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## Prevalence of Denture Stomatitis and Its Predisposing Conditions - A Retrospective Institutional study

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**Abstract:** Denture stomatitis is an inflammatory condition affecting denture wearers. It can occur mostly due to Candida infection or mechanical irritation from denture or allergic reaction to any of the material used for fabricating denture. Denture stomatitis is considered a multifactorial disease as it can occur due to occlusal disharmony and ill fitting dentures, blockage of mucous glands, candida albicans. Various treatment and preventive measures are based on etiology of denture stomatitis. The aim of this study was to investigate the prevalence of type of denture stomatitis and its association with age, gender and type of treatment given. A retrospective study was done from 1 June 2019 till 1 March 2020. Data was reviewed from the patients records and analysed the data of 86,000 patients between June 2019 and March 2020 that were documented in a private institution. Statistical analysis was performed to assess the association between denture stomatitis with age, gender and type of treatment given. Prevalence of Type I denture stomatitis was 35.19%, Type II denture stomatitis was 44.44%, Type III denture stomatitis was 20.37%. The association between age group and type of denture stomatitis showed that there was no significant relation between age and type of denture stomatitis. Association between type of denture stomatitis and gender was statistically significant ( $p < 0.05$ ). The association between the type of denture stomatitis and treatment given was not significant. Type II denture stomatitis is the most common type of denture stomatitis and occurs mostly between age groups 41 to 59 years with females having higher prevalence compared to males. Most common treatment suggested was denture correction. To reduce the risk of denture stomatitis, dentists should take a step to educate the patients how to use dentures and risk associated with not maintaining well and how to prevent it.

**Keywords:** Denture stomatitis, Candidiasis, Pin point hyperplasia, Diffuse erythema, Papillary hyperplasia, innovative

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### INTRODUCTION

Denture stomatitis is an inflammatory condition affecting denture wearers. It can occur mostly due to Candida infection or mechanical irritation from denture or allergic reaction to any of the material used for fabricating denture (1). In 1936 Cahn named this condition as 'denture sore mouth', but this term was changed in 1963 by Cawson to 'denture stomatitis' as there is no discomfort seen. There were various other names given by various authors like 'chronic denture palatitis', 'stomatitis venenata', 'chronic atrophic candidiasis', 'denture related candidiasis', 'stomatitis protetica', 'stomatopathy prothetica', etc. But the most widely accepted name was denture stomatitis as the main cause of its occurrence was denture (2).

There are many classification on denture stomatitis. Newton (1962) classified denture stomatitis on clinical basis into three types, Type I: Pinpoint hyperaemia, Type II: Diffuse erythema and Type III: Inflammatory papillary hyperplasia (3). Budtz-Jorgensen & Bertram (1970) classified denture stomatitis as Type 1: simple localized inflammation, Type 2: simple diffuse inflammation, and Type 3: granular inflammation (2).

Newton's Type I denture stomatitis mostly occurs due to trauma from denture. Denture Stomatitis has been found to be in association with medical conditions, smoking, old denture, denture maintenance, candidal infection and bacterial infection, oral hygiene status and wearing denture during night time (3)(4)(4). Aetiology for denture stomatitis involves local, systemic conditions and denture conditions (5). There are controversies about the cause of denture stomatitis whether it is because of trauma or infection (6), (7). Denture stomatitis is considered a multifactorial disease as it can occur due to occlusal disharmony and ill fitting dentures, blockage

of mucous glands, candida albicans (6), (8,9). People of lower economic status usually prefer removable dentures as they cannot afford the treatment cost of fixed partial dentures and maintenance of the removable prosthesis is not proper which might lead to denture stomatitis (10,11).

Various treatment and preventive measures are based on etiology of denture stomatitis. If the cause is ill fitting denture, discontinuing denture wearing is considered as an important treatment of denture stomatitis (2)(12). Management of candida based denture stomatitis is complex due to its multifactorial etiology. Use of antifungal therapy (13), removal of dentures during night and efficient plaque control can be followed to treat or prevent denture stomatitis (14,15). Recent studies suggested that use of denture relining materials with antifungals antiseptic mouth rinses and microwave irradiation to be considered for treatment of candida associated denture stomatitis (16). Some studies showed that implant overdentures can be effective alternative treatment options to reduce the prevalence of denture stomatitis specially in mandible as dentures are stabilized with implants (17,18), (19), (20,21).

Our department is passionate about research we have published numerous high quality articles in this domain over the past years ( 22) , (23),(24), (25), (26), (27,28) (29) (29) (30) (31), (32), (33), (34), (35), (36), (27), (37), (38), (39), (40), (41), (42), (43), (44), (45), (46), (47). The aim of this study was to investigate the prevalence of type of denture stomatitis and its association with age, gender and type of treatment given.

## MATERIALS AND METHODS

A retrospective study was done in a university based setting in a private institution. The clinical portion of this retrospective study was conducted over a 9 month period i.e from 1 June 2019 to 1 March 2020 and included patients with denture stomatitis were included in this study. Sampling bias was minimized by including all available data.

Newton's classification was considered for denture stomatitis:

Type 1- pin point hyperplasia

Type 2- diffuse erythema

Type 3- papillary hyperplasia

The treatment advised were also grouped into 4 groups

Group 1- denture correction

Group 2- replacement of denture

Group 3- advised medication

Group 4- advised fixed dental prosthesis

Data was reviewed from the patients records and analysed the data of 86,000 patients between June 2019 and March 2020. The data collected was entered, tabulated and analysed for evaluating association between denture stomatitis with age, gender and type of treatment given. Statistical analysis was done using SPSS Statistics Software for windows, version 20.0. Chi-square test and Pearson correlation was done to determine that is there any statistical significant association between denture stomatitis with age, gender and type of treatment given.

## RESULTS and DISCUSSION

Prevalence of Type I denture stomatitis was 35.19%, Type II denture stomatitis was 44.44%, Type III denture stomatitis was 20.37% (Figure 1). The association between age group and type of denture stomatitis showed that there was no significant relation between age and type of denture stomatitis with Type II being the most common type of denture stomatitis (Figure 2). Association between type of denture stomatitis and gender was statistically significant ( $p < 0.05$ ). Type III denture stomatitis being more common in male while type II denture stomatitis being more common in females (Figure 3). The association between the type of denture stomatitis and treatment given shows that for patients with Type I denture stomatitis 24.07% treatment done was denture correction, for 5.56% replacement of denture was considered, for 3.70% medicine were given and only for 1.85% fixed option was considered. For patients with Type II denture stomatitis 20.37% treatment done was denture correction, for 14.81% replacement of denture was considered and for 9.26% medicine were given. For patients with Type III denture stomatitis 12.96% treatment done was denture correction, for 5.56% replacement of denture was considered and for 1.85% medicine was given (Figure 4).

The etiology of denture stomatitis is both local and systemic (48). It includes many factors -like smoking, medical condition, bacterial and candidal infections, oral hygiene etc (3). The prevalence of denture stomatitis is seen to be 10-65% (2). This study shows that the prevalence of denture stomatitis is higher in females. Many other studies had shown the same result of women being more affected with denture stomatitis compared to males (48-53). There are many studies which showed higher prevalence of denture stomatitis in males because of smoking, etc (3,54). This study showed that Type II denture stomatitis - diffuse erythema is most prevalent followed by Type I denture stomatitis - pinpoint hyperemia followed by papillary hyperplasia. These results varied in a study done by Kossioni et al (3), which showed that Type I had highest prevalence followed by Type II followed by Type III denture stomatitis.

Our study showed that there is no significant association between age and type of denture stomatitis. But denture stomatitis was most prevalent in the age group of 41-59 years. These results were similar to various other studies (3,49,55),(56). These findings were contradicted by some studies which reported a higher prevalence in elderly people (57,58).

One study showed that partial denture wearers had a significantly higher prevalence of denture stomatitis than complete denture wearers. The association between the type of denture stomatitis and treatment given showed that for patients with Type I denture stomatitis 24.07% treatment done was denture correction, for 5.56% replacement of denture was considered, for 3.70% medicine were given and only for 1.85% fixed option was considered. For patients with Type II denture stomatitis 20.37% treatment done was denture correction, for 14.81% replacement of denture was considered and for 9.26% medicine were given. For patients with Type III denture stomatitis 12.96% treatment done was denture correction, for 5.56% replacement of denture was considered and for 1.85% medicine was given. According to Walker et al and Bergendal et al (59,60), drugs alone cannot treat denture stomatitis till the cause of it has been treated. According to Moore et al (61), cases where there is no systemic condition involved, removal of dental plaque alone can treat denture stomatitis. Elimination of the etiologic factor is one of the best treatments considered for denture stomatitis (2).

Limitation of our study is that it is done in an institutional setting, hence there are limited samples. As it is an institutional study there can be operator bias, protocol bias seen. The clinical scenarios for all the patients with denture stomatitis might be different and the treatment given might vary according to the operator.

## CONCLUSION

Type II denture stomatitis is the most common type of denture stomatitis and occurs mostly between age groups 41 to 59 years with females having higher prevalence compared to males. Most common treatment suggested was denture correction. Association of type of denture stomatitis with age and treatment given was not significant. But association between type of denture stomatitis and gender was significant with females having the highest prevalence of Type II denture stomatitis. To reduce the risk of denture stomatitis, dentists should take a step to educate the patients how to use dentures and risk associated with not maintaining well and how to prevent it.

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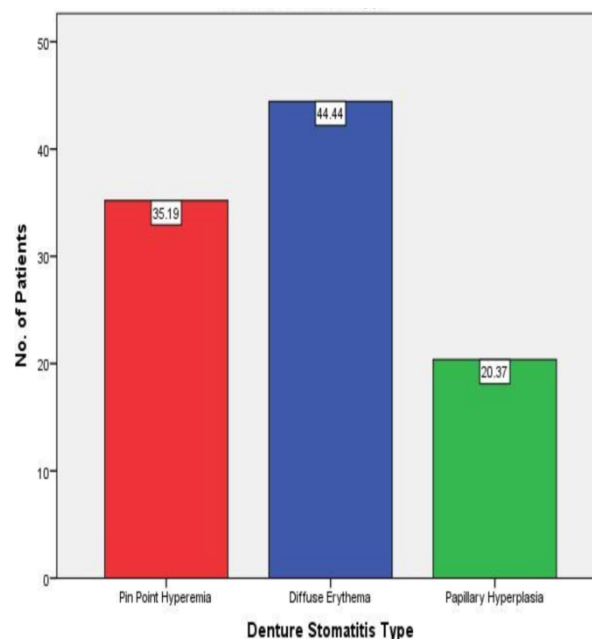
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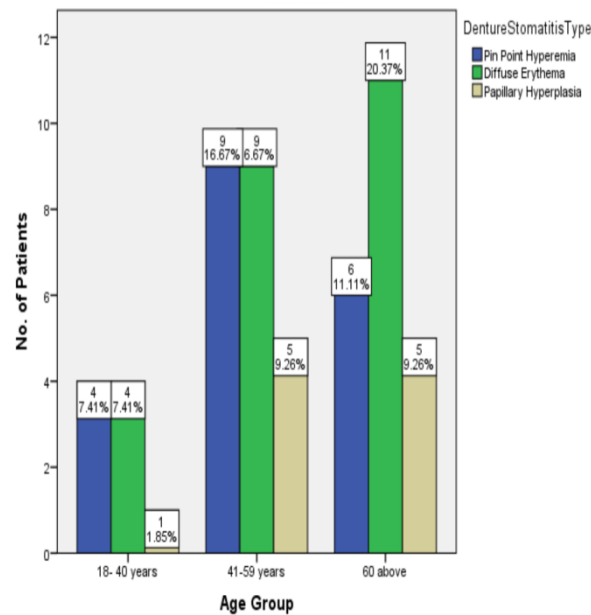
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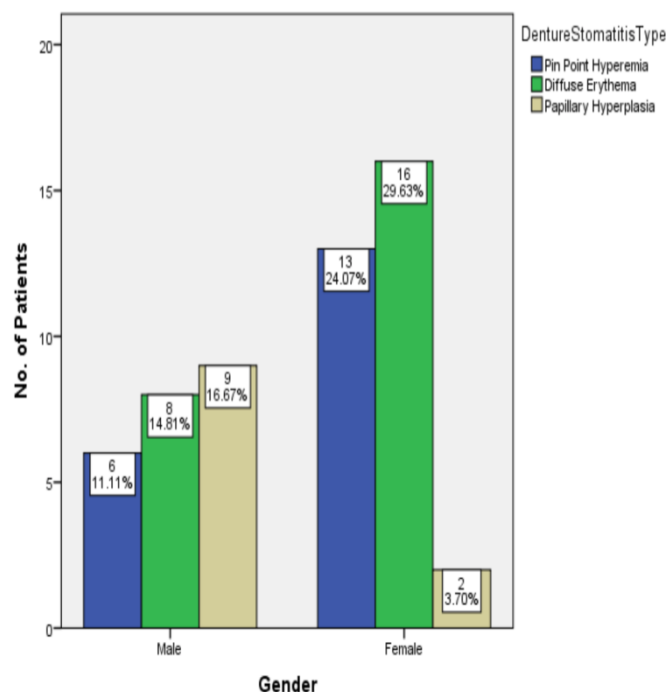
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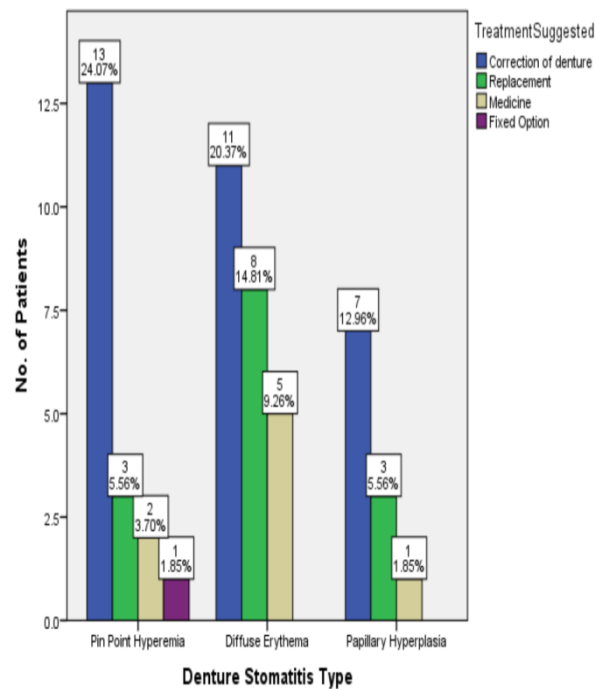
**Fig.1: Bar graphs show the percentage of types of denture stomatitis. X axis - Denture stomatitis type, Y axis - no. of patients. 35.19% - Pinpoint Hyperemia (Red), 44.44% - Diffuse Erythema (Blue), 20.37% - Papillary Hyperplasia (Green). Diffuse Erythema was more prevalent than other types of denture stomatitis.**



**Fig.2 :** Bar graphs show the association of age and types of denture stomatitis. X axis - Age group and Y axis - No of patients with denture stomatitis. Pinpoint erythema (Blue), Diffuse Erythema (Green), Papillary Hyperplasia (Beige). Pearson association was done and found to be statistically not significant. Chi square : 1.471, df : 4, p value : 0.832 (> 0.5). However, diffuse erythema was common in the age group of above 60 than others.



**Fig.3:** Bar graphs show the association of gender and types of denture stomatitis. X axis - Gender and Y axis - No of patients with denture stomatitis. Pinpoint erythema (Blue), Diffuse Erythema (Green), Papillary Hyperplasia (Beige). Pearson association was done and found to be statistically significant. Chi square : 8.706, df : 2, p value : 0.013 (< 0.5), hence proving that denture stomatitis is more common in females than in males.



**Fig.4: Bar graphs show the association of types of denture stomatitis and the treatment suggested.. X axis - Age group and Y axis - No of patients with denture stomatitis. Pinpoint erythema (Blue), Diffuse Erythema (Green), Papillary Hyperplasia (Beige). Pearson association was done and found to be statistically not significant. Chi square : 5.213, df : 6, p value : 0.517 (> 0.5). However, corrections of the denture were commonly suggested treatment than others.**