



ORIGINAL RESEARCH PAPER

Dentistry

UNVEILING THE HIDDEN THREAT: SECONDARY CARIES PREVALENCE IN THE CITY OF HYDERABAD.

KEY WORDS: Secondary caries, Prevalence, Intraoral camera, Hyderabad.

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ABSTRACT

Aim: The aim of this study is to ascertain and enhance the understanding of the prevalence of secondary caries in the population of Hyderabad. **Material And Methods:** This study was conducted by OroGlee Solutions Private Limited in Hyderabad. A total of 1884 subjects aged 18-50 years were examined. Oral examination was done using intraoral camera. **Results:** Out of 1884 subjects, 293 participants were identified with fillings. Among these 293 participants, 144 participants were found to have secondary caries. Thus, the prevalence of secondary caries in Hyderabad is 49.1%. **Conclusion:** Our study highlights the prevalence of secondary caries among individuals with dental restorations, indicating the importance of monitoring and preventive measures in clinical practice. The findings underscore the need for improved restoration techniques and patient education to minimize the risk of secondary caries development and enhance long-term oral health outcomes.

INTRODUCTION:

Dental caries is the most common chronic illness that affects people of all ages, gender, race, and socioeconomic backgrounds. Since dental caries affects many of the school-age children and majority of adults, it has been identified as the leading cause of oral health problems worldwide.^[1] Dental caries is an infectious disease that slowly weakens the hard tissues of the tooth due to its multifactorial aetiology. This leads to a lower quality of life and a high risk of morbidity in the general population. It is associated with behavioural, demographic, and socioeconomic factors. As a result, the frequency of dental caries shows a downward trend in the majority of developed countries.^[2]

The most frequent consequence of dental restorations is secondary carious lesions which leads to its failure, shortens the lifespan of the tooth and increase expenses due to necessary reinterventions and is one of the biggest clinical challenges.^{[3],[4]}

Secondary (or recurrent) caries is defined as lesions at the margins of existing restorations or tooth decay associated with sealants or restorations. Secondary caries is a complicated, multifaceted condition that combines the various characteristics of the repair and restorative material used, with the various factors of "conventional" caries. The pathophysiology of secondary caries involves enzymatic breakdown of the organic component and demineralization, just as other carious lesions. The aetiology is modified by the presence of a sealant margin or repair. Due to selective caries removal, carious dentine is sealed beneath the restorations, which might decrease the marginal integrity and raise the risk of microleakage and secondary caries.^{[1],[5]}

The scant research that is currently available suggests that secondary caries is the same as primary caries located at the margin of a restoration. Small ditches, cracks, and "microleakage" may not cause secondary caries, but broad voids certainly can. It is challenging to clinically identify secondary caries. The best parameters to identify secondary caries are dentin and enamel discolouration.^[6]

The aim of this study is to evaluate the prevalence, understand the factors, mechanisms, and risk factors associated with the development of secondary caries. By addressing these aspects, we aim to enhance the understanding of secondary caries, ultimately leading to the development of improved preventive measures, diagnostic tools, and treatment strategies in the field of restorative dentistry.

MATERIAL AND METHODS:

A cross-sectional survey was conducted by Oroglee Solutions Private Limited among the employees of corporate offices in the city of Hyderabad.

A survey questionnaire was prepared to acquire personal details such as age, gender, relevant dental and medical history and habits. Oral examination was done using an intraoral camera connected to a laptop to record videos of all aspects of teeth. Informed oral consent of the corporate employees was obtained before the examination.

Inclusion Criteria:

Participants from the age group of 18 years to 50 years were included in the study.

Exclusion Criteria:

Subjects below the age of 18 years and above the age of 50 years were excluded from the study.

RESULTS:

A total of 1884 participants were screened between the age of 18 to 50 years. 293 people were identified with fillings which accounts for 15.6% of the total participants.

Out of these 293 participants with fillings, 144 participants were observed to have fillings and caries in their same tooth i.e., secondary caries, accounting for 49.1%. So, the prevalence of secondary caries in tooth with fillings is 49.1%.

DISCUSSION:

The scientific understanding of the aetiology and pathophysiology of dental caries has expanded over the past century as a result of various research studies. It is now widely accepted that primary preventive measures, like applying fluoride and maintaining daily, regular oral hygiene habits, can stop or reverse the bacterial action that causes subsequent caries.^[2]

The condition known as dental caries is caused by slow and complex biological interactions between fermentable carbohydrates, acidogenic bacteria, and host components including saliva and teeth.^[2] It is the localized breakdown of hard tissues of the teeth that is caused by acidic substances produced during the bacterial breakdown of dietary carbohydrates.^[7]

It is an infectious post-eruptive condition that causes the enamel and other mineralized tissues to gradually dissolve and be destroyed. If treatment is not received, the lesions will

inevitably spread and become worse, moving closer to the tooth pulp and increasing in severity as the inflammation inside the pulp increases and becomes painful.^[6]

The term "primary caries" refers to carious lesions that form on tooth surfaces that are intact and natural, whereas "secondary or recurrent caries" are the one which forms next to an existing restoration.^[7]

Dental restorations are common procedures that aim to restore the shape and function of the cavitated tooth, prevent the progression of caries, and maintain the tooth in the arch. However, restorations are subject to failure, leading to a cycle of reinterventions that weakens the dental structure and results in the need for more complex procedures. The most common reasons for failure of dental restorations are recurrent caries and fracture of the restoration.^[8]

One condition that might develop in conjunction with a preexisting restoration is recurrent caries. Recurrent caries may occur as a result of increased surface roughness of dental restorations and micro-gaps at the tooth-restoration interface brought on by improper maintenance or gradual deterioration of the restoration. A patient's diet, oral hygiene habits, and susceptibility for dental caries are all important additional considerations.^[10]

According to reports, the most frequent causes of restoration failure are mechanical factors including restorative fracture and recurrent caries.^[10]

Resin-based materials cause a significant risk of development of recurrent caries, as this class of restorative materials is extremely vulnerable to plaque buildup when compared to other materials.^[10]

Early diagnosis of secondary caries might enable provision of less invasive treatment alternatives such as re-sealing or repair rather than total restoration removal and replacement. Secondary caries can be detected using a variety of methods, which includes visual, tactile, radiographic, laser fluorescence, and quantitative light-induced fluorescence evaluations.^[11]

In our study, A total of 1884 individuals aged 18 to 50 were screened. 293 persons were recognized with fillings, accounting for 15.6% of the total.

Among these 293 individuals with fillings, 144 were found to have both fillings and caries in the same tooth, indicating secondary caries, which accounts for 49.1%. Therefore, the prevalence of secondary caries in teeth with fillings is 49.1%.

A study conducted by Hussein Kamel et.al, on 61 patients in the age range between 18-70 years, who attended Tishik Dental hospital at Tishik University in Erbil city (Iraq), showed the prevalence of secondary caries as 53%.^[12]

Similarly, Jaber Ansari et.al, in Iran, conducted a study on 350 patients aged 12 to 67 years who attended the Operative Dentistry Department of Shahid Beheshti Dental School in 2012. Their study showed the prevalence of secondary caries as 26% and concluded that, in comparison to amalgam restorations, composite restorations exhibited a greater rate of secondary caries.^[13]

According to the study conducted by Lasya Genji et.al, on 2000 patients in the Department of Conservative Dentistry & Endodontics, at Saveetha dental college and hospitals, Chennai, India, secondary caries was shown to be the most prevalent reason for restoration failure in the 36 to 55 age range, accounting for 28%.^[14]

A microbiological study on recurrent (secondary) dental

caries was conducted by Fitzgerald et.al. Fifty-four freshly extracted human teeth containing amalgam restorations were examined. Out of these, 22 teeth accounting for 40% were free of dental caries in the site of restoration. In the remaining, 15 were identified as questionable, 8 with initial caries and 9 with active caries.^[15]

CONCLUSION:

Secondary caries represents a significant challenge in restorative dentistry, posing threats to the longevity and effectiveness of dental restorations. This highlights the need for thorough preventive plans, careful clinical methods, and continuous patient education to reduce the chances of secondary caries. As our understanding of secondary caries continues to evolve, emphasis on early detection, innovative materials, and novel treatment modalities will be crucial in combating its prevalence and enhancing the durability of dental restorations. By adopting a multidisciplinary approach that integrates advances in materials science, diagnostic technologies and preventive care, dental professionals can strive towards minimizing the impact of secondary caries, thus promoting optimal oral health outcomes for patients worldwide.

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