Journal of Cardiovascular Disease Research
ISSN: 0975-3583, 0976-2833 VOL16, ISSUE 1, 2025

Comparative Evaluation of Clinical Efficiency and Patient Acceptability toward the Use of recently launched matrices for Restoration of Class II Cavities in Primary Molars: An In Vivo Study

Dr. Dhiman Mukherjee[1], Dr. Richa Singh[2], Dr. Annu Kushwaha[3], Dr. Prateek Singh[4] Dr. Asheesh Sawhny[5]

[1]Post Graduate, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

[2]Reader, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

[3]Reader, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

[4]Reader, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

[5]Principal, Professor and Head of Department, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.

ABSTRACT

Aim: To compare two recently launched matrix systems (Polydentia MyQuickmat All-round Circumferential Matrix,Pac-dent Imatrix sectional Matrix) based on clinical efficiency and patient acceptability for placement of visible light cure composite resin restorative material in a Class II cavity in primary molars.

Materials and Methodology: Thirty patients with bilateral Class II cavities were selected. A split-mouth comparative experimental study was conducted at Rama Dental college,Kanpur, India. Cavities were restored using either MyQuickmat circumferential matrix or Imatrix sectional matrix band system. The patient upon completion of the treatment filled the subject preference questionnaire. Time assessment was done for matrix system placement. Contact points were evaluated using dental floss as open or closed.

Results:

Imatrix sectional matrices took longer to place (121.30 ± 29.40) than MyQuickmat circumferential matrices (112.20 ± 38.94). Compared to the circumferential matrices group (16) (54.3%), the sectional matrices group has more perfect contacts (23) (75.7%). Approximately 70% of patients said that the sectional matrices caused them discomfort. The MyOuickmat circumferential matrices were deemed more pleasant by the study participants than the Imatrix sectional matrices group.

Conclusion:

The MyQuickmat circumferential matrices group was more time efficient compared to the Imatrix sectional matrices group. However, sectional matrices resulted in a greater number of restorations with ideal contacts. Based on the preference MyQuickmat circumferential matrix band system has been found superior to Imatrix sectional matrix band system.

Keywords: Class II restoration, Contact point, Matrix system

Introduction:

Getting the right proximal contacts and shapes is one of the largest challenges that most doctors have while repairing a Class II cavity.In order to maintain a healthy periodontium, the goal is to replicate a natural proximal contact that is sufficiently tight to avoid food impaction. Carious lesions and periodontal issues may result from food impaction brought on by loose proximal contact.1. Matrix bands are very significant. When doing restorations on proximal carious lesions, matrix bands provide support. A matrix is a precisely shaped piece of metal or another material that supports and shapes the repair while it is being placed and allowed to harden or set.2. A correctly inserted and contoured wedge is used to adapt a suitably shaped matrix band gingivally. Pre-wedging protects the interproximal tissue during cavity preparation and causes the first separation of teeth. Gingival overhangs, food impaction, food lodgement, and recurrent caries have decreased with the use of matrices.3. The MyQuickmat circumferential matrix system and the Imatrix sectional matrix system are two newly released matrix systems. Tight contacts are produced by combining circumferential matrices, which are pre-contoured in three dimensions, with anatomical wedges and separators. The quadrilateral task to provide appropriate adaption is accelerated by the retainerless design's tendency to provide high comfort and visibility.The restoration's retention between the teeth that need to be restored is enhanced by sectional matrices. They guarantee a high degree of matrix band adaptability. They have a lengthy shelf life and are anatomically shaped. When the best possible tooth shape, function, and structure preservation are needed, they are employed.Two recent matrices were utilised in this investigation and compared according to their time, clinical effectiveness, and patient acceptance.

Materials and Method:

Selection of patient:

The present comparative experimental study comprised of 30 patients of with bilateral Class II cavities.Children were selected from the outpatient department of Rama Dental college, Kanpur, Uttar Pradesh. The study was approved by ethical committee of the University. Patients were made aware of the experimental design and a written informed consent was

obtained from them.Patient were clinically examined to make sure that the bilateral Class II caries were limited to enamel or dentin, adjacent teeth was present and there was no associated history of pain or swelling.Patients with special health care needs and those who were uncomfortable with the placement of rubber dam were excluded from the study.The principal investigator performed all the cases and assistance was sought from a clinical assistant to pick up chits.One chit to decide which side would be done first (right or left) and then a second chit to decide which matrix system would be placed first to avoid bias.

Methodology:

A rubber dam was used to isolate the operatory field. Composi-Tight 3D Fusion Ultra Adaptive Wedges, manufactured by Garrison Dental Solutions in the United States, were used for pre-wedging. Using air rotors and diamond burs, a Class II cavity was produced according to normal procedures. Imatrix sectional matrix was utilised on one side, and MyQuickmat circumferential matrix was used on the other. The matrix band was positioned in accordance with the manufacturer's directions once the cavity had dried. The cavity was restored using light-cure composite resin. Prior to starting cavity preparation on the opposite side for the second matrix system, restoration on one side was finished and confirmed.After the restoration was finished, the rubber dam and wedges were taken out after the matrix bands.After that, articulating paper was used to check the high occlusal spots. The last polishing and finishing was completed. Time was measured starting with the pre-wedging stage and ending with the whole matrix system placement verification. To do this, a stopwatch was used.A dental floss was used to measure proximal contacts. The patient acceptance questionnaire was filled out by the patient.

Statistical Analysis

Version 24 of SPSS was used for statistical analysis. To examine variations in proportions, the chi-square test was employed. The mean differences across groups were examined using the independent sample t-test. At $p < 0.05$, statistical significance was established.

Table 1: Comparison of mean time (seconds) between Imatrix sectional and MyQuickmat circumferential matrices group

Sectional matrix	**Circumferential Matrix**	

n	Mean±SD	n	**Mean±SD**	t value	p value
20	121.30±29.40	30	112.20 ± 38.94	0.908	0.369

Table 3: Answer to questions regarding comfortability on placement of Imatrix sectional and MyQuickmat circumferential matrices

Results

The left first molar received 53.3% of the Imatrix sectional matrices, while the right first molar received 53.3% of the MyQuickmat circumferential matrices. Sectional matrices took more time to put (121.30 ±29.40) than circumferential matrices (112.20 ± 38.94). Compared to the MyQuickmat circumferential matrices group (54.3%), the Imatrix sectional matrices

group has more perfect contacts (75.7%).The Imatrix sectional matrices were the source of discomfort for almost 70% of the patients.

Discussion

A matrix system is necessary for the direct restoration of a Class II preparation in order to restore shape and function. A well-managed proximal surface promotes healthy interdental papillae, eases interdental cleaning, and helps avoid food impaction. For the dental surgeon, immediate restoration of Class II cavities in the primary dentition presents a problem. The broad and flat contact area of primary teeth may be the reason of this; it is more difficult to position a matrix band than they have the potential to escape. When opposed to permanent teeth, the pulp horns of primary teeth are positioned higher. Therefore, while primary teeth are being prepared for cavities, there is a greater likelihood of pulpal exposure. A Class II cavity is therefore more likely to require pulp therapy if it is not recovered appropriately. If class II restorations are not done correctly, they do not last long in primary teeth. Innes NPT and Evans DJP claim that "minimal intervention" techniques help preserve tooth structure and integrity, maintain the maximal dentinal thickness of the pulpal floor, and lessen pulpal exposure by reducing some of the negative effects of restorative treatment.6This split-mouth investigation was conducted in various quadrants of the same arch. In order to prevent any disparity in the average operating time between the two quadrants, this was done.To remove bias, the chit system was utilised in this study to choose which side should be completed first, then which system should be completed on which side. Additionally, it made it easy for the patient to compare the two matrix systems.

Conclusion

According to the study's parameters, the following conclusion may be made: patients in this study felt more at ease using MyQuickmat circumferential matrices than the Imatrix sectional matrices group. Additionally, the MyQuickmat circumferential matrix group outperformed the Imatrix sectional matrix group in terms of time efficiency. More restorations with optimal restorations were produced by Imatrix Sectional matrices.

References:

1. Dinesh S, Priyadarshini S, Mohan S. Comparing metal and transparent matrices in preventing gingival overhang with different resin material in Class II restorations – an SEM study. Pravara Med Rev 2012;2(2):4–9.

2. Boksman L. Matrix systems and Class II composite resins. Oral Health 2010;28–34.

3. Patras M, Doukoudakis S. Class II composite restorations and proximal concavities: clinical implications and management. Oper Dent 2013;38(2):119–124. DOI: 10.2341/11-224-T

4. Raghu R, Srinivasan R. Optimizing tooth form with direct posterior composite restoration. J Conserv Dent 2011;14(4):330–336. DOI: 10.4103/0972-0707.87192

5. Gilmour AS, James T, Byrant S, et al. An in vitro study on the use of circumferential matrix bands in the placement of Class II amalgam restorations. Br Dent J Sep 2008;205(5):221. DOI: 10.1038/bdj.2008.135

6. Innes NPT, Evans DJP. Managing caries in primary teeth. Br Dent J 2014;7–14. Doi: 10.1038/bdjteam.2014.118

7. Lesaffre E, Philstrom B, Needleman I, et al. The design and analysis of split-mouth studies: What statisticians and clinicians should know. Stat Med 2009;28(28):3740–3782. DOI: 10.1002/sim.3634

8. Agarwal SK, Jhingran R, Bains VK, et al. Patient-centered evaluation of microsurgical management of gingival recession using coronally advanced flap with platelet-rich fibrin or amnion membrane: A comparative analysis. Eur J Dent 2016;10(1):121–133. DOI: 10.4103/1305-7456.175686

9. Alonso de la Peña V, Pernas García R, Pérez García R. Sectional matrix: Step-by-step directions for their clinical use.Br Dent J 2016;220(1):11–14. DOI: 10.1038/sj.bdj.2016.18

10. Brady LA. Pre-wedging for posterior composites. Restorative dentistry [Internet], 2011. Available at: http://leeannbrady.com/restorative-dentistry/pre-wedging-for-posterior-composites

11. Clark D. The seven deadly sins of traditional Class II restorations. Dent Today 2017;36(1):119–121.

12. Anfe TEDA, Arakaki Y, Nakamura DM, et al. Mesiodistal and buccolingual crown size of deciduous teeth from a tooth bank in Brazil. Braz Dent Sci 2012;15(1)74-78. DOI: 10.14295/BDS.2012.V15I1.761

13. Cho SD, Browning WD, Walton KS. Clinical use of a sectional matrix and ring. Oper Dent 2010;35(5):587–591. DOI: 10.2341/09-338-T

14. Durr-E-Sadaf, Ahmad MZ, Gaikwad RN, , Gaikwad RN, et al. Comparison of two different matrix band systems in restoring two surface cavities in posterior teeth done by senior undergraduate students at Qassim University, Saudi Arabia: A randomized controlled clinical trial. Indian J Dent Res 2018;29(4):459–464. DOI: 10.4103/ijdr.IJDR_26_17

15. Sykes LM, Evans WG, Gani F. “In my mouth”: Part 11: Ethical concerns regarding dental over-treatment and under-treatment. S Afr Dent J 2017;72(6):281–283. DOI: 10.17159/2519-0105/2017/v72no6a9

Dr. Dhiman Mukherjee – [1]Post Graduate, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India

dhimanmukherjee00@gmail.com. 6291488794.

Dr. Richa Singh – [2]Reader, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, UP, India

drrichasingh.2804@gmail.com. 9838870041.

Dr. Annu Kushwaha- [3]Reader, Department of conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, UP, India
annusingh144@gmail.com. 8400836432.

Dr. Prateek Singh- [4]Reader, Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, UP, India
kushwahaprateek@gmail.com. 9721628299.

Dr. Asheesh Sawhny- [5]Principal and Head of Department of Conservative Dentistry and Endodontics, Rama Dental College Hospital and Research Centre, Kanpur, Uttar Pradesh, India.
drasheeshmydentist@gmail.com. 9838500100.

Corresponding Author:

Dr. Dhiman Mukherjee - [1]PG student, Department of Conservative Dentistry and Endodontics,
Rama Dental College Hospital and Research Centre, Kanpur, Uttar, Pradesh, India
dhimanmukherjee00@gmail.com
6291488794