THE EFFECT OF LOCAL FACTORS IN THE DEVELOPMENT OF DENTURE STOMATITIS [+]

تأثير العوامل الموضعية على ظهور التهاب الفم الناتج من استخدام التعويضات السنية

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Abstract:

Denture stomatitis is the most common oral disorder found in denture wearers. It is usually associated with presence of *Candida albicans* infection. The study was carried out of (70) denture wearers to determine the effect of local predisposing factors, the oral and denture hygiene habits, age of denture and age of denture wearers and degree of Candida colonization on the denture surface to development the denture stomatitis. (47) case with denture stomatitis and (23) control were investigated clinically and mycologically. Clinical investigation included oral and denture hygiene assessment, age of denture and age of denture wearers statistically measured and denture swabs for Candida culture growth collected in standardized method. Results were showed that no significant differences (P > 0.05) between oral and denture hygiene habits and denture age. However in denture stomatitis group dentures were less older (6- 10) years then in controls(more than 10 years) but tended to be dirtier and related to the higher degree of denture stomatitis. The age of dentures was not related to the degree of inflammation but was with the degree of Candida colonization. The denture stomatitis, which develops frequently in older Patients (20%) more than meddle age. Significant difference (P < 0.05) was obtained in the degree of Candida colonization between denture stomatits and control group. Poor denture hygiene increase colonization of Candida which interact initiative local factors in the development of denture stomatitis.

المستخلص:

يعتبر التهاب الفم الناتج عن استخدام التعويضات السنية المتحركة من اكثر الاعتلالات الفموية شيوعا، وظهور المبيضات البيضاء. اجريت الدراسة على (70) مستخدم لتعويضات سنية متحركة. تم فحص العوامل المؤثرة على حدوث من خلال صحة تجويف الفم وصحة التعويضات السنية مع حساب عمر التعويضات وعمر مستخدمي التعويضات، كذلك تم تسجيل شدة ظهور التجمعات للمبيضات البيضاء وعلاقتها مع التهاب الفم. (47) مستخدم ظهر التهاب الفم و(23) مستخدم حالة مستقرة، تم تشخيص وعزل المبيضات البيضاء بالفحص المظهري والمجهري حسب الطرق النموذجية السائدة. اظهرت النتائج عدم وجود فروقات احصائية مهمة (P>0.05) بين صحة تجويف الفم والحالة الصحية للتعويضات وعمر التعويضات السنية. لوحظ في مجموعة التهاب الفم عمر التعويضات اقل من (6-10) سنوات مقارنة بالمجموعة المستقرة اكثر من (10) سنوات مع رداءة التعويضات. ان عمر التعويضات السنية لا علاقة لها مع شدة التهاب الفم ولكن العلاقة مع شدة التجمعات للمبيضات البيضاء. وزيادة التهاب الفم بنسبة (20%) مع الاعمار الكبيرة. وجود فروقات احصائية مهمة (P<0.05) مع زيادة التجمعات المبيضات البيضاء

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على التعويضات في المجموعتين، رداءة صحة التعويضات يساعد على زيادة التجمعات الذي يعتبر من العوامل المساعدة لالتهاب الفم.

Introduction:

The term prosthetic stomatitis is also refried to denture sore mouth, denture stomatitis is designates to the inflammation of oral mucosa, most frequently effected mucosa of the palate and gingiva, being in direct contact with the base of the removable denture, it develops more often in woman and its prevalence increase with age. [1]. Other studies shows no statistical relationship between denture stomatitis, frequency of denture bursching, denture cleaning method, but significant difference was found between yeast presence and denture cleanlines. [2-3]

Also the denture stomatitis is frequently associated with high levels of candida in saliva and difficient denture hygiene [3- 4]. Other Co- factors such as PH, carbohydrate ingestion increases, different systemic diseases and pharmacological treatment may increase denture stomatitis.[5]. Recent studies indicates that correlation may exist between denture stomatitis and elderly patients, amount of tissue coverage by a maxillary denture and removing the dentures [6- 7]. And other studies show the presence of microorganism on the fitting denture complete surface.

The aim of study was examine the effect of different factors in development and increase the denture stomatitis: oral hygiene habits, hygiene and age of the denture, *candida albicans* colonization, and finally the relation between denture stomatitis and older peoples.

Subjects and Methods:

The study included (70) patient aged (30- 75) years (mean age 52.5 years), wearing removable dentures. Out of this number there were (28) female and (42) male. Thirteen patients wearing upper and lower complete dentures or single complete dentures, but fifty seven patients wearing partial dentures, (55) piece of upper dentures and (15) piece of lower dentures were prepared. Subjects were divided in to two groups; the tested group, consisting of (47) subjects with inflammatory changes of the mucosa below the base of denture and control group represented by (23) case without inflammatory changes on the mucosa below the base of the denture.

Examinations were conducted in subjects treated in prosthetic dentistry of AlKayra centre in Al- Sadder city and the culture process in the laboratory of the hospital Al- Sadder from the period of October 2007 to may 2008, data on the patients were filled in questionnaires which along with case history data, comprised data on clinical finding of the mucosa and degree of inflammation, the intensity of inflammation below the base of the denture was divided in degrees by a modified classification according to Newton [8].

Degree 1 marked pin point hyperemia, degree II marked diffuse erythema, and degree III marked inflammatory papillary hyper plasia. The variables included Oral and denture hygiene the evaluation was done visually on the basis of plaque, dental calculus and pigmentation quantily. Oral hygiene was evaluated by degrees: degree 0= poor, degree 1= satisfactory, degree 2= good. Degree of hygiene of the denture (age of using the denture) was divided as; degree 0= poor hygiene of denture (more the 1/3 covered with plaque, calculus and pigment) degree 1= satisfactory (less than 1/3 denture covered with plaque, calculus and pigment); and degree 2= good hygiene denture (with out plaque, calculus and pigment). [9]

The last variable the age of the subjects which was evaluated by the relation between denture stomatitis, which develops frequently in older people's mouths [2]. In all the subjects swabs were taken from the base of the denture for *Candida albicans* mycopathological culture. The samples were cultured by means of a sterile cotton & stick on to nutritional sabourand dextrose agar, blood agar and maccongy agar after (48) hours incubation at (37) C^{o} temperature colonies of *Candida albicans* appeared, their number and diagnoised according to olsen method. [10]. All examined variables in the tested groups were compared with the finding in the control group.

Results:

The results of the study show the degree of oral hygiene more than 50% in both groups, in the tested group show (10) cases poor with (25) cases satisfactory and control group (4) cases poor with (12) cases satisfactory. The satisfactory degree oral hygiene in both groups are more than other degree of oral hygiene which are (37) cases with (25.9%) but poor oral hygiene are (14) cases with (9.8%) and good oral hygiene are (19) cases with (13.3%) which show in (table- 1).

(Table- 1) Distribution of subject according to degree of oral hygiene

Oral hygiene of subject	Degree of oral hygiene		
	Poor	Satisfactory	Good
Tested group	10	25	12
Control group	4	12	7
Total	14	37	19
Percentage	9.8%	25.9%	13.3%

However, the denture hygiene in the result show was less satisfactory in both groups. The patients, with denture stomatits had poorer denture hygiene (8.4%) but without significant difference in relation to the control group. The relation between inflammation intensity and denture hygiene showed that the patients with poorer hygiene had a higher degree of inflammation. the greatest number of cases had degree II inflammation according to Newton (22.4%) while only a smaller number of cases with poorer denture hygiene (8.4%) had high intensity inflammation (Newton III), which show in (table -2).

(Table-2) Relation between denture age and Newton types (inflammation)

Inflammation intensity / Denture hygiene	Type of Newton		
	Type I	Type II	Type III
1- 5 years	**10**	**5**	**1**
6- 10 years	**9**	**16**	**4**
More than 10 years	**7**	**11**	**7**
Total	**26**	**32**	**12**
Percentage	**18.2%**	**22.4%**	**8.4%**

Other result of study when examination the age of denture by devided the denture wearing time into group I (1- 5 years), group II (6- 10 years), and group III (more than 10 years). Show that most of the subject with denture stomatitis. show that the most of the subjects with denture stomatitis in tested groups are (23) cases with (10.8%), in group II as (6-10) years. While the control group show (13) cases with (2.9%) in group more than 10 years older denture. The difference in denture wearing time was not statistically significant (P> 0.05). show in (table- 3).

(Table-3) Distribution of subject according to denture age (time of warning)

Groups	Denture age	Number of case	
		Tested	Control
Group I	(1- 5) years	6	4
Group II	(6- 10) years	23	6
Group III	More than 10 years	18	13
Total		47	23
Percentage		10.8%	2.9%

The relation between degree of inflammation (type of Newton) and denture age. Show that denture age did not significantly influence either the inflammation due to type of Newton (P>0.05) or the denture infection (P>0.05). Although older dentures were more degree infected by *Candida albicans* in subjects with denture stomatitis.

Comparison of the degree of denture infection revealed a high degree of denture infection more than (50%) in most case with denture stomatitis, while *Candida albicans* was not found on the denture in the majority of the control group, these results were statistically significant (P> 0.05).

The age of subject effected to develops the denture stomatitis in the groups, increased frequently with older patients (20%) due to some local and systemic factors.

Discussion:

The relation of denture stomatitis with individual local and systemic factors has been reported in many studies, although the most studies show that there is interaction of several factors in the pathogenesis of disease. [4]. The microflora in the oral cavity changes with the beginning of wearing the denture, and new conditions of micro- environment favor the development of denture stomatitis in some persons. [6]. *Candida albicans* infection and bacterial interaction are reported to be among the most important causes and the influence of trauma upon weaker resistance of the mucosa in the pathogenesis of the disease. [11- 12]. The supposition is that cause determines the clinical picture so the Newton type I denture stomatitis is thought to be the result of a trauma, while generalized erythemia (Newton type 11) and development hyperplasia of the mucosa are the results of the interaction of several causes (Newton type III) [7, 8, 13]

Our results agrees with the aforementioned view reports due to influence of several local factors in the development of denture stomatitis. Namely, examined local factors, oral

hygiene, denture hygiene, age of denture and age of patients were not statistically different between the subjects with denture stomatitis and the control group.

The results finding satisfactory oral hygiene in more than half of the subjects in both groups, their denture hygiene was not a satisfactory. Earlier studies [2, 9] reported a connection between poor denture hygiene and development of denture stomatitis- our results show that the mouth inflammation intensity was higher in the subjects with poorer denture hygiene. However, control group did not have inflammatory changes, which clearly shows that the resistance of oral mucosa is particularly important in the development of inflammation. [13]. Denture age is important to be a predisposing factor for the development of denture stomatitis, mainly due to the illfitting denture, roughness of its surface, impossibility of adequate cleaning and accumulation of plaque and microbial pathogens [14], The illfitting denture show in tested group more than half cases but percentage of illfitting denture very less in control group, that is due to the effect of other local factor which lead to denture stomatitis. Moscona et al believe, that denture stomatitis is only the results of denture age and not the quality of its maintenance [6]. However, other authors, demonstrated that denture age is not a local factor that causes the development of inflammatory changes, disagree. [15]. However, in the cases with denture stomatitis, older dentures were more infected, which agrees with the reports of authers who point out that the quality of the denture is more important for the development of inflammation than its age [15] compared to the control group. The subjects with denture stomatitis showed significantly more infected denture with *Candida albicans,* which is indicative of the role played by the fungi in the development of inflammation. This is substantiated by the finding of inflammation in highly infected dentures. The greatest number of the cases with denture stomatitis had medium high intensity inflammation (Newton type 11), which is in agrees with the result of authors that type 11 denture stomatitis interaction of several factors of which *Candida albicans* is the most significant. On the basis of an investigation of some of the local factors in the incidence of denture stomatitis, the result of study show that poor hygiene habits and colonization of *candida albicans* on the denture are local factors that stimulate the development of denture stomatitis. The age of subjects can not effected directly on the healthy of mucosa under the denture, but its changes may be increased by stress, trauma or disease as well as by drug used in the treatment of disease.

General disorder, particularly of a nutritional and metabolic nature [5, 1] and side-effects caused by pharmacotherapy [5, 16] weaken the resistance of the mucosa making it susceptible to the action of various microbial pathogens, bacteria and fungi and to infection.

Therefore, denture stomatitis, which develops frequently in older people's mouths, is the result of interaction of several factors.

Conclusion:

1. **Oral hygiene habits, age and hygiene of the denture showed that there was no statistically difference between the patients with denture stomatitis and the control group.**
2. **There are a statistical significant difference in degree of the dentures infected by *Candida albicans* between the control and the tested group.**
3. **Poor hygiene habits and infection under the denture are initial local factors in the development of denture stomatitis.**
4. **Denture stomatitis which develops in older patients increased as a result of interaction of several factors, increased by stress, trauma or disease as well as by drugs used in the treatment of disease.**

References:

1. **Shulman JD., Rivera- Hidalgo F., Beach MM. "Risk factors associated with denture stomatitis in the united state " J. oral patho. Med., Vol. 34, No. 6, PP.340- 346, 2005.**
2. **Kulak- Ozkan Y, Kazazoglu E; Arikan A. "oral hygiene habits, denture cleanliness, presence of yeasts and stomatitis in elderly people" J. oral rehabit., Vol. 29, No. 3, PP. 300- 304, 2002.**
3. **Pires FR; santos EB; Bonan PR; De Almedia OP,Lopes MA. "Denture stomatitis and salivary Candida in Brazilian edentulous patients" J. oral rehabil; Vol. 29, No. 11, 1115- 9, 2002.**
4. **Baena- Monroy T; Moreno- Maldonado V; Franco- Martinez F; Aldape-Barrios B; Quindos G; Sanchez- Vargas LO; "Candida albicans, Staphylococcus aureus and streptococcus mutans colonization in patients wearing dental prosthesis" Med- oral patha oral cir. Bucal, Vol. 1, No.10, PP. 27- 39, 2005.**
5. **Soysa NS; Samaranayake LP; Ellepola AN. "Diabetes mellitus as a contributory factor in oral candidosis" Diabet Med., Vol. 23, No. 5, PP. 455- 459, 2006.**
6. **Moskona D; Kaplany I; "oral lesions in elderly denture wearers" Clin. Prev. Dent., Vol. 14, No. 11, 1992.**
7. **Budtz- Jorgensen E; "oral mucosal lesions associated with the wearing of removable denture" J. oral patho, Vol. 10, No. 65, 1981.**
8. **Newton AV; "Denture sore mouth". Br. Dent. J., Vol. 112; 357- 359, 1962.**
9. **Marinka Mravak- stipetic; Lada Hemerich; Ivana Jurcic, Vjekoslav Jerolimov. "Stimulating local factors in the development of denture stomatitis". Acta. Stomatol croat, Vol. 34, No. 2, PP. 133- 136, 2000.**
10. **Olsen I. "Occurrence and distribution of fungi". Acta. Odontol scand. Vol. 32, PP. 329- 333, 1974.**
11. **Daniluk T; Fiedoruk k; Sciepuk M; Zaremba ML."Aerobic bacteria in the oral cavity of patients with removable dentures" Adv. Med. Sci., Vol. 51, No. 1, PP. 86- 90, 2006.**
12. **Faraj S. A. A., "Candida- albicans population in the oral cavity of Iraqi edentulous patient" Iraqi denture J. Vol. No. , PP. 17- 20, 1982.**
13. **Wilson J. "The etiology, diagnosis and management of denture stomatitis" Br- Dent. J., Vol 18, No. 5, PP. 380- 384, 1998.**
14. **Monsengo P. "Presence of microorganisms on the fitting denture complete surface" J. oral rehabil, Vol. 27, No. 8, PP. 708- 713, 2000.**
15. **Lyon J P; da Costa Sc; Totti VM; Munhoz MF; de Resende MA. " Predisposing condition for *Candida Spp.* Carriage in the oral cavity of denture wearers and individuals with natural teeth" Can. J. microbial, Vol. 52,No. 5, PP. 462- 467, 2006.**
16. **Daniluk T; Tokajuk G; Stokowska W; Fiedoruk K; Sciepuk M "Occurrence rate of oral *Candida albicans* in denture wearer patients" Adv- Med. Sci., Vol. 51, No. 1, PP. 77- 80, 2006.**