



## Awareness of Dental Surgeons in Pune and Mumbai, India, regarding Chemomechanical Caries Removal System

Mohammed Nadeem Ahmed Bijle, Shankargouda Patil, Shahzad S Mumkekar, Nitin Arora, Monika Bhalla, KV Murali

### ABSTRACT

**Aim:** To evaluate awareness of dental surgeons in Pune and Mumbai, India regarding chemomechanical caries removal system (CMCR).

**Study design:** Sixty practicing dental surgeons from Mumbai (30) and Pune (30) were surveyed using questionnaire.

**Materials and methods:** Qualitative data was collected on the basis of structured schedule questionnaire method.

**Statistics:** Statistical analysis was done using SPSS v. 12.0. To test statistical significance, Chi-square test, Fishers exact test and Mann-Whitney U test were used.

**Results:** Of total respondents, 46.7% dental surgeons in Pune and 13.3% in Mumbai were aware about CMCR products. Carisolv® was known to 57.1% of dental surgeons in Pune and 75% in Mumbai, whereas, Papacarie® was known to 28.6% of dentists in Pune and none in Mumbai among the respondents aware about CMCR products.

**Conclusion:** A significantly higher proportion of dental surgeons from Pune were aware about CMCR products compared to Mumbai. Dental surgeons from Mumbai were unaware about Papacarie®. Almost equal proportion of Dentists from Mumbai and Pune would like to undergo CDE programs to seek knowledge on CMCR, particularly Papacarie®.

**Keywords:** Chemomechanical caries removal system (CMCR), Caridex, Carisolv®, Papacarie®, Survey.

**How to cite this article:** Bijle MNA, Patil S, Mumkekar SS, Arora N, Bhalla M, Murali KV. Awareness of Dental Surgeons in Pune and Mumbai, India, regarding Chemomechanical Caries Removal System. J Contemp Dent Pract 2013;14(1):96-99.

**Source of support:** Nil

**Conflict of interest:** None declared

### INTRODUCTION

One of the most common problems in clinical pediatric dentistry is how to minimize the use of drills to overcome fear and have a patient friendly approach. Chemomechanical

caries removal system is one of the ideologies that have changed the perception of dental treatment, making it more patient friendly. This amounts to instill a positive dental attitude, which in turn reduces the efforts of pediatric dentist to imply behavior management techniques and achieve child's cooperation easily. On the other hand, pediatric Dentist's all around, have conceptualized the importance of preserving tooth tissue combined with a patient-friendly approach, which is becoming self-evident. This has led to revolutionize Dentistry with the concept of 'minimal invasive dentistry'. Minimal invasive dentistry comprises of various techniques, viz; air abrasion, atraumatic restorative technique, sono abrasion, laser and chemomechanical caries removal system (CMCR).<sup>1</sup> Thus, CMCR can be designated as minimally invasive, painless and patient friendly technique, recommended for pediatric dental patients.<sup>1-6</sup>

Chemomechanical caries removal technique involves the application of chemical agents, to cause a selective softening of the carious dentine and facilitates removal by gentle excavation. Since, its inception in 1980's, CMCR has been originally marketed as 3 different systems, viz, Caridex, Carisolv® and Papacarie®.<sup>6,7</sup> Caridex required large volumes of solution and a special applicator tip, which weaned its popularity around 1990's and thus, was discontinued to be marketed.<sup>7</sup> Carisolv® and Papacarie® were later introduced around 2000, which had overcome the limitations of Caridex and are being used among the clinicians aware of this technique.

Carisolv® (Fig. 1) system uses a gel and special instruments that removes the pathologically affected portion of the tooth structure and preserves the healthy tissue. Papacarie® (Fig. 2) is based on a similar system as latter but does not include special instruments for caries removal



Fig. 1: Carisolv®



Fig. 2: Papacarie®

and is relatively cheap.<sup>8</sup> Both systems have been proved to be effective in caries removal.<sup>9</sup> However, high cost is a limiting factor to daily use in developing and under-developed countries.<sup>10</sup>

India is one of the developing countries. Since, the popularity of any system depends upon its economic viability, under-developed and developing countries find it difficult to incorporate an expensive mode of treatment. As mentioned previously, CMCR includes high cost, due to which its popularity in a developing country like India is nonjudgmental. Although an expensive mode of treatment, CMCR being an effective technique for pediatric and special children would be one of the reasons to incorporate into clinical pediatric dental practice.

Hence, this study was carried out to determine the awareness of CMCR among clinicians in Mumbai and Pune, which if not present can be incorporated through continuing dental education programs and marketing.

## MATERIALS AND METHODS

Qualitative approach was chosen to probe the awareness of dental surgeons in Pune and Mumbai, India regarding CMCR. This research was conducted by authors from

Department of Pedodontics and Preventive Dentistry, MA Rangoonwala College of Dental Sciences and Research Centre, Pune, Maharashtra, India.

Sixty practicing dental surgeons from Mumbai (30) and Pune (30) were surveyed using questionnaire. Qualitative data was collected on the basis of structured schedule questionnaire method. The schedule comprised of the following questions:

1. General information *viz*, Name, Address, Contact information, etc.
2. Questions related to clinical practice *viz*, No. of years in clinical practice, flow of practice, frequency of patients with dentinal caries and treatment modality incorporated to deal with dentinal caries.
3. Questions related to CMCR *viz*, familiarity and its length; product specification and type, grade, satisfaction, interest and recommendation, etc.

Clinicians responded to the schedule through a volunteer. A single volunteer was appointed to carry out survey in both the areas.

Qualitative data recorded was then entered in MS Office, Excel Sheet 2007. Data entered was subjected to statistical analysis using SPSS v. 12.0. To test statistical significance, Chi-square test, Fishers exact test and Mann-Whitney U test were used.

## RESULTS

The age and sex distribution of respondent dentists was significantly different between two locations. On account of general Information, most of the practitioners surveyed were male, around 35 years old and indulged in clinical practice for 5 to 10 years (Table 1).

The distribution of clinical experience was significantly different between two locations. The participating dentists from Pune had significantly higher clinical experience compared to Mumbai participants (Table 1).

**Table 1:** Distribution of general information

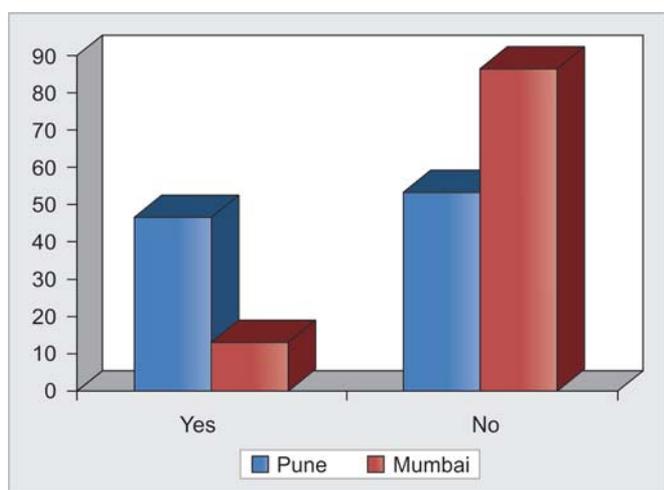
Location			
Parameters	Pune (n = 30)	Mumbai (n = 30)	p-value
Age (years) <sup>§</sup>	32 (26-43)	36 (26-69)	0.011
Sex			
Male	23 (76.7)	15 (50.0)	0.032
Female	7 (23.3)	15 (50.0)	—
Experience			
<5 years	9 (30.0)	3 (10.0)	0.000
5-10 years	12 (40.0)	27 (90.0)	—
>10 years	9 (30.0)	0	—

<sup>§</sup> Values are median (minimum – maximum) whose p-values are obtained using Mann-Whitney U test. The rest of the values are n (%) whose p-values are obtained using Chi-square test (Fisher's exact test)

The majority of dentists from Pune and Mumbai used conventional method (Air Rotor) to remove dentinal caries. Of total respondents, 46.7% dental surgeons in Pune and 13.3% in Mumbai were aware about CMCR products (Table 2 and Graph 1).

Parameters	Pune (n = 30)	Mumbai (n = 30)	p-value
<i>Method used for removal of dentinal caries</i>			
Air rotor	30 (100.0)	30 (100.0)	—
Other	0	0	—
<i>Know about CMCR</i>			
Yes	14 (46.7)	4 (13.3)	0.010
No	16 (53.3)	26 (86.7)	—

The values are n (%) whose p-values are obtained using Chi-square test (Fisher's exact test).



**Graph 1:** Distribution of awareness about CMCR

Caridex had an awareness among 14.3% of clinicians in Pune and 25% in Mumbai, Carisolv<sup>®</sup> was known to 57.1% of dental surgeons in Pune and 75% in Mumbai, whereas, Papacarie<sup>®</sup> was known to 28.6% of dentists in Pune and none in Mumbai among the respondents aware about CMCR products (Table 3). Although, 42.8% dental clinicians in Pune had an awareness of Papacarie<sup>®</sup> and Carisolv<sup>®</sup> both which was significant as compared to Mumbai, where none were aware of both methods in combination (Table 3).

CMCR products known by dental clinicians in Mumbai and Pune, were used by 28.6 and 25% respectively, rest did not have hands on experience till yet (Table 3 and Graph 2).

Approximately equal proportion of dentist in Mumbai (95.8%) and Pune (92.9%) were interested in CMCR products, in particular Papacarie<sup>®</sup> and would like to attend CDE program related to these products (Table 4).

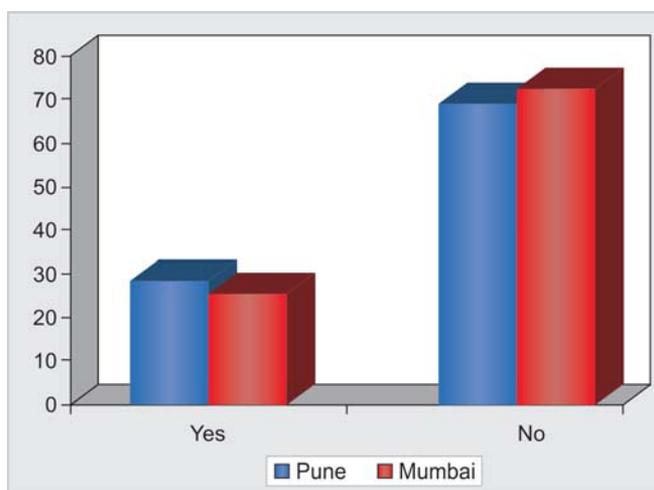
**DISCUSSION**

A survey on the status of a CMCR carried out in USA and Canada, inferred noninclusion of CMCR in curriculum of

**Table 3:** Distribution of survey information regarding distributed awareness and use of CMCR

Parameters	Pune (n = 14)	Mumbai (n = 4)	p-value
<i>Awareness of CMCR products</i>			
Caridex	2 (14.3)	1 (25.0)	0.030
Carisolv <sup>®</sup>	8 (57.1)	3 (75.0)	—
Papacarie <sup>®</sup>	4 (28.6)	0	—
<i>Awareness of CMCR products (combination)</i>			
Caridex and Carisolv <sup>®</sup>	2 (14.3)	0	0.030
Carisolv <sup>®</sup> and Papacarie <sup>®</sup>	6 (42.8)	0	—
Caridex and Papacarie <sup>®</sup>	0	0	—
All three	2 (14.3)	0	—
<i>Overall use of CMCR products</i>			
Yes	4 (28.6)	1 (25.0)	0.878
No	10 (71.4)	3 (75.0)	—

The values are n (%) whose p-values are obtained using Chi-square test (Fisher's exact test)



**Graph 2:** Distribution of use of CMCR products

**Table 4:** Distribution of survey information regarding CMCR product of interest and its respective CDE program for better understanding

Parameters	Pune (n = 16)	Mumbai (n = 26)	p-value
<i>Interested in CDE programs for CMCR</i>			
Yes	14 (87.5)	24 (92.3)	0.253
No	2 (12.5)	2 (7.7)	—
<i>CMCR product of interest</i>			
Carisolv <sup>®</sup>	1 (7.1)	1 (4.2)	0.315
Papacarie <sup>®</sup>	13 (92.9)	23 (95.8)	—

The values are n (%) whose p-values are obtained using Chi-square test

dental schools with a significant difference of 88%. Hence, majority of dentists graduating from dental schools in US and Canada were unaware about CMCR products.<sup>11</sup> The results of latter mentioned survey<sup>11</sup> seems to be similar with present survey, as the majority of dental surgeons in Mumbai and Pune were unaware of CMCR products. Although, the level of comparison cannot be standardized, as the present survey was carried out in 2010 and the previous survey<sup>11</sup> was done in 1989; where CMCR products, i.e. Carisolv<sup>®</sup>

and Papacarie<sup>®</sup> evaluated by present survey did not have existence. The difference of 21 years cannot be considered for comparison, as the development of minimal invasive dentistry has been remarkable in recent years throughout the globe.

Not many surveys have been carried in the subject of interest which provides limited scope for discussion as far as parameters are concerned. Although, some studies have proved, the use of CMCR finds no direct advantage as compared to traditional method for caries excavation in children.<sup>6,12</sup> However, some authors support CMCR as acceptable method of dentinal caries excavation in children over conventional methods.<sup>5</sup> Thus, usability and learn ability of CMCR products remains a debatable issue and should be left on individual dental surgeons choice.

## CONCLUSION

A significantly higher proportion of dental surgeons from Pune were aware about CMCR products compared to Mumbai. Dental surgeons from Mumbai were unaware about Papacarie<sup>®</sup>. Almost equal proportion of Dentists from Mumbai and Pune would like to undergo CDE programs to seek knowledge on CMCR, particularly Papacarie<sup>®</sup>.

Furthermore, there is a need of a survey with increased respondents and on a national scale to conclude a definitive statement with evidence.

## CLINICAL SIGNIFICANCE

CMCR products can be an alternative supplemental method of dentinal caries removal, if known by dental clinicians for treatment of pediatric dental patients. Hence, appropriate knowledge and awareness of such products can be a valuable asset for dentists to incorporate in daily practice.

## REFERENCES

1. Ganesh M, Dhaval P. Chemomechanical caries removal (CMCR) agents: Review and clinical application in primary teeth. *J Dent Oral Hygiene* 2013 March;(3):34-45.
2. Kavvadia K, Karagianni V, Polychronopoulou A, Papagiannouli L. Primary teeth caries removal using the Carisolv chemomechanical method: A clinical trial. *Pediatr Dent* 2004 Jan-Feb;26(1):23-28.
3. Munshi AK, Hegde AM, Shetty PK. Clinical evaluation of Carisolv in the chemomechanical removal of carious dentin. *J Clin Pediatr Dent* 2001 Fall;26(1):49-54.
4. Balčiunienė I, Sabalaitė R, Juškienė I. Chemomechanical caries removal for children. *Stomatologija, Baltic Dent Maxillofac J* 2005;7:40-44.
5. Elkholany NR, Abdelaziz KM, Zaghoul NM, Aboulene N. Chemomechanical method: A valuable alternative for caries removal. *J Minim Interv Dent* 2009;2(4):248-59.
6. Inglehart MR, Peters MC, Flamenbaum MH, Eboda NN, Feigal RJ. Chemomechanical caries removal in children: An operator's and pediatric patients' responses. *J Am Dent Assoc* 2007 Jan; 138(1):47-55.
7. Beeley JA, Yip HK, Stevenson AG. Chemochemical caries removal: A review of the techniques and latest developments. *Br Dent J* 2000 Apr 22;188(8):427-30.
8. Bussadori SK, Castro LC, Galvão AC. Papain gel: A new chemo-mechanical caries removal agent. *J Clin Pediatr Dent* 2005 Winter;30(2):115-19.
9. Corrêa FN, Rocha Rde O, Rodrigues Filho LE, Muench A, Rodrigues CR. Chemical versus conventional caries removal techniques in primary teeth: A microhardness study. *J Clin Pediatr Dent* 2007 Spring;31(3):187-92.
10. Corrêa FN, Rocha RO, Soares FZ, Rodrigues-Filho LE, Rodrigues CR. Fluorescence of primary dentine after chemomechanical and conventional rotary excavation. *Eur Arch Paediatr Dent* 2008 Sep;9(3):126-29.
11. Scraseck JG, List GM. The status of a chemomechanical caries removal system in dental education. *Oper Dent* 1989 Winter;14(1):8-11.
12. Peters MC, Flamenbaum MH, Eboda NN, Feigal RJ, Inglehart MR. Chemomechanical caries removal in children: Efficacy and efficiency. *J Am Dent Assoc* 2006 Dec;137(12):1658-66.

## ABOUT THE AUTHORS

### Mohammed Nadeem Ahmed Bijle

(Corresponding Author)

Lecturer, Department of Pedodontics and Preventive Dentistry, Yogita Dental College and Hospital, Khed, Ratnagiri, Maharashtra, India  
e-mail: nbijle@yahoo.co.in

### Shankargouda Patil

Senior Lecturer, Department of Oral and Maxillofacial Pathology KLE College of Dental Sciences, Bengaluru, Karnataka, India

### Shahzad S Mumkekar

Intern, Department of Pedodontics and Preventive Dentistry, MA Ragoonwala College of Dental Sciences and Research Centre, Pune Maharashtra, India

### Nitin Arora

Reader, Department of Orthodontics, Maharaja Gangasingh Dental College and Research Centre, Shri Ganganagar, Rajasthan, India

### Monika Bhalla

Reader, Department of Prosthodontics, Maharaja Gangasingh Dental College and Research Centre, Shri Ganganagar, Rajasthan, India

### KV Murali

Professor and Head, Department of Endodontics and Conservative Dentistry, Institute of Dental Sciences, Bhubaneswar, Odisha, India