

# Predictability of Maximum Root Coverage (MRC) In the Noncarious Cervical Lesion (NCCL) Associated With Gingival Recession

Dr Amrita Dutta<sup>1</sup>, Dr Suvodeep Saha<sup>2</sup>, Dr Sucharita Banerjee<sup>3</sup>,  
Dr, Pradip Kumar Giri<sup>4</sup>

<sup>1</sup>( PGT, Dept of Periodontics , Dr. R. Ahmed Dental College and Hospital, Kolkata, India)

<sup>2</sup>( Private practitioner, Kolkata, India)

<sup>3</sup>(PGT, Dept of Periodontics, Dr R Ahmed Dental College & Hospital)

<sup>4</sup>(Professor, Dept. of Periodontics , Dr. R. Ahmed Dental College and Hospital)

## Abstract:

**Background:** Non Carious Cervical Lesion (NCCL) are defined as the loss of tooth structures along the gingival margin of the tooth involving both the crown & root portion of tooth due to mechanical abrasion, erosion or abfraction, it is frequently associated with gingival recession which is very complex and challenging to the clinician that needs both restorative & surgical approach. In Type 3 & Type 4-NCCL complete root coverage is not possible only with surgery. For this reason, a line should be drawn to predetermine the limit up to which maximum root coverage (MRC) is possible and rest of the lesion requires restorative treatment. Coronally Advanced Flap (CAF) along with Sub Epithelial Connective Tissue (SECT) Graft technique is to be the gold standard treatment for root coverage surgery in spite of some obvious drawbacks, like creation of second wound etc. In this study, to avoid the drawback, it might be expected that CAF alone may be the suitable alternative for root coverage with predetermination of maximum root coverage line.

**Materials and methods:** In this prospective comparative study, 16 patients were selected from the Department of Periodontics of Dr R Ahmed Dental College & Hospital and after giving phase I therapy, they are divided into two groups. Both in group A and group B MRC line determination and restorations were done coronal to the line followed by root coverage procedure with Coronally Advanced Flap (CAF) only group A and CAF with Sub Epithelial Connective Tissue (SECT) graft in group B.

**Results:** In this study, the percentage of recession coverage is  $92.39 \pm 4.651$  for Group A and  $96.26 \pm 3.929$  for Group B respectively after 3 months follow up.

**Conclusion:** it can be concluded that the presence of a resin modified glass ionomer restoration may not negatively interfere with the percentage of soft tissue coverage when coronally advanced flap is used with or without sub epithelial connective tissue graft for the treatment of gingival recession associated with non-carious cervical lesions.

**Key Word:** Non carious cervical lesion (NCCL), coronally advanced flap (CAF), Sub Epithelial Connective Tissue Graft (CTG), Maximum Root Coverage (MRC)

Date of Submission: 02-04-2023

Date of Acceptance: 13-04-2023

## I. INTRODUCTION

Non-carious cervical lesion (NCCL) are defined as the loss of tooth substance at the Cemento-enamel Junction (CEJ). The etiology of NCCLs is multifactorial, involving other factors such as corrosion, and possibly abfraction, as An NCCL can involve only the crown portion of the tooth (enamel/coronal dentin) or only the root surface (cementum/root dentin) or both crown & root. When the NCCL involves the root it is commonly associated with gingival recession. (1) Gingival recession (GR) is defined as the apical migration of the gingival margin beyond the Cemento-enamel junction (CEJ). So, NCCL along with gingival recession may lead to aesthetic problem, dentin hypersensitivity etc. A multidisciplinary approach has been proposed to deal with this condition and to optimize the final aesthetic outcome. (2) Zucchelli et al. reported determination of the maximum root coverage (MRC) line is the prime goal in these cases where both the surgical & restoration is needed. (3) In 2006, Zucchelli et al. proposed a method based on interdental papilla height and contact point of the teeth that represents a scalloped line (Clinical CEJ) on the tooth surface called MRC line, up to which the soft tissue margin will be stable after the healing process of a root coverage surgical procedure. The MRC is calculated according to the "ideal" dimension of the papilla of the tooth with a gingival recession defect which represents the guiding line for

apical preparation of the conservative restoration completed prior to root coverage mucogingival surgery. According to the MRC position, location and extent of tooth surface defect five types of NCCL are classified by Zucchelli et al and also their different treatment approaches.

Type 1: The MRC is located > 1mm coronal to the NCCL.

Type 2: The MRC is located  $\leq$  1mm coronal to the NCCL.

Type 3: The MRC is located at the deepest point of NCCL.

Type 4: The MRC is located apical to the deepest point of the NCCL.

Type 5: The MRC is located at or apical to the most apical extension of the NCCL.

Among all types, Type 3 and 4 cases, are most complex type, where both restorative and surgical approaches are needed along with prediction of MRC line. Composite resin and glass ionomer cements (GICs) have been indicated as the restorative materials of choice for NCCL restorations. (4) But, GIC is suitable material for restoration because of its satisfactory bond with enamel and dentin, fluoride releasing property for longer period of time, good biocompatibility and similar Coefficient of Thermal Expansion (CTE) with tooth structure. Experimental studies show good periodontal health with RMGIC when used in subgingival restorations and observed better dentinal hypersensitivity reduction compared to other materials.<sup>22</sup> The proposed study is expected to fulfil two important criteria i.e. suitable surgical technique for maximum root coverage along with restorative procedure and an acceptable aesthetic where a predetermined line (MRC) is very much essential irrespective of their surgical technique. In 2019 Sharma et al clinically evaluated the treatment of gingival recession associated with root restoration in non-carious cervical lesions by Glass Ionomer Cement, RMGIC and Composite using a coronally advanced flap. (5) After 2-years follow-up successful result achieved with coronally advanced flap alone or in combination with a resin-modified glass ionomer restoration. After the healing period, good aesthetic outcome and gingival health with no signs of inflammation, such as redness and bleeding on probing.(BOP), were observed despite the subgingival location of part of the restoration.

## II. MATERIAL AND METHODS:

This prospective comparative study was carried out on patients of Department of Periodontics at Dr R Ahmed Dental College & Hospital from January 2019 to August 2020. A total 16 adult subjects (both male and females) of aged  $\geq$  18, years were for in this study.

**Study Design:** Prospective observational study

**Study Location:** This was a tertiary care teaching hospital based study done in Department of Periodontics at Dr R Ahmed Dental College & Hospital, Kolkata, West Bengal

**Study Duration:** January 2019 to August 2020

**Sample size:** 16 patients.

**Sample size calculation:** The sample size was estimated on the basis of a single proportion design. The target population from which we randomly selected our sample was considered 2000. We assumed that the confidence interval of 10% and confidence level of 95%. The sample size actually obtained for this study was 8 patients for each group. We planned to include 16 patients (Group I- Case, Group II- Control of 8 patients for each group) with 3 dropout case.

### Subjects & selection method:

The study population was drawn from consecutive patients who presented to Department of Periodontics at Dr R Ahmed Dental College & Hospital, Kolkata with NCCL and gingival recession and were taken into the study. Patients were divided into two groups (each group had 8 patients) .After case selections both groups of patients had undergone Phase I therapy followed by determination of MRC line as per protocol by Zucchelli. Surgical procedure along with restoration were done as per following design:-

- Group A: Phase I therapy followed by Restoration coronal to the MRC line followed by root coverage procedure with Coronally Advanced Flap (CAF) only.
- Group B: Phase I therapy followed by Restoration coronal to the MRC line followed by root coverage procedure with Coronally Advanced Flap along with Sub Epithelial Connective Tissue (SECT)- graft.

### Inclusion criteria:

- Age of the patients considered in between 18 to 55 years
- Absence of any systemic diseases that may affect the outcome of treatment.

- Single or multiple Miller's Class I,II,III gingival recession associated with Type 3 & Type 4-NCCL where restorative & surgical both treatment will require according to the MRC line.
- No contraindication for surgical procedure.
- No history of previous restoration and any periodontal surgery previously at the involved sites.

**Exclusion criteria:**

- Presence of any prosthetic crown or restoration on the involved tooth.
- Patient with habit of smoking.
- Carious cervical lesion.
- Teeth with evidence of pulpal pathology
- Molar teeth area.

**Procedure methodology:**

After written informed consent was obtained, predetermination of the root coverage line was done. The method used to predetermine the Maximum Root Coverage (MRC) line in the present study was based on the calculation of the ideal height of the anatomic interdental papilla that described by **Zuccheli et al.** The ideal height of the papilla was measured as the distance between the mesial-distal line angle of the tooth and the contact point. The line angle is easily identifiable, even in a tooth with buccal abrasion defect, by elevating the interdental soft tissues (with a probe or small spatula) and searching for the interdental CEJ. Once the ideal papilla was measured, this dimension was replaced apically starting from the tip of the mesial and distal papillae of the tooth with the recession defect. The horizontal projections on the recession margin of these measurements allowed for identification of two points that were connected by a scalloped line, representing the ‘line of root coverage.’”

At baseline, a stent was fabricated using acrylic resin material on the cast. After placing the acrylic stent, the distance from the Stent Reference Point (StRP) to the MRC line and Gingival Margin have measured. The difference of these two will determine the area to be expected to cover by surgery. Following the screening examination, all subjects received a session of prophylaxis including instruction in proper oral hygiene measures and scaling. A Coronally directed roll technique was prescribed for teeth with recession- type defects to minimize tooth brushing trauma to the Gingival Margin. Surgical treatment of the recession defect was not scheduled until the patient could demonstrate an adequate standard of supragingival plaque control. (As per Gingival Index status by Loe & Sillness 1963)

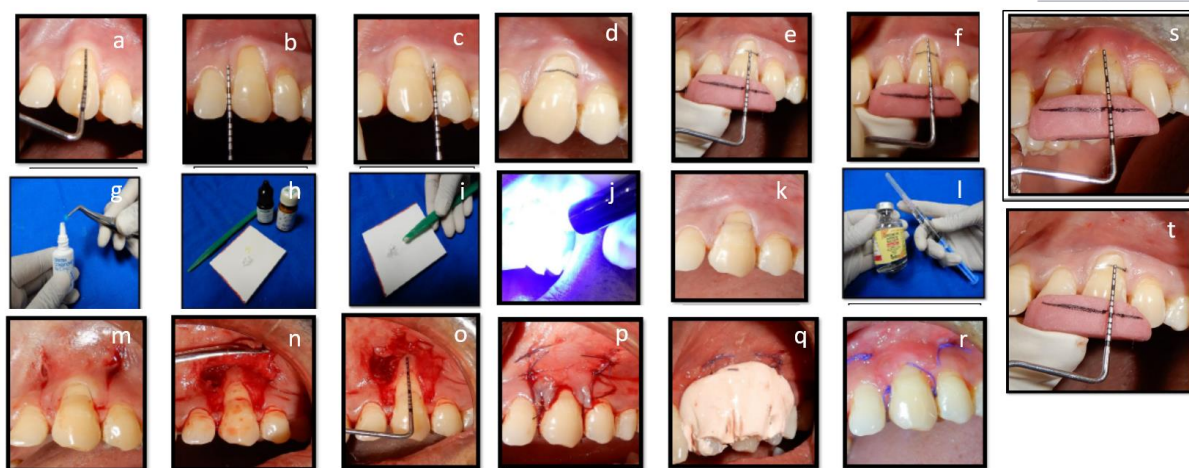


Fig.1(a-t) shows NCCL restoration followed by gingival recession coverage surgery with Coronally advanced flap alone in Group-A patients.

A reference point (slot) was impressed on the stent at the mid-buccal area of the experimental tooth to allow reproducible periodontal probe positioning. A black line was drawn on the stent and which served as a measurement reference point. After determination of MRC line the restorative procedure has done from the most coronal extension of NCCL to the MRC line under proper isolation. To remove the smear layer Dentine Conditioner was applied for 20 seconds to the bonding surfaces using a cotton pellet. This was followed by a thorough water rinse and careful air drying, leaving a smooth (glistening) appearance of the tooth surface. The selected shade of resin-modified glass ionomer cement powder and liquid were dispensed on a paper pad and mixed with a plastic spatula according to the manufacturer's instructions. The cement was then transferred to the tooth surface with the aid of a suitable placement instrument. Air bubbles incorporation was avoided. Contour

was formed and light cured for 20 seconds. Finishing & Polishing was done by using rubber cap and polishing disks. Complete restoration done coronal to the MRC line. The surgical area was prepared and adequately anaesthetized using 2% Lignocaine containing 1:80,000 epinephrine by giving infiltration anaesthesia. Two horizontal bevelled incisions (3mm in length) have given mesial and distal to the recession defect located at a distance from the tip of the anatomical papillae equal to the depth of the recession plus 1 mm. After that, two bevelled oblique, slightly divergent, incisions starting at the end of the two horizontal incisions and extending to the alveolar mucosa. The surgical papillae comprised between the horizontal incisions and the sulcular area apical to the root exposure were elevated split thickness keeping the blade almost parallel to the root, and the soft tissue apical to the root exposure was elevated full thickness inserting a small periosteum elevator in to the sulcus and proceeding in the apical direction up to exposing 3–4mm of bone apical to the bone dehiscence. In order to permit the coronal advancement of the flap, all muscle insertions present in the thickness of the flap were eliminated by keeping the blade parallel to the external mucosal surface. Adequate coronal mobilization of the flap was checked and mechanical instrumentation was done on the root surface by hand curette. The facial soft tissue of the anatomic (6) inter-dental papillae coronal to the horizontal incisions was de-epithelialized and the margin of the flap was placed 1mm coronal to the Cemento-enamel Junction for suturing. The suture of the flap started with two interrupted periosteal sutures performed at the most apical extension of the vertical releasing incisions; then, it proceeded coronally with other interrupted sutures, each of them directed, from the flap to the adjacent buccal soft tissue, in the apical–coronal direction. The sling suture permitted to stabilize the surgical papillae over the interdental connective tissue bed and allowed for a precise adaptation of the flap margin over the underlying convexity of the crown. In group B, the surgical procedure was same as Coronal Advanced Flap (CAF) procedure which was mentioned above. (7) Here, only a connective tissue graft was harvested from the palate, measured with periodontal probe) and placed on the gingival recession defect area to cover up to the level of CEJ and stabilized with resorbable suture (4-0 Polyglactin) anchored to the periosteum.

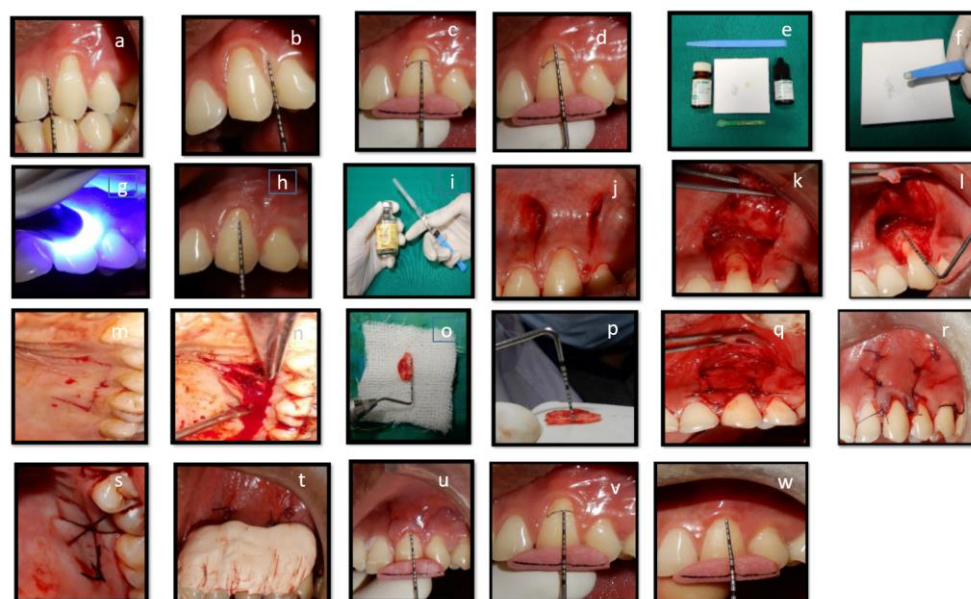


Fig.2 (a-w) shows NCCL restoration followed by gingival recession coverage surgery with coronally advanced flap with sub epithelial connective tissue graft.

It was advised to the patient not to suck or spit excessively for 24hrs and not to pull the lips or cheek to look at the surgical site. Place ice bag or cold application on the surgical site for 24hrs and instruction was given for medications (Tablet Amoxicillin with Potassium Clavulanate 625mg thrice daily after meal for 5days, Tablet Metronidazole 400mg thrice daily after meal for 5days, Tablet Ibuprofen 400mg twice daily after meal for 3days, Tablet Pantoprazole 40mg once daily before meal for 5days). Nutritious liquid or soft diet was instructed for the first week after surgery and avoid hot spicy food for those days. It was advised to the patient not to brush in the treated area but rinse with 0.2% Chlorhexidine Mouthwash 2 times a day. The sutures were removed 2 weeks after surgery and instruction was given to maintain the plaque control in the surgically treated area by rinsing with chlorhexidine for an additional 2 weeks. After this period, patients were again instructed in mechanical tooth cleaning of the treated tooth using an ultra-soft toothbrush and a roll technique for 1 month. All patients were recalled for prophylaxis 2 and 4 weeks after suture removal and, subsequently, once a month until the final

examination (90 days). All the parameters were recorded regarding probing depth, gingival index, keratinized gingiva width and clinical attachment level at baseline and 3 months interval.

**Statistical analysis**

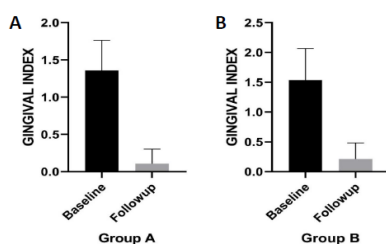
D'Agostino & Pearson test was performed to check the normality of the distribution of variables. Student's unpaired t-test and Mann Whitney test was performed for comparing normally and non-normally distributed variables, respectively (e.g. Group A vs. Group B and Baseline vs. Follow-up). P value less than 0.05 was considered as statistically significant. Statistical analysis was performed by using Graph Pad Prism Software version 8.0e.

**III. RESULTS**

**GINGIVAL INDEX:**

GINGIVAL INDEX: -

	GROUP A	GROUP B
BASELINE	1.357 ± 0.405	1.536 ± 0.529
3 MONTHS	0.107 ± 0.197	0.214 ± 0.267
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	-1.25 ± 0.456* (Statistically Significant) 0.0006	-1.321 ± 0.59* (Statistically Significant) 0.0012



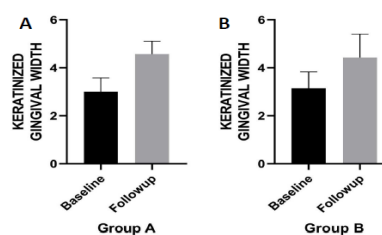
**Significant reduction of Gingival Index is observed in both A and B group**

The mean values (± SD) of Gingival Index at baseline and follow up are 1.357 ± 0.405 and 0.107 ± 0.197 for Group A respectively and 1.536 ± 0.529 and 0.214 ± 0.267 for Group B respectively. Improvement of gingival index status from baseline to 3 months follow up was observed in this study in both the groups but no statistically significant differences (P >0.05) were observed in between Group A and B which indicates a mild degree of inflammation still present after 3 months follow up without any Bleeding On Probing (BOP).

**KERATINIZED GINGIVAL WIDTH:**

KERATINIZED GINGIVAL WIDTH: -

	GROUP A	GROUP B
BASELINE	3 ± 0.577	3.143 ± 0.69
3 MONTHS	4.571 ± 0.535	4.429 ± 0.976
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	1.571 ± 0.787* (Statistically Significant) 0.0023	1.286 ± 0.488* (Statistically Significant) 0.0147



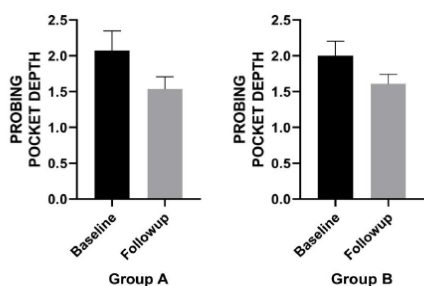
**Statistically Significant Improvement of Keratinized Tissue Width between Baseline and Follow up.**

The mean values (± SD) of Keratinized Tissue Width at baseline and follow up are 3 ± 0.577 and 4.571 ± 0.535 for Group A respectively and 3.143 ± 0.69 and 4.429 ± 0.976 for Group B respectively. Increased Keratinized Tissue Width after 3 months post operatively in both groups which is statistically significant (1.571 ± 0.787 for Group A and 1.286 ± 0.488 for Group B)



**PROBING POCKET DEPTH:-**

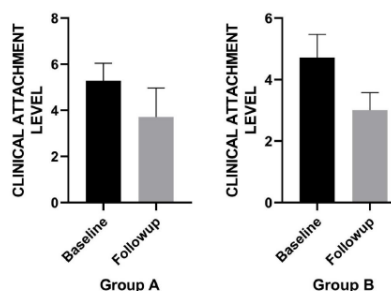
	GROUP A	GROUP B
BASELINE	2.071 ± 0.278	2.000 ± 0.204
3 MONTHS	1.536 ± 0.173	1.607 ± 0.134
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	-0.536 ± 0.304* (Statistically Significant) 0.0052	-0.393 ± 0.244* (Statistically Significant) 0.0058



**Statistically Significant reduction of Probing Pocket Depth after 3 months follow up.**

**CLINICAL ATTACHMENT LEVEL:-**

	GROUP A	GROUP B
BASELINE	5.286 ± 0.756	4.714 ± 0.756
3 MONTHS	3.714 ± 1.254	3 ± 0.577
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	-1.571 ± 0.787* (Statistically Significant) 0.0041	-1.714 ± 0.488* (Statistically Significant) 0.0023



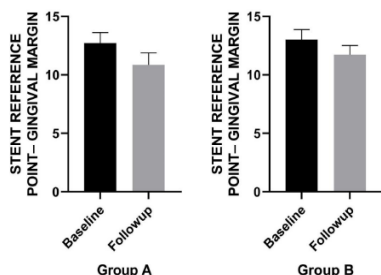
**Gain of Clinical Attachment after 3 months follow up in both**

The mean values (± SD) of Probing Pocket Depth at baseline and follow up are 2.071 ± 0.278 and 1.536 ± 0.173 for Group A respectively and 2.000 ± 0.204 and 1.607 ± 0.134 for Group B respectively. Result shows reduction of probing depth observed after 3 months follow up in both the groups which is statistically significant. Inter-group differences were not statistically significant for the PD values (p > 0.05).

The mean values (± SD) of Clinical Attachment Level (CAL) at baseline and follow up are 5.286 ± 0.756 and 3.714 ± 1.254 for Group A respectively and 4.714 ± 0.756 and 3 ± 0.577 for Group B respectively. Significant amount of clinical attachment gain was observed in this study which is statistically significant.

**MEASUREMENT OF GINGIVAL RECESSION: -**

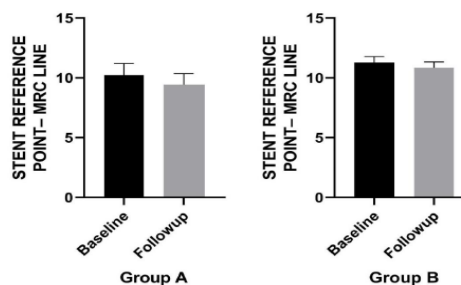
	GROUP A	GROUP B
BASELINE	12.71 ± 0.906	13.00 ± 0.866
3 MONTHS	10.86 ± 1.029	11.71 ± 0.809
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	-1.857 ± 0.852* (Statistically Significant) 0.0105	-1.857 ± 0.556* (Statistically significant) 0.0141



**Reduction of StRP to Gingival Margin distance after 3 months follow up which signifies coverage of Gingival Recession. Data is Statistically Significant in both Group A and Group B**

**ESTIMATION OF ROOT COVERAGE IN RESPECT TO MRC LINE: -**

	GROUP A	GROUP B
BASELINE	10.21 ± 0.994	11.29 ± 0.488
3 MONTHS	9.429 ± 0.932	10.86 ± 0.476
DIFFERENCE BETWEEN BASELINE & FOLLOWUP (P value)	-0.786 ± 0.488 (0.1531)	-0.429 ± 0.45 (0.1958)
RECESSION COVERAGE %	92.39 ± 4.651%	96.26 ± 3.929%



**In case of Stent Reference Point – MRC Line, no significant alteration is observed in any group.**

The mean values (± SD) of Stent Reference Point (StRP) to Gingival Margin Distance at baseline and follow up are 12.71 ± 0.906 and 10.86 ± 1.029 for Group A respectively and 13.00 ± 0.866 and 11.71 ± 0.809 for Group B respectively. Reduction of StRP to Gingival Margin was observed in this study which is statistically significant that signifies the improvement of gingival recession post operatively in both the group. The overall recession reduction is 1.857 ± 0.852 for Group A and 1.857 ± 0.556 for Group B respectively from its baseline to follow up results.

In this study, 28% cases were 1 mm short from MRC line and 17.7% cases were greater than predetermined MRC line. In our study among a total of 14 cases, 5 cases (35.71%) coincide with predetermined MRC line, 4 cases (28.57%) are 0.5 mm short and 5 cases (35.71%) are 1 mm short from MRC line. No overestimation of MRC line was observed in our study.

**IV. DISCUSSION**

Non-Carious Cervical Lesion (NCCL) is the loss of tooth structures along the gingival margin of the tooth involving both the crown and root portion of tooth due to mechanical abrasion, erosion or abfraction. It is frequently associated with gingival recession which is very complex and challenging to the clinician that needs both restorative and surgical approach. Zucchelli et al., 2011 classified NCCL into 5 types and presented a decision-making process based on the relationship between the estimation of root coverage by predetermination of Maximum Root Coverage (MRC) line before surgery and the topography of NCCL to facilitate the treatment option. (8) Among 5 types, in Type 3 and 4-NCCL complete root coverage is not possible with surgery alone. Rest of the lesion requires restorative treatment. Coronally Advanced Flap (CAF) with Sub Epithelial Connective Tissue (SECT) -Graft technique is to be the gold standard treatment for root coverage surgery in spite of some obvious drawbacks, like creation of second wound etc. (9) The present study fulfilled two important criteria i.e. suitable surgical technique for maximum root coverage along with restorative procedure. A total of 13 patients with 14 tooth surfaces (labial surfaces canine and premolars) mean age (43.43 ± 7.068 for Group A) and (43.14 ± 10.84 for Group B) were included in the present study. As the restoration was done on the labial surface of all the teeth with precise marginal finish, it will be taken into consideration that the patient has undergone optimal oral hygiene procedure. According to study by Lucchesi et al., 2017 restorations do not produce greater gingival inflammation and plaque accumulation and Santamaria et al. 2009 (7) mentioned that absence of Bleeding On

probing (BOP) and any signs of gingival inflammation in Coronally Advanced Flap with Restoration Group. These two studies satisfy the clinical observation regarding the status of gingiva pre and post operatively. Furthermore, the restorative materials and technique variables were controlled precisely, and restorations were contoured and finished accurately; these procedures are essential to avoid gingival inflammation and plaque accumulation. Isler et al., 2017 (10) and Santamaria et al., 2009 (7) observed significant improvement of keratinized tissue on follow up period. Lang and Loe, 1972 (11) suggested in their classic paper, that a minimum of 2 mm of keratinized tissue (1mm of attached gingiva) is required to maintain periodontal health properly which is maintained throughout this study. Pini Prato et al.2018 (12) in their 2 published articles regarding recession coverage surgery with Coronally Advanced Flap (CAF) alone and CAF with Sub Epithelial Connective Tissue graft, mentioned minimum 2 mm of Keratinized Tissue is required for long term follow up (up to 20yrs) without any apical shift of the gingival margin. These 3 studies satisfy the clinical observation of present study after 3 months post operatively. Santamaria et al., 2009 (7) where they observed significant reduction of Probing Depth between baseline and after 3 months follow up. In the present study both the groups were treated with Resin Modified Glass Ionomer Cement restoration before the surgical procedure with Coronally Advanced Flap (CAF) for Group A and CAF with Sub Epithelial Connective Tissue (SECT) graft for Group B. Significant reduction of Probing Depth was observed in both the Groups. Camp et al, 2003 observed in their study that the attachment of PDL and Gingival fibroblast to the RMGIC restoration was more. Probably this illustration explains one of the causes of pocket depth reduction in follow up period. In 2017 World Workshop Lang and Bartold (13) mentioned sulcular depth < 3mm with no bleeding on probing, redness and clinical swelling/edema are characteristics of clinically healthy gingiva which is fulfilled in this study in follow up period. Dursun et al, 2018 mentioned in their study that minimum Probing Depth with successful CAL gain in the area of recession in Resin Modified Glass Ionomer group may be an evidence of new connective tissue attachment. These two studies satisfy the clinical observation regarding the status of Clinical Attachment Level pre and post operatively in this study which corroborates with similar study by Zucchelli et al.2011 (14). But in this study, intergroup differences of CAL gain was not statistically significant. One important aspect in the combined approach (periodontal surgery plus restoration) to treat gingival recession associated with non-carious cervical lesion is the gingival margin stability over time. As it is a short-term study, so the gingival margins position of all groups is almost stable up to 3 months. In the study by Zucchelli et al. 2010, (14) 71.8% cases coincided with predetermined MRC line, 35 % cases were 0.5 mm short. These results though fulfilling the type of results observed by Zucchelli et al., 2010 but not in accordance with the mathematical estimations (% wise) which may be due to a smaller number of cases taken into consideration. Santamaria et al. 2009 (7) & 2013 (15) performed two studies where they compared the treatment outcome after Coronally Advanced Flap with RMGIC restoration and CAF with Sub Epithelial Connective tissue graft with RMGIC restoration. In their studies the percentage of root coverage was  $80.37 \pm 25.44\%$  for CAF with RMGIC Restoration group and  $93.29 \pm 7.97\%$  for CTG with RMGIC Restoration which shows the average root coverage outcome was better for CAF with SECT graft group. In our study the percentage of recession coverage is  $92.39 \pm 4.651$  for Group A and  $96.26 \pm 3.929$  for Group B respectively which almost corroborates with the study done by Santamaria et al., 2009 & 2013 in terms of root coverage. In this study another important aspect beside the periodontal surgical procedure is restoration of Non-Carious Cervical Lesion area where the successful outcome depends on few important factors and also these factors are associated with the longevity of the restoration. In a study by Santiago et al., 2010, they observed excellent retention of Resin Modified Glass Ionomer Cement in Non-Carious Cervical Lesions where the retention rate for the RMGIC restoration was 100% after 2 years follow up and high retention rate of RMGIC may be attributed to its capacity of adhering to enamel and dentin. Due to time constraint the follow up period has been restricted to 3 months which may not be sufficient to assess the retention property of the restored material which might require a longer period (approx. 2 years) to comply with the above-mentioned result done by Santiago et al., 2010. In one of the studies, Van Meerbeek et al., 2003 (16) mentioned the unique self-adhesive property of Glass Ionomer restoration and explained this self-adhesiveness owing to the combined micromechanical interlocking and chemical interaction. The micromechanical bonding component has been suggested to provide in particular resistance to abrupt de-bonding stress, while the chemical interaction may result in bonds that better resist hydrolytic break-down, whereas Hussainy et al.2018 (17) observed in their study that RMGIC restoration was superior than flowable composite and polyacid modified composite resin in terms of retention, marginal and colour stability after one year follow up. Hence, in our study we used RMGIC restoration where no marginal deterioration and no discoloration of restoration were observed after 3 months of follow up which satisfy the observations of the previous study done by Hussainy et al., 2018. In 1991 Heymann et al. (18) mentioned in their literature that, there are several factors which may have positive influence on the longevity of the restoration. Among them, proper isolation of the restoration area is the main factor without any contamination and make the cervical lesion area dry. In our study all these factors were properly controlled which may have positive influences in results of restoration outcomes. The smaller sample size and shorter follow up period might be considered as the main limitations of the present study. Hence, a long-term clinical trial with a larger sample size is needed to check the predictability of MRC technique using Coronally Advanced Flap with or without Sub Epithelial Connective Tissue graft. Another limitation of the present study is



the lack of esthetic analysis. It should be recognized that the assessment of patient satisfaction using a visual analog scale, or the assessment of the final esthetic outcome using a professional analysis, such as the root coverage esthetic score (RES), or a qualitative cosmetic evaluation, would provide interesting information for this type of study. In this study among 14 cases, 4 cases show 0.5 mm short and 5 cases show 1 mm short. So, restoration procedure should be done in the exposed Non-Carious Cervical Lesion area to avoid further recession in near future.

## V. CONCLUSION

After completion of the study, it can be concluded that the presence of a resin modified glass ionomer restoration may not negatively interfere with the percentage of soft tissue coverage when coronally advanced flap is used with or without sub epithelial connective tissue graft for the treatment of gingival recession associated with non-carious cervical lesions. All the clinical parameters show statistically significant improvement from baseline to 3 months evaluation which signifies root coverage improvement without periodontal tissue damage. It is important to consider the patient's tooth brushing technique for the long-term maintenance of the clinical outcomes achieved by any root coverage surgical procedure. It should be recognized that the periodontal surgery associated with the restorative procedure required a longer clinical time for getting successful result. Further studies with larger samples are recommended to confirm these results. A longitudinal observation is also necessary to evaluate the stability of the results and establish the long-term success of this combined approach. Other restorative materials and surgical techniques should be tested to achieve the best combination to treat this particular combined lesion.

## VI. CONFLICTS OF INTEREST:

This research was conducted by the investigators who independently performed all phases of the study, including protocol development, clinical procedures, data analysis, result interpretation and reporting.  
ORCID Dr Amrita Dutta <sup>ID</sup> <https://orcid.org/0000-0003-2092-0747>

## REFERENCES

- [1]. Santamaria, M. P., da Silva Feitosa, D., Nociti, F. H., Jr, Casati, M. Z., Sallum, A. W., & Sallum, E. A. (2009). Cervical restoration and the amount of soft tissue coverage achieved by coronally advanced flap: a 2-year follow-up randomized-controlled cli.
- [2]. Mair L. H. (1992). Wear in dentistry--current terminology. *Journal of dentistry*, 20(3), 140-144. [https://doi.org/10.1016/0300-5712\(92\)90125-v](https://doi.org/10.1016/0300-5712(92)90125-v).
- [3]. Lucchesi JA, Santos VR, Amaral CM, Peruzzo DC, Duarte PM. Coronally positioned flap for treatment of restored root surfaces: a 6-month clinical evaluation. *Journal of Periodontology*. 2007 Apr and 17397307., 78(4):615-623. DOI: 10.1902/jop.2007.060380. PMID:.
- [4]. Cairo, F., Nieri, M., & Pagliaro, U. (2014). Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions. A systematic review. *Journal of clinical periodontology*, 41 Suppl 15, S44-S62. <https://doi.org/10.1111>.
- [5]. Mitra, S. B., & Kedrowski, B. L. (1994). Long-term mechanical properties of glass ionomers. *Dental materials : official publication of the Academy of Dental Materials*, 10(2), 78-82. [https://doi.org/10.1016/0109-5641\(94\)90044-2](https://doi.org/10.1016/0109-5641(94)90044-2).
- [6]. Alkan, A., Keskiner, I., & Yuzbasioglu, E. (2006). Connective tissue grafting on resin ionomer in localized gingival recession. *Journal of periodontology*, 77(8), 1446-1451. <https://doi.org/10.1902/jop.2006.060021>.
- [7]. Santamaria, M. P., Ambrosano, G. M., Casati, M. Z., Nociti Júnior, F. H., Sallum, A. W., & Sallum, E. A. (2009). Connective tissue graft plus resin-modified glass ionomer restoration for the treatment of gingival recession associated with non-carious cerv.
- [8]. Raetzke P. B. (1985). Covering localized areas of root exposure employing the "envelope" technique. *Journal of periodontology*, 56(7), 397-402. <https://doi.org/10.1902/jop.1985.56.7.397>.
- [9]. Chambrone, L. A., & Chambrone, L. (2006). Subepithelial connective tissue grafts in the treatment of multiple recession-type defects. *Journal of periodontology*, 77(5), 909-916. <https://doi.org/10.1902/jop.2006.050249>.
- [10]. trial, Clinical evaluation of combined surgical/ restorative treatment of gingival recession-type defects using different restorative materials: A randomized clinical.
- [11]. Lang, N.P. and Löe, H. (1972), The Relationship Between the Width of Keratinized Gingiva and Gingival Health. *Journal of Periodontology*, 43: 623-627. <https://doi.org/10.1902/jop.1972.43.10.623>.
- [12]. Pini Prato, G. P., Magnani, C., & Chambrone, L. (2018). Long-term evaluation (20 years) of the outcomes of coronally advanced flap in the treatment of single recession-type defects. *Journal of periodontology*, 89(3), 265-274. <https://doi.org/10.1002/JPER.1>.
- [13]. Chambrone, L., Salinas Ortega, M. A., Sukekava, F., Rotundo, R., Kalemaj, Z., Buti, J., & Pini Prato, G. P. (2018). Root coverage procedures for treating localised and multiple recession-type defects. *The Cochrane database of systematic reviews*, 10(10), CD007161. <https://doi.org/10.1002/14651858.CD007161.pub3>
- [14]. Zucchelli, G., Mele, M., Stefanini, M., Mazzotti, C., Mounssif, I., Marzadori, M., & Montebugnoli, L. (2010). Predetermination of root coverage. *Journal of periodontology*, 81(7), 1019-1026. <https://doi.org/10.1902/jop.2010.090701>.
- [15]. Santamaria, M. P., da Silva Feitosa, D., Casati, M. Z., Nociti, F. H., Jr, Sallum, A. W., & Sallum, E. A. (2013). Randomized controlled clinical trial evaluating connective tissue graft plus resin-modified glass ionomer restoration for the treatment of gi.
- [16]. Van Meerbeek B, De Munck J, Yoshida Y et al. Buonocore memorial lecture. Adhesion to enamel and dentin: current status and future challenges. *Oper Dent*. 2003 and 215-235., 28(3):.
- [17]. Hussainy, S. N., Nasim, I., Thomas, T., & Ranjan, M. (2018). Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up. *Journal of conservative*.
- [18]. Heymann S. J. (1991). Erratum in Heymann article. *American journal of public health*, 81(5), 658-659. <https://doi.org/10.2105/ajph.81.5.658-a>.