

Patient preference for colored elastic ligatures, undergoing orthodontic treatment

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Abstract

Introduction: Elastomeric ligatures are the most common form of ligation in fixed appliance therapy. Being available in different shades, the patient can pick the color for the month, which is believed to positively affect their cooperation, due to their active involvement. However, little is known regarding the patients' preferences for the different colors.

Material and methods: The study included 200 patients with metal brackets, divided into groups based on gender (100 males; 100 females), questionnaire was filled and preferences for colored elastic ligatures were recorded using a color scale. Chi-square analysis was performed to assess the color preferences, and its influence by gender and age.

Results: 40% males and 43% females stated that they felt motivated when given an option to choose between colored ligatures. However, Pearson Chi-Square Test showed the result to be insignificant, with a P-value of 0.27.

Between colored and transparent ligatures, 32% males preferred colored ligatures compared to 75% females. Males picked darker shades (61%) while females preferred lighter ones.

Both genders rejected yellow. Pearson Chi square test showed insignificance in gender and color preference.

53% teenagers picked colored ligatures. Adults preferred transparent (65%). Pearson correlation showed insignificance in age and color preferences.

Conclusions: Males prefer transparent ligatures while females prefer colored ones.

Keywords: Auxiliaries; colors; esthetics; o rings; patient preference

Introduction

The demand for orthodontic treatment is increasing by the day, despite the fact that malocclusion isn't a disease, neither it is life threatening in any way. Research has shown that most patients go for orthodontic treatment for aesthetic reasons over health-related issues, like destruction of

soft tissues due to irregularities in the anatomy.^{1, 2, 3} This demand for treatment has also been noted in private clinics, where an increasing number of adults are seeking treatment.⁴ Manufacturers have responded to this by providing patients with esthetically pleasing alternatives to metallic braces such as lingual braces, Clear Aligners, ceramic brackets, and so forth.⁵

The commonly used modality to hold arch wires in place are elastomeric ligatures. But they have the disadvantage of becoming pigmented and go through undesirable color changes in the oral cavity, due to swelling up of the rubber structure, and also the inhabitation by bacteria.⁶⁻⁸ This has become a

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challenge, as the oral cavity is always exposed to food pigments and bacteria.⁹⁻¹¹

Manufacturers have found a solution in manufacturing elastic ligatures in a variety of shades. But it would appear that with increasing age patients are less inclined to accept these colored alternatives. Gender also seems to have an influence.¹²⁻¹⁵ Some studies have concluded that there is a universal preference for the color blue, but the variety and lack of control in measurement methods have made it difficult to extract a systematic, quantitative description of preference.¹⁶ The current recommendation is that the orthodontist should always have at least ten different colors at hand at all times, as there is little knowledge about which color is most preferred by the patients.¹⁷

The aim of this study was to evaluate the color preference of the patients receiving elastic ligatures during fixed orthodontic treatment. The knowledge obtained from this study will help orthodontists to stock and present to their patients the most popular colors. This, in turn, will have a positive influence on patient cooperation during orthodontic treatment.

Material and Methods

Ethical approval was taken for this cross-sectional study from the ethical committee of KCD, Peshawar in 2019 (No. 109/ADR/KCD). By using OpenEpi, the total sample size was 196 while keeping 5% margin for error and 95% confidence interval, and while keeping anticipated frequency 15%.¹⁷ This figure was rounded off to 200. Two hundred patients undergoing fixed orthodontic therapy in Khyber College of Dentistry were selected for this study. Patients who had been under treatment for at least 6 months were selected since they had a good knowledge of choosing ligatures. A self-administered questionnaire was used to assess the patient's preference regarding colored elastic ligatures. Questions regarding choice of colored vs. transparent ligatures, lighter vs. darker shades and favorite color of

each individual were asked. Data was analyzed using SPSS version 24. Descriptive statistics were calculated. Pearson's chi-squared analysis was performed to determine the effect of gender on color preferences. $P < 0.05$ was taken as significant.

Results

Total number of patients selected were 200. 100 were males and 100 were females, divided into two groups bases on gender. They were further divided into two subgroups depending upon their age i-e teen age group with mean age of 16 ± 3 years and adult age group with mean age of 26 ± 3 .

40% males and 43% females stated that they felt motivated about their treatment when given an option between colored elastomeric ligatures. Thus, majority of both genders were not attracted to colored ligatures. Also, Pearson Chi-Square Test showed the result found was insignificant with a P-value of 0.27. (See Table I)

Comparing the result of colored to transparent ligatures in preference, 32% males as compared to 75% females preferred colored ligatures over transparent ones. (See Table II)

Males were also more inclined towards darks shades (61%) compared to females which were more inclined towards lighter palette colors (67%). (See Table III)

In the color palettes both males and females majorly preferred the color Grey. Females showed inclination towards Pink and Red colors whereas these colors were completely ignored by males. Males on the other hand preferred the Blue palette colors more than females. The color yellow was ignored by both genders. However, Chi square test showed insignificance in Gender and color preference. (See Table IV a and b)

In terms of age, half of the teenage group preferred colored ligatures while the other half picked transparent ones. For the adult group, one third preferred transparent ligatures (65%). The Pearson Chi square test showed that the preference for the color of

ligatures was not influenced by the age of the patient. (See Table V).

Discussion

It has been shown through studies that each gender has color Preferences.^{14,18} Cohen et al's findings showed that the female eyes prefer the red palette, while men lean towards blue.¹⁸ This is highly similar to the findings in our study, where women preferred red shades and men preferred blue. Our study results were fairly similar to a study done by Tariq et al, in which females showed more preference towards colored ligatures compared to males.¹⁷ Although in contrast to the study by Tariq et al, majority of males in our study preferred transparent ligatures over colored.¹⁷

When comparing a detailed breakdown of the Colorful ligatures, Aljabaa et al study showed that female patients preferred transparent, blue and grey, whilst males preferred blue, grey, transparent and black ligatures.¹⁴ Majority of patients in our study both males and females preferred the color Grey. Females preferred red or pink, while males preferred Blue or Light blue. The preference of Color Grey may be due to the fact that most of the patient coming to Khyber college of dentistry belong to one of the conservative provinces of Pakistan and wearing of orthodontic braces is not shown off and thus combine well to the grey Color of metallic braces.

The study by Tariq also reported that age had no significant influence on the color preference.¹⁷ This is in line with our study for the teenager group, in which almost equal number of teenagers preferred both colored and transparent ligatures. But the findings of Tariq et al are in contrast to our study for the adult group, in which most preferred transparent ligatures.

One of the limitations of our study is that the sample size was small. Our recommendation for future studies is that the study should be carried out on a larger population. It is also recommended that the patients be shown

digital intraoral photographs of the colored elastic ligatures around brackets for easier selection of their preferred colors. Another limitation is that this study was carried out on one ethnic group, our recommendation is to carry out this study on multiple ethnicities at different centers.

Conclusions

- 1) Males preferred transparent ligatures
- 2) Females preferred colored ligatures.
- 3) Teenager mostly preferred both colored and transparent ligature.
- 4) Females and males both preferred grey colored ligatures compared to any other color palette.

Conflict of Interest: There is no conflict of interest to report.

Table I: Patient motivation in response to colored Ligatures in relation to gender.

Motivation in relation to Gender				
Gender	Motivated		Non-Motivated	
	No. of Patients	Percentage	No. of Patients	Percentage
Male	40	40%	60	60%
Female	43	43%	57	57%

Table II: Preference of Ligature in relation to gender

Ligature Color				
Gender	Colored		Transparent	
	No. of Patients	Percentage	No. of Patients	Percentage
Male	32	32%	68	68%
Female	75	75%	25	25%

Table III: Preference of Ligature Shade in relation to gender

Ligature Shade				
Gender	Light		Dark	
	No. of Patients	Percentage	No. of Patients	Percentage
Male	39	39%	61	61%
Female	67	67%	33	33%

Table IVa: Preference of Ligature color preference in relation to gender

Ligature Color Preference								
	Blue		Green		Grey		Light Green	
Gender	No. of patients	% age	No. of patients	% age	No. of patients	% age	No. of patients	% age
Male	12	12%	8	8%	64	64%	6	6%
Female	4	4%	6	6%	60	60%	4	4%

Table IVb: Preference of Ligature color preference in relation to gender

Ligature Color Preference								
	Light Blue		Pink		Red		Yellow	
Gender	No. of patients	% age	No. of patients	% age	No. of patients	% age	No. of patients	% age
Male	10	10%	0	0%	0	0%	0	0%
Female	6	6%	10	10%	10	10%	0	0%

Table V: Preference of Ligature color in relation to Age

Ligature Color				
Age	Colored		Transparent	
	No. of Patients	Percentage	No. of Patients	Percentage
Teenager	53	53%	47	47%
Adults	35	35%	65	65%

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