Clinician’s choices of restorative materials for children in Abha city, Saudi Arabia
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Abstract
Background: It has been observed that at times dentists find it difficult to decide on the technique and materials to use for restoration of deciduous and permanent teeth in children. Aims: To determine the choice of materials and techniques used by dentists for restoration of deciduous and permanent teeth in children. Materials & Methods: Fifty (50) dentists selected at random from the government and private clinics were questioned in Abha the largest city in southern Saudi Arabia using a 10 item questionnaire. Results: A total of 50 dentists were questioned for the study. 24 dentists cited Glass ionomer cement as the most frequently used restorative material in children. 27 dentists chose Silver amalgam and glass ionomer cement as the material of choice for restoration of posterior and anterior teeth respectively. Cavity shape and size for posterior and esthetics for anterior teeth were the major factors for selection of materials. In deciduous teeth Glass ionomer cement was used by 19 respondents as restorative material for deep caries without pulp exposure and by 23 dentists for restoration of proximal caries. 24 dentists used pit and fissure sealants for restoration of non-cavitated incipient lesions in primary teeth. 29 dentists used Atraumatic Restorative Technique (ART) in their day to day practice. Conclusion: The study concluded that G.I.C was the material of choice for restoration of teeth in children followed by composite and amalgam. Atraumatic restoration technique (ART) is practiced by over half of dentists and it encourages patient compliance.

Key Words: Dentists, Choice, Restoration, Children, Atraumatic Restoration Technique

Introduction
In the last decade there has been a significant growth in the range of tooth-colored materials available to restore primary and mixed dentition in children. An improved conventional glass ionomer cements, composite resins,(1, 2) resin-modified glass ionomer cements,(3) 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. Restoration of carious primary teeth is extremely important and significant not only for the healthy development and psychic state of the child but also for normal development of permanent teeth. The choice of restorative materials for primary teeth has a lot of varieties at the present time. The purpose of this study was to a) find the preferred restorative material of dentists for routine restorations in children, b) dentists’ preference of material for deep carious lesions and mechanical pulpal exposures and c) awareness among dentists about Atraumatic Restorative Treatment (ART) technique.

Materials and Methods
In this study a random sample of 50 dentists were chosen from the dentists treating children in various government and private dental clinics in Abha, Saudi Arabia. A 10-item questionnaire was created for this study to assess the choice of materials used by dentists in children in various clinical situations Table 1. The questionnaire was distributed to these dentists manually and collected on the next day. The results were tabulated and analyzed.

Table 1 Questionnaire

| 1. Which restorative material do you use most frequently in children in general? A. GIC B. Amalgam C. Composite D. Compomer |
| 2. What is your restorative material of choice for posterior teeth in children (Primary and Permanent teeth)? A. GIC B. Amalgam C. Composite D. Compomer |
| 3. What is your restorative material of choice for anterior teeth in children (Primary and Permanent teeth)? A. GIC B. Amalgam C. Composite D. Compomer |
| 4. What is the most important factor you consider to select the material for posterior teeth restoration in children (Primary and Permanent teeth)? Cavity shape, size Strength Prevent recurrent caries Marginal Seal Durability Restoring Function Easy Manipulation Retention Cooperation of child Pulp Vitality Resistance Non-irritant material Control of moist Oral hygiene Site of Caries Patient Seeking Color of Material |
| 5. What is the most important factor you consider to select the material for anterior teeth restoration in children (Primary and Permanent teeth)? Esthetic Durability Fluoride Release Patient Age Strength Restoring Function Cavity Retention Patient Cooperation Design Marginal Seal Site of Caries Oral Hygiene Non-irritant Easy Manipulation |
| 6. What is your restorative material of choice for deep caries without pulp exposure in children? GIC Amalgam GIC+Ca(OH)2 Pulpotomy Composite Composite +Ca(OH)2 ZOE Amalgam+ Ca(OH)2 |
| 7. What is your restorative material of choice in proximal caries in children? Primary teeth Permanent teeth Amalgam Composite GIC Amalgam Composite GIC+Ca(OH)2 Compomer GIC S.S.C Compomer |
| 8. What is your material of choice for mechanical exposure (sterile exposure) of the pulp? Primary teeth Permanent teeth Ca (OH)2 Pulpotomy Ca (OH)2 RCT Pulpotomy Extraction ZOE Ca (OH)2 + ZOE |
| 9. What is your material of choice for non-cavitated incipient carious lesion in children? P.F.N(1) Composite GIC Fluoride Compomer Ca(OH)2 Ca(OH)2 + F (2) |
| 10. Do you use ART (Atraumatic Restorative Treatment) technique during your daily practice? Yes/no |

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Results

A total of 50 dentists participated in the study. 24 (54%) cited glass ionomer cement as the restorative material used most frequently in children. This was followed by silver amalgam 13(26%), Composite 8(16%) and Compomer 5(10%). Silver Amalgam was chosen by 27 (54%) dentists as the material of choice for restoration of posterior teeth in children. The other materials of choice in order of preference were composite 13(26%), GIC 9(18%) and Compomer 1(2%). GIC was used by 27(54%) respondents for restoration of anterior teeth in children. Amalgam was used by 12 (24%), Composite by 5 (10%) and Compomer by 5 (10%) respondents. 1 respondent was using Zinc Oxide Eugenol (ZOE).

The factors that decided the choice of material for posterior teeth restoration in children are the cavity shape and size 15(30%) preventing recurrent caries 8(16%), strength of material 5 (10%) respondents and marginal seal was chosen by 3 (6%) dentists. The factors least considered by dentist were control of moisture, oral hygiene, color of material, retention, site of caries, and patient desire. 15 (30%) chose esthetics as the most important factor while selecting restorative material for anterior teeth. Release of fluoride was chosen by 4 (8%) respondents, durability of the material by 3 (6%) respondents. Retention, oral hygiene, non-irritant material and the site of the caries, was chosen by one respondent (2%) each.

GIC was the material of choice for deep caries without pulp exposure in primary teeth of children for 19(38%) respondents. Amalgam was chosen by 13 (26%) GIC with Dycal 8(16%) Amalgam with Dycal 1(2%) and composite 1(2%) dentists. Pulpotomy was preferred by 3 (6%) respondents.

23(46%) dentists used GIC for restoration of proximal caries in the primary teeth of children. Composite was used by 11 (22%) and 9 (18%) respondents use silver amalgam. For sterile mechanical exposure of the pulp Dycal was the material of choice for 26(52%) respondents. Pulpotomy was preferred by 16 (32%) and ZOE was the choice of 3(6%) respondents. Other procedures preferred were Pulpectomy by 3(6%) and Extraction by 1 (2%) dentists.

Material of choice for non-cavitated incipient carious lesion in primary teeth was Pit and fissure sealant selected by 24 (48%) dentists. Composite was chosen by 8 (16%) respondents. Six respondents (12%) were using GIC. Fluoride was the choice for 6(12%) respondents. Compomer was chosen by 3 (6%) dentists.

58% (29/50) of the dentist were using ART during their routine daily practice, while 21 (42%) respondents replied in the negative.

Discussion

A 10-item questionnaire was distributed to 50 dentists working in both Government and Private dental centers in Abha city, Saudi Arabia. The responses have shown that GIC is the most popular restorative material for children. We have also concluded that Silver Amalgam is the most widely used material for permanent posterior teeth. A little more than half of respondents preferred GIC as the material of choice for primary posterior teeth. A study from Finland reported glass ionomer cement as the predominant material of choice used in children younger than 17 years, placed in 91 per cent of primary teeth restorations and 47 per cent of permanent teeth restorations. For the anterior teeth in permanent dentition, composite was first choice of restorative material. For the primary teeth composite was chosen by significant number of respondents as their first choice. This finding is similar to the study reported by Kukletova M. It is also concluded that the cavity shape, size and the ability of the restorative material to prevent recurrent caries were the most important factors that mattered to the respondents when selecting the restorative materials for permanent posterior teeth.

Moisture control commanded least concern from the respondents despite of its vital importance in success of restoration. However analysis reveals that it is indispensable for the success of restoration as evident by the study of Mount GJ in 2002. This creates a need to educate the practitioners regarding the need and techniques of moisture control. Retention received less attention too.

Esthetics was considered the most important factor to select the anterior teeth restoration by half of the respondents which is logical as according to a study by Mount GJ in London in 2002 all GICs show an increase in translucency at seven days compared to that at placement, resulting in an aesthetic improvement. None of the respondents considered the patient opinion during selection of the anterior restoration while it was related primarily to their appearance and affected their social relations.

The results showed that about quarter of the respondents preferred amalgam as restorative material for permanent teeth if there is deep caries without pulp exposure. We noticed in deep caries, there was a very little use of cements, as a sub-base, under the amalgam and only 16% of the respondents replied that they used Dycal with amalgam. In proximal caries, the result shows that
amalgam was the most chosen material to restore permanent teeth as amalgam is the most durable, resistant and suitable for the Class II proximal cavities. While, GIC was most commonly chosen for proximal caries in primary teeth and this finding is similar with Tran LA and Messer LB study. (7)

Our observations concluded that majority of the respondents are using calcium hydroxide powder to do direct pulp capping with mechanical exposure (sterile exposure) for the permanent teeth. We found that very few of the respondents preferred root canal treatment (RCT) but it may not be indicated to the patient if the good isolation has been done. Also about half of the respondents applied direct pulp capping by Dycal to the primary teeth if there was mechanical (sterile) exposure. Jerrell RG, Courts FJ, Stanley HR observed that the pulpal response to direct pulp capping with two calcium hydroxide medicaments (Life and Dycal) following mechanical exposure of the pulp and direct pulp capping with calcium hydroxide after sixty-three days to determine pulpal response to the medicaments. (8)

Atraumatic restorative treatment facilitated the work of more than half of the respondents particularly in case of non-cooperative child patients while the ones who did not use this technique lost opportunities to successfully handle difficult patients as is evident by a study on Chinese pre-school children in which 93% of the children reported that they did not feel pain during treatment and 86% were willing to receive ART restorations again. (9)

Conclusion
To be successful, care must be taken by dentists to match the material with the situation that presents itself. Adherence to proper technique is critical, and proper attention to individual manufacturer’s instruction is essential. Using these principles, achieving good results in restorative dentistry for children can be easily accomplished. The restorative material of choice for children in Abha city is G.I.C followed by Composite and Amalgam. Nearly half of the responding dentists preferred using Atraumatic restorative technique (ART) if indicated.

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