



RESEARCH ARTICLE

A CLINICAL STUDY FOR RECESSION COVERAGE IN MAXILLARY MOLARS USING BUCCAL PAD OF FAT

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ARTICLE INFO

Article History:

Received 26th December, 2018

Received in revised form

20th January, 2019

Accepted 08th February, 2019

Published online 31st March, 2019

Key Words:

Buccalfat pad, Gingival recession, Miller's Class III, II.

ABSTRACT

Background: Gingival recession in maxillary molars can be treated by buccal pad of fat due to its easy assessibility, less donor site morbidity, excellent blood supply, minimal patient discomfort and better clinical outcome. Thus in this study we tried to treat miller class II and classIII gingival recession in maxillary 1st and 2nd molars using buccal pad of fat. **Materials and Methods:** 10 systemically healthy patients with age ranging from 34 to 55 years with Class II and Class III gingival recession in the maxillary molars were selected. Before the surgical phase, all the patients received oral hygiene instructions and scaling and root planning. A horizontal incision of 1–1.5 cm was made in the buccal sulcus of the maxillary molar region; buccinator muscle was separated bluntly to expose the BFP. The fat was then teased out from its bed and spread to cover defects adequately. It was then secured and sutured without tension. Clinical parameters such as probing depth, recession length (RL), and width of keratinized gingiva were recorded at baseline and at 6 months postoperatively, and weekly assessment for postoperative healing was done at 1 week, 2 weeks, 3 weeks, and 4 weeks **Results:** Treated recession defects healed successfully without any significant postoperative complications. RL from 5.6±1.26 to 1.5±1.702 were observed postoperatively ($P < 0.05$). Percentage of root coverage average was 80.8%. **Conclusion:** Pedicled buccal fat showed promising results as the treatment modality in the management of Class II and Class III gingival recession of maxillary posterior teeth.

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Citation: Dr. Rashidat ul khairat MDS., Dr. Beanish Bashir, MDS, Dr. Suhail Majid Jan, MDS and Dr. Roobal Behal, MDS, 2019. "A clinical study for recession coverage in maxillary molars using buccal pad of fat", *International Journal of Current Research*, 11, (03), 2515-2519.

INTRODUCTION

Gingival recession, a common and undesirable finding is the displacement of the gingival margin apical to the cemento-enamel junction (CEJ) (The American Academy of Periodontology). Its extent and severity increases with age, more prevalent in males and smokers, buccal sites, especially the canine tooth, and in sites with supra- and sub gingival calculus (Albander, 1999). The gingival recession is the location of the gingiva and not its condition. Recession can be localized or generalized throughout the mouth (Deby Johnson, 2012). Gingival recession is associated with multiple etiologic factors such as anatomic factors which include bone dehiscence, malpositioning of teeth, orthodontic tooth movement, muscle pull, or direct trauma associated with malocclusion, physiologic (aging) or pathologic factors as a part of the pathogenesis of periodontal disease or smoking (Tugnait, 2001; Loe 1992; Serino, 1994).

The mechanism by which gingival recession occurs is still unclear; however, it seems that gingival recession probably occurs in the presence of inflammation and tissue destruction in plaque-induced periodontal disease and due to faulty brushing habits. (Mohammed Azmatullah, 2012) Thus gingival recession leads to compromised esthetics, root hypersensitivity, increased incidence of root caries, pulp hyperemia and diminished plaque control, root abrasion, gingival bleeding, and/or a fear of tooth loss, thus necessitating treatment.

Therefore, several surgical techniques were described to manage the gingival recession defects, including increasing the keratinized tissue, frenectomy, and root coverage techniques, with varied reported clinical effectiveness (Wennstrom, 1996). The Pedicled buccal fat pad (PBFP) has been used for reconstruction of oral defects and had shown great success in all of the previous studies owing to its physical and biological

properties. The advantages of Pedicled buccal fat pad (PBFP) include anatomically favorable location, the ease and minimal dissection with which it can be harvested and mobilized, excellent blood supply, simplicity, versatility, low rate of complications, minimal to no donor site morbidity (Singh *et al.*, 2004). It has strong anti-infective and keratinizing properties that makes it a suitable choice for oral reconstructions and root coverage procedure in the region of maxillary posterior teeth (El Haddad, 2008). It also reduces patient discomfort including number of surgical sites with highest level of patient satisfaction in term of esthetics, colour and blending of grafted tissue (Mahajan, 2007). Therefore a graft which can be harvested from the adjacent area of the recession defect with its own blood supply may be the suitable auto graft for the root coverage.

The Buccal fat pad (BFP) was first described by Heister in 1732; and believed it to be a glandular structure. The true fatty nature of this tissue was defined by Bichat in 1802 (Carter, 2005). Egyedi first reported the use of buccal fat pad (BFP) in the closure of orotracheal/nasal communications. BFP is also used in the defects resulting from traumatic or malignant tumors in oral soft tissue (Egyedi, 1977). The BFP consists of an encapsulated central body (corpus) with four extensions: buccal, pterygoid, superficial, and deep temporal. The corpus and the buccal extension account for; 50% of the BFP and are the most clinically significant portions (Khouw *et al.*, 2004). BFP is a specially organized tissue with its fat termed syssarcosis, a fat that enhances intermuscular motion. It is not subjected to lipid metabolism unlike subcutaneous fat where it has a different rhythm of lipolysis (Colella *et al.*, 2004).

As it is located within the masticatory space, a horizontal vestibular incision in the mucobuccal fold is given that extends backward from above the maxillary second molar followed by blunt dissection through the buccinator muscle and the loose fascial layer that surrounds the fat pad the PBFP so readily. It has been documented that the BFP has a valuable surgical function and can serve as a well-vascularized, readily obtainable local flap for oral reconstructive purposes (Carter *et al.*, 2005). Thus in this study we tried to clinically evaluate the effect of pedicled BFP (PBFP) in the treatment of Class II and Class III gingival recession defects of maxillary posterior teeth.

MATERIALS AND METHODS

A 6 month clinical study was conducted comprising of systemically healthy 10 patients, 6 females and 4 males with class II and class III recession on the side of maxillary first molar or second molar measuring about 4 mm and above were selected after voluntary written consent. Inclusion criteria involved vital tooth without caries and restorations. Exclusion criteria included patients with poor oral hygiene, tobacco users, pregnant and lactating patients, and patients on steroid therapy. Nonsurgical periodontal therapy (Phase 1 therapy): At the baseline all the patients received oral hygiene instructions and non surgical periodontal therapy.

Clinical Measurements: Clinical parameters recorded during the course of the study were recession length (RL), width of keratinized gingiva (KGW), and percentage of root coverage. William's graduated probe was used to measure the readings and were recorded at baseline and at 6 months.

Surgical procedure: 0.12% chlorhexidine digluconate was used as pre-surgical rinse. Iodine solution swab was used to carry out an extraoral antiseptis. After the administration of (2% lignocaine 1:1, 00, 000 adrenalin) local anesthesia, crevicular incision was made and a full-thickness mucoperiosteal flap was raised. A horizontal incision of 1–1.5 cm was made in the mucobuccal fold in relation to the maxillary first molar region and extended backward. Buccinator muscle was separated bluntly to expose the BFP. The fat was teased out from its bed; the anterior portion was gently grasped and spread onto the defect site to cover adequately. Fat pad was applied adequately or little excess to cover the entire surgical defect to compensate for postoperative shrinkage during healing. It was then secured and sutured without tension using resorbable sutures.

Post-operative care: Suitable antibiotics and analgesics (Augmentin 625mg mg, thrice per day; and Diclofenac three times a day, for 5 days) were prescribed. Patients were advised to take soft semisolid to liquid diet, and brushing other areas except the operated site for 2 weeks. Patients were also advised to rinse with chlorhexidine gluconate mouthrinse (0.2%) twice daily for a period of 15 days. Each patient was [re-examined weekly] up to 1 month and after 6 months, and oral hygiene instructions were reinforced at each recall visit. No sub gingival instrumentation was attempted at any of these appointments.

Statistical analysis: The data were analyzed using statistical software SPSS and Microsoft Excel (version 5.00). The results were averaged (mean standard deviation) for each parameter at baseline and 6 months. Inter group analysis of data was done by applying Student's independent t-test and for intra group analysis, Paired t-test was employed. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Present study included 10 patients, 6 females and 4 males to evaluate the application of buccal pad fat in treatment of class II and class III recession defects in upper 1st and 2nd molars. Among the defects, 3 were 2nd molars and 7 were 1st molar defects. All the patients completed the study. The periodontal parameters at baseline together with the 6-month outcomes are summarized in table 1. Post operative healing was uneventful as summarized in Table 2. Table 1 and 3 demonstrate the measurement of recession defects pre and post operatively and gain in keratinized gingival epithelium. %age of root coverage was calculated and mean of root coverage was 80.8% at the end of 6 months. Average gain in keratinized epithelium was 1-1.5 mm which was statistically significant ($p < 0.05$). Gingival recession length decreased from 5.6 ± 1.26 to 1.5 ± 1.702 which was statistically significant ($p < 0.05$).

DISCUSSION

Several techniques have been used for recession coverage for esthetic and functional reasons. These include various methods with some short comings. Both free gingival and sub epithelial connective tissue graft requires two surgical sites and their survival depends on the circulation of recipient site. In case of Pedicle grafts such as lateral pedicle flaps that offer a predictable clinical outcome but are limited by their length and thickness, with chances of recession at the donor site (Nevins, 1998).

Table 1. Measurement of clinical parameters

case no	Age /gender	Gingival recession length pre op	Gingival recession length Post op	% of root coverage	Mean%	Gain in keratinized epithelium
1	34/f	4mm	1mm	73.1%	80.8	1mm
2	47/f	5mm	1mm	80%		1mm
3	55/m	8mm	6mm	75%		2mm
4	42/m	6mm	2mm	66%		1mm
5	37/f	7mm	2mm	71.4%		1mm
6	52/m	5mm	1mm	80%		1mm
7	34/f	6mm	0mm	100%		2mm
8	45/f	5mm	1mm	80%		1mm
9	49/f	4mm	0 mm	100%		1mm
10	51/m	6mm	1mm	83%		1mm

Table 2. Observations in the post-operative healing period

Case no	Pain			Swelling			Restriction of mouth opening			Infection		
	1WK	2WK	4WK	1WK	2WK	4WK	1WK	2WK	4WK	1WK	2WK	4WK
1	+	-	-	-	-	-	-	-	-	-	-	-
2	++	+	-	+	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-
5	+	-	-	-	-	-	+	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-
7	++	+	-	-	-	-	-	-	-	-	-	-
8	+	-	-	+	-	-	-	-	-	-	-	-
9	+	-	-	+	-	-	+	-	-	-	-	-
10	+	-	-	+	-	-	-	-	-	-	-	-

Table 3. Mean and standard deviation of different measurements in pre- and post-scores

MEASUREMENTS	MEAN ± SD PRE SCORE	MEAN ± SD POST SCORE
Gingival recession length	5.6 ± 1.26	1.5 ± 1.702
Gain in keratinized epithelium	0.7 ± 0.2	1.2 ± .421
Pocket depth	1.82 ± .45	1.08 ± 0.291

Pictorial representation of surgical technique employed



Pre operative



Flap elevation



Buccal pad of fat



Recession coverage with buccal pad of fat



Sutures placed



8 week- post operative view

Coronally positioned flap on the other hand requires keratinized gingiva thus used to cover shallow recessions (Miller, 2000). Thus these surgical techniques were not suitable for sites with severe gingival recession. Therefore PBFP can be used for root coverage procedure in severe gingival recession defects especially in the posterior maxilla due to its proximity to the recipient site and easy accessibility. It has a rich plexus of blood vessels forming an internal micro vascular network that ensures the survival of the flap after relocation with no need for anastomosis (Fan, 2002). In this study gingival recession length decreased from 5.6 ± 1.26 to 1.5 ± 1.702 which was statistically significant ($p < 0.05$). There was significant gain in width of keratinized gingiva from 0.7 ± 0.2 to $1.2 \pm .421$. 80.8% was the average root coverage at the end of 6 months. There was decrease in the pocket depth from $1.82 \pm .45$ to 1.08 ± 0.291 at the end of 6 months. In this study the post-operative healing occurred without any uneventful consequence and epithelialization of the BFP started within the 2nd week with complete epithelialization occurring in 4–6 weeks. These results were similar to that Deepa D; 2018, Agarwal, 2014 (Agarwal, 2014). The histological nature of the healing process of the BFP was first reported by Samman *et al.* (1993) who found complete absence of the fat cells in sections taken from healed sites, indicating fibrosis of the fat tissue and replacement of fat cells by collagen fibres slowly over time with reconstructed area covered by parakeratotic stratified squamous epithelium. This led to the conclusion that a population of multipotent stem cells comparable with mesenchymal stem cells could be isolated from human adipose tissue (Zuk, 2002). It was also found that cells derived from BFP can differentiate into osteoblast, which confirms the presence of stem cells within the BFP which could aid in periodontal regeneration (Pyo *et al.*, 2006). Thus buccal pad of fat can be used as a reliable modality for the recession coverage for maxillary molars due to less morbidity of donor site, good vascularity and easy accessibility.

Conclusion

It is concluded that the buccal pad of fat is a novel approach for covering severe gingival defects in maxillary molars than by other conventional procedures. However further long term studies with increased sample size are required to support the finding.

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