

MOST COMMONLY USED MATRIX BAND SYSTEM FOR CLASS II RESTORATION

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ABSTRACT

The aim of this study is to find the most commonly used matrix band system by restorative dentist in class II restoration. This study was conducted from 1st November 2019 to 31st January 2020 after obtaining approval from the final year students, House officer, post graduate resident and faculty members of operative dentistry department from the tertiary care dental hospitals of Karachi and Islamabad were enrolled in the study. A questionnaire was developed to assess the knowledge and attitude of participants regarding the most commonly used matrix band system among the restorative dentist to avoid the potential problems of overhanging restoration. Response of the participants was analyzed & calculated by SPSS version 23. Within limitation of this study it is concluded that 68% of restorative dentists used tofflemire matrix band along with dental wedges while restoring class II cavity.

Keywords: Class II cavity, Matrix band, Dental wedges, over hanging restoration.

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INTRODUCTION

According to G.V. Black classification of carious lesions, Class II caries affects proximal surfaces of premolars and molars. Restoration of Class II carious lesion should be done adequately to restore the anatomical form of the tooth to maintain function, esthetics, comfort, preservation and positional stability of teeth.^{1,2} It is necessary to build up the anatomical proximal contact with the adjacent tooth to maintain the integrity of dental arch against the masticatory forces²

Anatomical proximal contact of tooth is important to avoid food impaction in the interdental area for protection of periodontium^{3,4}. The under or over contoured proximal contacts of the restoration will lead to spaces in interdental area that causes food impaction, secondary carious lesion, periodontal complications and

eventual tooth migration.^{5,6} Overhanging restoration is most common local factor causing periodontal disease after plaque and calculus.⁷

Restoring anatomical contact points with direct restoration still remains challenging because of their associated problems. The potential problems associated with direct restoration of class II cavity can be handled by using the matrix band system. The properly placed matrix band has the ability to restore the proximal contact points with the adjacent tooth and it prevents the extrusion of excess restorative material at the gingival margins. Ultimate proximal contour of a restoration is affected by the shape of matrix band system.⁸ A variety of prefabricated matrix band systems are available for class II restoration e.g. Sectional Matrix band system, Ivory Matrix band system, circumferential matrix band etc. Similarly, different types of wedges like wooden wedges, plastic and synthetic resin wedges are available to aid in contouring the matrix band to the cavity to overcome the extrusion of excess material and produce an ultimate proximal contour^{9,10}.

The use of an appropriate matrix system is considered essential for the direct restoration of a Class II cavity, irrespective of the restorative material being used. Studies reported prevalence of 25% to 76% of overhanging interproximal restoration.⁷ Despite there being a large variation in matrix systems on the market the majority of dental practitioners still use the tofflemire matrix system. This study was conducted to find out the most commonly used matrix band system by the restorative dentists of Karachi, Rawalpindi &

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Islamabad for restoring class II carious lesion to avoid the potential problems of overhanging restorations.

METHODOLOGY

The study was conducted from 1st November 2019 to 31st January 2020 after obtaining approval from the ethical committee of Armed Forces Institute of Dentistry, Rawalpindi. Final year students, House officer, resident and faculty members of operative dentistry department from the tertiary care dental hospitals of Karachi, Rawalpindi and Islamabad were enrolled in the study. A questionnaire was developed which was reproduced from pretested questionnaire that has been previously used in similar studies. It contains questions to assess the knowledge & attitude of participants regarding the most commonly used matrix band system to avoid the potential problems of proximal restoration. Informed consent has been taken from the participants and their confidentiality was ensured. The questionnaire was distributed among the 300 participants of restorative dentists out of whom only 265 participants return complete form. Quantitative data was presented as frequencies and percentages. The data was analyzed by using SPSS version 23.

RESULTS

Out of 300 participants 265 returned the complete form so the response rate was 88.3% out of which 51% was Resident operative dentistry, 13% were consultants

and rest includes final year students, house officers and general dentists. Results of the study showed that 68% of the participants use tofflemire matrix band while 13% use ivory matrix band, 15% use sectional matrix band and only 4% use circumferential matrix. 68% of dentists reported using wedges before matrix placement. Chi-square test was applied to show the significance and a P value of less than 0.01 was considered as significant.

DISCUSSION

Restoring class II carious lesion with proper contour is one of the difficult task for restorative dentist as if it is not properly restored causing food impaction, secondary carious lesion and periodontal complications.¹¹ Different types of matrix bands and wedges are used for restoration of these lesions.⁶ We conducted this study to find about the most commonly used matrix band by restorative dentists in class II restorations. Our results showed that 68% of the participants used Tofflemire matrix band system, 13% use ivory matrix band, 15% use sectional matrix band and only 4% use circumferential matrix in restoring class II carious lesion. Similarly, Naz et al, evaluated the preference of dentists towards different matrix [systems and concluded that the 62.5% opted for the tofflemire matrix system, 41% used sectional matrix when restoring class II composite restorations.¹²

A study conducted by Patras and Doukoudakis et al concluded that dental wedge is the basic requirement

TABLE 1: SHOWING FREQUENCY OF VARIOUS MATRIX BAND SYSTEM USED BY THE PARTICIPANTS

Qualification	Types of matrix band used in restoration				Total
	Tofflemire matrix band system	ivory matrix band system	sectional matrix band system	circumferential matrix band system	
Final year students	10(4%)	0	0	0	10 (4%)
House officers	45 (17%)	0	0	0	45 (17%)
PG	50(19%)	35(13%)	40(15%)	10(4%)	135 (51%)
Consultants	35 (13%)	0	0	0	35 (13%)
General dentists	40(15%)	0	0	0	40 (15%)
Total	180(68%)	35(13%)	40(15%)	10(4%)	265(100%)

TABLE 2: SHOWING FREQUENCY OF WEDGE USE IN CLASS II RESTORATION

Qualification	Use of wedges before placing matrix band system		Total
	Yes	No	
Final year students	10 (4%)	0	10(4%)
House officers	15(6%)	30(11%)	45(17%)
PG	100(38%)	35(13%)	135(51%)
Consultants	35(13%)	0	35(13%)
General dentists	19(7%)	21(8%)	40(15 %)
Total	180 (68%)	85(32.0%)	265(100%)

for tooth separation and provides resistance against matrix band placement. Improper matrix band placement leads to contamination of cavity and weakening of the restoration.¹³ Lussi -et-al compared the iatrogenic damage to the tooth structure in relation to the adjacent tooth during class II cavity preparation by using magnification loupes, stainless band and protective separating wedges in preventing and minimizing damage to the tooth structure. He also compared the damage to the tooth structure between the experienced dentist and the undergraduate student. He found 81% experienced dentist utilized stainless band to avoid damage while 94% utilized wedges and 76% of undergraduates utilized stainless band and wedges.¹⁴ In our study majority of the dentists (68%) were found to be using wedges in restoring proximal tooth contours out of which 51% were residents 13% were consultants and 4% undergraduate students were using it. So compliance with dental wedges was found to be high in practicing dentists.

There are many matrix band systems available for use in dentistry, a study conducted by Bas AC Loomanst et al compared the proximal overhang by using two matrix band systems i-e V RING and compo-tight- gold and contact matrix system and found that v-ring results in least proximal overhang because its configuration is in the bucco lingual direction that leads to better adaptation to the tooth as compared to other system¹⁵ In our study it was found that majority of the dentists (68%) achieve better adaption of restorative material to the cavity wall using the tofflemire matrix system while 57% found no overhang and had no post-operative complaints of sensitivity from the patients. In another article by Bas AC Loomanst et al found that the circumferential matrix band system lost the proximal contact as compared to sectional matrix band because of the thickness of matrix band.¹¹

One of the limitations of this study was that it depended on the individual dentists' experience. More longitudinal studies need to be planned in the future to see the impact of using different matrix systems on the contours and the longevity of the proximal restorations.

CONCLUSION

Within its limitation, our study concluded that 68% of restorative dentists and post graduate trainee use tofflemire matrix band along with dental wedge while restoring class II carious lesions

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CONTRIBUTIONS BY AUTHORS

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|---------------------------------|---|
| 1 Maha Aslam: | Contribution to write up, literature review of the article and reference citation |
| 2 Ajmal Yousaf: | Conceived the idea, planned the study and helped in manuscript writing. |
| 3 Faisal Bhangar: | Helped in data collection and proof reading of the article |
| 4 Syeda Fatima Tu Zahra: | Supervised the study, reviewed and done proof reading of the article. |
| 5 Nazish Iftikhar: | Contributed to article writing and reference citation |
| 6 Laila Shah Khan: | Helped in data collection and proof reading of the article |