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THE UTILIZATION PATTERNS OF RESTORATIVE MATERIALS IN PRIMARY MOLARS AMONG PEDIATRIC DENTISTS.

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Abstract:
Background: Many changes have occurred in development and availability of dental restorative materials for primary teeth. To date, there has been no emphasis to identify the approaches and materials used by pediatric dentists for primary teeth. The present study was conducted to assess the preferred choice of restorative materials among pediatric dentists for restoring primary teeth in children.
Methodology: A self-administered questionnaire was utilized to obtain demographic information. Six hypothetical clinical scenarios were presented and clinicians choice of material for each of these scenario was evaluated.
Statistical Analysis: Statistical analysis was done based on chi-square test. Results were displayed as percentages.
Results: A total of 62 pediatric dentists completed the questionnaire, of which 97% preferred tooth-coloured materials over amalgam. Respondents reported the most influencing factors in the choice of restorative materials as age, behaviour of child and caries experience.
Conclusion: Responses to various hypothetical clinical scenarios showed preference of tooth coloured materials and uniform choice of materials was noted among pediatric dentists irrespective of age or years of clinical experience.
Keywords: restorative materials, primary teeth, pediatric dentists

Introduction:

Dental caries is still one of the most prevalent diseases worldwide. It can have potentially serious effect on the child's dental and general health, social and emotional wellbeing. Restoration of carious primary teeth is extremely important and significant as it restores him/her to health and function.[1]

In the last decade, there has been a significant growth in the range of restorative materials available to restore primary dentition in children. An improved conventional glass ionomer cements, composite resins, resin modified glass ionomer cements, light cured glass ionomer cements, silver reinforced glass ionomer cements and polyacrylic acid modified composites (compomers) have become available in addition to amalgam and stainless steel crowns.

Today the pediatric dental practitioners are encountered with many materials suitable for each restorative situation. The wide array of products available in the market and different materials indicated for the same restorative purpose make the selection decision cumbersome for the clinicians.

Within the dental literature, there is lack of agreement among clinical and in vitro studies on the relative success of various restorative materials.[2,3] Internationally, the popularity of materials among practitioners and patients and the recommendation of materials by public health services and dental societies also differ widely.[4] So far, there have been no consistent guidelines developed in the pediatric dental literature for either cavity design or material selection and choice is based upon clinician preferences.

The purpose of the present study was to assess the preferred choice of restorative materials among pediatric dentists for restoring primary teeth in children.

METHODOLOGY

The survey form/questionnaire was distributed among eighty five pediatric dentists practicing in Bengaluru, Karnataka, India, out of which sixty two responded. Section one of the questionnaire dealt with questions pertaining to demographic information which included respondent's gender, age and years of clinical experience. The second section had six hypothetical clinical scenarios (brief descriptions with diagrams and material options) presenting lesions of various sizes, location and depth in primary molars. These material choices and six hypothetical clinical scenarios were adopted from work of Tran and Messer[5] with few modifications (Fig 1).

Participants were asked for their choices of materials including Fissure Sealant (FS), Preventive Resin Restoration (PRR), GIC, Resin modified GIC (RMGIC), Composite resins (CR), Amalgam (A), Stainless Steel crowns (SSCs), Compomers (Comp) and Miracle mix (MM). Final section included questions pertaining to the factors affecting the choice of restorative materials and also the influence of parents and child patients in the restorative material selection.

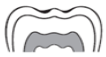
Scenario	Lesion on mandibular primary second molar	Material choices
(1) 4-years old child	Occlusal lesions just into enamel 	FS ☐ PRR ☐ GIC ☐ RMGIC ☐ CR ☐ A ☐ SSC ☐ Comp ☐ MM ☐
(2) 5-years old child	Occlusal lesions half way to dentine enamel junction 	FS ☐ PRR ☐ GIC ☐ RMGIC ☐ CR ☐ A ☐ SSC ☐ Comp ☐ MM ☐
(3) 6-years old child	Occlusal lesion just into dentine 	FS ☐ PRR ☐ GIC ☐ RMGIC ☐ CR ☐ A ☐ SSC ☐ Comp ☐ MM ☐
(4) 5-years old child	Occlusal lesion half way to the pulp	FS ☐ PRR ☐ GIC ☐ RMGIC ☐
		CR ☐ A ☐ DSSC ☐ Comp ☐ MM ☐
(5) 8-years old child	Proximal lesion half way to the pulp 	FS ☐ PRR ☐ GIC ☐ RMGIC ☐ CR ☐ A ☐ SSC ☐ Comp ☐ MM ☐
(6) 8-years old child	Two proximal lesions half way to the pulp 	FS ☐ PRR ☐ GIC ☐ RMGIC ☐ CR ☐ A ☐ SSC ☐ Comp ☐ MM ☐

Figure 1: Hypothetical clinical scenarios (all cases are of a co-operative child with good oral hygiene, no other lesions, living in a fluoridated area and using a fluoridated tooth paste) (Abbreviations of the material choices are provided in the text)

RESULTS

Demographics

Females comprised majority of the study sample (64.5%) and 48.4% of the participating pediatric dentists were in the age group of 31-40 years. Most of the participants were having 6-20 years of clinical experience (61.3%), out of which 80.6% of practitioners worked both in academic institution and private clinic.

The choice of restorative materials for primary teeth as responded by the pediatric dentists is depicted in the Table 1, clearly indicating a preference for tooth colored materials. Responses for the various clinical scenarios adopted from work of Tran and Messer[2] is depicted in Table 2. A significant section of the participants opinioned that age of the child, caries experience and behavior of child as the most significant factors influencing their choice of restorative material while treating primary posterior teeth. Majority of the practitioners (98.4%) were found to advise parents about the restorative materials used in children.

Table 1: Distribution of usage of restorative materials for primary teeth

Restorative material	Frequency	Valid Percent
Amalgam only	1	1.6
More amalgam than tooth coloured materials	1	1.6
More tooth coloured than amalgam	25	40.3
Tooth coloured materials only	35	56.5
Total	62	100.0

Table 2: Distribution of material of choice for various hypothetical clinical scenarios

	Distribution of material of choice for various hypothetical clinical scenarios					
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
FS	35	6	0	0	0	0
	56.5%	9.7%	.0%	.0%	.0%	.0%
PRR	16	30	14	6	0	0
	25.8%	48.4%	22.6%	9.7%	.0%	.0%
GIC	7	18	31	26	16	5
	11.3%	29.0%	50.0%	41.9%	25.8%	8.1%
RMGIC	2	6	5	15	20	6
	3.2%	9.7%	8.1%	24.2%	32.3%	9.7%
CR	2	2	10	9	8	8
	3.2%	3.2%	16.1%	14.5%	12.9%	12.9%
SSC	0	0	0	1	12	39
	.0%	.0%	.0%	1.6%	19.4%	62.9%
Comp	0	0	0	5	3	3
	.0%	.0%	.0%	8.1%	4.8%	4.8%
MM	0	0	2	0	3	1
	.0%	.0%	3.2%	.0%	4.8%	1.6%

DISCUSSION

Majority of subjects in present study are in the age group of 31-40 years with clinical experience between 6 to 20

years. On that account, the participants are well experienced and specialised in pediatric dentistry.

96.8% of the study population preferred tooth coloured materials over amalgam. The trend towards finding an alternative to amalgam and increasing preferences for tooth coloured materials observed in the present study is in accordance with several other previous studies.[5-7] Also choice of materials did not differ with the experience of clinicians with most of them showing preference for tooth coloured materials than amalgam.

In the present study, for non-cavitated incipient carious lesions, the material of choice was fissure sealant (56.5%). Similar findings were reported in a study conducted by Madhavan S et al in 2016.[8] Sealants are a preferable choice as it reduce the risk of caries in those susceptible pits and fissures. Also sealants micromechanically bonds to the tooth thus preventing access by cariogenic bacteria to their source of nutrients.

PRR, a conservative approach compared to conventional restorations, was preferred by 48.4% of the respondents for occlusal lesions half way to dentine enamel junction. This was in accordance with the findings of Al-Dlaigan YH.[6]

For class I lesions, that is, occlusal lesions into dentin, 41.9% of participants preferred GIC. Also, for occlusal lesion half way to the pulp, 50% of present study population preferred GIC. This could be attributed to high caries risk that makes the fluoride releasing materials the primary choice for restoring posterior primary teeth. Similar results were reported by 76% of the respondents in study done by Madhavan S et al in 2016.[8] However, there is literature that reports GIC to be inadvisable for use in primary molars due to its low tensile strength and poor long term performance.[9,10,11]

For class II lesions with proximal lesion half way to the pulp, 32.3% of participants chose RMGIC. In case of two proximal lesions half way to the pulp, 62.9 % of study population preferred SSC. This was in agreement with several other studies.[12,13] This could be because SSCs are considered as the most durable restorative option for multisurface primary lesions and have a high success rate than any other kind of restorations.

No significant association was found between the choice of materials and the years of experience or gender of the study population in this study.

Most influencing factor in choice of restorative material in the present study was found to be age of the child (29.0%) and caries experience (24.2%) and behaviour of the child (19.4%). According to study by Tran et al (2003)[5], those with a greater concern for child behaviour and moisture control favoured glass ionomer cement and for whom caries experience and child age were more important tend to choose amalgam and stainless steel crowns.

It is a promising trend that majority of clinicians (77.4%) were considering parental preference for the restorative materials and 98.4% of them advise about the restorative material.

Also the child's preference for restorative materials was considered by 64.5% of the respondents which is welcoming.

CONCLUSION

From the findings of the present study, it was concluded that

- Tooth coloured materials are the most popular choice for the restorations of primary molars
- GICs are the pediatric dentists' first choice to restore occlusal carious lesions in primary molars.
- Uniform choice of materials was observed among the clinicians which were closely adhering to the recommendations in most of the clinical scenarios given in the study.
- Most influencing factors among the choice of restorative material was age of the child, caries experience and behaviour of the child.

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