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Association of Age and Gender distribution in Patients undergoing Onlay Restoration

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ABSTRACT

In order to reinforce a weakened cusp, a restoration covering the cusp is done to reduce the incidence for fracture and the failure of the tooth. There are multiple options to perform posterior restorations, which include direct materials like amalgam and composite and indirect materials like ceramic and metal. The aim of the study was to find out the association of age, gender and tooth number in patients undergoing onlay restoration. 86000 patient records at a private dental college were reviewed between June 2019 to March 2020. Our study included all the people who had undergone onlay restoration. A total of 49 onlay restorations were done. The collected data was tabulated using Microsoft Excel and analyzed using SPSS. Incomplete data was excluded from the study. Statistical analysis was done using a chi-square test. In our study, we observed that the age group below 30 years (p>0.05) reported the most for onlay treatment with a higher incidence of males (p>0.05). A maximum number of onlay treated teeth was 46. (p>0.05) Metal ceramic was the most common type of material used for onlay fabrication. (p>0.05) Within the limitations of the study, no significant difference was found between age, gender, tooth number and type of material used for onlay fabrication.

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INTRODUCTION

The most common cause of enamel loss in a clinical situation is dental caries (Rajendran, 2019). Although a worldwide significant reduction in the prevalence of dental caries has been seen, untreated carious lesions are highly prevalent in permanent teeth, affecting about 35 percent of the world's population, particularly in the posterior teeth. Bacteria play the most significant role in the initiation and progression of diseases involving the pulp and periapical regions (Manohar and Sharma, 2018). MMPs are produced by odontoblasts and they have a wide role in dental caries and periapical inflammation (Ramesh *et al.*, 2018). While caries are the predominant cause of tooth structure loss, many other

non-carious lesions, such as attrition, abfraction, erosion and fracture, can also lead to a breakdown of the hard tissues, thus requiring their restoration. The consequences of these lesions are sensitivity and high wear (Hussainy, 2018).

One of the most commonly seen injuries involving the teeth and its supporting structures is dental trauma (Jose *et al.*, 2020). If a patient only reports with chipped teeth or localized defects, veneers are usually the material of choice due to a conservative and esthetic approach (Ravinthar and Jayalakshmi, 2018). Obliteration of the pulp canal usually occurs after serious teeth injuries (Kumar and Antony, 2018). Avulsion of permanent teeth causes significant damage to the supporting tissues and vascular and nerve structures (Rajakeerthi and Nivedhitha, 2019). Other causes leading to pulpal involvement include dental erosion which is caused by acid attacks (Nasim and Nandakumar, 2018).

There are multiple ways to restore posterior teeth that include direct materials like amalgam and composite and indirect materials like ceramic and metal. The clinician's selection of a particular material and technique for the restoration of posterior teeth may be affected by personal choice and skills, patient demands and finance among others (Laegreid *et al.*, 2014). Prior to planning for a restorative treatment, diagnosing the pulp status is very important. Diagnosing the exact pulpal status by direct examination is uncertain due to the fact that the pulp is enclosed within a hard tissue. In order to identify the actual pulp status, a surrogate test must be performed (Janani *et al.*, 2020).

The quality of dental restorations has been significantly influenced by changes in treatment practices, the implementation of improved restorative materials and techniques, successful preventive programs, enhanced dental care and increasing interest in caries-free teeth. There are two types of restorations that can usually be used to restore a tooth which includes (a) direct and (b) indirect (Qualtrough *et al.*, 2009). Every type of restoration has its own advantages and disadvantages as well as indications and contraindications. Complete coverage restorations are commonly used in daily clinical practice, particularly when the loss of tooth structure exceeds 50 per cent. Gold, metal ceramics, all-ceramic and zirconia crowns have been successfully used and all reflect different choices for restorative materials (Sailer, 2009).

Choosing an alloy for a cast metal restoration in the 1950s was choosing a high gold alloy ADA specification, which were composed of gold and platinum greater than 75 per cent (Siddique, 2019; Teja and Ramesh, 2019). The type I alloy (soft) contained most noble metals (83%) and the types II, III and IV (hard) were composed of an increasing quantity of silver and copper. The most commonly used base alloys are Ni-Cr and Ni-Cr-Be. Beryllium improves the physical properties of the alloy (Pierce and Goodkind, 1989).

Dental ceramics also called porcelains, composed of a composite structure with crystalline phase or phases within a matrix made up of glass (Ramanathan and Solete, 2015). There are various porcelain systems available, and research is continuing to develop stronger, highly aesthetic and multi-purpose materials, for crowns, bridges, inlays and onlays.

Previously our team had conducted numerous clinical studies, in-vitro studies, randomized controlled trials, (Ramamoorthi *et al.*, 2015) and reviews (Noor and Pradeep, 2016) in the last 5 years. Now, we are focussing on epidemiological surveys. The idea for this study stemmed from the current interest in our society.

The aim of the study was to find out the association of age, gender and tooth number in patients undergoing onlay restoration.

MATERIALS AND METHODS

The study setting for this study was a university setting. 86000 patient records at a private dental college were reviewed between June 2019 to March 2020. Our study included all the people who had undergone onlay treatment. A total of 49 onlay procedures were done. Cross verification of data was done using photographs and RVGs. Data was reviewed by an external reviewer. To minimize sampling bias, all the available data was included in the study.

Data collected included name, age, gender, tooth number and material used for onlay restoration. The collected data was tabulated using Microsoft Excel and analyzed using SPSS. Differential (frequency distribution) and inferential (chi-square test) statistics were done.

RESULTS AND DISCUSSION

In our study, we observed that the age group below 30 years ($p>0.05$) (Figure 1) reported the most for onlay treatment with a higher incidence of males ($p>0.05$) (Figure 2). A maximum number of onlay treated tooth was 46. ($p>0.05$) Metal ceramic was the most common type of material used for onlay fabrication. ($p>0.05$).

Figure 1 depicts, Chi-square test was done and the association between age and material used for onlay was found to be statistically not significant. Pearson's Chi-square value = 3.320, df = 4, p-value 0.506 (>0.05) hence statistically not significant.

Figure 2 depicts, Chi-square test was done and the association between gender and material used for onlay was found to be statistically not significant. Pearson's Chi-square value = 27.796, df = 2, p-value 0.247 (>0.05) hence statistically not significant.

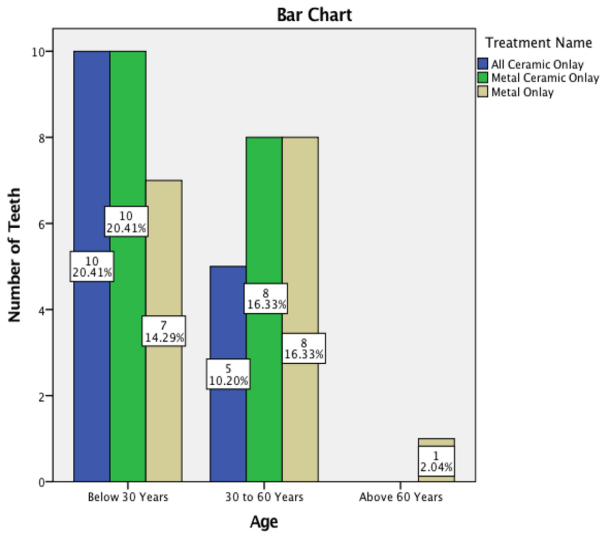

Figure 1: Bar graph showing the association between age and material used for onlay fabrication

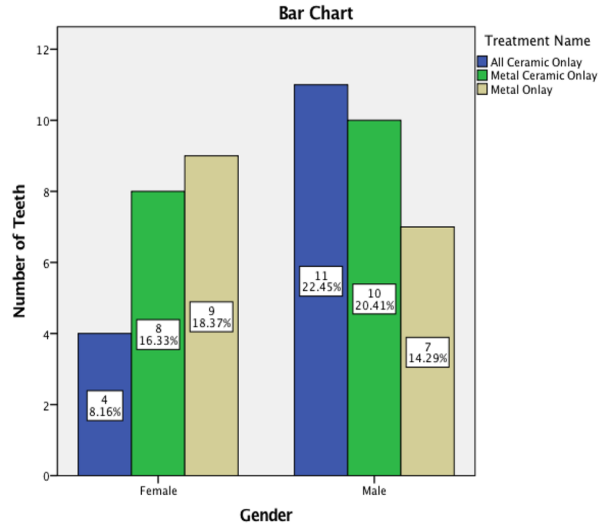

Figure 2: Bar graph showing the association between gender and material used for onlay fabrication

Our study highlighted the association of age, gender and tooth most commonly involved in onlay restoration. Among the 49 onlay restoration evaluated, a maximum number of onlay restorations were done in the age group below 30 years of age. (57%) Only 2% of the onlay restorations belonged to the age group above 60 years and 41% of the onlay restorations belonged to the age group between 30-60 years. In terms of gender, 57% were males and 43% were females. Most common tooth involved for onlay restoration was 46 (29%) followed by 26. (12%) The material of choice for onlay restoration was almost equal between metal (33%), metal-ceramic (36%) and all-ceramic (31%).

Indirect ceramic restorations can be designed in a single sitting either in a laboratory by a dental technician or by using CAD / CAM systems. Longevity studies show 0% to 7.5% annual failure rate (AFR) for ceramic inlays/onlays, and between 0.8% to 4.8% AFR for chairside fabricated restorations. Indirect ceramic restorations demonstrated comparable or slightly better clinical performance than direct composite restorations, especially given that indirect restorations are usually larger (Wittneben, 2009).

Studies have found a gender influence on the survival of restorations. Men may have stronger biting forces than women, which may contribute to higher failure rates due to bonding interfaces or fatigue of the material resulting in fracture and debonding, and increased failure rate. As highlighted by Schulz and others (Schulz *et al.*, 2003) the combination of various patient factors, like loading which is unfavourable, and an inadequate material dimension could have contributed to a higher rate of failure in men as observed in their study. Parafunctional habits can overcome the gender influence, and therefore gender should not be an outlying variable when evaluating the survival of the restoration. Furthermore, women regularly attend dental services as they are more concerned about their health.

In a study done by (Olsson, 2019) women were more likely to choose an indirect restoration compared to men. This is in contradiction to our study and a previously reported gender-equal distribution in the utilization of dental care (Sondell *et al.*, 2003). The higher mean age for people who choose an indirect coronal restoration may be linked to the differences in the dental status between various age groups. Older patients have an increased number of missing teeth as well as filled teeth with multiple missing or filled surfaces (Boslaugh, 2007). In general, older people may thus be more likely to need a crown compared to younger individuals with a higher number of remaining tooth substance which was in contradiction to our study in which the age group below 30 years reported the maximum for onlay restoration.

The limitations of our study were that it was an institutional-based study, the duration of cases taken into account was only 1 year and a very small sample size. Future scope includes taking a larger population into account and populations from different geographical locations.

CONCLUSION

The age group below 30 years (p>0.05) reported the most for onlay treatment with a higher incidence of males (p>0.05). A maximum number of onlay treated teeth was 46. (p>0.05) Metal ceramic was the most common type of material used for onlay fabrication. (p>0.05) Within the limitations of the study, no significant difference was found between age, gender and type of material used for onlay fabrication.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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