



A Novel Treatment of Gingival Recession using a Botanical Topical Gingival Patch and Mouthrinse

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ABSTRACT

Background and aim: Current treatment of gingival recession (GR) is limited to surgical procedures. We describe a case series of 18 patients with GR who were treated with a botanical patch and rinse following standard conservative therapy.

Case series description: A total of 22 sites with GR > 1 mm were studied. Following scaling and root planing (SRP) and oral hygiene instruction, patients received two courses of patch treatment (3 days each) and botanical rinse administered twice daily throughout the treatment period. Outcome measures (GR, gingival index (GI) and gingival thickness (GT) were taken at baseline; at 1 to 2 weeks; 2 to 4 weeks; and at 6 to 8 weeks. Miller classification and plaque index (PI) were measured at baseline and at 6 to 8 weeks. At the end of the treatment period, mean GR decreased from 4.18 ± 1.74 mm to 3.31 ± 1.51 mm (20.8%); Miller grade from 1.86 ± 0.56 to 1.06 ± 0.43 ; GI scores from 1.45 ± 0.63 to 0.17 ± 0.38 (88.3%); and PI scores from 1.33 ± 0.59 to 0.78 ± 0.94 . GT increased from 0.74 mm \pm 0.40 to 1.21 ± 0.39 (63.5%). No adverse effects were reported with either the patch or rinse treatments.

Conclusion: We observed a decrease in GR and GI scores in 18 patients (22 sites) treated with the study patch and rinse, with increased GT.

Clinical significance: A combined botanical patch-rinse treatment may be effective as adjuvant treatment to standard conservative care for GR. Further research is needed to verify these findings.

Keywords: Gingival recession, Inflammation, Botanical compounds, Topical patch, Mouthrinse, Case series.

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Conflict of interest: None declared

BACKGROUND

Gingival recession (GR) results from displacement of the gingival margin apical to the cemento-enamel junction (CEJ).¹ In addition to the esthetic defect, gingival recession can increase cervical dentine hypersensitivity and susceptibility to root caries.² GR is a common problem, with more than half of adult patients demonstrating a recession of ≥ 3 mm in at least a quarter of dentition.^{3,4} GR is believed to be caused primarily by anatomical factors, chronic trauma (e.g. harsh or poorly positioned toothbrushing), periodontitis and improper tooth alignment. Other factors such as aging, alveolar bone dehiscence, high frenum attachment and smoking have been implicated as well.³⁻⁷ The pathogenic mechanism for GR is thought to be inflammatory, resulting from the accumulation of dental plaque biofilm, mechanical trauma and faulty oral hygiene technique.⁶

Current treatment of GR is limited to surgical procedures. Nonsurgical treatments are not considered to be effective, though a preliminary open-label clinical trial (n = 24) showed scaling and root planing (SRP) with polishing to prevent further recession and reduce root convexity.⁸ Periodontal plastic surgery procedures can correct and prevent anatomic, traumatic or plaque-induced defects of the gingiva, alveolar mucosa or bone.⁵ However, surgery can be complicated by discomfort, painful wound healing of the palatal donor site for grafted tissue, necrosis of primary palatal flap, postoperative swelling, bleeding and ecchymosis. Despite high success rates, it is still unclear as to whether patients are truly satisfied with the esthetic outcomes of such procedures.⁵ Many patients are unable to undergo surgical correction of GR, due to local considerations and potential medical complications. In addition, many of the chronic lesions present in these patients cannot be effectively treated surgically, either due to advanced disease or local anatomic factors.

The PerioPatch[®] (Izun Pharmaceuticals Corporation[®] New York, NY) contains extracts of three herbal components—*Centella asiatica*, *Echinacea purpurea*, and *Sambucus nigra*. These compounds have been shown to be both safe and effective in inducing prohealing and anti-inflammatory effects on gingival tissue. Centella increases collagen production and stimulates cellular hyperplasia in granulation tissue, increasing levels of DNA, protein and hexosamine.⁹ This herb increases tensile strength in healing wounds via promotion of collagen cross-linking and rapid re-epithelialization.¹⁰ Centella also exhibits antibacterial activity,¹¹ and reduces levels of β -glucuronidase, an enzyme directly correlated to gingival inflammation.¹² Clinically, it has been shown to improve gingival index (GI) scores following subgingival implantation, when compared to controls.¹³ *Sambucus nigra* has been shown to inhibit bacterial proinflammatory activity, and to exhibit antibacterial activity in periodontal tissue.¹⁴ Finally, *Echinacea purpurea* exhibits antibacterial and anti-inflammatory effects, inhibiting proinflammatory interleukins such as interferon- γ and TNF- α .^{15,16} Echinacea has also been shown to reverse stress-delayed wound healing in mice.¹⁷

The hydrogel-based patch is comprised of an inner hardened hydrophilic gel layer which absorbs tissue exudates, and an outer layer which facilitates exposure of the gum tissue to the hydrogel components. In addition to the botanical compounds, the inner layer contains polyacrylic acids which absorb moisture, further promoting adhesion of the patch to the gum tissue. Following adherence of the inner gel layer to the tissue, the outer layer self-dislodges after about two hours.¹⁸ The patch has been shown to reduce inflammatory fluids and exudates in the inflamed tissue of the gum (Izun Pharma Ltd. Internal report #018: Hydrophilicity of the PerioPatch. July 15, 2010). In clinical research, the patch has been shown to reduce measures of inflammation.¹⁹ In two randomized placebo-controlled, double-blind trials a significant reduction in infla-

mmatory markers was observed in patients with moderate to severe gingivitis undergoing patch treatment, either as a stand-alone therapy or as adjuvant treatment to SRP.^{18,20}

The Izun Oral Rinse[®] (Izun Pharmaceuticals Corporation New York, NY) is a mouthrinse containing the same three bioactive herbal components as the patch. Extracts of these compounds are formulated in an alcohol-free solution containing flavorants and a preservative. In a randomized, controlled and double-blind study, the rinse was found to reduce GI scores, plaque index (PI) scores, and the number of bleeding sites in an untreated patient model. These effects were more pronounced with the study rinse than with controls, which included a cetylpyridinium chloride rinse, an essential oils rinse and a water-only preparation.²¹

Each of the two study medications utilizes the active botanical components in different ways; the patch elucidates a primarily local response through hydrodynamic changes in the inflammatory exudates. The rinse causes a more general response throughout the mouth cavity by delivering the active agents directly to the tissue. The use of both modalities has the potential to create a synergistic effect, though this combined treatment has not yet been investigated.

The purpose of the present case series was to observe the effects of the patch and rinse products when used together as adjuvant therapy to standard SRP treatment in the treatment of gingival recession. GI scores and gingival thickness (GT) were examined as well, as was the safety of the study patch and rinse treatments.

Clinical Presentation

Patients presenting to the Jerusalem Perio Center in Jerusalem, Israel, with GR of >1 mm at a least one site are offered treatment with the combined patch-rinse treatment. A consecutive series of 18 patient files examining 22 involved sites were included. Treatments took place from December 2010 to February 2012, and the study received approval by the institutional review board at the Shaare Zedek Medical

Table 1: Treatment schedule

	Baseline visit (day 0)	1st follow-up (1-2 weeks)	2nd follow-up (2-4 weeks)	3rd follow-up (6-8 weeks)
<i>Treatment</i>				
SRP*	+	–	–	–
PerioPatch	+	+	–	–
	(3-day regimen)	(3-day regimen)		
Izun Oral Rinse	+	+	+	+
<i>Measurements</i>				
Gingival recession	+	+	+	+
Gingival index	+	+	+	+
Gingival thickness	+	+	+	+
Miller classification	+	+	+	–

* SRP: scaling and root planning

Center in Jerusalem, Israel. GR of the anterior aspect of the tooth is measured using a Michigan '0' probe, using the distance from the CEJ to the deepest area of recession (to the nearest 1 mm). In addition to measurements of GR, patients are evaluated for severity of gingival inflammation. For this purpose, the GI score is calculated (possible range: 0-3), using the method described by Loe et al.²² GT is also measured, using a Williams periodontal probe held horizontally at the deepest point of the recession and pierced vertically to the mucosal surface to the bone.²³ Values for this outcome parameter ranged from 0.5 to 2.0 mm.

Evaluation of all the above parameters was conducted by the study periodontist (WZL) with the aid of a trained assistant. The treatment schedule for patients with GR undergoing the combined patch-rinse treatment is presented in Table 1. Following standard SRP treatment, baseline measurements of GR, GI, PI and GT are taken, as well as Miller classification. Following instruction on general oral hygiene, the first patch is applied by the study dentist, who demonstrates the steps of application with the patient holding a mirror. Patients are instructed to self-apply the patch twice more on the initial day of the study (Day 0); twice on the next day (Day 1); and once on the next and

last day of the patch treatment (Day 2). The 3-day patch treatment protocol is repeated at the next follow-up visit, though without SRP treatment. Throughout the entire treatment period patients are instructed to use the study rinse twice daily. Patients return for follow-up at 1 to 2 weeks following initial treatment; at 3 to 4 weeks; and finally, at 6 to 8 weeks. Patients are instructed to maintain normal oral hygiene throughout the treatment period.

Case Management

Treatment with the PerioPatch entails the placement of the patch over the affected area of the gingiva, overlapping onto the bottom third of the tooth and covering the buccal or lingual surface of at least two teeth (Figs 1A to C). The inner, light-colored side of the patch is applied directly to the involved area of the gum, creating a seal over the affected area and remaining in place for up to 5 hours. The outer, darker side of the patch dislodges itself within 2 hours of application, at which time it should be discarded. Each patch is used only once and then discarded.

The Izun Oral Rinse[®] is a standard mouthrinse, with a pleasant minty taste. Patients are instructed to fill one capful (15 ml) and to swish the rinse around the mouth for 1 minute,



Figs 1A to C: Patch application following scaling and root planing (SRP): (A) Following SRP, prior to patch application, (B) Following patch application, (C) At 8 weeks, following combined patch and oral rinse treatment

then expectorate. It is recommended not to eat, drink or rinse the mouth with water for 30 minutes after rinsing. The rinse treatment is repeated twice daily.

CLINICAL OUTCOMES

A total of 18 patient files, with 22 sites of GR were evaluated. All patients had been treated with the combined patch and rinse treatment, following SRP at the initial visit. The characteristics of the study subjects are presented in Table 2. Four of the patients were male, and the mean age of the study group was 45.9 (range: 16-86). The most common cause of GR cited was trauma, with 9 of the affected sites attributed to either abrasion or excessive flossing. The remainder of the sites were caused by either anatomical factors, such as high frenum attachment (4 sites); orthodontic treatment (3 sites); or unknown cause (6 sites). None of the patients had any underlying illness requiring chronic medication use, nor were any on antibiotic or anti-inflammatory treatment during the study period.

The results of the effect of the study treatment on GR, GI and GT at each of the four visits are presented in Graphs 1A to C. At the final follow-up visit (6-8 weeks), GR measurements decreased from a mean value (\pm SD) of 4.18 ± 1.74 mm at baseline to 3.31 ± 1.51 mm (20.8%), and Miller classification from 1.86 ± 0.56 to 1.06 ± 0.43 .

GI scores decreased as well, from 1.45 ± 0.63 to 0.17 ± 0.38 (88.3%), with PI scores reduced from 1.33 ± 0.59 to 0.78 ± 0.94 . GT measurements increased from 0.74 mm \pm 0.40 to 1.21 ± 0.39 (63.5%). No adverse effects were reported with either patch or rinse treatments.

DISCUSSION

In this case series, we examined the files of 18 patients with 22 sites of gingival recession who received adjuvant treatment with a botanical-based topical patch and mouthrinse treatment following standard treatment with SRP. This is the first study in which the effects of either the study patch or rinse were examined in the treatment of gingival recession. The observed decrease of 20.8% from baseline in GR measurements represents a reasonable treatment benefit. Even more marked was the decrease in GI scores and increase in GT measurements which resulted from the combined botanical treatment (93 and 93.2% from baseline, respectively). The use of the combined patch and rinse treatments as adjuvant to SRP treatment offers a safe and noninvasive method for stabilizing gingival recession, without the need for surgery.

Current treatment of GR is limited to surgical procedures, which may be accompanied by significant side effects and are not appropriate for some patients. And while it

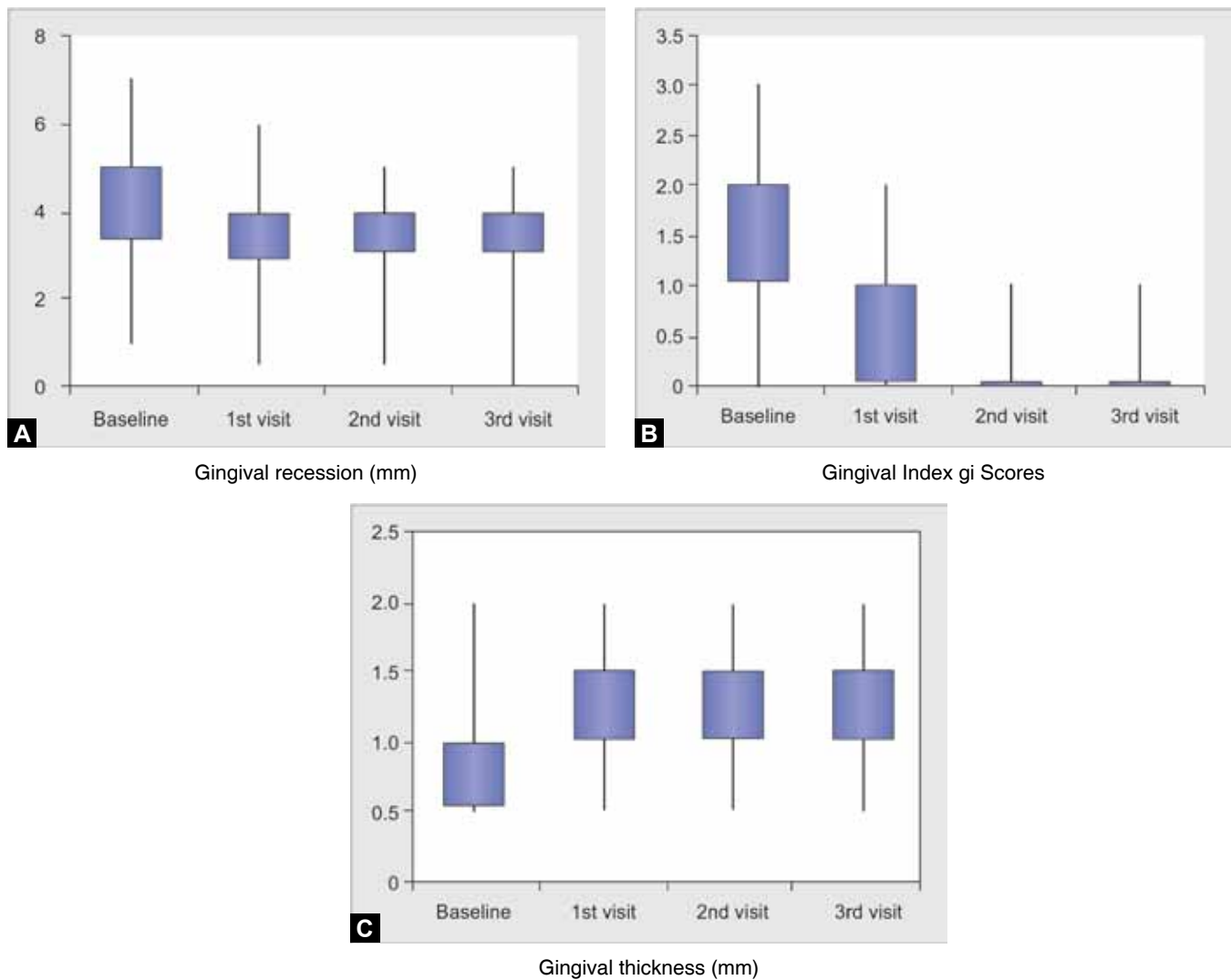
Table 2: Baseline characteristics of study patients

Site no.	Gender	Age (years)	Tooth	Recession (mm)	Miller class.	GI*	PI**	GT***	Cause
1	F	62	11	4	2	1	1	2	Abrasion
2	M	72	14	5	2	1	1	0.5	Abrasion
3	F	40	46	3	1	2	2	0.5	Flossing
4	F	40	44	4	1	1	Na	0.5	Flossing
5	F	23	44	1	1	1	Na	0.5	Anatomical
6	F	64	34	2	1	1	1	1	Anatomical
7	M	54	33	5	2	2	2	0.5	Abrasion
8	M	54	34	4	3	1	2	1	Abrasion
9	F	86	34	4	1	2	2	0.5	Abrasion
10	F	30	14	4	2	1	1	0.5	Anatomical
11	F	17	41	7	2	3	2	0.5	Orthodontics
12	F	36	36	5	2	1	1	0.5	High frenum
13	F	52	31	6	2	2	0	1	Unknown
14	M	16	13	7	2	2	2	1	Orthodontics
15	M	16	23	7	2	2	Na	1	Orthodontics
16	F	46	3	4	2	1	1	0.5	Unknown
17	M	70	23	5	2	0	1	na	Unknown
18	F	36	36	5	2	2	1	0.5	Unknown
19	F	38	33	3	2	1	1	1	Unknown
20	F	38	34	2	2	1	Na	0.5	Unknown
21	M	56	41	4	3	3	2	1	Abrasion
22	F	64	34	1	2	1	1	0.5	Abrasion

* GI = Gingival index

** PI = Plaque index

*** GT = Gingival thickness



Graphs 1A to C: Outcome parameters of patients treated with botanical-based topical patch and mouthrinse for gingival recession

is recommended that factors leading to recession such as harsh toothbrushing should be corrected, this may stabilize the damage but will not necessarily reverse the process.²⁴

We evaluated the efficacy of a nonsurgical treatment which combines a local patch treatment with a mouthrinse, both based on the same botanical formula. It was thought that while the patch would provide a more concentrated and directed treatment to the receding gingival area, the rinse would enable a more prolonged exposure, augmenting the more short-term effects of the patch. At the end of the treatment period, a significant reduction in local inflammation was observed, as measured by GI scores. In addition to their anti-inflammatory effects, other mechanisms of action may help understand the effect of the botanical components. The compound *Centella asiatica*, for example, has been shown to increase collagen production and stimulate cellular hyperplasia in granulation tissue, due to higher levels of DNA, protein and hexosamine.²⁵

In addition to the reduction in GI scores, the study patients demonstrated a significant increase in GT measurements. Gingival thickness is considered to be one of the most important factor in predicting the success of surgically-achieved root coverage.⁸ Though not necessarily a desirable outcome esthetically, thickened tissue significantly improves the ability of the gingiva to resist trauma and subsequent recession, enabling tissue manipulation, promoting creeping attachment and reducing the severity of clinical inflammation.²⁶ Thus, the combined study patch-rinse treatment can serve as a presurgical treatment, potentially improving postsurgical outcomes.

Reports of case series are limited, both by the small sample size as well as the lack of a control group. In addition to these limitations, our study did not examine parameters such as posterior recession, probing depth and attachment width. Nor were questions such as the degree of distress to patients resulting from the recession or the hypersensitivity

of the exposed root addressed. The use of two forms of treatment (patch and rinse) together raises the question regarding the contribution of each product individually. Finally, patient adherence to the treatment protocol was not tested. Nevertheless, the present case series is supported by three randomized and blinded clinical trials, which have shown beneficial effects for both of the botanical-based products in reducing signs and symptoms of gingival inflammation. Future research is needed in order to assess the true benefits of the combined treatment for GR, within the framework of controlled clinical trials.

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