



Prevalence and gender comparison of children requiring class I restorations in primary mandibular second molars - A retrospective study

Sadhvi B, Vignesh Ravindran*, Suresh V

Saveetha Dental College and Hospitals, Saveetha institute of medical and technical sciences (SIMATS), Saveetha University, Chennai, Tamil Nadu, India

Article History:

Received on: 01 Sep 2020

Revised on: 05 Oct 2020

Accepted on: 06 Oct 2020

Keywords:

GIC,
Composite,
Restorations,
Second Molars,
Prevalence

ABSTRACT

Dental caries is a worldwide health problem and about 621 million children are affected around the world. The most common type of caries that affects the children are the class 1 caries, given by GV blacks classification. Pediatric restorations of the various lesions are commonly done using GIC and composite. Posteriors molars are more prone to caries when compared to the anteriors as they have deeper pits and fissures. This research aims on the assessment of prevalence of class I restorations using GIC and gender comparison of the class 1 restorations in the second molars of pediatric patients between 5-12 years. The study was performed in the outpatient department of Pediatric and Preventive Dentistry. Data required for the study was procured by reviewing the patient records visiting the dental college. The data was sorted in excel and statistically analysed using the IBM SPSS software analysis and the results interpreted in graphs and tabulations. Results revealed that prevalence of GIC restorations were 41.16% and Composite restorations were 58.54% in all the primary teeth. Distribution of GIC and composite restorations on the primary mandibular second molars revealed prevalence of GIC restorations as 57.27% and prevalence of composite restorations as 42.73%. Association of gender and types of restorations among children reveals distribution of GIC restorations as 55.11% among males and 44.89% among females and the distribution of composite restorations as 50.62% among males and 49.38% among females respectively. This difference was statistically significant ($p=0.001$). Within the limitations of the current study, glass ionomer restorations were higher in primary mandibular second molars when compared to composite restorations. On gender comparison, females received higher composite restorations when compared to males who received a Glass ionomer cement restorations.



*Corresponding Author

Name: Vignesh Ravindran

Phone: +91 9789934476

Email: vigneshr.sdc@saveetha.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL3.3372>

Production and Hosted by

IJRPS | <https://ijrps.com>

© 2020 | All rights reserved.

INTRODUCTION

Dental caries is a highly prevalent worldwide health problem, representing the most common infectious disease in the paediatric population affecting about 621 million children around the world (Weiss *et al.*, 2003). It has multifactorial etiology which leads to initiation and progression of the lesion (Subramanyam *et al.*, 2018), out of which most common ones include high sugar diet, dental plaque (Govindaraju and Gurunathan, 2017) and bacterial invasion. The most common type of caries that affects

the children are the class 1 caries, given by GV blacks classification. Class 1 caries, According to GV Blacks are the caries on the pits and fissures of molars and lingual pits of all teeth (Gilbert, 1982). The contemporary management of dental caries encompasses identification of an individual risk for caries progression, understanding of the disease process and active surveillance to assess disease progression and manage with appropriate preventive services, supplemented by the most adequate restorative therapy when indicated (Ruff *et al.*, 2018). Management of dental caries is essential as children who suffer from poor oral health are 12 times more susceptible to have lesser activity days than those who do not (Gurunathan and Shanmugaavel, 2016). It also can affect their life in many different aspects. The awareness of oral hygiene measures such as proper brushing techniques, adequate fluoride intake, and fluoride gel application are thus important areas of emphasis (Mahesh and Masitah, 2018).

The benefits of restorative therapy include removal of cavitation or defects to eliminate areas that are susceptible to caries; stopping the progression of tooth demineralization; restoring the integrity of tooth structure; preventing the spread of infection into the dental pulp; and preventing the shifting of teeth and space loss due to loss of tooth structure. The risks of restorative therapy include lessening the longevity of teeth by making them more susceptible to fracture, recurrent lesions or cystic lesion such as ranula (Packiri, 2017), restoration failure (Downer *et al.*, 1999) pulp exposure during caries excavation, future pulpal complications and iatrogenic damage to adjacent teeth (Lenters *et al.*, 2006).

Previous research by Tinanoff N *et al.* in 2001 revealed that carious restorations are 62% more in molars when compared to other teeth (Tinanoff *et al.*, 2015). Similar findings were obtained in a study by Frankl SN *et al.* in 1992, where posterior teeth were the most affected tooth by carious lesions especially from 6-12 years of age (Ricketts *et al.*, 2013).

Research by Gao *et al.* in 2018 showed that resin modified GIC and resin composites are the most recommended paediatric restorative materials, as they have better Esthetics and increased wear resistance (Gao, 2018). Research by Anderson M *et al.* in 2002 revealed that Materials such as glass-ionomers, resin ionomers, resin ionomer products, and improved resin-based composite systems had been developed which are having profound impact on the restoration of primary teeth, particularly the

treatment of caries on the posterior teeth. The principal advantage of these new materials is that they require less retention form, and this is particularly important in primary teeth to conserve the relatively thin enamel that could help prevent subsequent caries invasion of dentin (Anderson, 2002). However, the previous studies could not associate gender with class 1 restorations and this research aims to overcome the challenges.

This research emphasises on the assessment of prevalence of class I restorations using GIC and gender comparison of the class 1 restorations in the second molars of pediatric patients between 5-12 years.

MATERIALS AND METHODS

The study was performed as a retrospective study under a university setting in the outpatient department of Pediatric and Preventive Dentistry. The advantages of this study include available data, population of various strata of society while the disadvantages account for the study being unicentric, geographical trends not assessed. Ethical approval was obtained from institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). Data required for this was procured by reviewing the patient records of about 86000 patients visiting the dental college. The sample was collected from June 2019 to March 2020. Dental Information Archiving Software is the database system used in college to record all the details of the patient, which includes their demographic data, photographs, diagnosis and treatment reports. The total sample size of the study is 1127 collected using the college database, out of which according to the inclusion and the exclusion criteria, the samples were grouped accordingly. To eliminate bias, simple random sampling was done to narrow down the sample size to 923. Verification of the data was done with the presence of additional reviewers procedure notes and photographs of application of fluoride. Stratification and randomisation were done to minimise sampling error. Data that were incomplete were excluded. There is high internal validity and less external validity for the study. The obtained data were tabulated in excel systematically. Data were then entered in the SPSS analysis software and descriptive analysis and correlation statistics performed. The obtained results were tabulated and graphically represented.

RESULTS AND DISCUSSION

Prevalence of GIC restorations are 41.16% (n=4143) and Composite restorations are 58.54% (n=5921)

(Figure 1) which shows that composite restorations are generally more prevalent when compared to GIC. Distribution of GIC and composite restorations on the primary mandibular second molars revealed prevalence of GIC restorations as 57.27% (n=923) and prevalence of composite restorations as 42.73% (n=688) (Figure 2), thereby an increased number of GIC restorations on primary mandibular second molars. Further, association of gender and types of restorations among children reveals distribution of GIC restorations as 55.11% among males (n=2283) and 44.89% (n=1860) among females and the distribution of composite restorations as 50.62% among males and 49.38% (n=2924) among females respectively. Children who were Males received more glass ionomer restorations when compared to females, who received more composite restorations which were statistically significant. Chi-square test between gender and types of restorations among pediatric patients reveals p value<0.05 statistically significant (Figure 3).

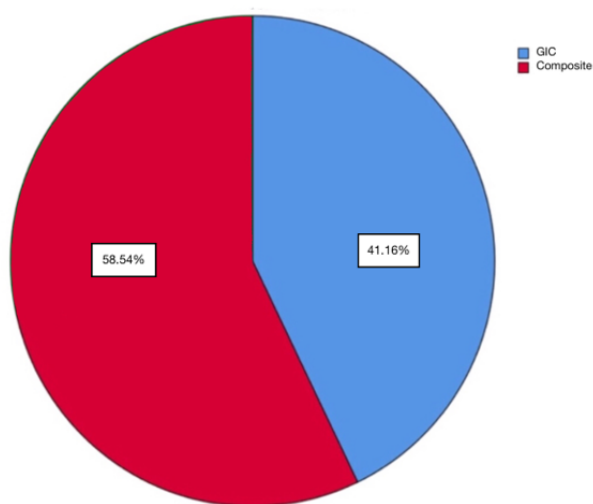


Figure 1: Pie chart representing the distribution of GIC and composite restorations among the children requiring class I restorations in all primary teeth

In Figure 1, Blue colour denotes GIC restorations and Red colour denotes composite restorations. Among the restorations, higher percentage of children received composite restorations than glass ionomer cement restorations. In Figure 2, Blue colour denotes glass ionomer cement restorations and Red colour represents composite restorations. Among the restorations in primary mandibular second molars, glass ionomer restorations were more prevalent than composite restorations. In Figure 3, X-axis represents gender and Y-axis represents the number of patients. Blue colour denotes glass ionomer cement restorations and Red colour represents composite restorations.

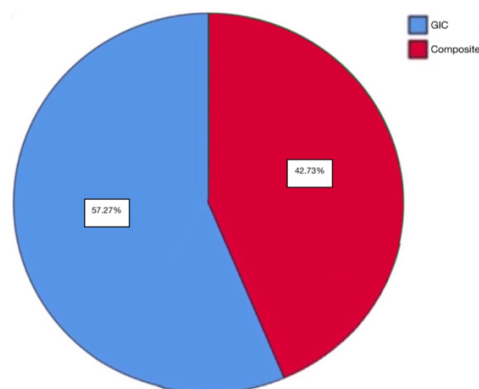


Figure 2: Pie chart representing the distribution of Class I glass ionomer cement and composite restorations in primary mandibular second molars

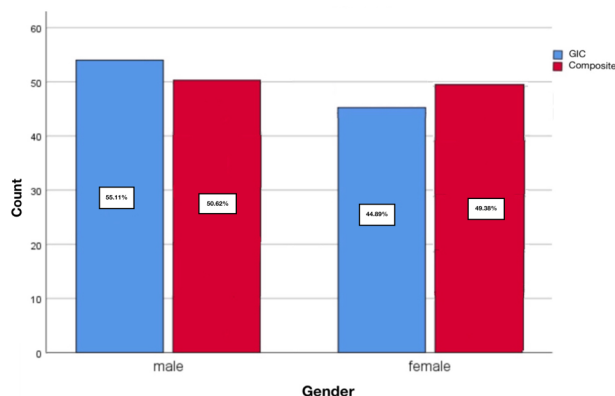


Figure 3: Bar graph representing the association of type of restorations in primary mandibular second molars based on the gender of the patients

resents composite restorations. Males had a higher chance of receiving a glass ionomer cement restoration while females had higher chances of receiving composite restorations. This difference was statistically significant (Chi-square test; p = 0.001 statistically significant).

Caries is a multifactorial bacterial disease that has been identified as a worldwide epidemic (Somasundaram et al., 2015). Complete knowledge of caries in pediatric patients and also other aspects such as the type of caries progression, frenal attachment type (Christabel, 2015), presence of any malocclusion is important for a pediatric dentist. In paediatric dentistry, the most important concern is the loss of carious primary molars leading to space loss (Jeevanandan, 2017). The objective of treating an infected primary tooth is to retain it till physi-

ologic exfoliation to guide the erupting permanent teeth (Govindaraju *et al.*, 2017a). In other words, it is a natural space maintainer (Panchal *et al.*, 2019). Further, primary teeth play an imperative role in the self esteem of the preschool children and also plays a pivotal role in speech development, esthetics and function (Ravikumar *et al.*, 2017). Restoration of the primary molars is thus essential before it becomes grossly decayed and the choice of treatment left is pulpectomy (Jeevanandan and Govindaraju, 2018), to treat the necrosed pulp due to caries (Lakshmanan *et al.*, 2020). Further, Pulpectomy is challenging and time consuming (Govindaraju *et al.*, 2017b) and it is the only choice left to save the teeth from extraction and maintain its form and function (Govindaraju *et al.*, 2017c) Thus it is better to restore it in early stages of disease using materials such as GIC and composites. Study of its prevalence and knowledge is thus essential for a dentist and this study aims to throw some limelight on the same.

Results obtained in our study for prevalence of GIC restorations revealed that Composite has a greater prevalence over GIC restorations. Supporting our results, a study by Manhart J *et al.* in 2013 stated that the success rate of Class I and II composite restorations is always higher than the success rates of class I and class II GIC restorations (Manhart *et al.*, 2000). However, Dhar Vineet *et al.* in 2015, in his study, showed that glass ionomer cement or resin-modified glass ionomer cement is the ideal restorative material for primary dentition, as it has several advantages such as Adhesion to enamel and dentin, Anticariogenic effect, Low solubility, Biocompatibility and Less technique sensitivity (Dhar *et al.*, 2015). Our study findings, thereby, are in concordance with similar articles. The reason for increased prevalence of composite restorations over GIC restorations is due to its properties such as Esthetics, Conserves tooth structure, Adhesion, Low thermal conductivity, Universal application, Ease of manipulation and easily repairable (Rodrigues *et al.*, 2019). In the patient's point of view, aesthetic concerns of parents and increased strength of composites, and compromised fluoride release are the prime reasons for opting composites over GIC restorations.

Results obtained in our study for the prevalence of class I GIC restorations revealed that Glass ionomer cement was the most prevalent type of restoration. Similar results were obtained in the study by Randar Mahmood Talabani *et al.* in 2015 stating that class I occlusal surface caries has the maximum prevalence among pediatric patients, thereby supporting our results (Talabani *et al.*, 2015). Opposing results were seldom found as it is clearly seen that

the class I restorations are the most common among the children. The Reason for class I caries is due to the presence of lesser smooth surface caries owing to better oral hygiene measures.

Association of class I restorations in primary mandibular second molars and gender revealed Male predominance with class I restorations in primary mandibular second molars in our study. Supporting our results, EK Zorić *et al.* in 2014 revealed that Males had a greater number of restorations than females (Zorić *et al.*, 2014), while the study by Shaffer, John & Leslie *et al.* in 2015 showed that women had more dental restorations, though men had more current decay (Shaffer *et al.*, 2015). However, Our study findings were in concordance with major studies. Reason for Male predilection is due to the increased cariogenic diet and poor oral hygiene that increases caries incidence.

The strength of the study is this study being performed with available data and population of variant economic stature. Limitations of this study include Geographic limitations, Unequal sample size and Unicentered study. Future prospects of this study includes overcoming the limitations Knowledge of prevalence of class I caries is essential for parents to take up better oral hygiene measures. Primary mandibular second molar is an important tooth in the primary dentition that maintains arch length. The key motive of this study is to emphasise Knowledge on restorative therapy, thereby leading to lesser dental mortality.

CONCLUSION

Within the limitations of the current study, glass ionomer restorations were higher in primary mandibular second molars when compared to composite restorations. On gender comparison, females received higher composite restorations when compared to males who received glass ionomer cement restorations.

Conflict of Interest

The authors declare that there is no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

Anderson, M. 2002. Risk assessment and epidemiology of dental caries: review of the literature. *Pediatric Dentistry*, 24(5):377–385.

- Christabel, S. L. 2015. Prevalence of Type of Frenal Attachment and Morphology of Frenum in Children, Chennai, Tamil Nadu. *World Journal of Dentistry*, 6(4):203–207.
- Dhar, V., Hsu, K. L., Coll, J. A., Ginsberg, E., Ball, B. M., Chhibber, S., Johnson, M., Kim, M., Modaresi, N., Tinanoff, N. 2015. Evidence-based Update of Pediatric Dental Restorative Procedures: Dental Materials. *Journal of Clinical Pediatric Dentistry*, 39(4):303–310.
- Downer, M. C., Azli, N. A., Bedi, R., Moles, D. R., Setchell, D. J. 1999. How long do routine dental restorations last? A systematic review. *British Dental Journal*, 187(8):432–439.
- Gao, S. S. 2018. The longevity of posterior restorations in primary teeth. *Evidence-Based Dentistry*, 19(2):44.
- Gilbert, B. W. 1982. Greene Vardiman Black: Father of Modern Dentistry. Department of Medical Humanities, Southern Illinois University School of Medicine.
- Govindaraju, L., Gurunathan, D. 2017. Effectiveness of Chewable Tooth Brush in Children-A Prospective Clinical Study. *Journal of clinical and diagnostic research*, 11(3):31–34.
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017a. Clinical evaluation of quality of obturation and instrumentation time using two modified rotary file systems with manual instrumentation in primary teeth. *Journal of clinical and diagnostic research*, 11(9):55–58.
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017b. Comparison of quality of obturation and instrumentation time using hand files and two rotary file systems in primary molars: A single-blinded randomized controlled trial. *European Journal of Dentistry*, 11(03):376–379.
- Govindaraju, L., Jeevanandan, G., Subramanian, E. M. G. 2017c. Knowledge and practice of rotary instrumentation in primary teeth among indian dentists: A questionnaire survey. *Journal of International Oral Health*, 9(2):45.
- Gurunathan, D., Shanmugaavel, A. K. 2016. Dental neglect among children in Chennai. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 34(4):364.
- Jeevanandan, G. 2017. Kedo-S Paediatric Rotary Files for Root Canal Preparation in Primary Teeth – Case Report. *Journal of Clinical and Diagnostic Research*, 11(3).
- Jeevanandan, G., Govindaraju, L. 2018. Clinical comparison of Kedo-S paediatric rotary files vs manual instrumentation for root canal preparation in primary molars: a double blinded randomised clinical trial. *European Archives of Paediatric Dentistry*, 19(4):273–278.
- Lakshmanan, L., Mani, G., Jeevanandan, G., Ravindran, V., Ganapathi, S. E. M. 2020. Assessing the quality of root canal filling and instrumentation time using kedo-s files, reciprocating files and k-files. *Brazilian Dental Science*, 23(1).
- Lenters, M., van Amerongen, W. E., Mandari, G. J. 2006. Iatrogenic damage to the adjacent surfaces of primary molars, in three different ways of cavity preparation. *European Archives of Paediatric Dentistry*, 1(1):6–10.
- Mahesh, R., Masitah, S. M. 2018. Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review. *International Journal of Pharmaceutical Research*, (04):10–10.
- Manhart, J., Kunzelmann, K.-H., Chen, H. Y., Hickel, R. 2000. Mechanical properties of new composite restorative materials. *Journal of Biomedical Materials Research*, 53(4):353–361.
- Packiri, S. 2017. Management of Paediatric Oral Rantula: A Systematic Review. *Journal of clinical and diagnostic research*, 11(9):6–9.
- Panchal, V., Jeevanandan, G., Subramanian, E. G. 2019. Comparison of instrumentation time and obturation quality between hand K-file, H-files, and rotary Kedo-S in root canal treatment of primary teeth: A randomized controlled trial. *Journal of Indian Society of Pedodontics and Preventive Dentistry*, 37(1):75.
- Ravikumar, D., Jeevanandan, G., Subramanian, E. M. G. 2017. Evaluation of knowledge among general dentists in treatment of traumatic injuries in primary teeth: A cross-sectional questionnaire study. *European Journal of Dentistry*, 11(02):232–237.
- Ricketts, D., Lamont, T., Innes, N. P., Kidd, E., Clarkson, J. E. 2013. Operative caries management in adults and children. *Cochrane Database of Systematic Reviews*, 3.
- Rodrigues, J. A., Casagrande, L., Araújo, F. B., Lenzi, T. L., Mariath, A. A. 2019. Restorative materials in pediatric dentistry. *Pediatric Restorative Dentistry*, pages 161–167.
- Ruff, J. C., Herndon, J. B., Horton, R. A., Lynch, J., Mathwig, D. C., Leonard, A., Aravamudhan, K. 2018. Developing a caries risk registry to support caries risk assessment and management for children: A quality improvement initiative. *Journal of Public Health Dentistry*, 78(2):134–143.
- Shaffer, J. R., Leslie, E. J., Feingold, E., Govil, M., McNeil, D. W., Crout, R. J., Weyant, R. J., Marazita,

- M. L. 2015. Caries Experience Differs between Females and Males across Age Groups in Northern Appalachia. *International Journal of Dentistry*, 2015:1-8.
- Somasundaram, S., Ravi, K., Rajapandian, K., Gurunathan, D. 2015. Fluoride content of bottled drinking water in Chennai, Tamilnadu. *Journal of Clinical and Diagnostic Research: JCDR*, 9(10):32-34.
- Subramanyam, D., Gurunathan, D., Gaayathri, R., Priya, V. V. 2018. Comparative evaluation of salivary malondialdehyde levels as a marker of lipid peroxidation in early childhood caries. *European Journal of Dentistry*, 12(01):067-070.
- Talabani, R. M., Al-Zahawi, A., Ibrahim, R. O. 2015. Prevalence And Distribution Of Dental Caries Experience According To GV Black Classification For Patient Attending To Dental School. *Journal of Oral Health and Community Dentistry*, 9(2):60-63.
- Tinanoff, N., Coll, J. A., Dhar, V., Maas, W. R., Chhibber, S., Zokaei, L. 2015. Evidence-based Update of Pediatric Dental Restorative Procedures: Preventive Strategies. *Journal of Clinical Pediatric Dentistry*, 39(3):193-197.
- Weiss, P. A., Czerepak, C. S., Hale, K. J. 2003. Oral health risk assessment timing and establishment of the dental home. *Pediatrics*, 111(5):1113.
- Zorić, E. K., Žagar, M., Zlatarić, D. K. 2014. Influence of Gender on the Patient's Assessment of Restorations on the Upper Anterior Teeth. *Acta Stomatologica Croatica*, 48(1):33-41.