Novel treatment (new drug/intervention; established drug/procedure in new situation)

Aesthetic management of gingival recession by root biomodification with carbon dioxide laser and subepithelial connective tissue graft with lateral repositioned flap technique

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Summary

Localised gingival recessions continue to represent an important aesthetic condition requiring treatment in periodontics. Various techniques have been tried to treat exposed root surfaces to improve aesthetics with high percentage of success and minimal discomfort. Root biomodification is done to improve the predictability of these procedures. This clinical report describes periodontal plastic procedure involving subepithelial connective tissue graft with lateral repositioned flap technique and root biomodification with CO₂ laser for the management of gingival recession.

BACKGROUND

The connective tissue graft with lateral repositioned flap and root biomodification with CO₂ laser is a novel approach to treat gingival recession with 100% success.

The principal objective in the treatment of gingival recession is to cover the root surface and to reduce hyper-sensitivity. Additional benefits include an increase in the thickness of keratinised gingiva and an aesthetic appearance. Subepithelial connective tissue graft can be considered the gold standard procedure in the treatment of Miller Class-1 and II recession type defect.¹

So far, a concerted effort has been made in the field of root biomodification to improve the outcome of regenerative periodontal therapies by favouring the attachment of the regenerated periodontal structure. Mechanical instrumentation leaves a smear layer which affects cell reattachment and can serve as a reservoir for microbial growth. Therefore chemical conditioning of roots has been performed to remove the smear layer and improve biocompatibility.² CO₂ laser irradiation of 1 sec at 3 Watt power completely removes the smear layer with minimal change in the diameter of the dentinal tubules.³ Furthermore, the CO₂ laser irradiation for 1.0 s may promote comparatively better attachment of periodontal fibroblast on dentinal root surface than the conventional chemical conditioning agents.⁴ The aim of this case report is to evaluate the role of CO₂ laser for the biomodification of the exposed root surface and correct the gingival recession with connective tissue graft and lateral repositioned flap to achieve the maximum aesthetics and health.

CASE PRESENTATION

A 30-year-old female patient reported to the out patient Department of Periodontics, with chief complaint of bleeding from gums and sensitivity to cold in lower front teeth region.

On examination, there was marginal gingivitis and Miller's class 1 gingival recession in # 31. The recession depth was measured to be 5 mm and the width of

keratinised gingiva was 2 mm recorded using UNC 15 probe (figure 1).

As part of initial therapy, oral hygiene instructions were given and scaling and root planing done. Blood investigations were also carried out. The patient was recalled after 15 days to assess her oral hygiene and gingival health before the surgical management. An informed consent before the treatment was taken.

After proper part preparation, 2% lignocaine hydrochloride with 1:80 000 epinephrine (Lignox 2% A, promoted by Warren, manufactured in India by Indoco Remedies Ltd, Verna, Goa) was given. The papillae mesial and distal to recession defect were de-epithelialised. A template for the connective tissue graft, an aluminium foil was adapted and trimmed to the desired size. A lateral repositioned flap was reflected (figure 2) to cover the recession defect according to Grupe and Warren technique.⁵

The connective tissue graft was harvested from the area distal to canine and mesial to palatal root of maxillary 1st

Figure 1 Preoperative.

Figure 2 Lateral repositioned flap.

Figure 5 After suturing.

Figure 3 Laserisation at 3 watt.

Figure 6 Postoperative 3 months.

Figure 4 Connective tissue graft is placed.

molar due to adequate thickness of palatal mucosa in this region. The graft was trimmed and irrigated with normal saline to remove blood clot over it and the exposed root was biomodified with carbon dioxide laser with helium-neon laser guide (Satelec Dental CO₂ Laser Model Lasersat, Merignac Cedex, France.) at a measured power of 3 watt in defocused mode for 1 s (figure 3). Eyes of the patient were

protected with cotton. The trimmed graft was placed over the biomodified root surface and covered by the lateral sliding flap (figure 4). Suturing was done to secure the graft to the recipient bed with 5-0, resorbable suture material (Ethicon, Manufactured in India by Jhonsen and Jhonsen Aurangabad.) (figure 5). A mild digital compression for 5 min was given and a non-eugenol periodontal dressing was applied. Palatal wound was sutured by interrupted direct loop suture method.

Postoperative instructions were given. Chlorhexidine gluconate (0.2%, Clohex Plus, Manufactured in India by Group Pharmaceuticals Ltd, Kolar, Marketed by Dr Reddy's Ltd Hyderabad) was prescribed twice a day for 4 weeks. The patient was instructed not to brush over the operated area for at least 4 weeks. Antibiotics and analgesics were prescribed for 7 days. The patient was advised to take soft diet for first 1 week and to wear stent, if she feels discomfort during chewing. Home care instructions were reviewed again and the patient was scheduled for recall appointments after 2 weeks, 1 month and 3 months (figure 6). No relapse of the recession was observed on recall visits and aesthetics, function and health were found to be satisfactory.

OUTCOME AND FOLLOW-UP

In the present case, the reduction in recession depth was 5 mm, and gain in keratinised gingiva was 3 mm. This

amounts to 100% root coverage and adequate gain in width of keratinised gingival after 1 month.

DISCUSSION

This case was designed to evaluate the effectiveness of the subepithelial connective tissue graft in covering localised gingival recession when supplemented with CO₂ laser root biomodification. The clinical result achieved clearly demonstrated the benefit from the addition of CO₂ laser application.

Since Langer and Langer⁶ introduced the subepithelial connective tissue graft, the technique has been modified several times. Some of the modifications included the use of acid biomodification.⁷ The clinical advantage of subepithelial connective tissue graft is apparent at the recipient site, where there is good tissue blending and predictability of results, and in the palatal donor area, as it uses a more conservative approach to harvest the graft, decreasing the degree of discomfort. Subepithelial connective tissue graft with lateral repositioned flap technique has advantage of improved support and nourishment of the graft. Root biomodification can be performed by various traditional chemical agents like tetracycline hydrochloride, citric acid, hydrogen peroxide and EDTA. But it was found that CO₂ laser irradiation of 1 s at 3 watt power on periodontally involved root surfaces completely removed the smear layer with minimal change in the diameter of the dentinal tubules.³ The principle of this procedure is that removing the smear layer from the root surface exposes the collagen fibres which lead to improved healing.

It was found that the behaviour of human periodontal cells on CO₂ laser irradiated dentinal root surfaces showed better attachment.⁴ It was also noted that the CO₂ laser biomodification could induce predictable clinical improvement when used as an adjunctive tool with traditional periodontal surgery.

Learning points

- ▶ The main clinical tool to measure success for all the root coverage procedures is the measurement of amount of exposed root surface covered.
- ▶ This novel approach of root coverage can provide 100% root coverage.
- ▶ Root biomodification with carbon dioxide laser provides better fibroblast attachment.

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Competing interests None.

Patient consent Obtained.

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