# Clinical Assessment and Patients' Satisfaction of Denture Adhesive Usage among Complete Denture Wearers

# การประเมินผลทางคลินิกและความพึงพอใจในการใช้กาวติดฟันเทียมของผู้ป่วยฟันเทียมทั้งปาก

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**ABSTRACT**

The purpose of this study was to assess the difference of oral condition and patients' satisfaction of denture adhesive usage in complete denture wearers. Forty complete denture wearer participants were recruited in this study. At T0, all participants were assessed oral condition and overall patients' satisfaction score, and were instructed to use a denture adhesive consecutively for 1 month. After 1 month, at T1, all participants were assessed satisfaction score, and were asked to choose whether they want to continue using (Group U) or stop using (Group NU) a denture adhesive. At T2, all participants from both groups were recalled again after 1 month for satisfaction score assessment. The results showed that the denture quality between Group U and Group NU were significantly different ($p$<0.05, Chi-square test). Group U had significantly improved overall patients' satisfaction score over the study period, while Group NU was no significant difference in overall patients' satisfaction score among time interval (T0, T1, and T2).

**บทคัดย่อ**

การศึกษานี้มีวัตถุประสงค์เพื่อศึกษาความแตกต่างของสภาวะช่องปากและความพึงพอใจในการใช้กาวติดฟันเทียมในผู้ป่วยฟันเทียมทั้งปาก ผู้ป่วยฟันเทียมทั้งปากจำนวน 40 คนได้เข้าร่วมการศึกษานี้ โดยครั้งแรก (T0) ได้รับการตรวจช่องปากและสอบถามคะแนนความพึงพอใจโดยรวมต่อฟันเทียม จากนั้นผู้ป่วยจะถูกแนะนำให้ใช้กาวติดฟันเทียมทุกวันเป็นเวลา 1 เดือน แล้วผู้ป่วยจะถูกสอบถามคะแนนความพึงพอใจโดยรวมต่อฟันเทียมอีกครั้ง(T1)และให้เลือกว่าจะใช้กาวติดฟันเทียมต่อ (กลุ่ม U) หรือหยุดใช้กาวติดฟันเทียม (กลุ่ม NU) ในครั้งที่สาม (T2) ผู้ป่วยทั้งหมดจะถูกเรียกกลับมาสอบถามคะแนนความพึงพอใจอีกครั้งภายหลังจากเวลาผ่านไป 1 เดือน ผลการศึกษาพบว่า กลุ่มที่เลือกใช้กาวติดฟันเทียมและกลุ่มที่ไม่เลือกใช้กาวติดฟันเทียมมีคุณภาพของฟันเทียมทั้งปากที่แตกต่างกันอย่างมีนัยสำคัญทางสถิติ ($p$<0.05 สถิติไคสแควร์) โดยกลุ่มที่เลือกใช้กาวติดฟันเทียมมีคะแนนความพึงพอใจโดยรวมต่อฟันเทียมมากขึ้นอย่างมีนัยสำคัญทางสถิติตลอดระยะการศึกษา ในขณะที่กลุ่มที่ไม่เลือกใช้กาวติดฟันเทียมไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติของคะแนนความพึงพอใจโดยรวมต่อฟันเทียม

**Keywords:** Complete denture, Denture adhesive, Satisfaction

**คำสำคัญ:** ฟันเทียมทั้งปาก กาวติดฟันเทียม ความพึงพอใจ

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**Introduction**

The conventional complete denture is one of the treatment of choice for completely edentulous patients. Successful treatment can be determined by objective functional assessments and patients' satisfaction with their prostheses (Carlsson et al.,2010). However, in some clinical situations even if all treatment procedures have been done correctly, patients might not be satisfied with their dentures. Implant is usually used to support and retain complete denture to increase patient's sastisfaction (Feine et al., 2002). Nevertheless, most edentulous patients cannot receive implant-retained overdentures due to their limited systemic condition and/or financial status (Narby et al., 2008). Therefore, denture adhesives may be an alternative option to improve oral function and patient confidence in using a complete prosthesis (Adisman, 1989; Grasso, 1996; Coates, 2000).

A denture adhesive is defined as a material used to enhance adhesion of a denture to the oral mucosa (Glossary of Prosthodontic, 2005). There are many available commercial denture adhesives, formulated as creams, powders, pads/wafers and strips. The mode of action is provided by an interface which forms a retentive force between the denture base and patient's denture-supporting tissue, when adhesive, saliva and oral fluids combine (Adisman, 1989). The duration of action ranges from 3 - 12 hours, based on the formulation of the adhesive and the patient's subjective assessment (Kulak et al., 2005; Uysal et al., 1998).

The effectiveness of denture adhesives in complete denture wearers has been investigated from the perspective of objective and subjective assessments (Kapur, 1967; Gonçalves et al., 2014). Clinical studies showed that adhesives enhance retention and stability (Kapur, 1967; Munoz et al., 2012; Pradies et al., 2009), and objectively assessed masticatory efficacy (Gonçalves et al., 2014; Wang et al., 2010). The results of patient-based outcome studies showed that patients' satisfaction can be improved after using a denture adhesive (Kulak et al., 2005; Munoz et al., 2012). In Thailand, complete denture wearers can purchase denture adhesives over-the counter. An adhesive is not necessary for every complete denture wearer, and using it unnecessarily without prescription from the dentist may be a waste of money. However, there are no studies reporting the difference of oral condition and patient's satisfaction in complete denture wearers who choose to use or not use a denture adhesive.

**Objectives of the study**

The aims of the study were to evaluate the difference of oral condition and patients' satisfaction in complete denture wearers who choose to use or not use a denture adhesive, in terms of denture-supporting tissue, denture quality, and overall patients' satisfaction in their prostheses. The null hypothesis was that there was no difference in oral condition and patient's satisfaction between complete denture wearers who choose to use and those who choose not to use a denture adhesive.

**Methodology**

Forty totally edentulous patients, using both maxillary and mandibular conventional complete dentures were recruited. The dentures were made by undergraduate and postgraduate students in the Prosthodontics clinic at the Faculty of Dentistry, Chulalongkorn University, and were used at least 6 months before the time of assessments. The

study protocol was approved by the Research Ethics Committee of Chulalongkorn University (No. 029/ 2017). Written informed consent was obtained from each participant after a detailed explanation of the study.

Age and gender were recorded for socio-demographic purposes. Prostheses age and the experience of using a complete denture were collected as a denture history. The condition of the denture-supporting tissue was classified according to the American College of Prosthodontics (ACP) classification system for the completely edentulous (Classes I - IV) (McGarry et al., 1999). The quality of each maxillary and mandibular denture was evaluated and scored separately for retention and stability using Kapur's method (Kapur, 1967). For the retention score, 0 represented no retention, 1 represented minimum resistance to a vertical displacement force, 2 represented moderate resistance to a vertical displacement force, and 3 represented maximum resistance to vertical and lateral displacement forces (4-point scale). For the stability score, 0 represented no stability, 1 represented a moderate rocking on the denture-supporting structures under pressure, and 2 represented slight or no rocking on denture-supporting structures under pressure (3-point scale). The summative score of retention and stability for each denture separately was calculated (maximum score 5). The sum score of a set of maxillary and mandibular dentures (maximum score 10) defined its clinical rating as good (sum score of > 8), fair (sum score of 6-8), and poor (sum score of < 6). The condition of denture supporting tissue and denture quality were evaluated by one experienced examiner. Intra-individual reliability of the examiner was performed by repeating the assessment at two different visits. The agreement in intra-individual reliability was tested using cronbach's alpha coefficients ($\alpha$).

At the beginning of the study (T0), each participant was asked to rate overall satisfaction in their prostheses using a five-point Likert scale (Celebic et al., 2003) by one interviewer [1 = not at all satisfied, 2 = slightly satisfied, 3 = moderately satisfied, 4 = very satisfied, and 5 = extremely satisfied]. After the satisfaction interviews, participants were instructed to apply a denture adhesive (Polident®, GlaxoSmithKline, Dublin, Ireland) according to the spot method described by Grasso (Grasso, 2004), onto the tissue surface of the maxillary and mandibular dentures daily for a period of 1 month. After 1 month (T1), all participants were interviewed again using the same criteria as at T0, and were asked to choose whether they want to continue using or stop using the denture adhesive. All participants were divided into two groups, which were continue using denture adhesive group (Group U) and stop using denture adhesive group (Group NU). At the end of the evaluation period (T2), one month after the second visit (T1), all participants from both groups were asked again for overall satisfaction.

The data were analyzed with the Statistical Package for the Social Sciences (SPSS program v22.0; SPSS, Chicago, IL). For all statistical analyses, a $p$-value < 0.05 was considered significant. Chi-square test was used to assess condition of denture-supporting tissue and denture quality between Group U and Group NU. The Mann-Whitney U test was used to compare overall patient's satisfaction score between Group U and Group NU. The Wilcoxon signed-rank test was used to determine overall patient's satisfaction score within Group U and Group NU among time interval (T0, T1, and T2).

**Results**

Table 1 shows the socio-demographic data and oral health status in Group U and Group NU. Group U consisted of 21 participants (16 males and 5 females; mean age 69.08±6.54 years old), and Group NU consisted of 19 participants (11 males and 8 females; mean age 69.20±6.59 years old). There was no significant difference between mean age of the two groups. The participants who had a complete denture experience in Group U was 42.86% and Group NU was 52.63%, and the mean age of complete denture was 2.20±1.61 years and 2.17±1.67 years, respectively. There was no significant difference between mean complete denture age between two groups. The denture quality between Group U and Group NU were significantly different ($p$ = 0.019), while the condition of denture-supporting tissue between two groups was not different ($p$ = 0.102).

**Table 1** Socio-demographics and oral health status data in complete denture wearers who choose to continue (Group U) and stop (Group NU) using a denture adhesive presented in number and percentage

| | **Group U (n =21)** | **Group NU (n =19)** | ***p*-Value** |
|---|---|---|---|
| **Gender** | | | |
| Males | 16 (76.19) | 11 (57.89) | |
| Females | 5 (23.81) | 8 (42.11) | |
| **Age, years** [mean (SD)] | 69.08 (6.54) | 69.20 (6.59) | 0.447 |
| **Complete denture experience** | | | |
| Yes | 9 (42.86) | 10 (52.63) | |
| No | 12 (57.14) | 9 (47.37) | |
| **CD age, years** [mean (SD)] | 2.20 (1.61) | 2.17 (1.67) | 0.694 |
| **Denture-supporting tissue (ACP classification)** | | | 0.102 |
| Class I | 6 (28.57) | 4 (21.05) | |
| Class II | 7 (33.33) | 13 (68.4) | |
| Class III | 6 (28.57) | 1 (5.26) | |
| Class IV | 2 (9.52) | 1 (5.26) | |

**Table 1** Socio-demographics and oral health status data in complete denture wearers who choose to continue (Group U) and stop (Group NU) using a denture adhesive presented in number and percentage (Cont.)

| | Group U (n =21) | Group NU (n =19) | *p*-Value |
|---|---|---|---|
| **Denture quality** | | | 0.019* |
| Good complete denture | 6 (28.57) | 13 (68.42) | |
| Fair complete denture | 12 (57.14) | 3 (15.79) | |
| Poor complete denture | 3 (14.29) | 3 (15.79) | |

*Note: * means significantly different*

Mean (SD) of overall patients' satisfaction score in Group U and Group NU are shown in Table 2. At T0, mean overall patients' satisfaction score of the prostheses was significantly different ($p = 0.002$) between Group U (3.48±0.98) and Group NU (4.47±0.77). For Group U, overall patients' satisfaction score was significantly different ($p < 0.001$) among time interval at T0 (3.48±0.98), T1 (4.19±0.60), and T2 (4.62±0.59). The result showed that overall patients' satisfaction score improved in Group U over the study period. In Group NU, there was no significant difference in mean overall patients' satisfaction score among time interval at T0, T1, and T2. There was no significant difference in overall patients' satisfaction score between Group U and Group NU at T1 and T2, respectively.

**Table 2** Mean (SD) of patient's satisfaction score in their prostheses in complete denture wearers who choose to continue (Group U) and stop using (Group NU) a denture adhesive at T0, T1, and T2

| | Group U (n =21) | Group NU (n =19) | *p*-Value |
|---|---|---|---|
| **T0** | 3.48 (0.98) | 4.47 (0.77) | 0.002* |
| **T1** | 4.19 (0.60) | 4.05 (0.97) | 0.815 |
| **T2** | 4.62 (0.59) | 4.47 (0.70) | 0.515 |
| ***p*-Value** | < 0.001* | 0.273 | |

*Note: * means significantly different*

**Discussion and Conclusions**

The aim of this study was to evaluate the oral condition and overall patients' satisfaction in their prostheses in complete denture wearers who choose to use or not use a denture adhesive. The study protocol was designed to assess the condition of denture-supporting tissue, denture quality, and overall satisfaction in the prostheses. Prior to

the study, participants had been assessed condition of denture-supporting tissue and denture quality by only one experienced examiner. Intra-individual reliability of the examiner was very good in the assessment of the denture-supporting tissue ($\alpha$= 1.00) and the denture quality ($\alpha$ = 0.88). The condition of denture-supporting tissue was determined by ACP classification. Most clinical studies (Niwatcharoenchaikul et al., 2014; Fitzpatrick, 2006) had also use this standard guideline. This guideline is an effective screening tool, because it has been developed based on diagnostic findings on oral cavity (McGarry et al., 1999). It can be useful in dental school for professional communication. Kapur's method was used to evaluate denture quality, that has been reported in other studies (Kapur, 1967; Niwatcharoenchaikul et al., 2014).

Group U and Group NU had no difference in mean age and mean denture age. The results showed no difference in the condition of denture-supporting tissue between Group U and Group NU due to a small sample size. It is a limitation of this study in evaluating the difference of denture-supporting tissue between two groups. There was a significant difference in the denture quality between two groups ($p$ = 0.019). The null hypothesis of no difference in denture quality between the two groups is therefore rejected. Berg E. (1988) reported that a mandibular denture was an important factor for overall denture acceptance due to the anatomy and oral structure in mandibular area (Fitzpatrick, 2006).

The reason that the overall satisfaction score at T0 in Group U was lower than that in Group NU is because the denture quality. The fair and poor denture quality have more tendency for patients to choose to use a denture adhesive. This finding was consistent to the finding in the other study (Celebic et al., 2003), which reported that quality of denture had an effect on patients' satisfaction. Previous clinical studies have shown that a denture adhesive improved patients' satisfaction with complete dentures (Kulak et al., 2005; Munoz et al., 2012). In this study, Group U had an increased overall satisfaction in their prostheses score after using a denture adhesive at T1 and T2, compared to T0. After using a denture adhesive, Group U showed satisfaction score in their prostheses in the similar level to those of Group NU at T1 and T2. Many studies found that a denture adhesive enhanced the retention and stability of dentures (Kapur, 1967; Munoz et al., 2012; Pradies et al., 2009), reduced the movement of dentures during function and reduced the tendency of food particles accumulate under the denture (Gonçalves et al., 2014).

In this study, we used clinical assessment and overall patients' satisfaction score to evaluate the difference in complete denture wearers who choose to use or not use a denture adhesive. Analysis of the results suggest that quality of the denture and overall patients' satisfaction with their prostheses can be used as a valid measurement. It is important to note that the design of study led participants use a denture adhesive at no cost, which may be a limitation of the study. Additional studies should be evaluating the association of denture quality and condition of denture-supporting tissue between Group U and Group NU. Oral health related quality of life should be beneficial to evaluate and compare between two groups. Although a denture adhesive improved patients' acceptance of prostheses, periodic recall for possible adjustment remains an essential for complete denture wearers.

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