http://doi.org/10.33279/jkcd.v14i3.610

LAYPEOPLE PERCEPTION OF ATTRACTIVENESS OF THE ORTHODONTIC APPLIANCES – A CROSS SECTIONAL SURVEY

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ABSTRACT

Objectives: *To assess the perception of adult laypeople regarding the attractiveness of various orthodontic appliances.*

Materials and Methods: *A total of 195 participants, aged 18 to 40 years, with at least an intermediate level of schooling, non-dental education, and no history of orthodontic treatment, were included in the study. Participants evaluated the attractiveness of nine different orthodontic appliances through a questionnaire designed using frontal oral smiling photographs. The appliances included metal brackets with colorless elastomeric ligatures, self-ligating brackets made of stainless steel, clear aligner trays, hybrid brackets, ceramic brackets, self-ligating ceramic brackets, metal brackets with colored elastomeric ligatures, no appliance (simulating lingual brackets), and shaped brackets. Scores were given on a Visual analogue scale. Attractiveness scores were stratified based on gender and occupation using one-way ANOVA.*

Results: *The results showed the mean age of 25.90±5.49 years among the participants, with the majority being female (53.85%) and students (36.41%). The "CAT" bracket type was rated as the most attractive (8.37 ± 1.35), while the "Shaped brackets" and "SLB" types received lower attractiveness scores (5.54 ± 1.96 and 5.90 ± 1.85, respectively). Significant differences were observed among the different bracket types ($p<0.001$). Lingual brackets and CAT brackets was perceived as highly attractive in both genders, with statistically significant differences ($p<0.001$) between genders.*

Conclusion: *The study concludes that adult laypeople preferred orthodontic appliances with minimal visibility and clear materials, while increased metal visibility was associated with decreased perceived attractiveness.*

Key words: *Attractiveness, orthodontic appliance, laypeople, perception*

INTRODUCTION

Aesthetics plays a significant role in the decision-making process for orthodontic care. Patients today not only prioritize improved dentofacial appearance but also seek aesthetically appealing treatment options[1]. Advancements in dental technology have led to a demand for orthodontic appliances that complement patients self-image and lifestyle[2]. Orthodontic practices have responded by offering options like clear aligners and tooth-colored brackets to meet patient preferences without compromising effectiveness. Acknowledging the importance of aesthetics can lead to greater patient satisfaction and treatment success[3].

The aesthetic appeal of orthodontic appliances significantly influences patients' treatment decisions. Concerns about the appearance of appliances may

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lead some patients to forego treatment[4]. Despite the positive effects of orthodontic therapy on dentofacial appearance, criticism persists due to the visibility of appliances, resulting in the colloquial term "metal mouth"[5]. This perception may deter patients who worry about their appearance while wearing appliances. However, modern orthodontic practices offer discreet options like clear aligners and tooth-colored brackets, addressing aesthetic concerns and improving patient satisfaction and adherence[6].

Advancements in technology and increasing public demand have transformed orthodontic appliances. Previously limited to bulky metal brackets, orthodontic appliances now offer aesthetically pleasing choices like ceramics, plastic brackets, lingual bracket systems, and bracket-less options[7,8]. Research shows patients prefer smaller, clear brackets, emphasizing enhanced aesthetics and comfort. These developments have improved patient experiences and treatment outcomes, allowing customization of treatment plans to meet individual needs and preferences. Modern orthodontics provides a diverse array of appliance options, catering to a wide range of patients[9].

A study conducted on adults from the central United States reported that clear aligners and lingual braces had the highest acceptance rates at 90%, followed by ceramic braces. However, traditional and self-ligating metal brackets had lower acceptance rates, with only 55% and 58% acceptance, respectively[10].

The attractiveness of orthodontic appliances is subjective and can vary among different cultures and populations. However, there is a lack of local studies on this topic, making it challenging to offer a diverse range of orthodontic appliances to patients. Understanding the level of attractiveness is crucial not only for healthcare providers but also for manufacturers and distributors of orthodontic products to cater to the preferences of the population. Therefore, the aim of this study was to assess how adult laypeople perceive the attractiveness of various orthodontic appliances.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted at the Department of Orthodontics, Rehman College of Dentistry, Peshawar, from 1st March 2023 to 15th May 2023. Ethical approval was obtained from ethical committee of RCD (EC Ref no.RCD-06-23-150). The participants were included using a non-probability sampling technique. The sample size of 195 was calculated using the WHO calculator with a 7% margin of error and 95% confidence level, based on the previous acceptance rate of 55% for metal brackets[11].

A verbal informed consent was obtained from all participants. The study participants comprised individuals aged 18 to 40 years with at least an intermediate level of schooling, non-dental education, and no history of orthodontic treatment. Both genders were included, while individuals with mental retardation, color blindness or dental qualifications were excluded.

A questionnaire was provided to the participants to evaluate the in terms of attractiveness of nine different types of orthodontic appliances. The questionnaire was designed using frontal closeup smiling photographs of a female model wearing different orthodontic appliances from a previous study (Figure 1)[11]. The photographs exhibited an almost perfect smile with the teeth between the right and left 2nd premolars visible, with no malocclusion or midline shift. Additionally, all photographs featured identical 0.016x0.022" stainless steel wires. The displayed orthodontic appliances included: (A) metal brackets with colorless elastomeric ligatures; B) self-ligating brackets made up of stainless-steel brackets; (C) Clear aligners; (D) hybrid brackets (half-metal and half-ceramic); (E) ceramic brackets; (F) self-ligating ceramic brackets; (G) metal brackets colored elastomeric ligature; (H) no appliance (to simulate lingual brackets) (I) shaped brackets (heart-shaped). The appliances were scored using a Visual Analogue Scale of 1-10; 1 being the least attractive and 10 being the most attractive.

Data were analyzed with R version 4.1.2. Descriptive statistics were computed in terms of mean and SD for continuous variables like age, perception score and frequency with percentages for categorical variables like gender and occupation. Perception score was stratified among gender and occupations using one way ANOVA. $P<0.05$ was considered as a significant level.

RESULT

The mean age of the participants was 25.90±5.49 years. Table 1 displays the distribution of respondents based on their gender, occupation, and age groups.

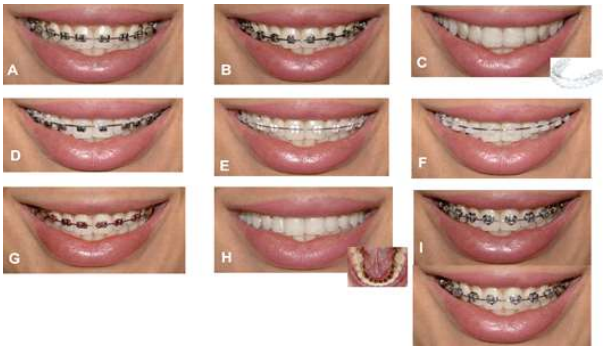

Fig 1: Frontal smiling photographs showing various orthodontic appliances

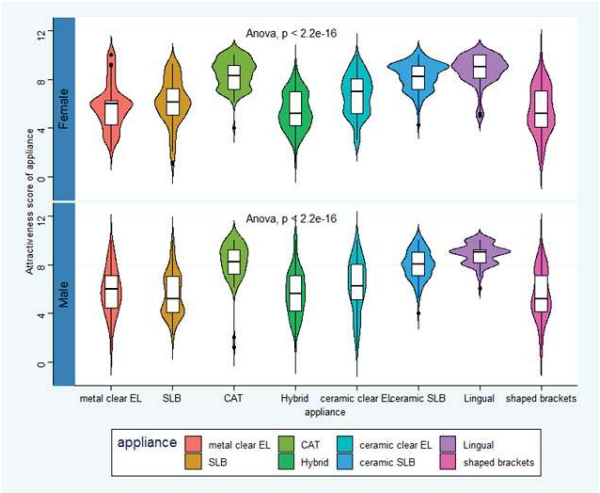

Fig 2: Comparison of attractiveness score of various appliances in both gender

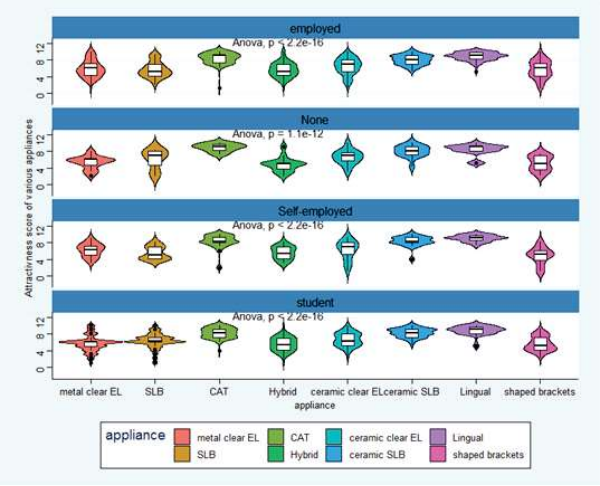

Fig 3: Comparison of attractiveness score of various appliances in various occupations

For gender, there were 105 females (53.85%) and 90 males (46.15%) in the study population. Regarding occupation, 86 individuals (44.10%) were employed, 15 (7.69%) were not employed, 23 (11.79%) were self-employed, and 71 (36.41%) were students.

Table 2 displays the attractiveness scores for different appliances type. The "CAT" bracket type had the highest mean attractiveness score of 8.37 ± 1.35. The bracket types "Ceramic clear EL," "Ceramic SLB," "Hybrid," "Lingual," and "Metal clear EL" had mean attractiveness scores of 6.49 ± 1.90, 8.14 ± 1.17, 5.53 ± 1.7, 8.82 ± 1.05, and 5.82 ± 1.90, respectively. The "Shaped brackets" type, had a mean attractiveness score of 5.54 ± 1.96, while the "SLB" type had a mean attractiveness score of 5.90 ± 1.85.A statistically significant difference was observed among the different bracket types (p<0.001).

Figure 2 shows the comparison of attractiveness scores for various appliances in genders. In both genders, the highest attractiveness was observed for lingual and CAT, followed by ceramic SLB. The differences in each gender were statistically significant by one way ANOVA test (P<0.001).

Figure 3 shows that there is significant difference in attractiveness score for various occupations.

Table 1: Frequency of gender and occupation

Variable	Characteristic	N (%)
Gender	Female	105 (53.85)
	Male	90 (46.15)
Occupation	Employed	86 (44.10)
	Unemployed	15 (7.69)
	Self-employed	23 (11.79)
	Student	71 (36.41)

Table 2: Comparison of attractiveness score of various appliances

Appliances	Attractiveness Score	p-value*
CAT	8.37 ± 1.35	<0.001
Ceramic clear EL	6.49 ± 1.90	
Ceramic SLB	8.14 ± 1.17	
Hybrid	5.53 ± 1.7	
Lingual	8.82 ± 1.05	
Metal clear EL	5.82 ± 1.90	
Shaped brackets	5.54 ± 1.96	
SLB	5.90 ± 1.85	

CAT, Clear aligner therapy; EL, Elastomeric ligature; SLB, Self ligating brackets; *ANOVA test

DISCUSSION

The objective of this study was to investigate the perceptions of adult laypeople regarding the attractiveness of different orthodontic appliances. Our research findings revealed the presence of statistically significant differences in the attractiveness ratings assigned to various orthodontic appliances. Participants showed a preference for appliances with minimal visibility and those featuring clear materials. Moreover, our study demonstrated a negative correlation between the level of attractiveness and the amount of visible metal content in the appliances, indicating that increased metal visibility led to a decrease in perceived attractiveness.

The aesthetic aspect of orthodontic appliances with visible metal components assumes importance due to the common use of metal wires in orthodontic treatment[12]. Previous study employed a Visual Analog Scale (VAS) and reported the negative impact of increased metal visibility on the perceived attractiveness of appliances. They also found a statistically significant category-ceramic self-ligating brackets exhibiting reduced visible metal content compared to previously utilized hybrid self-ligating designs[10]. Similarly another study by Ziuchkovski et al[13] also found that metal visibility affect negatively the attractiveness of appliances among adults.

Another study conducted in Iran aimed to evaluate the perceived acceptability, attractiveness, and value of different orthodontic brackets consisting of 116 participants. The participants utilized the Visual Analog Scale (VAS) to rate the attractiveness. The findings revealed that lingual brackets were perceived as the most attractive. On the other hand, ceramic brackets were found to have the highest level of attractiveness among all the groups. Large metallic brackets received lower ratings for attractiveness and acceptability. Moreover, art students displayed a greater willingness to pay for aesthetic braces, while parents expressed their readiness to opt for aesthetic brackets for their children, despite the additional costs involved[14]. These results support our findings.

The study conducted with 27-year-old adults in Sweden highlighted their reluctance towards wearing visible orthodontic appliances, with 33% expressing resistance[15]. Furthermore, the literature revealed differences in orthodontic appliance preferences between children/adolescents and adults. While adults prioritize the aesthetic aspects of their appliances, children and adolescents are less influenced by aesthetic enhancements in their decision to undergo orthodontic treatment[16]. Additionally, another study found that orthodontic appliances significantly influenced patients' self-perceptions, leading to improved self-confidence and body image. However, interestingly, the presence of orthodontic appliances did not affect how others perceived these patients in social settings[17]. This suggests that while patients experience positive psychological effects, the visible appearance of orthodontic appliances may not impact how others evaluate them.

CONCLUSION

Our study successfully investigated adult laypeople perceptions of the attractiveness of various orthodontic appliances. The research findings revealed statistically significant differences in the attractiveness ratings assigned to different appliances. Participants displayed a clear preference for appliances with minimal visibility and clear materials, while a negative association was established between the level of attractiveness and the amount of visible metal parts in the orthodontic appliances.

LIMITATIONS

There are several limitations to this study that should be taken into consideration. Firstly, the study utilized frontal closeup smile photographs with appliances rather than the full face which may influence how attractiveness is perceived. Secondly, the study was conducted in a local hospital setting, which may limit the generalizability of the findings to the wider population. Finally, the study utilized a relatively small sample size of adult population.

RECOMMENDATIONS

Future research should include standardized full-face photographs with balanced features, in addition to the close-up smile photographs. This will provide a more comprehensive understanding of attractiveness and how different facial features influence the attractiveness rating. Further studies in this area should aim for a larger sample size with different age groups by collaborating with multiple institutions and conducting multi-site research. Engaging a wider population will enhance the generalizability of the findings. Based on these recommendations, future studies can provide more robust and widely applicable findings

on the attractiveness of the orthodontic appliances.

REFERENCES

1. Yi S, Zhang C, Ni C, Qian Y, Zhang J. Psychosocial impact of dental aesthetics and desire for orthodontic treatment among Chinese undergraduate students. Patient Prefer Adherence. 2016:1037-42.
2. Seyyedi SA, Razeghinejad MH, Yeganeh Majd H, Taram S. Assessment of the Patient Satisfaction from Adjunctive Laser Therapy during Orthodontic Treatment. Journal of Res Appl Basic Med Sci. 2022;8(4):237-45.
3. Nc SC, Kalidass DSP, Davis D, Kishore S, Suvetha S. Orthodontics in the Era of Digital Innovation--A Review. J Evol Med Dent Sci. 2021;10(28):2114-22.
4. Saccomanno S, Saran S, Laganà D, Mastrapasqua R, Grippaudo C. Motivation, perception, and behavior of the adult orthodontic patient: a survey analysis. BioMed Res Int. 2022;2022:107.
5. Oliveira SCd, Furquim RD, Ramos AL. Impact of brackets on smile esthetics: laypersons and orthodontists perception. Dent Press J Orthod. 2012;17:64-70.
6. Collier S, Pandis N, Johal A, Qureshi U, Sharma P, Fleming P. A prospective cohort study assessing the appearance of retrieved aesthetic orthodontic archwires. Orthod Craniofac Res. 2018;21(1):27-32.
7. De Stefani A, Bruno G, Preo G, Gracco A. Application of nanotechnology in orthodontic materials: a state-of-the-art review. Dent J. 2020;8(4):126-32.
8. Papageorgiou SN, Polychronis G, Panayi N, Zinelis S, Eliades T. New aesthetic in-house 3D-printed brackets: proof of concept and fundamental mechanical properties. Prog Orthod. 2022;23(1):6-13.
9. Johal A, Bondemark L. Clear aligner orthodontic treatment: Angle Society of Europe consensus viewpoint. J Orthod. 2021;48(3):300-4.
10. Rosvall MD, Fields HW, Ziuchkovski J, Rosenstiel SF, Johnston WM. Attractiveness, acceptability, and value of orthodontic appliances. Am J Orthod Dentofacial Orthop. 2009;135(3):276–e1.
11. Alansari RA, Faydhi DA, Ashour BS, Alsaggaf DH, Shuman MT, Ghoneim SH, et al. Adult perceptions of different orthodontic appliances. Patient Prefer Adherence. 2019:2119-28.
12. Walton DK, Fields HW, Johnston WM, Rosenstiel SF, Firestone AR, Christensen JC. Orthodontic appliance preferences of children and adolescents. Am J Orthod Dentofacial Orthop. 2010;138(6):698. e1-. e12.
13. Ziuchkovski JP, Fields HW, Johnston W, Lindsey D. Assessment of perceived orthodontic appliance attractiveness. Am J Orthod Dentofacial Orthop 2008;133(Suppl):S68-78.
14. Moshkelgosha V, Salahi M, Rostami S. Evaluation of perceived acceptability, beauty and value of different orthodontic brackets. J Dent Biomater. 2015;2(1):33–38.
15. Jeremiah HG, Bister D, Newton JT. Social perceptions of adults wearing orthodontic appliances: a cross-sectional study. Eur J Orthod. 2010;33:476-82.
16. Kuhlman DC, Lima TAd, Duplat CB, Capelli Junior J. Esthetic perception of orthodontic appliances by Brazilian children and adolescents. Dent Press J Orthod. 2016;21:58-66.
17. Weir T. Clear aligners in orthodontic treatment. Austral Dent J. 2017;62:58-62.