

Comparative Evaluation Of Effectiveness Of Pinhole Surgical Technique With Coronally Advanced Flap For The Treatment Of Gingival Recession Defects In Humans- A Clinical Study

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Abstract :

Introduction : *Gingival recession is seen commonly in the overall population and often is an indication to the patient to pursue treatment for denuded roots due to hypersensitivity and/ to improve aesthetics. It is a constantly developing and growing research field. In order to avoid progress of recession. A surgical procedure that deal with all the GR defects in a single visit, that is easy, practical, operator friendly, not requiring a second surgical site, time efficient, and most significantly, meet up the patient's esthetic concerns is a desirable option.*

Aim/ Objectives : *To evaluate the effectiveness Of Pinhole Surgical Technique with Coronally Advanced Flap for the treatment of gingival recession defects for root coverage (RC), improvement in relative attachment level (RAL), increase in width of keratinized gingiva (WKG) and gingival thickness.*

Methodology : *20 healthy patients with class I or class II recession will be assigned randomly to either pinhole surgical technique or coronally advanced flap. Follow up of 1, 3 and 6 months will be done.*

Results: *At 6 months improvement in RC, RAL and the amount of WKG. Along with improvement in gingival thickness will also be seen. Plaque index and Bleeding index will be reduced at 6 months.*

Conclusion : *In this study we will try to achieve practicability of a novel invasive approach of pinhole technique to root exposure in Class I or II type of GR defects and to compare this technique with CAF with PRF procedure for root coverage.*

Keywords: *Pinhole Surgical Technique , Coronally Advanced Flap, Gingival Recession*

Conflict of Interest: None Type of Article: Study Protocol

1. INTRODUCTION

The patients these days are getting aware of their own looks and more awareness has been drawn to exposed roots that are visible while a patient smiles which does not look aesthetic [1]. Mucogingival treatment may be obligatory to avoid more recession, treat aesthetic complications, to help prevent plaque accumulation, also decrease hypersensitivity. In the past three decades, numerous procedures such as the laterally positioned flap, FGG, CAF, CTG, PRP and PRF in combination with CAF all have been tried.[2-3]

Choukroun's PRF is concentrate of second-generation in which cytokines, glycanic chains, and structural gp are present. PRF is an autologous leukocyte and PRF material. They are entrapped inside a gradually made complex fibrin. During Centrifugation procedure there is formation of 3 strata: PPP at the top, PRF lump in the centre, and RBC at the bottommost of the test cylinder. After completion of centrifugation, earlier formed Platelet Rich Fibrin lump is detached and flattened to squeeze out the serum and obtain a fibrin membrane. These three- dimensional architecture membrane contain platelets and growth factors and easy to handle. It is autogenous in nature, with no artificial chemical agents involved in it. PRF is not expensive and safe for treatment modality. It has ability to hold cytokines and various types of growth factors which are released for a prolonged period at the wound site.[4-5]

A new method for management of multiple recession defects by means of a Pin Hole Surgical Technique was presented by John Chao. He determined that 94% mean defect decrease was achieved with minimum post-operative problems and optimum patient based results. In the Chao Pinhole Surgical Technique, a blade is taken to create a small hole in the patient's present gum tissue. By this pinhole, specially designed tools are used to gradually release the gum tissue. These tools benefit in expanding and glide the gum tissues to shield the uncovered roots. Chao Pinhole Surgical Technique shows no need for grafts, sutures, and incisions. It only includes the modification of the present tissue [6]

Hence, the current study which is a clinical study will be conducted to compare the practicability of a novel invasive approach of pinhole technique to root exposure in Class I or II type of GR defects and to compare this technique with CAF with PRF procedure for root coverage considering the following objectives:

1. To assess the success of PRF and pinhole surgical technique with root coverage, improvement in CAL and to improve the size of the KG.
2. To assess the success of PRF and coronally advanced flap in relation to root coverage, improvement in CAL and to improve the size of the KG.
3. To equate the success of PRF and pinhole surgical technique with that of PRF and coronally advanced flap in relation to root coverage, improvement in CAL and to improve the size of the KG.

Therefore, it is a parallel group randomized clinical control trial weather when compared the practicability of a novel invasive approach of pinhole technique to root exposure in Class I or II category of GR defects and to compare this technique with CAF with PRF for root coverage.

2. STUDY POPULATION MATERIAL:

Twenty two systemically healthy patients presenting with single or more GR faults on external surface of the tooth will be chosen by the casualty Periodontics department, DMIMS, Wardha using following inclusion and exclusion:

3. INCLUSION CRITERIA:

1. Incidence of one or additional GR defect on the external areas of the teeth each in upper arch categorized as either Class I or II.
2. Occurrence of ≥ 2 mm GR depth
3. Radiographic evidence of adequate interdental bone.
4. Occurrence of adequate width of KG below it.

4. EXCLUSION CRITERIA:

1. Patients using tobacco goods and smokers.
2. Unwilling patients.
3. Person with undesirable oral hygiene following phase I treatment and showing plaque score ≥ 1 .
4. History of periodontal surgical treatment in quadrant selected for the study.
5. Pregnant lady or lactating mother.
6. Presence of badly caries teeth
7. Presence of mobile teeth.

5. STUDY DESIGN:

Methodology:

Twenty two patients, each with multiple gingival recession defects will be selected for the study. Prior to surgery selected patients will be randomly assigned by double blinding to either pinhole surgical technique or coronally advanced flap.

Initial Therapy:

Initial therapy including scaling and root planning will be provided along with polishing to all patients. In order to prevent brushing injury Modified Stillman's brushing technique will be advice to patients. Till the patient achieves plaque score of ≤ 1 , plaque control technique will be repeated.

6. CLINICAL MEASUREMENTS:

A) Indices:

On the day of surgical procedure, three and six months afterwards, patient's oral hygiene and gingival status will be evaluated in all the patients.

1. Plaque Index (Turesky - Gilmore - Glickman Modification of Quigley-Hein 1970) [7]
2. Papillary Bleeding Index (Muhlemann H.R 1977) [8]

B) Probing Measurements:

The enlisted clinical factors will be recorded for evaluation of the outcomes. PPD, relative CALI and relative GM level will be measured and GR factors including recession deepness, thickness of KG and gingival thickness will be recorded using a UNC-15 probe. For making uniform clinical dimensions, stents will be made on casts. An acrylic stent will be placed on the occlusal surfaces of the experimental tooth which act as assessment point. To extend the periodontal probe to the deepest area of defect, it is inserted at necessary angle. To produce longitudinal grooves burs will used. To use the furrows as marking for UNC-15.[9]

Gingival thickness will be estimated 3 mm under the GM, that will be performed under topical anesthesia by using a reamer having a rubber stopper. Recession depth will be calculated from the CEJ to the GM. WKG will be calculated by measuring the gap from the

apical point of the MGJ to the MG by UNC-15 Probe. These clinical factors will be documented only on the teeth to be examined at the time of surgical procedure , 3 and 6 months following surgery.[10]

Surgical Procedure for Test group:

Before starting the treatment, the patients will be educated to gargle with 0.2 % Chlorhexidine gluconate for one-two minutes. All necessary aseptic precautions and infection control measures are undertaken. After introduction of local Anaesthesia, the uncovered roots will be cautiously prepared with the help of ultrasonic instruments followed by curettes.

PRF Preparation

A standard protocol will be follow for preparing PRF. Previous to the surgical procedure, about 5ml blood will be drawn and gathered in sterile tubes (devoid of anticoagulant) and centrifuged at 3000 rpm for 10 minutes. This allows formation of structured fibrin clot in the centre of the test tube. Sterile tweezers and scissors will be used to separate the PRF from red corpuscular base. It will then be compressed to squeeze out the serum and obtain a fibrin membrane.[11]

Site preparation and placement of PRF:

Following injection of local anaesthetic, using a no. 12 scalpel BP , a parallel cut of 2-3 mm will be created close the bottom of vestibule ,below to receiver location ,in the alveolar mucosa. It incision will be created in proximity with the depth of the vestibule acceptably mesial to the root of the first premolar so that, in the judgment of the clinician ,in cases with mandibular premolar involvement, the incision had less risk of damage to the mental nerve. Particularly made instruments Trans-Mucosal Papillae Elevators [TMPEs], will be introduced through the incision to raise a muco-periosteal flap. Reflection of the flap will be directed by imagining of the shape and movement of the instrument between the mucosa and gingival tissue. For the advancement of 2 neighbouring papillae on both side of the exposed root(s) the flap will then be elongated above. At least 4 papillae are included in pinhole surgical technique. The interdental elongation of the flap will result in a freely mobile flap, that will be then placed to cover above the CEJ. The PRF will then be introduced carefully through the entry incision and tuck into the subgingival areas underneath the papillae and marginal soft tissue. For approximately 5 minutes, gentle finger pressure will be given. The first incision will heal by primary intention.[6]

Surgical procedure for Control group:

The incision will be placed at the level slightly coronal to CEJ not including gingival sulcus of adjacent defect site but including interproximal area on the labial surface of the teeth with defect. Beyond the mucogingival junction, two oblique vertical incisions proximal to the selected sites will be given and a full thickness flap will be reflected up to the MGJ and split thickness flap will be reflected once this point a mucosal flap will be stretched apically after this point to reduce the strain which approve the coronal advancement . The epithelia from the neighboring papillae will be uncovered away so as to generate site for placement the coronally positioned flap along with PRF. The root surface will be instrumented with curettes and is will be head with saline solution.[12]

Placement of PRF over recipient site:

At the receiver position at CEJ, the PRF obtained will be placed, covering the recession area and adjacent connective tissue bed and it will be sutured by sling sutures. After approximating graft over recession, flap will be advanced to entirely cover the PRF and the de-epithelialized area of the papilla. The flap will be positioned a little at higher position to CEJ and will be sutured using 4-0 silk suture with simple interrupted suture technique laterally and with continuous sling sutures coronally. The vertical incisions will be closed by sutures.

Post-operative care:

Post surgery, coe pack dressing will be applied immediately at the recipient location. Non-steroidal anti-inflammatory Tab. Ibugesic Plus, TDS and Cap. Mox, TDS will be given for 5 days. Patients will be advised to avoid brushing over treated side and to rinse with 0.2% chlorhexidine gluconate two times a day, for 14 days. They will be taught not to disturb the pack and evade unnecessary trauma to the surgical location.

7 days after surgery, coe pack will be detached. The healing is recorded and a 2nd coe pack will be positioned if required. On 14th post-operative day the sutures will be detached. Patients will be advised to clean the surgical location with cotton roll drenched by 0.2% chlorhexidine gluconate for further week in an apico-coronal way followed by using a ultrasoft toothbrush by Charter's brushing technique. Follow up will be taken at regular interval of one, three and six months postoperatively.

Hence the study will be conducted to see the efficacy of PRF and pinhole surgical technique regarding root coverage, gain in CAL and to improve the width of the KG.

7. STATISTICAL ANALYSIS:

The mean and standard deviations will be considered for every parameter. Mean records are analysed for the statistical significance by standard statistical technique. Student's paired t-test will be applied to relate the records from the day of surgery to those at three months and six months for each group. Correlation between treatment groups at the day of surgery, three months and six months will be completed with the student's unpaired t-test. If the probability value [*p*] is more than 0.05, the alteration detected will be taken as non-significant and if a smaller amount than 0.05, it will be taken as significant.

8. RESULTS :

The present clinical study will result in comparison of mean values of PI score, PBI score, PPD, CAL, HGR, VGR, AG, KG, GT by TGP at the day of surgery, three months and six months. Plaque index and Bleeding index will be reduced at 6 months in both groups. Statistically significant difference will be found in test group compared to control group in PPD and CAL at 3 and 6 months. Comparing VAS score will be less in test group. At six months, HGR, VGR, AG, KG, GT by TGP will be significantly high in test group when compared to control group.

9. DISCUSSION:

In this study we will try to achieve practicability of a novel invasive approach of pinhole technique to root exposure in Class I or II type of GR defects and to compare this technique with CAF with PRF procedure for root coverage as given by Chao et al. A novel method for management of multiple recession defects using a Pin Hole Surgical Technique was

presented by John Chao . He determined that 94% mean defect reduction was achieved with least possible post-operative difficulties and optimum patient centred results. The Chao Pinhole Surgical Technique is a minimally invasive alternative for management of gum recession. [4]

Reddy et al 2018 conducted a study with similar aim as applied to soft- tissue esthetic techniques with idea of minimal surgical invasion. His study offered a series of 5 patient with eighteen recession locations which were managed with a minimally invasive Pinhole Surgical Technique which caused complete root coverage of 96.7% in six months follow- up with minimal problems.[13]

The results obtained in the current study will be similar with the findings reported in previous studies. This study is expected to provide an alternative treatment option for the clinicians for treatment of root coverage which will be less invasive and can be used in clinics. Along with providing less discomfort to the patients.

Research ethics approval-After taking approval from Institutional ethical committee Ref. no.DMIMS(DU)/IEC/2018-19/7491

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