, probing pocket depth, and gingival overgrowth scores were tabulated and compared statistically using the one sample unpaired *t* test. **Statistical Analysis:** Statistically significant difference ($P < 0.05$) was found in PI GBI, PPD, and GO score between baseline, 3 months, and 6 months. **Results:** All clinical parameters improved significantly after therapy without the need of further surgical treatment. **Conclusions:** Full-mouth disinfection might be a beneficial treatment concept in patients with drug-induced gingival overgrowth, thus decreasing the need for surgical therapy.

Key words:

Chlorhexidine, drug-induced, gingival overgrowth, non-surgical

INTRODUCTION

Gingival enlargement is the term used to describe medication-related gingival overgrowth or gingival hyperplasia,^[1] a condition commonly induced by three main classes of drugs: Anticonvulsants, antihypertensive calcium antagonists, and immunosuppressant cyclosporine. Drug-induced gingival enlargement was first reported in 1939 by Kimball,^[2] with chronic usage of the anti-epileptic drug phenytoin. The prevalence of drug-induced gingival overgrowth (GO) varies among medications, and a variety of risk factors have been identified and reviewed recently, including age and sex of the patient, drug variables, concomitant medication, genetic factors, and the inflammatory status of the periodontal tissues.^[3,4] Although the mechanisms of action may be different, the clinical and microscopic appearance of drug-induced gingival enlargement is similar with any drug. It begins as a firm, nodular enlargement of the interdental papilla, within 3 months of taking the medicine, mainly limited to keratinized portions of the gingiva. The target cell is the gingival fibroblast, as all lesions are characterized by an increase in the connective

tissue component.^[5] Indeed, it has been shown that fibroblasts from overgrown gingiva in phenytoin-treated patients are characterized by elevated levels of protein synthesis, most of which is collagen.^[6] The nature of the relationship between plaque and the expression of GO is unclear, and controversy exists as to whether plaque accumulation is the cause or consequence of the gingival changes. Moreover, the massive plaque accumulation in the gingival pockets may be a consistent source for transient bacteremia, which increases the risk of systemic infections in immunocompromised patients, leading to profound complications.^[7] Although surgery remains the main option for treatment of drug-induced GO, alternative strategies have been investigated to either prevent this unwanted effect or reduce the incidence of its recurrence.^[8] Professional debridement with scaling and root planing has been shown to offer some relief in gingival overgrowth patients.^[9] In chronically immunosuppressed patients, papillary lesions present on the surface of the enlarged gingiva have been reported to resolve using topical antifungal medications (e.g., nystatin lozenges).^[10] The primary aim of nonsurgical therapy is to

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reduce the inflammatory component in the gingival tissue by suppressing or minimizing the amount of periodontal pathogens.^[11] In this perspective, the one-stage, full-mouth disinfection (OSFMD) was proposed by Quirynen *et al.*,^[12] aiming at eradication, or at least suppression, of periopathogens in a very short time span from all oropharyngeal habitats (mucous membranes, tongue, tonsils, and saliva).

The one-stage, full-mouth approach is aimed to prevent/retard a cross-contamination of the treated periodontal pockets by bacteria from untreated habitats. Thus, the aim of the present study is to evaluate whether a non-surgical approach according to the full-mouth disinfection concept is effective in preventing further surgical excision of drug-induced GO.

MATERIALS AND METHODS

After receiving the approval from the Institutional Ethical Committee, 20 patients (12 women, 8 men) between the ages of 20 and 50 years were selected for the study from the outpatient Department of Periodontics. A detailed case history proforma was designed and details of all the patients were recorded. The verbal and written consent was obtained from all the patients after explaining the complete clinical procedure. All the patients agreed for the participation in the study. In all these patients, GO had resulted from therapy with phenytoin ($n = 13$) and calcium channel blockers ($n = 7$) [Figures 1a, 2a, and 3a]. Physician referral was given in all the patients for substitution or withdrawal of the drug if possible. Of the 20 patients, 12 patients ($n = 12$) were substituted with new-generation anticonvulsant drugs. In the rest of the patients ($n = 8$), the dosage of the anticonvulsant drug was reduced, but complete substitution of the drug was not advocated by the physician. All the patients were non-smokers. The study was conducted from August 2012 to February 2013.

Clinical parameters

Baseline measurements included plaque index (PI) by Silness and Loe,^[13] bleeding on probing (BOP) as measured by Sulcus Bleeding Index (SBI),^[14] and probing pocket depth (PPD) which was recorded using a UNC-15 probe. Because of the overgrowth, it was impossible to measure the clinical attachment level reliably at most sites at baseline. Therefore, it was not considered for further analysis.

The degree of GO was graded numerically using a modification of a scoring system described by Seymour *et al.*^[15] A GO score was assigned to each interdental unit (gingival unit) and was the sum of two components. The first component measured the degree of gingival thickening by means of a 3-point scale (0 = normal width, 1 = thickening up to a tangent drawn between the labial surfaces of the two neighboring teeth, 2 = thickening over the tangent). The second component measured the extent of encroachment of the gingival tissues on the labial aspect of the adjacent tooth crown and ranged from 0 (no clinical evidence of overgrowth) to 3 (overgrowth covering three-fourths of the tooth crown). Since encroachment at the lingual aspect could not be examined properly on the photographs, scoring was limited to the labial aspect. The papillae distal to the dental arch and sites adjacent to edentulous spaces were not measured. The maximum score

possible using this method was 5. The degree of GO was expressed as a mean score and as a percentage in relation to the total number of gingival units per patient.^[16]

Therapy

Periodontal therapy was followed in accordance with the one-stage, full-mouth disinfection concept consisting of a combination of several therapeutic efforts. Firstly, full-mouth scaling and root planing (the entire dentition in two visits within 24 hours, i.e., two consecutive days) was done. Alongside, chair side mouth rinsing was done by the patient with a 0.2% chlorhexidine solution for 2 minutes prior to and after each session of root planing. Furthermore, tongue was brushed with 1% chlorhexidine gel (Chlorhexamed, GlaxoSmithKline) [Figure 4] for 1 minute. This was followed by an additional subgingival irrigation (three times, repeated within 10 minutes) of all pockets with a 1% chlorhexidine gel [Figure 5] in order to suppress the remaining bacteria. Antibiotics were not used. All patients received standard oral hygiene instructions immediately after the first session of scaling and root planing. These included inter-dental plaque control by dental floss and use of interdental brushes, toothbrushing, and brushing of the tongue dorsum twice a day. The full-mouth disinfection clinical situation was reevaluated at 3 and 6 months. The clinical parameters and radiographic parameters which were recorded at baseline were recorded again at 3 and 6 months.

Statistical analysis

Data were expressed as the mean + SD. Differences in PI, GBI, PPD, and GO score between baseline, 3 months, and 6 months were analyzed with the one-sample *paired student t test* for intragroup comparisons. The individual patient was included as a random effect in all mixed effects regression models, since each patient gave more than one tooth. Statistical significance was set at $P < 0.05$.

RESULTS

A total of 20 subjects ($N = 20$ in each group) completed the 6-month follow-up period. In all the patients, surgical intervention was not indicated after FMD. Statistically significant difference ($P < 0.05$) was found in PI, GBI, PPD, and GO score between baseline, 3 months, and 6 months. At 3 months, the mean reduction in GBI scores was 4.9 ± 1.52 mm and at 6 months the mean reduction was 4.10 ± 0.88 mm, which was statistically significant ($P < 0.05$) [Table 1]. The reduction in the GO scores from baseline to 6 months was 3.8 ± 1.23 mm (23%), which was statistically significant ($P < 0.05$) [Table 1]. The severity of GO, as measured by the modified Seymour index,^[15] expressed as mean and %, is presented in Figure 6. Similarly, the plaque index scores also declined from baseline to 6 months. The changes in maximum PPD in anterior and posterior segments throughout the therapy are presented in Figure 7. After therapy, the mean PPD was < 5 mm in all subjects. The improved clinical situation remained stable during maintenance and showed further slight improvements [Figures 1b, 2b, and 3b].

DISCUSSION

The most effective treatment of drug-related gingival enlargement is withdrawal or substitution of medication. When

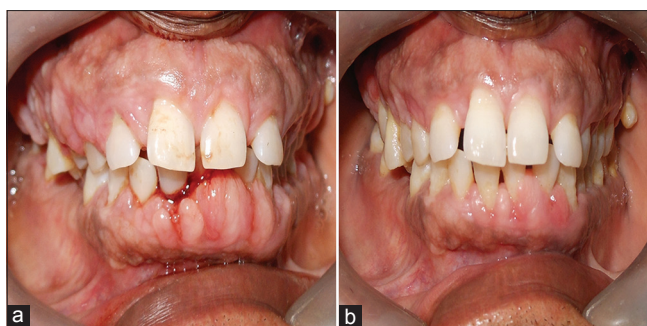


Figure 1: (a) Photograph showing gingival overgrowth of maxillary and mandibular anterior teeth at the baseline. (b) Photograph showing substantial reduction in gingival overgrowth of maxillary and mandibular anterior teeth 6 months after treatment

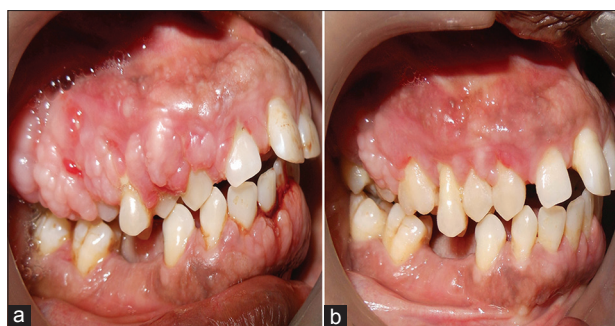


Figure 2: (a) Photograph showing gingival overgrowth of maxillary and mandibular right posterior teeth at the baseline. (b) Photograph showing substantial reduction in gingival overgrowth of maxillary and mandibular right posterior teeth 6 months after treatment



Figure 3: (a) Photograph showing gingival overgrowth of maxillary and mandibular left posterior teeth at the baseline. (b) Photograph showing substantial reduction in gingival overgrowth of maxillary and mandibular left posterior teeth 6 months after treatment



Figure 4: Chlorhexamed, GlaxoSmithKline



Figure 5: Subgingival irrigation by chlorhexidine

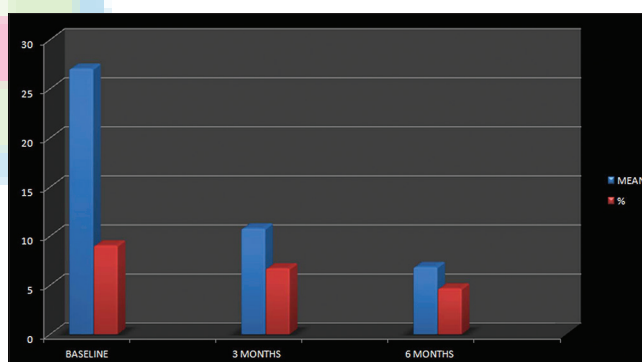


Figure 6: Mean and % GO score at baseline, 3 months, and 6 months

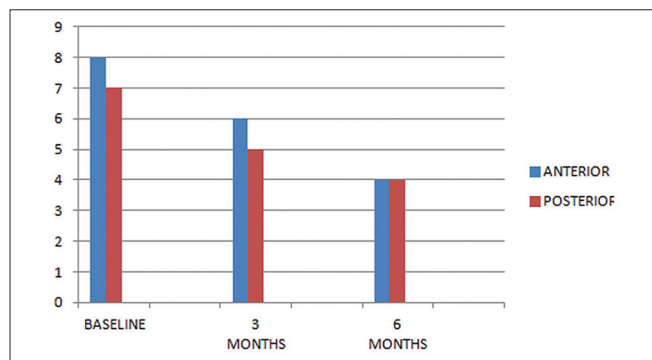


Figure 7: Distribution of PPDs ≥ 7 mm, 5 to 6 mm, and ≤ 4 mm at baseline, 3 months, and 6 months

this treatment approach is taken, it may take from 1 to 8 weeks for resolution of gingival lesions.^[17] Unfortunately, not all

patients respond to this mode of treatment, especially those with longstanding gingival lesions.^[18] Therefore, in such cases, surgery remains the main option, and that scalpel gingivectomy is still the treatment of choice.^[19,20] However, there is evidence that nonsurgical periodontal therapy reduces the inflammatory component in the gingival tissues and thereby reduces the need for surgery.^[21] Conservative nonsurgical periodontal therapies, including frequent professional prophylaxis and a rigorous home care regimen, can be carried out. It has further been suggested that gingival enlargement may regress with time in patients undergoing a vigorous oral hygiene program.^[22] For this purpose, the authors investigated the effect of the FMD concept as a nonsurgical approach in patients with drug-induced gingival enlargement.

The aim of the full-mouth disinfection approach was to eradicate, or at least suppress, all periodontal pathogens in a very short time span, not only from the periodontal pockets but

Table 1: Mean PI, GBI, PPD, and GO scores at baseline, 3 months, and 6 months

Parameters	Base line	3 months post-treatment	6 months post-treatment	Significant difference ($P<0.05$)
Plaque index scores	9.5±1.4	5.1±1.6	3.9±1.5	($P<0.05$)
Gingival bleeding index scores	9.40±1.58	5.1±1.6	3.9±1.5	
Probing pocket depth in mm	8.6±1.6	4.9±1.52	4.10±0.88	
Gingival overgrowth scores	16.2±1.8	12.4±1.9	11.8±1.63	

GBI – Gingival bleeding index GO – Gingival overgrowth;
PPD – Probing pocket depth; BL – Base line

also from the entire oropharyngeal cavity (mucous membranes, tongue, tonsils, and saliva). As such, the recolonization of the treated pockets by bacteria from untreated sites / niches (called cross contamination or intra-oral translocation) might be delayed until better healing of the pockets is achieved. The one-stage, full-mouth disinfection concept consists of a full-mouth scaling and root planing (the entire dentition in two visits within 24 hours, i.e., two consecutive days) to reduce the number of subgingival pathogenic organisms.^[23] It has been indicated that when the opportunity for intraoral translocation of periodontopathogens was reduced, the outcome of nonsurgical periodontal therapy could be improved. The mechanism for the intra-oral translocation of the pathogenic species remains unidentified. However, saliva, in which all bacterial species can survive, seems to play an important role. The translocation of periodontal pathogens directly into a periodontal pocket through the salivary flow is, however, unlikely because the continuous outflow of crevicular fluid from the pocket makes this nearly impossible. An indirect impact via a change in the supragingival plaque that may gradually extend subgingivally seems to be a more reasonable explanation. Several studies have indeed indicated that the subgingival microbiota depends, at least partially, on the presence of supragingival plaque.^[24] However, recent studies comparing the FMD concept with quadrant scaling and root planing at 1- or 2-week intervals failed to demonstrate differences in the clinical, microbiologic, or immunologic outcomes.^[25]

Applying the FMD regime in patients with drug-induced GO resulted in a statistically significant reduction of the GO and concomitantly the PPDs. The results after nonsurgical therapy of drug-induced GO described in the literature are conflicting. Some authors concluded that a nonsurgical approach including supra- and subgingival scaling and root planing was adequate in treating drug-induced GO.^[26] In contrast, other investigators demonstrated that oral hygiene programs or nonsurgical periodontal therapy, while of some benefit to the patient, failed to completely prevent or resolve GO.^[27] In the present study, the patients were followed for a period of 6 months. The individual plaque control improved throughout the therapy, but was still not optimal in most patients at the reevaluation

and the last recall visit. However, the PPD significantly decreased in all the patients from baseline to six months. Thus, this conservative approach combining chlorhexidine use and nonsurgical periodontal therapy involving the FMD concept reduced the need for surgical intervention in patients with drug-induced GO.

CONCLUSION

The one-stage, full-mouth disinfection concept results in significant additional clinical improvements with nonsurgical periodontal therapy. The new concept has no disadvantages and/or risks for the patient. Therefore, it is beneficial both for the clinician and the patient as it provides a better outcome of the mechanical debridement, reduced need for surgery, and more efficient time management, with less absence from work for the patient.

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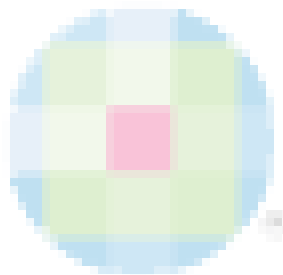
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