

Comparisons of Esthetic Perceptions of Smiles with Various Gingival Displays between Orthodontists and Lay People in Chiang Mai Province

การเปรียบเทียบการยอมรับความสวยงามของภาวะยิ้มเห็นเหงือก ระดับต่างๆ ระหว่างทันตแพทย์จัดฟันและบุคคลทั่วไป ในจังหวัดเชียงใหม่

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บทคัดย่อ

การศึกษานี้มีวัตถุประสงค์เพื่อเปรียบเทียบการยอมรับในความสวยงามของภาวะยิ้มเห็นเหงือก ของทันตแพทย์จัดฟันและบุคคลทั่วไปในจังหวัดเชียงใหม่ กลุ่มผู้ประเมินประกอบด้วย ทันตแพทย์จัดฟันจำนวน 25 คน (ชาย 11 คน, หญิง 14 คน) อายุเฉลี่ย 40.56 ± 11.40 ปี และบุคคลทั่วไปจำนวน 98 คน (ชาย 48 คน, หญิง 50 คน) อายุเฉลี่ย 20.92 ± 2.06 ปี กลุ่มตัวอย่างได้ทำการประเมินภาพถ่ายสีทางด้านหน้า ของรอยยิ้มจำนวน 7 แบบ แต่ละแบบ มีระดับของเหงือกที่เห็นแตกต่างกัน ตั้งแต่ 0.0-6.0 มิลลิเมตร กลุ่มตัวอย่างเลือกภาพ ที่มีระดับของการเห็นเหงือกที่ตนเองยอมรับได้ โดยสามารถ เลือกได้มากกว่า 1 แบบ จากนั้น ข้อมูลที่เก็บได้ถูกวิเคราะห์โดยใช้สถิติ Chi-square ผลการศึกษาพบว่า ทันตแพทย์จัดฟันยอมรับในความสวยงาม ของภาวะยิ้มเห็นเหงือก ที่ระดับ 1.0 มิลลิเมตร มากที่สุด (ร้อยละ 100) และ ที่ระดับ 5.0 และ

Abstract

The aim of this study was to compare the perceptions of the esthetics of smiles with various gingival displays between orthodontists and lay people in Chiang Mai, Thailand. Two groups of subjects were chosen. The first group consisted of 25 orthodontists, 11 males and 14 females (mean age 40.56 ± 11.40 years); the second group consisted of 98 lay people, 48 males and 50 females (mean age 20.92 ± 2.06 years). Seven photographs of a smile, each with a different degree of gingival display ranging from 0.0 to 6.0 mm, were presented to the subjects, who were asked to identify the aesthetically acceptable smiles. The frequency of each photograph selection was recorded. A Chi-square test was performed to compare the perceptions of

6.0 มิลลิเมตร น้อยที่สุด (ร้อยละ 4.0) ในขณะที่บุคคลทั่วไปยอมรับในความสวยงาม ของภาวะยิ้มเห็นเหงือก ที่ระดับ 0.0 มิลลิเมตร มากที่สุด (ร้อยละ 83.7) และ ที่ระดับ 5.0 และ 6.0 มิลลิเมตร น้อยที่สุด (ร้อยละ 1.0) เมื่อเปรียบเทียบความคิดเห็นของทั้งสองกลุ่ม พบว่า ไม่มีความแตกต่างอย่างมีนัยสำคัญทางสถิติ ในการยอมรับในความสวยงามของการยิ้มเห็นเหงือก ระหว่าง ทันตแพทย์จัดฟันและบุคคลทั่วไป ($p < 0.05$) สรุปได้ว่า ทันตแพทย์จัดฟันยอมรับในความสวยงามจากภาวะยิ้มเห็นเหงือก ไม่แตกต่างจากบุคคลทั่วไป

คำไขหรัส: ภาวะยิ้มเห็นเหงือก

the two groups. The results showed that the most acceptable smiles for orthodontists and lay people were the smiles with gingival displays of 1.0 (100%) and 0.0 (83.7%) mm, respectively, whereas the least acceptable smiles were the smiles with gingival displays of 5.0 and 6.0 mm, for both orthodontists (4.0%) and lay people (1.0%) groups. There was no statistically significant difference in the perception of the esthetics of gingival display between orthodontists and lay people ($p < 0.05$). In conclusion, the present study revealed that the perception of smiles with gingival display between orthodontists and lay people were not different.

Key words: smile, gingival display

Introduction

The smile is the first impression we get of a person.⁽¹⁾ Smile esthetics is one of the objectives of orthodontic treatment about which both orthodontists and lay people are always concerned. Smile analysis is used in orthodontic diagnosis and treatment planning. Smile esthetics is a combination of every feature of the lips, consisting of the lip line, smile arc, upper lip curvature, lower lip curvature, buccal corridor, smile symmetry, frontal occlusal plane and dental and gingival components.⁽²⁾ One of the most important aspects of smile esthetics is the gingival display.

A smile with excessive gingival display, or gummy smile, is a smile in which the lip line is 2.0 mm higher than the cervical part of the upper incisors.⁽¹⁾ On average, females have higher lip lines than do males.^(3,4) Furthermore a smiles with gingival display are more acceptable in females.⁽³⁾

Recently, many studies have investigated the perception of lay people of smiles with gingival

display. Silvia and Wasserstein⁽⁵⁾ and Hunt *et al.*⁽⁶⁾ found that lay people could accept smiles with gingival display between 0.0 and 1.0 mm and between 0.0 and 2.0 mm, respectively.

Although many orthodontists consider a smile with gingival display as undesirable, patients might not perceive it as a problem.⁽⁷⁾ Thus, it would be interesting to study the social aspects of subjects who have smiles with gingival display.

The objective of the present study was to compare the perceptions of the esthetics of smiles with gingival display between orthodontists and lay people in Chiang Mai, Thailand. In addition, the perceptions of males and females in the aspect of smiles esthetics were evaluated.

Materials and Methods

Two groups of subjects were chosen for this study. The first group consisted of 25 orthodontists, 11 males and 14 females (mean age 40.56 ± 11.40 years); the second group consisted of 98 lay

people, 48 males and 50 females (mean age 20.92 ± 2.06 years).

A photograph of one smile was produced of a person who had an Angle's Class I molar relationship with normal overjet and overbite, symmetrical smile with gingival display of 6.0 mm, no physiologic or pathologic attrition, upper incisal line coincident with the border of lower lip, occlusal frontal plane parallel to the horizontal plane and harmoniously integrated dental and gingival components. The smile photograph was exposed using a digital camera (Nikon D100®) with the smile in the position of the highest lip line (Figure 1a-b). Thereafter, the Photoshop® program was used to modify the smile (Figure 2). The upper lip level was adjusted and seven photographs were produced with seven levels of gingival display, which were 0.0, 1.0, 2.0, 3.0, 4.0, 5.0 and 6.0 mm, respectively (Figure 3a-g).

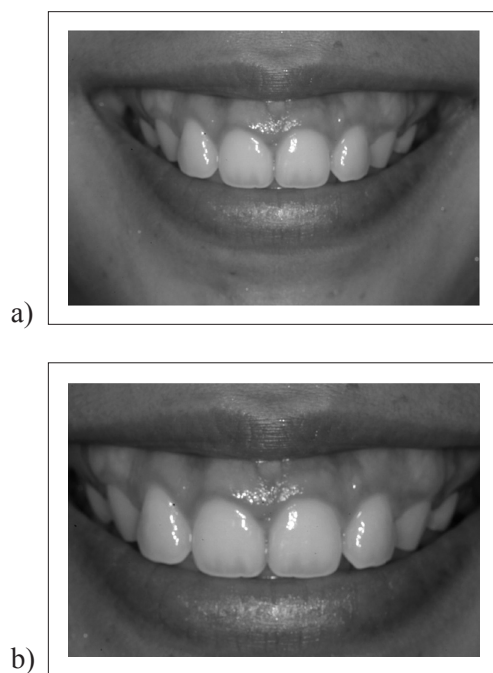


Figure 1: a) Original photograph of smile with gingival display, b) Photograph modified by cropping and moving upper lip over gingiva and teeth.



Figure 2: The upper lip was cropped and repositioned vertically at various levels of gingival display.

All photographs were color printed on 2.5 x 3.0 inches (width x height) Kodak® paper. The smile photographs were shuffled and randomly presented to the lay people and orthodontist subjects, who were asked to choose the aesthetically acceptable smiles. The subjects were free to choose more than one photograph. In addition, each subject was asked to complete a questionnaire requesting personal, demographic information, their orthodontic history, and satisfaction with his or her own smile.

Reliability

Two weeks after the first assessment, twenty-five percent of both orthodontists and lay people were asked to reassess the aesthetically acceptable smiles. A Kappa test was used to compare the first and second assessments.

Statistical analysis

The frequency of selection of each photograph was recorded. Data analysis was performed using the Statistical Package for the Social Sciences (SPSS Inc, Chicago, IL, USA). The Pearson Chi-square test was used to compare the perceptions between orthodontists and lay people as well as between males and females.

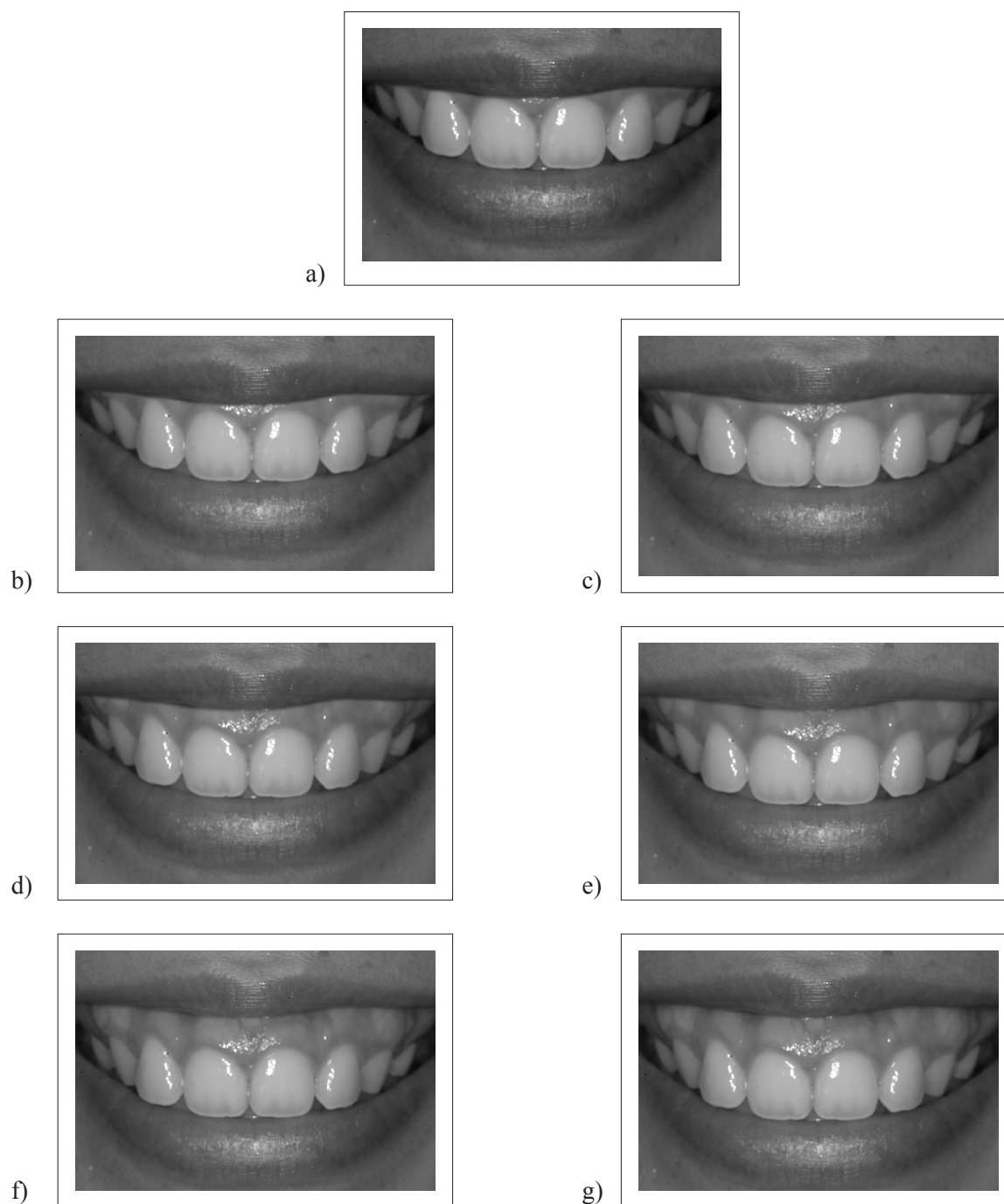


Figure 3: Modified Photographs of smile with gingival display: a) 0.0 mm, b) 1.0 mm, c) 2.0 mm, d) 3.0 mm, e) 4.0 mm, f) 5.0 mm, g) 6.0 mm.

Results

In order to perform the reliability test, eight orthodontists and 22 lay people were randomly selected for the second assessment. The Kappa values for the perception of orthodontists and lay people were 0.832 and 0.826 respectively

($p < 0.001$). These were high levels of reliability in assessment of the smiles.

The descriptive results showed that the most acceptable smiles for orthodontists were 1.0 mm (100%) and 0.0 mm (96.0%) and for lay people were the smiles with gingival display of 0.0

(83.7%) and 1.0 (82.7%) mm respectively, whereas the least acceptable smiles were the smiles with gingival display of 5.0 and 6.0 mm for both orthodontists (4.0%) and lay people (1.0%) groups (Table 1).

When the frequency of acceptance of smile by the lay people and the orthodontist groups were compared, the results of the Pearson Chi-square / likelihood ratio indicated that there was no statistically significant difference in the perception of the aesthetics of gingival display between orthodontists and lay people ($\chi^2 = 17.66$, degree of freedom = 19, $P = 0.52$) (Table 1).

Table 1 Numbers and percentages of acceptance of smiles at various levels of gingival display in lay people and orthodontist groups.

Level of gingival display (mm)	Lay people		Orthodontist	
	Amount of acceptance (Number of persons)	Percentage (%)	Amount of acceptance (Number of persons)	Percentage (%)
0.0	82	83.7	24	96.0
1.0	81	82.7	25	100.0
2.0	49	50.0	17	68.0
3.0	19	19.4	8	32.0
4.0	3	3.1	3	12.0
5.0	1	1.0	1	4.0
6.0	1	1.0	1	4.0

*Pearson Chi-square : $p < 0.05$

The perceptions of males and females regarding smile esthetics with different amount of gingival display are shown in Table 2. The most acceptable smiles for the male group fell at the levels of gingival display of 0.0 mm (88.1%) and 1.0 mm (86.4%). As with the male group, the most acceptable smiles for the female group fell at the levels of gingival display of 1.0 mm (85.9%) and 0.0 mm (84.4%). The smiles with gingival display of 5.0 and 6.0 mm were the least accepted for both males (1.7%) and females (1.6%). The statistical analysis found that there was no difference in perception regarding smile esthetics between the two groups.

Discussion

The results showed that the majority of orthodontists and lay people accepted smiles with gingival display of less than 1.0 mm, which was in agreement with earlier studies.^(5,6) The photographs of smiles with higher gingival display were less accepted. Therefore, it could be inferred that the amount of gingival display when smiling influences orthodontists' and lay people's perceptions of beautiful smiles.

Table 2 Acceptances of smiles at various levels of gingival display classified by gender

Level of gingival display (mm)	Male		Female		Total	
	Amount of acceptance (Number of persons)	Percentage (%)	Amount of acceptance (Number of persons)	Percentage (%)	Amount of acceptance (Number of persons)	Percentage (%)
0.0	52	88.1	54	84.4	106	86.2
1.0	51	86.4	55	85.9	106	86.2
2.0	31	52.5	35	54.7	66	53.7
3.0	13	22.0	14	21.9	27	22.0
4.0	5	8.5	1	1.6	6	4.9
5.0	1	1.7	1	1.6	2	1.6
6.0	1	1.7	1	1.6	2	1.6

*Pearson Chi-square : $p < 0.05$

Several studies found differences in esthetic perception of smiles with gingival display between orthodontists and lay people.⁽⁷⁾ Because of the specialized experience of orthodontists, it should be expected that orthodontists would accept smiles with gingival display less than would lay people. Kokich et al. found that lay people considered smiles with gingival display exceeding 4.0 mm as unattractive, whereas, orthodontist rated 2.0 mm of gingival display as excessive and unattractive.⁽⁷⁾ However, our results showed that there was no statistically significant difference between the two groups. The higher the smile line, the less acceptances for both orthodontists and lay people. It means both groups give higher value to a lower level of gingival display when considering the beauty of a smile. Therefore, orthodontists should pay attention to this point and communicate with patients to make an agreement about the aims of treatment before starting treatment.

The relationship between gender and smile perception have been discussed in several studies. Smiles with gingival display were found almost twice as often in females as in males.⁽⁸⁾ In addition, Silvia and Wasserstein⁽⁵⁾ indicated that smiles with higher levels of gingival display are more accepted by female evaluators. It means that females are more tolerant of upper gingival exposure, which is a more predominant feature in women.⁽⁵⁾ However the present study found that there were no significant differences in the acceptance of smiles with gingival display between males and females (Table 2).

The perception of esthetics of smiles varies between persons according to experiential, social, cultural and environmental factors. It is sometimes very difficult to judge a beautiful smile, because it does not depend only on teeth or gum, but also on other facial components. The present study emphasized the perception of gingival display,

which is only one part of a smile. There are other smile components that could influence its attractiveness, for example, lateral negative space, dental midline, canting of incisal plane, and discrepancy in incisor crown angulation. Further studies should be performed to evaluate if other aspects of smiles would influence the perceptions of either orthodontists or lay people.

Conclusions

1. There was no statistically significant difference in the perception of the esthetics of gingival display between orthodontists and lay people.
2. The perceptions of beautiful smiles regarding the amount of gingival display were similar in orthodontists and lay people. The most acceptable smile for orthodontists and lay people in Chiang Mai were smiles with between 0.0 mm to 1.0 mm of gingival display.
3. There was no significant difference in the acceptance of smiles with gingival display between male and female observer.

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