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ORIGINAL ARTICLE

Awareness and Practice of Deep Margin Elevation among Dental Practitioners in India: A Cross-Sectional Survey

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ABSTRACT

Objective: To evaluate knowledge, attitude and practice of deep margin elevation (DME) amongst dental practitioners in India, thereby increasing awareness. **Material and Methods:** A cross-sectional study was carried out among academicians, private practitioners, and post-graduate students, comprising 266 participants. Twenty-three close-ended web-based questionnaires were circulated through Google Forms. Data was analyzed using the Chi-square test, and descriptive analysis was performed using the Statistical Package for the Social Sciences software. **Results:** Although most respondents were aware of DME, only 27.4% claimed to have used this approach in daily practice. 60.4% reasoned out that DME was a technique-sensitive procedure. However, 50% of participants prefer to use DME as a substitute for surgical crown lengthening. There was a significant association between awareness regarding the term DME, knowledge of the procedure, and the study participants' cadre (p=0.024 and p=0.214, respectively). **Conclusion:** Knowledge, attitude, and practice of DME among dental practitioners in India are adequate. However, few dentists use this method to treat extensive subgingival decay in clinical practice. This can be attributed to the lack of literature on the subject and the perceived difficulties of the procedure. There is a need for more clinical research to understand the long-term prognosis of teeth restored using this technique and to encourage its usage in practice.

Keywords: Awareness; Dentistry; Tooth; Education, Dental; Preventive Dentistry.

Introduction

The occurrence of proximal caries is still widespread even though many studies have indicated a decline in the prevalence of dental caries [1,2]. A recent study conducted in India showed the prevalence of proximal caries as 46.3% in the disto-occlusal region, 44.3% in the mesio-occlusal region, and 9.3% in the mesio-occluso-distal region [3].

With such high prevalence rates, dental clinicians find it challenging to restore deep proximal lesions with subgingival margins that extend beyond cementoenamel junction (CEJ). This is brought on by restricted access, slipping of rubber dam over margins, and constant discharge of saliva, crevicular fluid, and blood [4,5]. The conventional approach is to apically displace the periodontium to access the subgingival margin, allowing sufficient leeway to establish the supracrestal tissue attachment (STA) or biologic width (BW). The procedures for this include orthodontic extrusion, surgical crown lengthening (SCL), or surgical extrusion [6]. There are benefits and drawbacks to each of the potential treatment choices. Therefore, selecting the most advantageous approach is crucial, considering the expectations and requirements of patients and the biological factors [7].

When carried out as a justification for restorations, SCL necessitates performing an apically positioned flap with/without bone resection to expose at least 4 mm of healthy dental tissue [8]. This can lead to subsequent gingival recession, exposure of furcation areas and developmental depressions of the root, hypersensitive dentin, poor crown-root ratio, and compromised aesthetics, further delaying the placement of the final restoration [4,9-11]. Orthodontic extrusion, however, causes no such untoward effects. Nonetheless, the drawbacks include a lengthy treatment time, deteriorating dental hygiene, aesthetic issues, high patient compliance, and a necessity for fiberotomy [12]. Surgical extrusion is an invasive but rapid approach. Still, it cannot be used for multi-rooted teeth as there is a possibility of ankylosis and root resorption owing to periodontal ligament trauma [13].

Deep margin elevation (DME), also termed "cervical margin relocation," "proximal box elevation," and "coronal margin relocation," is a restorative approach for deep proximal lesions that requires a direct restoration to relocate the subgingival cervical margin to a supragingival location. DME has been suggested as a substitute to shorten the duration and complexity of treatment [6,7]. With the paradigm shift towards minimally invasive procedures, DME can be an alternative to conventional methods in select cases [14,15]. Even though this technique was proposed by Eggmann et al. [6], it is relatively new to clinicians. The reluctance to apply it could be attributed to the lack of literature on the subject and the perceived difficulties of the procedure. There is no existing data regarding the awareness and practice of DME amongst the Indian population. The present study aims to assess the knowledge, attitude, and practice of the Indian population and increase awareness of DME in due process.

Material and Methods

Study Design and Ethical Clearance

The cross-sectional survey was conducted over five months (from February 2023 to June 2023). Ethical clearance was obtained from the Institutional Ethical Committee (ABSM/EC 08/2019). All participants were informed that answering the questionnaire would be anonymous.

Sample Size Calculation

The sample size was calculated using the formula n = $\frac{\left(Z^2\ 1-\frac{\alpha}{2}\right)\ (1-p)\,p}{\xi^2 p}$

Where: Z: Confidence interval; 1-α/2: Desired confidence level; p: Expected prevalence; and ξ: Relative precision. The prevalence was kept at 67% [17]. The selection of participants was done by convenient sampling and was found to be 247.

Data Collection

Three experts in the field validated the questionnaire. The survey questions were examined to analyze the comprehension, interpretation, and response difficulty accurately. A self-constructed 23, close-ended web-based questionnaire was formulated through Google Forms and circulated using the subsequent Google link. The survey was divided into four key sections: sociodemographic characteristics, knowledge, attitude, and practice of dental practitioners towards the DME technique. The questionnaire comprised ten questions to assess knowledge, five to evaluate attitude, and four case scenarios of carious lesions with clinical photographs and radiographs showing teeth with differing levels of proximal margins to evaluate the practice towards DME (Figure 1). The clinical scenarios were framed based on the classification given by Ghezzi et al. [16]. Scenario 1 consisted of a tooth with proximal caries above the gingival sulcus, while in scenario two, the proximal caries extended sub-gingivally where rubber dam isolation was possible. Rubber dam isolation was impossible in scenario three as the proximal caries were slightly more than 3mm from the bone crest. In scenario 4, the proximal caries were located less than 3mm from the bone crest (Figure 1).

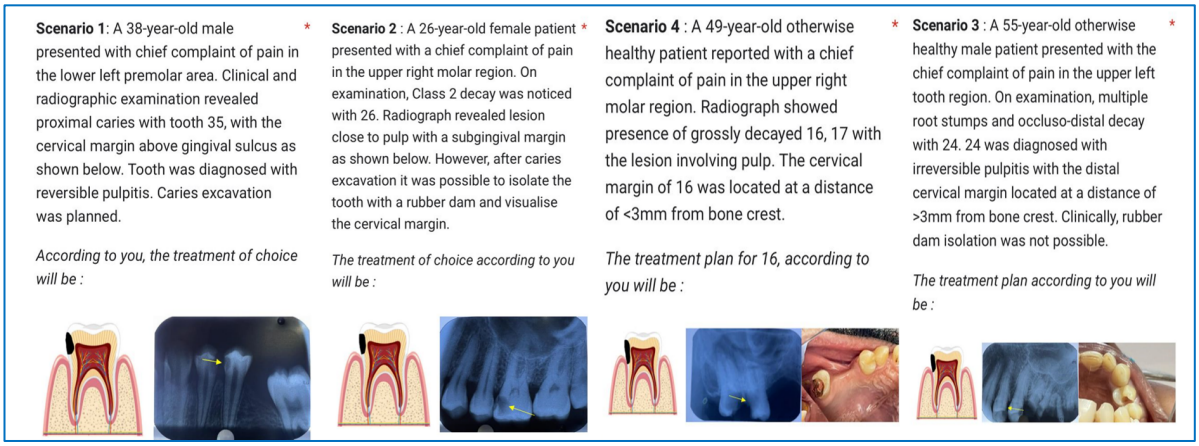

Figure 1. Clinical scenarios to assess the practice of deep margin elevation.

Study Participants

Academicians, private practitioners (PP), and postgraduate students working/studying in India and having at least one year of work experience were included in the present study. The current study excluded academics, private practitioners, post-graduate students with less than one year of experience, and undergraduates.

Statistical Analysis

Data was analyzed using Statistical Package for the Social Sciences (SPSS) software, version 21 (IBM Corp., Armonk, NY, USA). A descriptive analysis was conducted to understand the research population. Frequencies and percentages were used to report categorical variables. The chi-square test determined the relationship between participants' knowledge, attitude, practice, and the cadre. A p-value less than 0.05 was used to determine the significance.

Results

Of the 266 participants who responded to the survey, 51.5% were postgraduate students, 21.8% were private practitioners, 7.1% were academicians, and 19.5% were private practitioners and academicians. Most respondents (70.7%) had 1-5 years of clinical experience, while about 12% and 10%, respectively, had 6-10 years and 11-20 years of experience. Only 7.1% of respondents had experience above 20 years.

The findings regarding knowledge about DME showed that most respondents (74.8%) agreed that minimally invasive approaches gave better results than conventional approaches (Table 1). 64.3% of respondents were aware of the procedure of deep margin elevation. 21.4% of participants responded that deep margin elevation is the gradual relocation of the deep proximal margin, 34.2% answered that it is the application of a restorative material at the gingival margin below the proximal contact, and 40.2% chose both of the above. In comparison, 1.5% chose none of the above, and 21.4% were unaware. Regarding the isolation method of choice, most respondents (47.7%) opted for gingival retraction chords, while 42.9%, 8.3%, and 1.1% opted for a rubber dam, PTFE tapes, and cotton rolls, respectively. A majority believed that Glass Ionomer Cement (GIC) / Resin-modified Glass Ionomer Cement - RMGIC (47%) and sectional matrix (48.1%) were the restorative material and matrix system of choice for better marginal adaptation. 33.1% of respondents agreed that self-etch, selective enamel etching, and immediate dentin sealing (IDS) were the concepts of adhesion for positive results. About 63.9% agreed that IDS aids in the marginal integrity of the restoration. About 83.1% of the respondents believed that BW should be considered a primary factor before DME, and 32.7% considered the required minimum standard BW as 3mm (Table 1).

The findings regarding attitude towards DME showed that only 27.4% of the respondents used DME in their clinical practice. 60.4% of respondents reasoned that as it was a technique-sensitive procedure, they did not use the technique regularly in practice. Isolation of the working field (54.7%) was the most common hindrance. Difficulty in exposure of the cervical margin (42.9%) was the most common reason for practitioners not choosing DME in their practice. 50% of the participants would prefer DME as an alternative to SCL (Table 1).

Table 1. Percentage of the knowledge, attitude, and practice assessment on deep margin elevation.

Questions	N	%
Which of the following approaches do you think gives ideal results?		
Conventional/Traditional approaches	67	25.2
Minimal intervention approaches	199	74.8
Are you aware of the term Deep Margin Elevation (DME)?		
Yes	171	64.3
No	95	35.7
If Yes, deep margin elevation is		
Gradual relocation of the deep proximal margin	57	21.4
Application of a restorative material at the gingival margin below the proximal contact	34	12.8
Both	107	40.2
None	4	1.5
Don't know	64	24.1
Which isolation method do you think would give the best results for DME?		
Rubber dam	114	42.9
Gingival retraction chord	127	47.7
PTFE tapes	22	8.3
Cotton rolls	3	1.1
According to you, the restorative material of choice for adequate marginal adaptation is		
GIC / Resin Modified GIC	125	47.0

Composites	103	38.7
Amalgam	10	3.8
All of the above	28	10.5
Which of the following matrix systems do you think aids in good marginal adaptation of the restoration?		
Circumferential matrix	69	25.9
Sectional matrix	128	48.1
Tofflemire matrix	51	19.2
Ivory No.1	18	6.8
In your opinion, which concept of adhesion will essentially give positive results for marginal adaptation of the restoration?		
Self-etch	51	19.2
Selective enamel etching	42	15.8
Immediate dentinal sealing	55	20.7
All of the above	88	33.1
Use any. It doesn't make a difference	30	11.3
In the case of indirect restoration after DME, do you think immediate dentin sealing aids in the marginal integrity of the restoration?		
Agree	170	63.9
Disagree	12	4.5
Don't know	84	31.6
Should biologic width be considered as a primary factor prior to DME?		
Agree	221	83.1
Disagree	10	3.8
Don't know	35	13.2
If yes, how much should the minimum standard biologic width be for DME		
1 mm	47	17.7
2 mm	59	22.2
3 mm	87	32.7
Don't know	73	27.4
Do you use DME in your regular clinical practice?		
Yes	73	27.4
No	193	72.6
If not, what, amongst the following, would be your reasons not to use DME?		
Compromise in the fracture resistance of teeth	22	10.6
Technique sensitive	125	60.4
Tedious procedure	45	21.7
Other	15	7.2
If yes, which of these are your difficulties while performing DME?		
Isolation of the working field	105	54.7
Application of matrix	34	17.7
Bonding to dentin	12	6.3
Time-consuming procedure	41	21.4
According to you, the reason practitioners do not choose DME frequently in clinical practice is		
Violation of biological width/ attachment loss	48	18.0
Microleakage at dentin restoration interface	67	25.2
Difficulty in exposure of the cervical margin of the tooth	114	42.9
Difficulty in oral hygiene maintenance for the patient	37	13.9
Would you prefer using DME as an alternative to surgical crown lengthening or orthodontic forced eruption?		
Yes	133	50.0
No	51	19.2
Don't know	82	30.8

For scenario one, most respondents chose a final restoration without any supplemental procedure (62.8%). In contrast, respondents opted for deep margin elevation for scenarios two, three, and four instead of the various conventional treatment procedures (53.8%, 51.9%, and 49.2%, respectively) (Table 2).

Table 2. Distribution of participants according to scenario.

Scenario	N	%
Scenario 1		
Final restoration without any supplemental procedure	167	62.8
Deep margin elevation	86	32.3
Gingival resection	2	0.8
Surgical crown lengthening	8	3.0
Extraction	3	1.1
Scenario 2		
Final restoration without any supplemental procedure	109	41.0
Deep margin elevation	143	53.8
Gingival resection	6	2.3
Surgical crown lengthening	5	1.9
Extraction	3	1.1
Scenario 3		
Final restoration without any supplemental procedure	37	13.9
Deep margin elevation	138	51.9
Gingival resection	35	13.2
Surgical crown lengthening	34	12.8
Extraction	22	8.3
Scenario 4		
Final restoration without any supplemental procedure	20	7.5
Deep margin elevation	131	49.2
Gingival resection	16	6.0
Surgical crown lengthening	18	18.0
Extraction	51	19.2

A statistically significant association existed between the level of training and the strategy adopted to achieve the ideal results (p=0.002). Likewise, regarding the knowledge about the term deep margin elevation (p=0.024) and the the restorative material for adequate marginal adaptation (p=0.042) (Table 3).

Table 3. Association between independent variables and the participant's level of training.

Variables	Student PG N (%)	PP N (%)	Academician N (%)	Both N (%)	p-value
Years of experience					
1-5	132 (49.6)	38 (14.3)	5 (1.9)	13 (4.9)	<0.001*
6-10	5 (1.9)	9 (3.4)	7 (2.6)	11(4.1)	
11-20	0 (0.0)	6 (2.3)	5 (1.9)	16 (6.0)	
> 21	0 (0.0)	5 (1.9)	2 (0.8)	12 (4.5)	
Which of the following approaches do you think gives ideal results?					
Conventional/Traditional approaches	48 (18.0)	10 (38.0)	2 (0.8)	7 (2.6)	0.002*
Minimal intervention approaches	89 (33.5)	48 (18.0)	17 (6.4)	45 (16.9)	
Are you aware of the term Deep Margin Elevation (DME)?					
Yes	77 (28.9)	40 (15.0)	13 (4.9)	41 (15.4)	0.024*
No	60 (22.6)	18 (6.8)	6 (2.3)	11 (4.1)	
If Yes, Deep margin elevation is					
Gradual relocation of the deep proximal margin	29 (10.9)	14 (5.3)	4 (1.5)	10 (3.8)	0.214
Application of a restorative material at the gingival margin below the proximal contact	22 (8.3)	5 (1.9)	2 (0.8)	5 (1.9)	
Both	44 (16.5)	25 (9.4)	10 (3.8)	28 (10.5)	
None	2 (0.8)	0 (0.0)	1 (0.4)	1 (0.4)	
Don't know	40 (15.5)	14 (5.3)	2 (0.8)	8 (3.0)	
Which isolation method do you think would give the best results for DME?					
Rubber Dam	58 (21.8)	25 (9.4)	5 (1.9)	26 (9.8)	0.781
Gingival retraction chord	64 (24.1)	27 (10.2)	12 (2.5)	24 (9.0)	
PTFE tapes	13 (4.9)	5 (1.9)	2 (0.8)	2 (0.8)	
Cotton rolls	2 (0.8)	1 (0.4)	0 (0.0)	0 (0.0)	

In your opinion, what is the restorative material of choice for adequate marginal adaptation?					
GIC / Resin Modified GIC	65 (24.4)	28 (10.5)	11 (4.1)	21 (7.9)	0.042*
Composites	54 (20.3)	18 (6.8)	6 (2.3)	25 (9.4)	
Amalgam	2 (0.8)	7 (2.6)	0 (0.0)	1 (1.9)	
All of the above	16 (0.6)	5 (1.9)	2 (0.8)	5 (19.5)	
Which of the following matrix systems do you think aids in good marginal adaptation of the restoration?					
Circumferential matrix	41 (15.4)	11 (4.1)	5 (1.9)	12 (4.5)	0.947
Sectional matrix	62 (23.3)	30 (11.3)	10 (3.8)	26 (9.8)	
Tofflemire matrix	25 (9.4)	12 (4.5)	3 (1.1)	11 (4.1)	
Ivory No.1	9 (3.4)	5 (1.9)	1 (0.4)	3 (1.1)	
In your opinion, which concept of adhesion will essentially give positive results for marginal adaptation of the restoration?					
Self-etch	32 (12.0)	10 (3.8)	2 (0.8)	7 (2.6)	0.769
Selective enamel etching	22 (8.3)	9 (3.4)	3 (1.1)	8 (3.0)	
Immediate dentinal sealing	25 (9.4)	15 (5.6)	5 (1.9)	10 (3.8)	
All of the above	41 (15.4)	21 (7.9)	7 (2.6)	19 (7.1)	
Use any. It doesn't make a difference	17 (6.4)	3 (1.1)	2 (0.8)	8 (3.0)	
In the case of indirect restoration after DME, do you think immediate dentin sealing aids in the marginal integrity of the restoration?					
Agree	84 (31.6)	36 (13.5)	15 (5.6)	35 (13.2)	0.809
Disagree	7 (2.6)	3 (1.1)	0 (0.0)	2 (0.8)	
Don't know	46 (17.3)	19 (7.1)	4 (1.5)	15 (5.6)	
Should biologic width be considered as a primary factor prior to DME?					
Agree	109 (41.0)	46 (17.3)	17 (6.4)	49 (18.4)	0.248
Disagree	6 (2.3)	3 (1.1)	1 (0.4)	0 (0.0)	
Don't know	22 (8.3)	9 (3.4)	1 (0.4)	3 (1.1)	
If yes, how much should the minimum standard biologic width be for DME?					
1 mm	24 (9.0)	7 (2.6)	5 (1.9)	11 (4.1)	0.351
2 mm	30 (11.3)	12 (4.5)	5 (1.9)	12 (4.5)	
3 mm	41 (15.4)	19 (7.1)	5 (1.9)	22 (8.3)	
Don't know	42 (15.8)	20 (7.5)	4 (1.5)	7 (2.6)	
Do you use DME in your regular clinical practice?					
Yes	36 (13.5)	15 (5.6)	7 (2.6)	15 (5.6)	0.787
No	101 (38.0)	43 (16.2)	12 (4.5)	37 (13.9)	
If not, what, amongst the following, would be your reasons not to use DME?					
Compromise in the fracture resistance of teeth	13 (6.3)	3 (1.4)	1 (0.5)	5 (2.4)	0.578
Technique sensitive	67 (32.4)	28 (13.5)	8 (3.9)	22 (10.6)	
Tedious procedure	22 (10.6)	7 (3.4)	4 (1.9)	12 (5.8)	
Other	7 (3.4)	6 (2.9)	1 (0.5)	1 (0.5)	
If yes, which of these is difficult for you while performing DME?					
Isolation of the working field	59 (30.7)	23 (12.0)	8 (4.2)	15 (7.8)	0.142
Application of matrix	14 (7.3)	6 (3.1)	4 (2.1)	10 (5.2)	
Bonding to dentin	5 (2.6)	1 (0.5)	1 (0.5)	5 (2.6)	
Time-consuming procedure	16 (8.3)	14 (7.3)	2 (1.0)	9 (4.7)	
According to you, the reason practitioners do not choose DME frequently in clinical practice is					
Violation of biological width/ attachment loss	28 (10.5)	6 (2.3)	5 (1.9)	9 (3.4)	0.618
Microleakage at the dentin restoration interface	33 (12.4)	15 (5.6)	3 (1.1)	16 (6.0)	
Difficulty in exposure of the cervical margin of the tooth	58 (21.8)	27 (10.2)	10 (3.8)	19 (7.1)	
Difficulty in oral hygiene maintenance for the patient	18 (6.8)	10 (3.8)	1 (0.4)	8 (3.0)	
Would you prefer using DME as an alternative to surgical crown lengthening or orthodontic forced eruption?					
Yes	71 (26.7)	27 (10.2)	14 (5.3)	21 (7.9)	0.049*
No	20 (7.5)	12 (4.5)	2 (0.8)	17 (6.4)	
Don't know	46 (51.5)	19 (7.1)	3 (1.1)	14 (5.3)	

PP: Private Practitioner; *Statistically significant.

An association was observed between scenarios 1, 3 and 4 and the participant's level of education (p=0.048, p=0.005 and p=0.001) (Table 4).

Table 4. Association between scenario and the participant's level of training.

Scenario	Student PG	PP	Academician	Both	p-value
	N	%	N	%	
Scenario 1					
Final restoration without any supplemental procedure	82 (30.8)	43 (16.2)	13 (4.9)	29 (10.9)	0.048*
Deep margin elevation	50 (18.8)	12 (4.5)	5 (1.9)	19 (7.1)	
Gingival resection	0 (0.0)	1 (0.4)	1 (0.4)	0 (0.0)	
Surgical crown lengthening	2 (0.8)	2 (0.8)	0 (0.0)	4 (1.5)	
Extraction	3 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)	
Scenario 2					
Final restoration without any supplemental procedure	59 (22.2)	26 (9.8)	17 (6.4)	17 (6.4)	0.143
Deep margin elevation	73 (27.4)	27 (10.2)	12 (4.5)	31 (11.7)	
Gingival resection	1 (0.4)	1 (0.4)	0 (0.0)	4 (1.5)	
Surgical crown lengthening	2 (0.8)	3 (1.1)	0 (0.0)	0 (0.0)	
Extraction	2 (0.8)	1 (0.4)	0 (0.0)	0 (0.0)	
Scenario 3					
Final restoration without any supplemental procedure	24 (9.0)	9 (3.4)	0 (0.0)	4 (1.5)	0.005*
Deep margin elevation	79 (29.7)	26 (9.8)	12 (4.5)	21 (7.9)	
Gingival resection	10 (3.8)	6 (2.3)	5 (1.9)	14 (5.3)	
Surgical crown lengthening	16 (6.0)	10 (3.8)	0 (0.0)	8 (3.0)	
Extraction	8 (3.0)	7 (2.6)	2 (0.8)	5 (1.9)	
Scenario 4					
Final restoration without any supplemental procedure	14 (5.3)	1 (0.4)	1 (0.4)	4 (1.5)	0.001*
Deep margin elevation	77 (28.9)	27 (10.2)	5 (1.9)	22 (8.3)	
Gingival resection	9 (3.4)	4 (1.5)	2 (0.8)	1 (0.4)	
Surgical crown lengthening	13 (4.9)	9 (3.4)	7 (2.6)	19 (7.1)	
Extraction	24 (9.0)	17 (6.4)	4 (1.5)	6 (2.3)	

*Statistically significant.

Discussion

The respondents of the present survey relied on minimally invasive procedures to give ideal results. Lately, there has been a paradigm shift towards minimally invasive approaches in dentistry. GV Black's concept of "Extension for prevention" is being replaced by "Prevention of extension" [18].

A recent study conducted in India came to similar outcomes, demonstrating that dentists have chosen a conservative approach by adopting minimally invasive dentistry (MID) for managing caries [19]. More than half of the participants knew of DME, but only 27.4% utilized this procedure in their dental clinics (Table 1). Even though DME has been prevalent in the literature for quite some time, these findings highlight that most practitioners still suggest it as a relatively new strategy to apply in clinics. This can be attributed to most reported studies being in vitro or in silico, and only a few clinical studies show long-term follow-up [20-29].

DME is the stepwise, gradual relocation of the deep proximal margins to uplift the cavity outlines for direct or indirect restoration [30]. The technique consists of placing a base of direct composite resin with about 1-1.5 mm thickness under the bonded restoration, which facilitates accurate impression-taking by conventional or digital methods. Subsequently, the restoration can be luted, eliminating the issues with poor fit, such as secondary caries and periodontal inflammation [29]. Using a rubber dam has several benefits, including superior isolation of the working field from saliva or moisture, improved visibility for the dentist, decreased mirror fogging, better visual contrast, and soft tissue retraction. This might encourage the adhesion of the restorative material to the tooth and increase longevity [31]. Likewise, the clinical studies that have used rubber dams as

the isolation method have shown success rates [27-29]. However, 47.7% and 8.3% of the practitioners opted for gingival retraction chords and PTFE tape (Table 1). A survey conducted among dentists showed that a gingival retraction cord was preferred for gingival displacement because of the ease of application and predictability [32]. Moreover, novel isolation methods like the 'Teflon tape technique' showed better patient acceptance and operability [33].

The majority chose GIC/RMGIC as the ideal restorative material for DME. No consensus is available on which material is the most appropriate. Compared to GIC and RMGIC, more studies have used resin-based composites (RBC) and have shown RBC to be advantageous [34]. Circumferential metal matrices improved the marginal integrity of deep class II restorations [35]. However, 48.1% of respondents preferred a sectional matrix (Table 1). This could be because of the good emergence profile it is known to provide [36]. No conclusive evidence is available on the adhesive strategy that is most favorable for DME.

No observable effect was found on the marginal adaptation of various bonding protocols and the type of adhesives. This implies that an individual may select their adhesive technique for DME. Care must be taken not to etch the dentin. Self-etch adhesives or universal adhesives, applied in self-etch or selective enamel etch mode, were shown to be advantageous for DME [6]. Most responders concurred that DME and IDS may be coupled to enhance indirect adhesive restorations' marginal seal and bond. The adhesive composite resin base can be applied to occlude the dentinal tubules, fill the undercuts, and reinforce the cusps by correcting the geometry [37]. 95% of respondents acknowledged that BW or STA should be considered a primary factor before DME (Table 1). The compatibility of DME and subgingival restoration with periodontium is adequate, given that the restoration is polished well and contoured, BW is not breached, and stringent supportive therapy and excellent oral hygiene are practiced [27]. 3 mm of STA between the cervical margin of the restoration and the bone crest was recommended for optimal gingival health [10].

The reason for not preferring DME in day-to-day practice was the technique sensitivity of the procedure and the belief that the fracture resistance of the teeth would be compromised. However, the fracture resistance of teeth was not affected by DME [7,38]. The difficulty faced by most dentists while performing DME was the isolation of the working field and application of the matrix. In case residual gaps persist in the gingival margin after using conventional matrices, a matrix-in-a-matrix technique might provide adequate seal [39]. This essentially is placing a circumferential metal matrix and then a sectional matrix within it to fill the gap, and finally, packing at the gingival level with a piece of PTFE tape. Difficulty in exposure of the cervical margin was perceived to be the reason for practitioners not choosing DME frequently. If BW is sufficient, electrocautery/ gingivectomy can be used to expose the cervical margin as well [16]. About half of the participants preferred DME as an alternative to SCL. Likewise, a systematic review concluded that DME, in conjunction with indirect restorations, was reported to have a higher survival rate than teeth treated with surgical crown lengthening [15].

The present survey respondents preferred using deep margin elevation in all clinical scenarios of subgingival caries. This could be because of a bias, as the survey was based on deep margin elevation. Dablanca-Blanco et al. [40] suggested using DME when the subgingival carious lesion reaches the gingival sulcus up to the apical extent of the junctional epithelium. When the lesion goes beyond this and invades the connective tissue, SCL is recommended. If the bone level is invaded and the tooth can be restored, a combination of SCL and DME was suggested as the treatment plan. The study's limitations include a relatively small sample size, which may affect the generalizability of the findings. Additionally, most participants were students with 1-5 years of clinical experience, potentially limiting the applicability of the results to more experienced populations.

Overcoming barriers in translating deep margin elevation to regular practice involves strategies like increasing awareness and education among dental practitioners about the benefits and techniques of DME through continuous professional development and training programs. Additionally, improving access to high-quality materials and tools required for DME can facilitate its adoption.

Areas of future research in DME include exploring the long-term clinical outcomes and success rates of different materials and techniques used in the procedure. Investigating the impact of deep margin elevation on the longevity and durability of dental restorations, as well as patient satisfaction and comfort, is crucial. Additionally, studies could focus on developing new materials and innovative methods to improve the efficacy and ease of the procedure. Research on the cost-effectiveness and accessibility of deep margin elevation in various clinical settings would also be valuable.

Conclusion

The knowledge, attitude, and practice of deep margin elevation among dental practitioners in India are adequate; however, reservations regarding the procedure persist. Deep margin elevation is a valuable procedure for clinicians as it is a minimally invasive approach. The reluctance to apply deep margin elevation in regular practice could be attributed to the fact that it is a technique-sensitive procedure requiring a good isolation aid and matrix retainer system. There is a need for more clinical research to understand the long-term prognosis of teeth restored using this technique and to encourage its usage in regular practice.

Authors' Contributions

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NR	https://orcid.org/0000-0002-7454-6300	Methodology, Investigation, Writing - Review and Editing, Visualization and Supervision.
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All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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