A combined treatment regimen for desquamative gingivitis in patients with oral lichen planus

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BACKGROUND: Chronic desquamative gingivitis (DG) is a condition characterized by erythema, ulceration, and desquamation of the free and attached gingiva, usually expression of a district-systemic disease, such as oral lichen planus (OLP).

METHODS: A combined protocol of oral hygiene and topic corticosteroid therapy was applied in 30 patients with DG associated with OLP. Plaque index (PI) and bleeding on probing (BoP) were evaluated at baseline and after 3 months.

RESULTS: PI scoring was significantly lower after treatment in anterior, posterior, and all sites (P < 0.0001) as well as in vestibular and lingual ones (P < 0.0001 and P = 0.0001, respectively). BoP measures were found to be reduced significantly to 22.94% in a full-mouth evaluation (P < 0.0001; OR = 2.633; 95% CI: 2.2685-3.0561) as well as in each specific site (P < 0.0001).

CONCLUSION: This clinical trial validated the efficacy, in patients with DG associated with OLP, of a protocol based on professional oral hygiene and self-performed plaque control measures in improving of gingival health status.

J Oral Pathol Med (2007) 36: 110-6

Keywords: bleeding gingival status; chronic desquamative gingivitis; dental plaque control; oral lichen planus

Introduction

Chronic desquamative gingivitis (DG) was described for the first time by Tomes and Tomes (1), and later, in 1932, Prinz (2) coined the term 'chronic diffuse desquamative gingivitis' for cases characterized by severe epithelial desquamation. While early reports suggested a single etiology for DG, it was speculated that it may be a manifestation of several diseases, principally mucocutaneous disorders, such as lichen planus (LP), mucous membrane pemphigoid (MMP), and pemphigus vulgaris (PV; 3). This correct hypothesis was confirmed and DG is a term still indicating a peculiar clinical picture and not a diagnosis *per se* (4–6).

Desquamative gingivitis is clinically characterized by erythema with epithelial desquamation, atrophy, ulceration, and/or presence of vesiculobullous lesions, and by a different involvement of marginal (MG) and attached gingiva (AG) both in anterior and posterior areas (4, 7, 8).

When DG begins, erythema predominates with minimal desquamation, later epithelium is easily peeled with possible presence of vesiculobullous lesions. Several cases have been shown with extensive areas of ulceration (4, 9).

Desquamative gingivitis occurs more often in females than males (4, 7), most cases appear after 30 years of age even if it can be seen at any age from puberty. The disease is chronic with periods of remission and exacerbation: gingiva may heal after several months or, regrettably, DG persists for years. Patients may be free of symptoms or complain for a burning sensation up to an intense pain.

Topical corticosteroids remain the most widely used treatment in DG because of oral lichen planus (OLP); nevertheless, the lack of adherence of the topical drug formulation to the sites affected for a longer duration has been considered as a factor in reducing the efficacy of this treatment (7, 10).

At the same time, clinical aspect is usually exasperated by plaque accumulation, often by trauma or inaccurate teeth brushing (11, 12). Indeed, pain and bleeding may impede correct oral hygiene practices, aggravating the gingival symptoms and supporting onset of periodontal complications, dental caries, and halitosis (13–16).

Authors performed a literature research in MED-LINE/PubMed and Cochrane Oral Health Group's Trial Register by the main key words related (gingivitis AND desquamative, gingivitis AND vesiculobullous diseases, desquamative gingivitis AND plaque, oral hygienist AND desquamative gingivitis, plaque control AND lichen planus AND mucous membrane, pemphigoid AND pemphigus vulgaris), and few original papers

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on the gingival health management in patients with DG At each

were found (7, 11, 17). The main goal of the present study was to verify, in OLP patients affected of DG, the efficacy of a combined protocol of professional and self-performed plaque control measures, coupled with topical steroid regimen, in improving their gingival health status.

Patients and methods

Study design

A single-blind open clinical trial was designed, although known that placebo-controlled type represents the ideal study design; we decided against this latter approach on ethical grounds, in view of the severe clinical condition of the patient. This study included 30 patients, 25 (83.3%) women and five (16.7%) men; the mean age was 61.37 ± 11.22 years (range: 41–82). They were consecutively recruited among patients with OLP, from July 2004 to June 2005, as being treated at the Oral Medicine Section (Department of Oral Sciences, University of Palermo, Palermo, Italy).

For each patient, previous medical history, results of histologic and immunologic investigations, and type of treatment were reviewed and registered. Medical and serologic screening of patients was performed at the time of diagnosis by evaluating routine hematologic parameters and testing for hepatitis B and C virus seropositivity and antinuclear antibodies (ANA; 18), together with a biopsy specimen.

The clinical inclusion criteria were: presence of erythematous and erosive gingivitis involving MG and/ or AG; clinical and histologic diagnosis of OLP; absence of acute infections and dysplasia/neoplasia in bioptic specimens, history of severe and chronic gingival pain, difficulties in eating and drinking, and absence of destructive periodontal disease as defined by the presence of a site with a periodontal probing depth (PPD) of 5 mm or more in combination with clinical attachment loss (CAL) of 2 mm or more (19).

None had received systemic treatment with corticosteroids and/or antibiotics within 3 months before the study. Details on demographical characteristics are shown in Table 1.

Evaluation of mucosal status oral health

An electronic initial chart is created for all patients at their first examination visit (20).

Table 1 Anamnestic and taxonomic characteristics in CDG patients (n = 30)

	Diagnosis, n (%)	Age, range (mean)			
OLP	30	41-82 (61.3)			
Gender					
F	25 (83.3)	42-82 (60.6)			
М	5 (16.7)	41-82 (64.8)			
HBV+	$4^{a}(13.3)$	69-71 (70.5)			
HCV +	$3^{a}(10)$	60-77 (69.3)			

OLP, oral lichen planus; CDG, chronic desquamative gingivitis. ^aOne co-infected (HBV+/HCV+) patient.

At each visit, with exception of Recall-1, a single experienced clinician (G.P.D.) performed digital color photographs of all patients recruited and assessed oral-mucosal status in areas of particular clinical interest.

Periodontal examination

Periodontal examination, by means of PI (21) and bleeding on probing (BoP) test (22) in six sites for tooth (mesiovestibular, mid-vestibular, distovestibular, mesiolingual, mid-lingual, and distolingual), was performed by a single-blind examiner (G.R.) trained in Periodontology. These parameters were registered by Williams periodontal probe (Hu-Friedy Instrument Co., Chigago, IL, USA). The probe was held with a light grasp, using approximately 25 g of pressure and pointed toward the apex of the tooth (23, 24). Presence or absence of bleeding after probing was recorded for evaluating inflammation of MG; to perform BoP test, Williams probe was inserted approximately 2 mm into the gingival sulcus and moved gently in horizontal direction, kept parallel to the long axis of the tooth. Each tooth site (except for third molars) was assessed and assigned a score of 0 (no bleeding) or 1 (bleeding) after 15 s following probing. Finally, number and percentage of sites, which bled at given time on such probing, were calculated. Worthy of note, PPD and CAL were not measured since a preliminary periodontal screening, by an early diagnostic detection system (i.e. Periodontal Screening and Recording) confirmed absence of cases with destructive periodontal involvement (25).

Diagnosis

The diagnosis of DG in patient with OLP included a detailed medical-dental history, a personal and family history of systemic diseases related, a comprehensive clinical oral examination of lesional and contiguous tissues (26). Additionally, hematologic examinations and evaluation of skin and other mucosal sites were performed.

Oral mucosal specimens were performed from the periphery of the lesion so that all or most of them, had got some attached epithelium. If the lesions appeared to be lichenoid the specimens were taken from the striated area. Erosive lesions were biopsied from the periphery of the lesion, again to include some attached epithelium (27).

Diagnosis of DG in OLP patients was clinical (presence of erosive or vesiculobullous gingival lesions) and histologic with the presence of the following microscopic features: hyperkeratosis, varying thickness of the epithelium, a subepithelial lymphocytic band-like infiltrate, and focal signs of basal layer degeneration (28, 29).

Combined clinical protocol

Clinical protocol applied is shown in Table 2. At the first periodontal visit (T = 0), all subjects were assessed clinically: a clinician expert in oral photography (G.P.D.) performed digital photographs, and a clinician trained in Periodontology (G.R.) recorded PI and BoP scores. All patients received supragingival and subgin-

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 Table 2
 Timing chart of multidisciplinary treatment regimen in CDG patient

Timing	Procedures	Investigator involvement
T = 0	Photographic records	Р
	PI and BoP registration	Р
	Oral hygiene instruction	OH
	Supragingival and subgingival scaling	OH
	Mouth rinses with alcohol-free chlorexidine 0.2% (2/die \times 7 days)	Р
	Topical clobetasol according to protocol	OMP
Recall-1 (1 week)	Oral hygiene reinforcement	ОН
	Supragingival and subgingival scaling; polishing	ОН
	Oral mucosal status assessment and the corticosteroids treatment modulate	OMP
Recall-2 (1 month)	Photographic records	Р
x	Overall oral mucosal status evaluation and setting	OMP
Recall-3 (2 months)	Photographic records	Р
	Overall oral mucosal status evaluation and setting	OMP
T = 1 (3 months)	Photographic records	Р
	PI and BoP registration	Р
	Evaluation the overall oral mucosal status	OMP
	Setting	P-OMP-OH

P, Periodontologist; OMP, Oral Medicine Practitioner; OH, Oral Hygienist; PI, plaque index; BoP, bleeding on probing; CDG, chronic desquamative gingivitis.

gival scaling and plaque control instructions by a dental hygienist (P.L.). The initial treatment comprised an intensive individual hygiene program in order to establish the most appropriate non-traumatic procedures and to obtain the best possible standard of oral hygiene; it was instructed, by an erythrocin dye tablet, the use of toothbrushes, dental floss, and/or inter-dental brushes. At the first appointment, the hygienist had to spend at least 30 min for the instructions. Each patient was advised to use a soft-bristle Meridol toothbrush (GABA International AG, Basel, Switzerland) and apply the modified Bass technique. He/she was also instructed to rinse twice daily for 30 s with 10 ml of chlorexidine digluconate 0.2% alcohol-free (Dentosan Pfizer Consumer Health Care, Rome, Italy), for 1 week.

This treatment was combined with the prescription by an oral medicine practitioner (D.L.C.) of a topical clobetasol prepared with an oral ointment (30). The paste was applied by the fingers, for 5 min, one, two, or three times daily in relationship with seriousness of clinical picture. Patients were instructed to remain seated and expectorate excess saliva after application moreover, they were asked not to remove the remains of the paste from their mouth and/or swallow after at least 10 min. The frequency of the applications was gradually reduced until the patient was on a maintenance dosage of one application of 5 min at alternate days.

After 1 week, at the 'Recall-1', patient was clinically assessed again, the hygienist scaled and polished all teeth and also reinforced plaque control instructions.

Follow-up visits were scheduled for each month (Recall-2 and Recall-3) in order to evaluate the overall oral mucosal status, by clinical examination and photographic reports, and to modulate the steroid topical treatment.

After 3 months (T = 1) from the first periodontal visit, photographs and all clinical measurements were carried out by the same examiners (G.P.D. and G.R.). If necessary, scaling and/or polishing were also performed.

Photographic reports were compared at the baseline time, Recall-1, Recall-2 and T = 1, in order to assess the response to the treatment in terms of mucosal/gingival health status. The evaluators (G.P.D. and G.R.) were asked to examine independently each picture for a maximum of 20 s without being able to re-evaluate the previously seen photograph, and indicated with 'yes' or 'no' the visual improvement (31).

Statistical analysis

Data management and analysis were performed using STATVIEW software (Version 5.0.1.; SAS Institute, Inc., Cary, NC, USA).

The variables evaluated in this study were changes in two clinical periodontal parameters (i.e. PI and BoP) observed at T = 0 and T = 1. Data analysis was performed on individual PI means calculated for both lingual and buccal surfaces (full-mouth PI). Results were also examined for anterior (incisors and canines) and posterior (premolars and molars) sites. In both cases, means plaque indices (PI) were derived separately for buccal and lingual surfaces.

The data were analyzed for normality of distribution through the use of the Kolmogorov–Smirnov test. As they were normally distributed, a paired Student's *t*-test was performed to determine the differences between PI values recorded before and later treatment. BoP data were analyzed by means of the McNemar test (19, 32–34).

Statistical significance was considered when *P*-value was ≤ 0.05 ; crude OR and 95% CI were also calculated.

Results

Mean (\pm SD) dental plaque scores and standard deviation for all sites and, separately, for anterior and posterior sites were calculated (Table 3). The plaque scoring was significantly lower after treatment in all surfaces (Student's *t*-test = 5.617; *P* < 0.0001) as well

Protocol for desquamative gingivitis

			Plaaue index	Significance
	T = 0	T = 1	reduction (%)	(P-value)*
Full-mouth	1.41 ± 0.45	0.97 ± 0.57	31.2	< 0.0001
Anterior sites	1.3 ± 0.46	0.86 ± 0.59	33.84	< 0.0001
Posterior sites	1.59 ± 0.53	1.15 ± 0.64	27.67	< 0.0001
Buccal sites	1.28 ± 0.53	0.77 ± 0.54	39.84	< 0.0001
Anterior buccal sites	1.16 ± 0.54	0.61 ± 0.57	47.41	< 0.0001
Posterior buccal sites	1.49 ± 0.62	1.01 ± 0.64	32.21	< 0.0001
Lingual sites	1.54 ± 0.44	1.18 ± 0.66	23.37	< 0.001
Anterior lingual sites	1.44 ± 0.48	1.1 ± 0.69	23.61	0.049
Posterior lingual sites	1.69 ± 0.51	1.29 ± 0.71	23.66	0.0008

 Table 3
 Pre-treatment and post-treatment plaque scores

Mean \pm SD and percentage of plaque reduction.

*By Student's t-test.

in anterior (Student's *t*-test = 4.948; P < 0.0001) and posterior sites (Student's *t*-test = 5.915; P < 0.0001). Similar results were obtained in vestibular (Student's *t*-test = 6.968; P < 0.0001) and lingual surfaces (Student's *t*-test = 23.37; P < 0.0001; data not shown).

A significant reduction in the number and percentage of BoP-positive sites were observed in full-mouth evaluation (22.94% less; P < 0.0001) as well as in each specific surface, as shown in Table 4. Some clinical cases at T = 0 and T = 1 were illustrated in Fig. 1a–d.

In all of patients a general improvement of mucosal and gingival lesions were confirmed by the two independent evaluators of photographic documentation.

Discussion

Desquamative gingivitis is a condition characterized by intense erythema, ulceration, and desquamation of the free and AG. This form of chronic gingivitis may represent the local manifestation of various mucocutaneous disorders, such as LP, MMP, and PV, and of drug-related reactions (8).

The etiopathogenetic distribution of DG among the main mucocutaneous disorders, as reported by the literature, is presented in Table 5.

The management of DG, in the past, was generally problematic seeing the high frequency of misdiagnoses for immuno-mediated diseases; due to the current techniques (e.g. immunochemistry, direct and indirect immunofluorescence) it is now possible to reach to their definite diagnosis, and to reduce number of idiopathic desquamative/erosive gingivitis cases. (27).

Desquamative gingivitis, when it starts, is a common gingival manifestation of no plaque-related diseases, but it may also turn into a periodontal plaque-related issue. This can happen when an adequate self-performed plaque control is not allowed due to pain and bleeding. Vice versa, mucosal symptoms, such as MG inflammation, burning, spontaneous or provoked bleeding, can be aggravated by the concurrent presence of dental plaque (12, 35, 36). Clinically, gingivae appear erythematous, mainly vestibular areas present vesicles or bullae, as extending apically from the MG to the alveolar mucosa. The affected gingival epithelium is very fragile and the surface detaches easily in response to any minor trauma. Occasionally, similar lesions are also seen on edentulous alveolar ridges (37).

As regards to gingival status health in DG, and the effect of dental plaque control in patients with DG and OLP has not received much attention in literature.

Holmstrup et al. 1990 (17) analyzed 11 patients, all women with atrophic or ulcerative LP lesions of the gingiva; this is the only study in which the patients with periodontal implication due to mucocutaneous disorders received a program of an intensive individual hygiene treatment. In that study, patients used the most appropriate and painless method for a 1-year period during which they were seen for follow up at 3-month intervals. The mean plaque scores decreased after the initial treatment followed by an increase.

Table 4 Effect of hygiene protocol on bleeding on probing

	Number (%) of sites bleeding on probing, $T = 0$	Number (%) of sites bleeding on probing, $T = 1$	Reduction (%), OR (95% CI)		
Full-mouth	2842 (73.32)	1947 (50.38)	22.94*, 2.633 (2.2685–3.0561)		
Anterior sites	1380 (68.24)	875 (43.27)	24.97*, 2.3165 (1.9007–2.8232)		
Posterior sites	1462 (78.85)	1072 (58.19)	20.66*, 2.8735 (2.281–3.6199)		
Buccal sites	1319 (68.05)	854 (44.20)	23.85*, 2.5198 (2.05-3.0972)		
Anterior buccal sites	617 (61.02)	378 (37.38)	23.64*, 2.0149 (1.535-2.6449)		
Posterior buccal sites	702 (75.72)	476 (51.68)	24.04*, 2.9084 (2.0985–4.0308)		
Lingual sites	1523 (78.58)	1093 (56.57)	22.01*, 2.6118 (2.0981–3.2513)		
Anterior lingual sites	763 (75.46)	497 (49.15)	26.31*, 2.3971 (1.7847–3.2196)		
Posterior lingual sites	760 (81.98)	596 (64.71)	17.18*, 2.7302 (1.9565–3.8099)		

*P-value: < 0.0001.

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Figure 1 (A) A case of vestibular DG in upper and lower arches at T = 0. (B) The same case at T = 1, with clinical improvement of gingival status. (C) A case of vestibular DG in upper arch at T = 0. (D) The same case at T = 1, with clinical improvement of gingival status.

Author	Number of patients	F	М	Mean age (years)	MMP (%)	LP (%)	PV (%)	Other (%)	No cause (%)
Nisengard and Neiders (4)	100	81	19	45	35	28	3	1 ^a	33
Rogers et al. (42)	41	_d	_d	d	88	2	5	0	5
Sklavounou et al. (43)	453	284	169	d	26	39	35	0	0
Holmstrup et al. (17)	11	11	0	60	0	11	0	0	0
Markopoulos et al. (44)	49	37	12	47	45	45	6	0	4
Yih et al. (27)	72	_d	_d	_d	40	42	5	3 ^b	10
Vaillant et al. (45)	33	25	8	60	39	36	15	7 ^c	3

Table 5 Etiopathogenetic distribution of CDG

^aPsoriasis.

^bLinear IgA disease.

^cLupus and post-herpetic erythema multiforme.

^dNot reported.

MMP, mucosae membrane pemphigoid; LP, lichen planus; PV, pemphigus vulgaris; CDG, chronic desquamative gingivitis.

In the present open clinical trial, none of DG due to lupus, psoriasis or erythema multiforme was registered, and none presented extra oral lesions. All participants underwent a thorough professional cleaning and were instructed to exercise meticulous self-performed plaque control. Our main finding was to demonstrate that this combined protocol, when performed for mid-long periods of time, not only reduce the amount of dental plaque, but it also reduces the gingival bleeding.

The importance of meticulous supragingival plaque removal for gingivitis resolution and maintenance of periodontal health following therapy is unequivocal (38–40). So, the key point for gingival health maintenance in DG patients is to achieve an adequate control of plaque and calculus together with a proper oral hygiene measures reinforced constantly, although in the presence of a different inflammatory chronic immune-related disease.

In our study, patients were advised to use a softbristle toothbrush and to apply the modified Bass technique. In addition, the proper use of dental floss and erythrocin dye tablet was explained. This treatment, in agreement with the literature (4, 41), was combined with the very diffuse topical treatment with clobetasol-17-propionate in an oral ointment applied for a variable period of time (30) directly onto the affected gingivae. However, it can be difficult to apply the ointment to the entire surface in patients with extensive lesions. In

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addition, normal mouth movements can rapidly dislocate the drug formulation, precluding good control over the contact time between the corticosteroid and the lesion that is critical to the success of this therapy.

Consistently with ADA guidelines (http://www. ada.org), an important observation made in this clinical trial is that the intensive individual hygiene program instituted, significantly affect the plaque accumulation and gingival bleeding, obtaining a percentage of PI reduction and BoP > 15%.

Finally, the use of digital photography, created with a high degree of resolution, has developed rapidly in dental practice, bringing many advantages: (i) it is ideal for systematic documentation before and after treatments; (ii) it has minimum costs; (iii) images can be easily transmitted via Internet from a remote location for review or consultation with other practitioners; (iv) transversal and longitudinal diagnostic capability of hard and soft oral tissues is enhanced; (v) objective data are available and (vi) the self-oral educational patient is simplified.

In conclusion, our study, although an open clinical trial with a limited sample size, robustly suggests the build-up, at the beginning of the DG management, of a task force among experts in oral medicine, periodontology, and dental hygiene with the common major aim to provide a satisfactory quality of oral health to the patient.

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