

ORAL PRESENTATION

Health Science

Graduate School

Valaya Alongkorn Rajabhat University under the Royal Patronage

THE PREVALENCE OF ORAL MUCOSAL LESIONS IN RELATED TO DENTURE WEARING OF THE ELDERLY

Adjabhak Wongviriya¹, Ruchadaporn Kaomongkolgit², Chaidan Intapa³

¹ Master of Philosophy Program in Oral Biology, Faculty of Dentistry
Naresuan University, adjabhak.jew@gmail.com

² Master of Philosophy Program in Oral Biology, Faculty of Dentistry
Naresuan University, ruchadapornk@nu.ac.th

³ Master of Philosophy Program in Oral Biology, Faculty of Dentistry
Naresuan University, chaidani@nu.ac.th

ABSTRACT

This study aims to determine the prevalence of oral mucosal lesion in related to denture factors among the elderly. Demographic data and denture usage information including type of denture, denture age, denture retention and stability, denture hygiene and nocturnal denture wearing were recorded from 211 Thai patients who were 60 years or above. Intraoral examination and diagnosis of oral mucosal lesions were made following World Health Organization Guideline (1980). Denture-related stomatitis was defined following Newton's classification (1962). The association and correlation between factors were analyzed using Chi-square test and logistic regression, respectively. The significant level was set with $p \leq 0.05$. The prevalence of denture-related oral mucosal lesions was 28.0 %. Three most common lesions, sort descending, were traumatic ulcer (12.8%), frictional keratosis (10.9%) and denture-related stomatitis (5.7%), respectively. Denture-related stomatitis and epulis fissuratum were associated with removable denture wearing ($p < 0.05$), while using logistic regression, denture-related stomatitis also showed significant correlation with denture hygiene ($p = 0.050$). This study showed that the important factor of causing denture-related stomatitis is denture hygiene, while other factors may play role as contributing factor.

Keywords: Oral mucosal Lesion, Elderly, Thailand, Denture

Introduction

Globally, since the medical is well developed, human lifespan are longer than before, so the geriatric population is increasing continuously (United Nation, 2015; Glick, 2015). The geriatric population in Thailand is also increasing (Institute for Population and Social Research Mahidol University, 2014). When getting elder, there are aging related change through whole of the body. From previous study, it is noted that with the advancing age, epithelium becomes thinner which cause lesser in protective function for underlying tissue from mechanical, chemical and also thermal stimuli (Abu Eid, Sawair, Landini, & Saku, 2012; Malik, Rathee, & Bhoria, 2015). Also, the collagen production dramatically is decreased and resulted in losing the ability to defense against mechanical force (Huttner, Machado, de Oliveira, Antunes, & Hebling, 2009). Moreover, the immune function is getting worse. This impairment attributed to the risk of infection; bacterial, viral and fungal (Nakasato & Yung, 2011; Behl & Ziegler, 2013).

With this elevating number of the elderly, some of oral diseases including dental caries and periodontal disease, raise in the same direction. These two diseases are major causes of tooth extraction and consequent substitution of the denture (Mack et al., 2004; Agrawal et al., 2015). However, these substitutions become a risk of some oral mucosal lesions which is grouped as denture related lesions (Jainkittivong, Aneksuk, & Langlais, 2010; Mubarak, Hmud, Chandrasekharan, & Ali, 2015). Previous studies illustrate that wearing alone may not cause these lesion. There are variety of factors including type of denture, denture retention and stability (Mubarak, Hmud, Chandrasekharan, & Ali, 2015; Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Turker, Sener, Kocak, Yilmaz, & Ozkan, 2010), denture age (Moskona & Kaplan, 1992; Jagger & Harrison, 1995), denture hygiene (Naik & Pai, 2011) and nocturnal wearing (Compagnoni, Souza, Marra, Pero, & Barbosa, 2007; Emami et al., 2014). Majority of the denture-related lesions are caused by removable dentures and the most common lesion found, is denture-related stomatitis. For fixed denture including crown and bridge, most of the case are allergic contact stomatitis (Emami et al., 2014). As described above, the denture can cause variety of oral mucosal lesions. In Thailand, there are few studies on the prevalence of denture related oral mucosal lesion in the elderly.

Objective

This study aims to evaluate the prevalence of denture relate oral mucosal lesions in elderly patients in Dental Hospital, Naresuan University, Thailand.

Materials and Methods

Our study included 211 subjects whose age was 60 years old or above and attended Dental Hospital, Naresuan University, Thailand, during 2015-2016. This study was approved by Naresuan University Institutional Review Board, IRB number 151/59. All patients would be firstly tested with mini-mental state examination (MMSE) and those who did not pass the test would be excluded from the study.

All subjects will be collected data including age, gender and denture status including type, denture age, denture hygiene, denture retention, denture stability and nocturnal denture wearing. For denture hygiene, this study would obtain only removable denture and divide into 3 grade following Naik and Pai's protocol: good –without soft and hard deposition; fair–less than one third of soft or hard deposition; and poor–over one third of soft or hard deposition (Naik & Pai, 2011). For denture retention, this study would follow Mccord and Grant's protocol: good–no movement in vertical direction and poor–had movement. For denture stability, as same as retention: good–no movement in horizontal direction and poor–had movement (McCord & Grant, 2000).

Intraoral examination would be done after collecting the denture data. Diagnosis would be done following World Health Organization Guideline (1980). Denture-related stomatitis was defined following Newton's classification (1962). Each lesion would be collected only one, in first visit. All variables would be analyzed the association and correlation by using Chi square test and logistic regression analysis, respectively.

Results

In this study included 211 elderly Thai; 147 (69.7%) were 60–69 years and 64 (30.3%) were 70 years or above. Dividing from gender, there 102 (48.3 %) male patient (average ages of 66.71 ± 5.518 years) and 109 (51.7 %) female patient (average ages of 67.54 ± 5.911 years). There were 59 (28.0%) patient who had at least one oral mucosal lesion that related to denture. The distribution of presenting of oral mucosal lesions in related to age group and gender is showed in **Table 1**. There was no association between prevalence of oral mucosal lesion to both age and gender.

Table 1 Prevalence of oral mucosal lesions in distribution between gender and age groups

Age Group	Present of lesion			Not present of lesion		
	Male n = 42 (%)	Female n = 31 (%)	Total n = 73 (%)	Male n = 60 (%)	Female n = 78 (%)	Total n = 138 (%)
60–69	28 (13.3)	20 (32.8)	48 (22.8)	48 (22.7)	51 (24.2)	99 (46.9)
70 or above	14 (6.6)	11 (34.4)	25 (11.8)	12 (5.7)	27 (12.8)	39 (18.5)

Of total 211 of patients, there were 70 (33.2%) denture wearers and the other 141 (66.8%) were not. Among denture wearers, there were 52 (29.8%) removable denture wearers with 81 pieces of removable denture which divided into 3 groups including 53 complete dentures (64.6%), the average denture age was 105.4 ± 174.3 months; 9 removable partial dentures (11.4%), the average denture age was 37.6 ± 48.0 months; and 19 temporary plates (24.0%), the average denture age was 57.2 ± 48.8 months. There were 2 patients who had dental implant fixation (0.9%) and 25 of those who had fixed crown or bridge (11.8%). The distribution of type of denture in upper and lower arch is showed in **Table 2**.

Table 2 Distribution of type of denture

Type of denture	Upper arch (n=60) n (%)	Lower arch (n=48) n (%)
CD	33 (55.0)	19 (39.6)
TP	11 (18.3)	3 (6.3)
RPD	4 (6.7)	5 (10.4)
Crown & bridge	12 (20.0)	17 (35.4)
TP with crown & bridge	2 (3.3)	3 (4.2)
Implant with CD	0 (0)	1 (2.1)
Implant with crown & bridge	0 (0)	1 (2.1)

For denture hygiene, 27 (33.3%) pieces were classified as good, 9 (11.1%) as fair and 45 (55.6%) as poor hygiene, respectively. In our study, there were 31 (38.3%) pieces of denture which had good retention while the rest 50 (61.7%) had poor retention. There were 31 (38.3%) of good stability dentures and 50 (61.8 %) were good stability dentures. Lastly, of total 52 patients who wear removable denture, 33 (63.5%) put it off

during night while the other 19 (36.5%) wore them. Table 3 demonstrated the association between prevalence of denture-related oral mucosal lesions and denture wearing. It showed that denture-related stomatitis and epulis fissuratum had association with denture wearing, $p = 0.001$ and $p = 0.003$, respectively.

Table 3 Association between prevalence of denture-related oral mucosal lesions and denture wearing

Oral mucosal lesion	Denture wearing	
	Yes (n=70) n (%)	No (n=141) n (%)
Traumatic ulcer	12 (17.6)	15 (10.5)
Frictional keratosis	10 (14.7)	13 (9.1)
Denture-related stomatitis†	12 (17.6)	0 (0)
Angular cheilitis	4 (1.5)	4 (2.8)
Epulis fissuratum†	4 (1.5)	0 (0)

† Chi-square test, $p < 0.05$

From 53.8% of patients with denture-related stomatitis wore complete denture, while 46.2% wore partial denture. No difference of causing oral mucosal lesion between types of denture was found. Mean of denture age of those patients who present of denture-related stomatitis was 51.7 ± 53.2 months. Logistic regression analysis for denture-related stomatitis was showed in Table 4. It illustrated that only denture hygiene was correlated to present of the lesion ($p = 0.05$).

Table 4 Logistic regression analysis between denture factors of upper denture wearer and presentation of denture-related stomatitis.

Variable		Denture-related stomatitis presentation				
		N	OR	95% CI		p-value
				Lower	Upper	
Denture hygiene	Good and fair (Ref)	24	25.73	1.004	660.105	0.050
	Poor	26				
Nocturnal wearing (upper arch)	No (Ref)	31	10.66	0.933	121.746	0.057
	Yes	19				
Denture stability	Good (Ref)	29	0.07	0.003	1.646	0.099
	Poor	21				
Denture retention	Good (Ref)	24	0.23	0.015	3.423	0.285
	Poor	26				

Discussion and Conclusion

In this present study, the prevalence denture related oral mucosal lesion is 28.0 %, as same as the others. Previously studies reported the prevalence of denture-related oral mucosal lesion with the range of 20.5-71.8% (Huttner, Machado, de Oliveira, Antunes, & Hebling, 2009; Jainkittivong, Aneksuk, & Langlais, 2010; Mubarak, Hmud, Chandrasekharan, & Ali, 2015; Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Taheri, Torabi-Parizi, Karimi-Afshar, Haghani, & Taheri,

2016). The variation of the result may attribute to difference of the participant's characteristic such as socioeconomic status and denture wearing style.

In this study, oral mucosal lesions were found in only those who wore removable dentures which share the same result with other reports (Jainkittivong, Aneksuk, & Langlais, 2010). This may related by the removable denture had more risk factors than fixed denture including percentage of soft tissue covering and denture fitting, so it prone to cause oral mucosal lesions.

Three most common lesions, sort descending, are traumatic ulcer (12.8%), frictional keratosis (10.9%) and denture-related stomatitis (5.7%), respectively. This result shares the same direction with other studies that report the commonly found of traumatic ulcer and denture-related stomatitis (Jainkittivong, Aneksuk, & Langlais, 2010; Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Taheri, Torabi-Parizi, Karimi-Afshar, Haghani, & Taheri, 2016). Frictional keratosis is also the common lesion which found in denture wearer (Jainkittivong, Aneksuk, & Langlais, 2010), but because of different in methodology, some study doesn't include it. In our study, there were 2 lesions which associated with denture wearing including denture-related stomatitis and epulis fissuratum.

From 211 randomly selected elderly, the prevalence of denture-related stomatitis was found to be only 5.7% which quite lesser than other studies which report of 14.0-58.2% (Jainkittivong, Aneksuk, & Langlais, 2010; Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Taheri, Torabi-Parizi, Karimi-Afshar, Haghani, & Taheri, 2016). Nevertheless, from our study showed the lesser of percentage compared with the others, this may related to, in Thailand, some edentulous patient with poor socioeconomic status refused to wear dentures.

Moreover, denture-related stomatitis was correlated with denture hygiene, while the rest others were not. This result may conform to other finding that denture-related stomatitis has multifactorial cause including nutritional deficiency, trauma and infection (Glick, 2015; Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Jagger & Harrison, 1995; Compagnoni, Souza, Marra, Pero, & Barbosa, 2007). Food debris in poor-hygiene-denture would be a great source of fungus and other microorganism to grow. From above statement, although our study showed that types of denture were not significantly associated with denture-related stomatitis, we suggested that complete denture has more tissue-covering-surface than partial denture, they might have higher risk of causing denture-related stomatitis.

In addition, from previously studies shows association between denture-related stomatitis and denture age which show variety of time cut point ranged from 60-120 months (Martori, Ayuso-Montero, Martinez-Gomis, Viñas, & Peraire, 2014; Jagger & Harrison, 1995; Taheri, Torabi-Parizi, Karimi-Afshar, Haghani, & Taheri, 2016). In our study, mean of denture age was 51.7 ± 53.2 months which were much lesser than those reports. This implies that denture-related stomatitis can occur in denture wearer independently from duration of using it.

As having described above, epulis fissuratum also shows association with denture wearing. Because of little of its prevalence, we did not analyze it using logistic regression. However, from observation, epulis fissuratum was found in merely those who had poor stability and retention. This finding can be describe by it etiology, that epulis fissuratum caused by chronic mechanical irritation from ill-fitting denture (Glick, 2015; Taheri, Torabi-Parizi, Karimi-Afshar, Haghani, & Taheri, 2016).

The limitation of this study are lacking of data in socioeconomic status, systemic disease, medication usage, hyposalivation, and type of denture damage. Further study with this data would help clarifying more on picture of denture-related oral mucosal lesions among the geriatric.

In conclusion, denture wearing can cause several of oral mucosal lesions in the elderly population. Various causative denture factors are specific among the individual denture-related mucosal lesions. This study showed that the important factor of causing denture-related stomatitis is denture hygiene, while other factors may play role as contributing factor.

Acknowledgement

This research was supported by Faculty of Dentistry, Naresuan University. The authors would like to thank Associate Professor Pensri Phothipakdee, Faculty of Dentistry, Khon Kaen University; Assistant Professor Dr. Patcharaphol Samnieng, Faculty of Dentistry, Naresuan University; Dr. Jadesada Palasuk, Faculty of Dentistry, Naresuan University, for valuable discussion.

References

- Abu Eid, R., Sawair, F., Landini, G., & Saku, T. (2012). Age and the architecture of oral mucosa. *Age*, 34(3), 651-658.
- Agrawal, R., Gautam, N. R., Kumar, P. M., Kadhiresan, R., Saxena, V., & Jain, S. (2015). Assessment of Dental Caries and Periodontal Disease Status among Elderly Residing in Old Age Homes of Madhya Pradesh. *Journal of International Oral Health*, 7(8), 57-64.
- Behl, C., & Ziegler, C. (2013). *Cell Aging: Molecular Mechanisms and Implications for Disease*. Springer Berlin Heidelberg.
- Compagnoni, M. A., Souza, R. F., Marra, J., Pero, A. C., & Barbosa, D. B. (2007). Relationship between Candida and nocturnal denture wear: quantitative study. *Journal of Oral Rehabilitation*, 34(8), 600-605.
- Emami, E., Nguyen, P. T., Almeida, F. R., Feine, J. S., Karp, I., Lavigne, G., & Huynh, N. (2014). The effect of nocturnal wear of complete dentures on sleep and oral health related quality of life: study protocol for a randomized controlled trial. *Trials*, 15(358), 1745-6215.
- Freitas, J. B., Gomez, R. S., De Abreu, M. H. N. G., & Ferreira E Ferreira, E. (2008). Relationship between the use of full dentures and mucosal alterations among elderly Brazilians. *Journal of Oral Rehabilitation*, 35(5), 370-374.
- Glick, M. (2015). *Burket's Oral Medicine, 12e*. People's Medical Publishing House USA.
- Huttner, E. A., Machado, D. C., de Oliveira, R. B., Antunes, A. G., & Hebling, E. (2009). Effects of human aging on periodontal tissues. *Special Care in Dentistry*, 29(4), 149-155.
- Institute for Population and Social Research Mahidol University, Population Aging in Thailand, [http:// www.ipsr.mahidol.ac.th](http://www.ipsr.mahidol.ac.th). Accessed 01.05.16.
- Jagger, D. C., & Harrison, A. (1995). Denture cleansing--the best approach. *British Dental Journal*, 178(11), 413-417.
- Jainkittivong, A., Aneksuk, V., & Langlais, R. P. (2010). Oral mucosal lesions in denture wearers. *Gerodontology*, 27(1), 26-32.

- Mack, F., Mojon, P., Budtz-Jorgensen, E., Kocher, T., Splieth, C., Schwahn, C. et al. (2004). Caries and periodontal disease of the elderly in Pomerania, Germany: results of the Study of Health in Pomerania. **Gerodontology**. 21(1), 27-36.
- Malik, P., Rathee, M., & Bhoria, M. (2015). Oral tissues - Considerations in geriatric patients. **International Journal of Applied Dental Sciences**. 1(3), 4-7.
- Martori, E., Ayuso-Montero, R., Martinez-Gomis, J., Viñas, M., & Peraire, M. (2014). Risk factors for denture-related oral mucosal lesions in a geriatric population. **The Journal of Prosthetic Dentistry**. 111(4), 273-279.
- McCord, J. F., & Grant, A. A. (2000). Clinical assessment *British Dental Journal*. (Vol. 188, pp. 375-380).
- Moskona, D., & Kaplan, I. (1992). Oral lesions in elderly denture wearers. **Clinical Preventive Dentistry**. 14(5), 11-14.
- Mubarak, S., Hmud, A., Chandrasekharan, S., & Ali, A. A. (2015). Prevalence of denture-related oral lesions among patients attending College of Dentistry, University of Dammam: A clinico-pathological study. **Journal of International Society of Preventive and Community Dentistry**. 5(6), 506-512.
- Naik, A. V., & Pai, R. C. (2011). A Study of Factors Contributing to Denture-related stomatitis in a North Indian Community. **International Journal of Dentistry**. 2011, 1-4.
- Nakasato, Y., & Yung, R. L. (2011). **Geriatric Rheumatology: A Comprehensive Approach**: Springer New York.
- Pachava, K. R., Shenoy K, K., Nadendla, L. K., & Reddy, M. R. (2013). Denture-related stomatitis - A Review. **Indian Journal of Dental Advancements**. 5(1), 1107-1112.
- Taheri, S., Torabi-Parizi, M., Karimi-Afshar, M., Haghani, J., & Taheri, A. (2016). Denture-related oral mucosal lesions among removable denture wearers referred to clinics of Kerman, Iran. **Journal of Oral Health and Oral Epidemiology**. 5(2), 78-83.
- Turker, S. B., Sener, I. D., Kocak, A., Yilmaz, S., & Ozkan, Y. K. (2010). Factors triggering the oral mucosal lesions by complete dentures. **Archives of Gerontology and Geriatrics**. 51(1), 100-104.
- UN, Department of Economic and Social Affairs. (2015). **Population Division**. World Population Ageing, 2015. New York, pp.9.
- World Health Organization (1980). Guide to epidemiology and diagnosis of oral mucosal diseases and conditions. **Community Dentistry and Oral Epidemiology**. 8, 1-26.