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### Original Research

#### A comparative efficacy of Nystatin and Fluconazole incorporated into tissue conditioner as drug delivery method for Denture stomatitis

Neeraj Kumar<sup>1</sup>, Ayusha Kumari<sup>2</sup>, Vibhash Priyadarshi<sup>3</sup>, Abhijit Kumar<sup>4</sup>, Ravi Shankar Prasad<sup>5</sup>, Bineet Kumar<sup>6</sup>

<sup>1,3</sup>Second year, <sup>6</sup>Third year, PG students in department of Prosthodontics, <sup>2</sup>Second year PG in dept. of periodontics,

<sup>4</sup>Third year PG in dept. of Orthodontics, <sup>5</sup>Second year PG in dept. of Conservative dentistry and Endodontics, Vananchal Dental College and Hospital Garhwa, Jharkhand, India

#### ABSTRACT

**Background:** Denture stomatitis (DS) is a chronic inflammatory condition of the palatal and alveolar mucosa underlying complete or removable dental prostheses. The present study compared efficacy of Nystatin and Fluconazole incorporated into tissue conditioner as drug delivery method for Denture stomatitis. **Materials & Methods:** The present study was conducted on 40 denture wearers with denture stomatitis of both genders. On the right half, tissue conditioner mixed with 10% fluconazole was applied and on the left half tissue conditioner plus Nystatin 500,000 units was applied. **Results:** Out of 40 patients, males were 26 and females were 14. The mean *C. albicans* unit before application on left side of palate was 390.8 and on right side was 380.4. The difference was non-significant ( $P > 0.05$ ). The mean *C. albicans* unit after application on left side of palate was 42.6 and on right side was 153.4. The difference was significant ( $P < 0.05$ ). **Conclusion:** Authors found that Nystatin as antifungal agent was effective against *Candida albicans* and can be an effective treatment as compared to fluconazole in DS patients.

**Key words:** *Candida albicans*, Denture stomatitis, Nystatin

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**Corresponding author:** Dr. Bineet Kumar, Third year PG in department of Prosthodontics, Vananchal Dental College and Hospital Garhwa, Jharkhand, India

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#### INTRODUCTION

Denture stomatitis (DS) is a chronic inflammatory condition of the palatal and alveolar mucosa underlying removable dental prostheses. Denture stomatitis is more commonly seen in the maxillary mucosa.<sup>1</sup> The prevalence of denture stomatitis is varied from 15 to 65% and even more significant in the institutionalized denture wearing population at up to 72%. This condition is usually asymptomatic, although it can be associated with burning, bleeding, an unpleasant taste. Even though several microorganisms can cause this condition, most studies showed that *Candida*

*albicans* and the ill fitting dentures promote the development of this condition. *Candida albicans* is an oral commensally fungus found in 40% of human beings, which facilitates the formation of denture plaque, in which *Candida albicans*.<sup>2</sup>

*Candida albicans* is asexual diploid fungus. It reproduces by budding and produces pseudohyphae both in culture and in tissues. It may be found in yeast form (blastospore) or mycelial form (pseudohyphae).<sup>3</sup> Yeast form is found in denture wearers with normal mucosa while mycelial form is seen in denture stomatitis patients. Like other yeasts, *Candida albicans*

is gram positive.<sup>4</sup> The management of Candida associated denture stomatitis is complex due to its multi-factorial etiology. Current treatment includes following options: Meticulous oral and denture hygiene, removal of dentures at night or prolonged rest periods, antifungal therapy such as fluconazole and topical nystatin etc., correction of minor denture faults and tissue conditioners application on the fitting surface of the denture.<sup>5</sup> The present study compared efficacy of Nystatin and Fluconazole incorporated into tissue conditioner as drug delivery method for Denture stomatitis.

**MATERIALS & METHODS**

The present study comprised of 40 denture wearers with denture stomatitis of both genders. All patients were informed regarding the study and written consent was obtained. Ethical clearance was taken from institute ethical committee.

Data such as name, age, gender etc. was recorded. After removal of the upper denture, a palatal scraping with the help of sterile cotton swab was obtained from the palatal mucosa of the patient from right and left sides and these were collected into the sterilized saline solution in a “biju bottle”. These biju bottles containing palatal scraping / swabs were sent to the microbiology laboratory for the confirmation and count of Candida colonies.

The palatal surface of the upper denture was roughened and cleaned for the application of the medication and

was divided into right and left halves. On the right half, tissue conditioner mixed with 10% fluconazole was applied and on the left half tissue conditioner plus Nystatin 500,000 units was applied. The patient was advised to avoid extreme temperature foods to prevent the changes in wax stops during three days application. The patient was then advised to return after 3 days. On the next appointment, the upper denture was again removed and samples were taken from the right and left halves of the palatal mucosa and sent to the microbiology laboratory for Candida colonies evaluation as before. In the laboratory Sabouraud’s dextrose agar plates were prepared. 25 microlitre saline solution was taken from the biju bottles and spreaded on to the prepared plate of dextrose agar. For this purpose, a Pasteur spreader was red heated over a flame to ensure sterilization. It was cooled in the air. The spreader was dipped in saline solution. The specimen was inoculated on the culture plate. For the sake of standardization, same size of Pasteur spreader was used for all cases. After inoculation, the culture plate was covered with sterile covers.

The plates were transferred to incubator. They were left there for 48 hours at 37°C in aerobic condition. This allowed the growth of candida if present. After 48 hours, the culture plates were observed for CFUs. The CFUs of candida were identified by their morphologic characteristics and specific odor. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Gender	Male	Female
Number	26	14

Table I shows that out of 40 patients, males were 26 and females were 14.

**Table II Candida albicans before tissue conditioner**

Side of palate	Mean	P value
Left	390.8	0.91
Right	380.4	

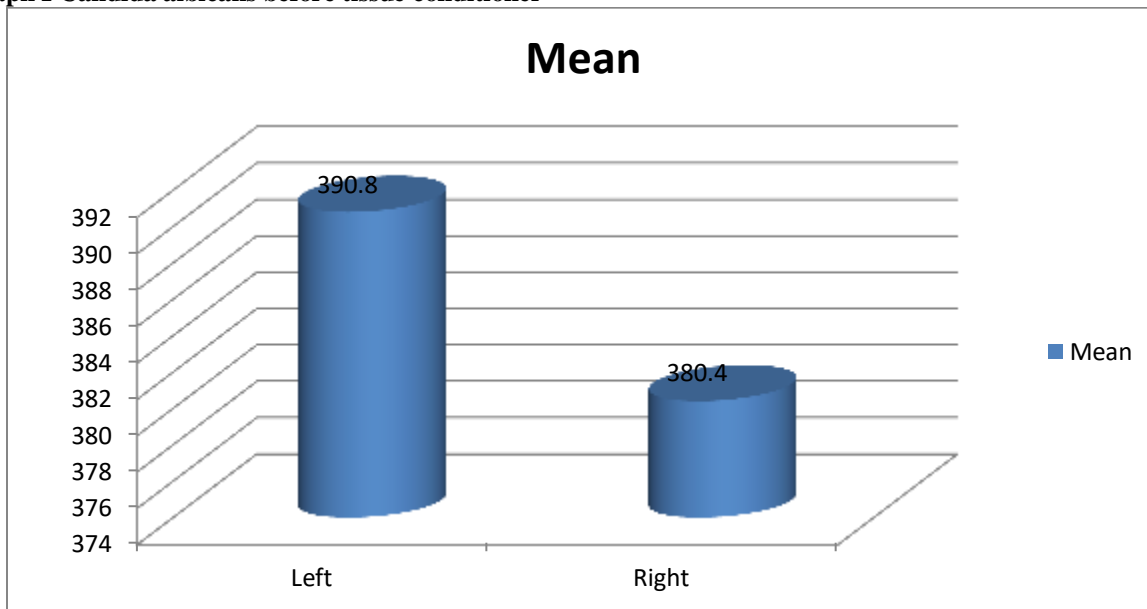
Table II, graph I shows that mean C. albicans unit before application on left side of palate was 390.8 and on right side was 380.4. The difference was non- significant (P> 0.05).

**Table III Candida albicans after tissue conditioner**

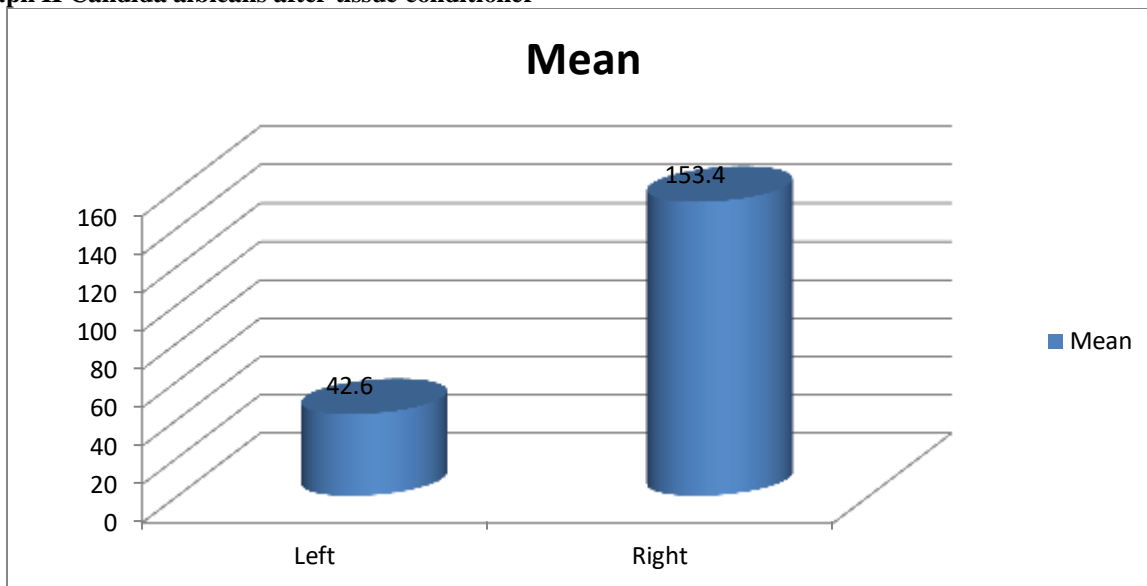
Side of palate	Mean	P value
Left	42.6	0.001
Right	153.4	

Table III, graph II shows that mean C. albicans unit after application on left side of palate was 42.6 and on right side was 153.4. The difference was significant (P< 0.05).

**Graph I Candida albicans before tissue conditioner**



**Graph II Candida albicans after tissue conditioner**



**DISCUSSION**

Denture stomatitis is a pathological condition of the denture bearing mucosa caused by trauma from ill-fitting dentures. It is characterized by generalized inflammation or reddening of the palatal mucosa underneath the denture and more prevalent in complete denture wearers. A significant proportion of denture wearers (72%) are affected by this condition.<sup>6</sup> The fungal (candidal) infections are considered to be the main contributory factor for developing the denture stomatitis hence commonly termed as Candida-associated stomatitis. The etiology of denture stomatitis can be multifactorial however, the infection by Candida

species especially the Candida albicans (*C. albicans*), is considered to be the main etiologic factor.<sup>7</sup> In addition to *C. albicans*, other risk factors such as denture trauma, poor oral and denture hygiene, continuous and nocturnal denture wear, xerostomia, alteration in salivary pH have been reported to be associated with denture stomatitis.<sup>8</sup> The present study compared efficacy of Nystatin and Fluconazole incorporated into tissue conditioner as drug delivery method for Denture stomatitis.

In this study, we enrolled 40 complete denture wearers with denture stomatitis. out of 40 patients, males were 26 and females were 14. Iqbal et al<sup>9</sup> included thirty six

(36) patients selected by purposive non-probability sampling. Upper complete denture was divided into right (Rt) and left (Lt) sides for medication. Right side was the control side i.e., tissue conditioner alone was applied while left side was interventional side i.e., tissue conditioner incorporated with Nystatin (500,000 units) was applied. Samples were taken from the palatal mucosa of both sides before the application of the tissue conditioner and 3 days after medication; candida colonies were detected and counted. The reduction in the number of colonies on both sides was significant ( $P < 0.05$ ) but it was highly marked on the interventional side than on the control side. Nystatin (500,000 units) when combined with tissue conditioner was effective against candida albicans and can be an effective treatment in non-compliant DIS patients.

We found that mean *C. albicans* unit before application on left side of palate was 390.8 and on right side was 380.4. The mean *C. albicans* unit after application on left side of palate was 42.6 and on right side was 153.4. Chincholikar et al<sup>10</sup> included a total of 60 samples; 20 each of auto polymerising acrylic resin, heat polymerising acrylic resin and permanent silicone soft liner, (10 samples in each group incorporated with 10% w/w herbal neem extract and the other 10 with 10% w/w fluconazole), were fabricated using a stainless steel die of specific dimensions ( $50 \pm 1$  mm in diameter and  $1.0 \pm 0.05$  mm thickness), as per the American Dental Association (ADA) specification no. 12. They were subsequently checked for leaching of the antifungal agents over a time period of three weeks at the intervals of 2, 14 and 21 days using the High Performance Liquid Chromatography (HPLC) apparatus. The eluates were also checked for their anti-candidal activity by measuring the zones of inhibition of each agent in all the three test groups. Fluconazole exhibited significantly better elution profile and antifungal activity against *Candida albicans* as compared to herbal neem extract. Amongst the materials tested, permanent silicone soft liner exhibited significantly higher elution and better antifungal activity in terms of colony inhibition of *Candida albicans* followed by auto

polymerising acrylic resin and heat polymerising acrylic resin.

## CONCLUSION

Authors found that Nystatin as antifungal agent was effective against candida albicans and can be an effective treatment as compared to fluconazole in DS patients.

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