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Results: When comparing the L*, a* and b* values of the teeth with the gender; statistically significant difference was not fount between the gender and the L* and b* values (P>0,05) while statistically significant difference was observed between the gender and the a* value (P<0,05).

Conclusions: The tooth colour distribution according to the Vitapan Classical; in the central and lateral teeth it was maximum A2, while it was found to be B3 in the canine teeth. The tooth colour distribution according to the VITA Toothguide 3D-MASTER colour scale; in the central teeth the 2M2 colour was measured most often, in the lateral teeth the 3M2 colour was detected the most often while in the canine teeth the 2M3 colour was measured the most often.

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Running title: Maxillary Anterior Teeth Color Measurement

ABSTRACT

Background: This study intended to determine the colour distribution of the maxillary, central, lateral and canine teeth and to investigate the effect of age and gender on this colour distribution.

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Results: When comparing the L*, a* and b* values of the teeth with the gender; statistically significant difference was not fount between the gender and the L* and b* values (P>0,05) while statistically significant difference was observed between the gender and the a* value (P<0,05).

Conclusions: The tooth colour distribution according to the Vitapan Classical; in the central and lateral teeth it was maximum A2, while it was found to be B3 in the canine teeth. The tooth colour distribution according to the VITA Toothguide 3D-MASTER colour scale; in the central teeth the 2M2 colour was measured most often, in the lateral teeth the 3M2 colour was detected the most often while in the canine teeth the 2M3 colour was measured the most often.

Key Words: Spectrophotometry, Measurement of the tooth colour, Colour analysis, Dental scales

INTRODUCTION

Accordance with natural form and colour of tooth is important for aesthetic success of the restoration (Dozić et al. 2007; Tuncdemir et al. 2012). Anterior region of dental restoration is one of the most striking area therefore the determination of the tooth colour is a very important issue for the aesthetic dentistry. Especially the colour should be selected by the right method and it should be transferred to the technician correctly (Juszczyk et al. 2009; Nagano et al. 2005).

There are various parameters that make it difficult for natural appearance of the restoration. These factors including the optical properties of the natural teeth, the permeability of the light and the property of the surface complicate especially the natural appearance of the prosthetic restoration. A number of factors play a critical role in the success of the aesthetic restoration's colour selection. The colour selection is affected by factors such as the colour perception of the individual, the source of the light in the environment, structural and surface properties of both the tooth and the used material also (Vichi et al.).

The conventional and digital methods are widely used in the selection of the tooth colour (Chen et al.). Conventional is a commonly used method (Hugo et al. 2005) and the measurement of the tooth colour is carried out with the help of the scale (Da Silva et al. 2008; Dozić et al. 2007). During the implementation of this method, the tooth colour is determined by comparing the tooth and the scale within the same environment under the same light. In this method the light source and the subjective characteristics (factors such as age, gender, experience, colour blindness, eye fatigue) can lead different results in color selection (Dozić et al. 2007; Hammad 2003; Okubo et al. 1998). Commonly used scales are the Vitapan Classic (Vita Zahnfabrik, Bad Sackingen, Germany) and the Vita 3D Master (Vita Zahnfabrik, Bad Sackingen, Germany), the acceptable colour selection is carried out with these scales (Brewer et al. 2004).

Various colour measurement instruments are used for digital methods. These devices are mainly the spectrophotometers, colorimeters, digital cameras and RGB devices (Bhat et al. 2011). The digital devices ensure a more standard and reliable measurement in the colour measurement (Bahannan 2014; Chen et al. 2012; Tuncdemir et al. 2012). When comparing the conventional and digital tooth colour measurement methods, the colour measurement devices were reported to provide better results (Bahannan 2014; Chen et al. 2012; Kröger et al. 2015; Pimental and Tiossi 2014) . Munsell and CIE colour systems were used in the studies of colour identification. In the Munsel colour system, the colour is identified by the tone of the colour (Hue), value of the colour (Value) and the intensity of the colour (Chroma). Hue defines a colour like blue, yellow and red and it is the feature which distinguishes one colour group from the other. Value is the amount of brightness and the amount of light reflected by the objects and the low value refers to the dark colours while the high value refers to the lighter colours. The low value shows the tooth in grey as non-vital. Chroma refers to the intensity of the colour (O'Brien 2002; Rosenstiel et al. 2006). The CIE L*a*b system is used for tooth color related studies (Alghazali et al. 2012; AlSaleh et al. 2012; Dozić et al. 2007; Özat et al. 2013; Pop-Ciutrila et al. 2015). This system has three coordinates to define the colour. L* specifies the lightness and darkness of the colour while the a* and b* coordinates define the chromatic character of the colour. This system has the ability to examine the colour differences between two objects or teeth (O'Brien 2002; Rosenstiel et al. 2006).

In dentistry $\Delta E^*=[(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$ formula is used in the colour related researches in order to compare the colour of two different restorations or two teeth colours (Gómez-Polo et al. 2015; O'Brien 2002; Pop-Ciutrila et al. 2015). This formula evaluates the size of the colour difference between two colours numerically; it does not give a sense about the direction of the colours' coordinate axis (Gómez-Polo et al. 2015).

MATERIALS and METHODS

The colour measurements of the maxillary right central, lateral and canine teeth was carried out on a total of 202 voluntarily patients including 89 men (44%) and 113 women (56%) between the age of 15 and 70 (average 31) who applied to the Elazığ Oral and Dental Health Center. Institutional approval was taken from the Fırat University Ethics Board of the Non-invasive Procedures (14.06.2016-11-04) and from the Elazığ Oral and Dental Health Center in relation with the tooth colour measurement.

The study conducted on the teeth colour measurement included only the healthy right maxillary central, lateral and canine teeth which have not received orthodontic treatment, bleaching treatment, and any kind of restoration which were not endodontic treatment and had not internal staining.

The tooth colour measurements were carried out in clear weather under daylight between 10 and 12 o'clock am. The bright colours on the patients' face and dress were covered during the tooth colour measurement. Before the tooth colour measurement, infection control shield (VİTA Easyshade Infection Control Shield, Vita Zahnfabrik, Bad Sackingen , Germany) was inserted to the Vita EasyShade V (Vita Zahnfabrik, Bad Sackingen , Germany) device and the calibration of the device was carried out according to the instructions before each tooth measurement. Before measuring the tooth colours the plaque index scores of the teeth were taken and the measurement was carried out on the surface of the teeth with "0". Three measurements were performed on the middle third of the labial face of the right maxillary central, lateral and canine teeth by placing the tip of the device perpendicularly and the average of these three measurements was taken. Grey background colour was used in order to prevent the reflection of the background while performing the colour measurement with the Vita EasyShade device.

The L, C and H data of the colour measurements made with Vita EasyShade V device were recorded and the conversions to the L*, a* and b* values were carried out on the http://www.easyrgb.com/index.php?X=CALC#Result and the ΔE* values were calculated through the $\Delta E^* = [(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2]^{1/2}$ formula. Different ΔE* values were used in order to measure the acceptability level of the compliance between the colours. Different ΔE* values such as 2.6 (Douglas et al. 2007), 2.7 (Chu et al. 2010; Ragain and Johnston 2000), 3.7 (AlSaleh et al. 2012; Johnston and Kao 1989) were used by the researchers. 2.6 ΔE* value was used in the study on tooth colour measurements.

The colour measurements of the central, lateral and canine teeth were compared statistically with the Vita EasyShade V device. Student's t-test was used for the statistical comparison of the tooth colour distribution between the genders and the Anova test was used for the statistical comparison of the tooth colour distribution between the age groups. All the statistical analysis was carried out by using the SPSS 15.0 (SPSS Inc., Chicago IL) data analysis program.

RESULTS

The general distributions of the colour measurement values of the maxillary right central, lateral and canine teeth carried out by the Vita Easyshade V (Vita Zahnfabrik, Bad Sackingen, Germany) device on a total of 202 voluntarily patients including 89 (Pimental and Tiossi) and 113 (women) between the age of 15 and 70 (average 31) are given in Figure 1 according to the Vitapan Classical colour scale.

Fig. 1: The general distribution of the Maxillary Right Central, Lateral and canine teeth according to the Vitapan Classical colour scale.

When examining the general distribution according to the Vitapan Classical colour scale without considering the age and gender on the central teeth the A2 (29.7%) and A1 (12,9%) were the most measured teeth colour while B1, C4 and D2 (0.5%) tooth colours were measured the least. On the lateral teeth the A2 (21.8%), and B3 (15.3%) tooth colours were measured the most often while the B4 and D2 (0.5%) the least. The B1 tooth colour was not identified in the measurements carried out on the lateral teeth. On the canine teeth B3 (30.7%) and A3,5(30.2%) tooth colour were observed the most often while the B2 and D3 colours were observed the least. The A1, B1, C2 and D2 tooth colours were not detected in the measurements performed on the canine teeth.

The general distributions of the colour measurements values of the maxillary right central, lateral and canine teeth carried out by the Vita Easyshade V device are given in Figure 2 according to the VITA Toothguide 3D-MASTER colour scale.

Fig. 2: The general distribution of the Maxillary Right Central, Lateral and canine teeth according to the VITA Toothguide 3D-MASTER colour scale

When examining the general distribution according to the VITA Toothguide3D-MASTER colour scale without considering the age and gender on the central teeth 2M2 (30,2%) tooth colour was measured the most often while the 4L2.5 and 4R2.5 (0.5%) colours were detected the least. The 2L2.5, 3L2.5, 4M3, 5M2 and 5M3 tooth colours were not detected on the central teeth. On the lateral teeth the 3M2 (15.3%) and the 2M2 (11.9%) tooth colours were detected most often while the 4M3, 4R2.5 and 5M2 (0.5%) were measured the least. 1M1, 2L2.5, 3L2.5, 4L2.5 and 5M3 tooth colours were not detected. On the canine teeth 2M3 (19.8%) and 4M2 (16,8%) tooth colours were measured most often while the 2L1.5, 3L1.5, 4M3 and

5M2 (0.5%) were detected the least. 1M1, 1M2, 2L2.5, 2M1, 2R1,5, 3L2.5, 3M1, 4L2.5 and 5M3 tooth colours were not detected in the measurements carried out on the canine teeth.

The age distribution of the 202 individuals whose tooth colours were measured within the context of this study can be classified in the following way; between the age of 15-24 (35.1%) 71 individuals, between the age of 25-34 (27.2%) 55 individuals, between the age of 35-44 (22.8%) 46 individuals and older than 45 (14.9%) 30 individuals.

According to the age the colour distribution of the Right Maxillary Central, Lateral and Canine teeth were given in Table 1 according to the Vitapan Classical colour scale.

Table 1: The distribution of the right maxillary central, lateral and canine teeth according to the Vitapan Classical colour scale.,

When examining the colour distribution of the Right Maxillary Central teeth according to the age range, A2 (35,2 %/ 27,3%/ 32,65/ 16.7%) tooth colour was observed most often in the 15-24, 25-34, 35-44 and in the over 45 age groups. When examining the colour distribution of the Right Maxillary Lateral teeth, the A2 (25% / 23.6%) colour was measured most often within the 15-24 and 25-34 age groups, the B3 (21,7%) tooth colour was observed the most often within the 35-44 age group, while within the age group of more than 45 the A2 (16.7%) tooth colour was measured the most often. The B1 tooth colour was not detected while the examination of the Right Maxillary Lateral teeth's colour distribution according to the Vitapan Classical colour scale. When examining the colour distribution of the Right Maxillary Canine teeth according to the distribution of the age range, the A3.5 (26.8%) tooth colour was observed the most often within the 15-24 age group, the B3 (34.5%)tooth colour was measured the most often within the 24-35 age group, the A3.5 (34.8%) tooth colour was detected the most often

within the 35-44 age groups while in the age group of over 45 the A4 (30%) was measured the most often.

The colour distribution of the Right Maxillary Central, Lateral and Canine teeth were given in Table 2 according to the age distribution and according to the VITA Toothguide 3D-MASTER colour scale.

Table 2: The distribution of the Right Maxillary Central, Lateral and Canine teeth according to the VITA Toothguide 3D-MASTER colour scale

When examining the distribution of the Right Maxillary Central teeth according to the age range and the VITA Toothguide 3D-MASTER colour scale, the 2M2 (32,4/29.1/32.6/23.3 %) tooth colour was measured the most often within the age groups of 15-24, 25-34, 35-44 and in the age group of over 45. When examining the colour distribution of the Right Maxillary Lateral teeth, the 3M2 (18,3%) tooth colour was observed the most often within the age group of 15-24, the 2M2 (12.7%) tooth colour was measured the most often within the age group of 25-34, the 3M2 (19.6%) tooth colour was observed the most often within the age group of 35-44 while the 2R1.5 (16,7%) tooth colour was observed within the age group of over 45. When examining the colour distribution of the Right Maxillary Canine teeth the 2M3 and 4M2 (16.9%) tooth colours were observed the most often within the age group of 15-24, the 2M3 (25,5 %) tooth colour was measured the most often within the age group of 25-34, the 2M3 and 3M3(21,7 %) tooth colours were observed the most often within the age group of 35-44 while the 4M2 (30,0%) tooth colour was observed within the age group of over 45.

The colour distribution of the Right Maxillary Central, Lateral and Canine teeth were given in Figure 3 according to the gender distribution and according to the Vitapan Classical colour scale.

Fig. 3: The distribution of the maxillary central, lateral and canine teeth according to the gender and according to the Vitapan Classical colour scale.

When examining the colour distribution of the right maxillary central tooth according to the gender, A2 tooth colour was detected most often both in men and women. This ratio was 34.5% in women and 23.6% in men. When examining the colour distribution of the right maxillary central tooth according to the gender the C4 tooth colour was not detected in the women and the B1, B4 and D2 tooth colours were not observed in men. When examining the colour distribution of the right maxillary lateral tooth according to the gender, A2 (25.7%) tooth colour was detected most often in women and the A3 (19.1%) was detected most often in women. When studying the results of the right maxillary lateral teeth colour measurements, the B1 and D2 tooth colours were not detected in women, while the B1, B4 and C4 tooth colours were not detected in men. When examining the colour distribution of the right maxillary canine tooth colour according to the gender the B3 (31%) tooth colour was observed most often in women while the A3,5 (38.2%) tooth colour was detected the most often in men. When studying the results of the right maxillary canine teeth colour measurements, the A1, B1, C2 and D3 tooth colours were not detected in women, while the A1, B1, and C2 tooth colours were not detected in men.

According to the gender the colour distribution of the Right Maxillary Central, Lateral and Canine teeth were given in Figure 4 according to the VITA Toothguide 3D-MASTER colour scale.

Fig. 4: The distribution of the maxillary central, lateral and canine teeth according to the gender and according to the VITA Toothguide 3-D MASTER colour scale

When examining the distribution of the right maxillary central tooth colour according to the gender, the 2M2 tooth colour was detected most often both in men and women. This ratio was found to be 32.7% in women while it was 27 % in men. When examining the distribution of the right maxillary lateral tooth colour according to the gender, the 3M2 tooth colour was detected most often both in men and women. This ratio was found to be 15.9 % in women while it was 14.6 % in men. When examining the distribution of the right maxillary canine tooth colour according to the gender, the 2M3 (21,2%) tooth colour was detected in women the most often, while the 3M3 (20.2%) tooth colour was observed in men the most often.

The general distribution (L*,a* and b*) of the colour measurement of the Right Maxillary Central, Lateral and Canine teeth carried out by the Vita EasyShade V Device on all participants was given in Table 3.

Table 3: The general distribution of the colour measurement of all individuals' Right Maxillary Central, Lateral and Canine teeth

When examining the distribution of the L*, a* and b* values the lowest L* value was detected in the Lateral while the highest L* value was detected in the Canine teeth. The lowest a* value was found in the central and lateral teeth, the highest a* value was detected in the Lateral teeth. The lowest and highest b* values were detected in the Lateral teeth. When considering the average of the L*, a* and b* values the highest average L*value was detected in the central teeth, the highest average a* value was detected in the canine teeth while the highest average b* value was detected in the central and lateral teeth. When comparing the L*,a* and b* values statistically among the teeth, statistically significant differences were

observed between the L* values of the Central and Lateral teeth, between the a* and b* values of the Central-Canine and Lateral –Canine teeth (P<0,05).

The L*, a* and b* values of the Right Maxillary, Central, Lateral and Canine teeth were given in Table 4 according to the gender.

Table 4: The colour measurement distribution of the Right Maxillary Central, Lateral and Canine teeth according to the gender distribution

When comparing the L*,a* and b* values of the teeth with the gender; statistically significant difference was not observed between the L* ,b* values and the gender (P>0,05) while statistically significant difference was observed between the a* values and the gender (P<0,05).

When comparing the L*,a* and b* values of the Central, Lateral and Canine teeth with the age groups; when comparing the L* values of the Central teeth between the age groups, statistical significance was found between the age groups of 15-24 and 25-34 and between the age groups of 15-24 and over 45 (P<0,05), while statistically significant difference was not detected while comparing the a* and b* values of the central teeth between all the age groups (P>0,05). When comparing the L* values of the Lateral teeth between the age groups, statistical significance was found between the age groups of 15-24 and over 45 and between the age groups of 25-34 and over 45 (P<0,05), while statistically significant difference was not detected while comparing the a* and b* values of the Lateral teeth between all the age groups (P>0,05). In the comparison of the L*values of the canine teeth statistically significant difference was not observed between the age groups (P>0.05). The a* values of the Canine teeth between the age groups of 15-24 and 35-44 were found to be significant statistically (P<0,05). In the comparison

of the b* values of the canine teeth statistically significant difference was not detected among all the age groups (P>0,05).

The comparative table of the ΔE* values belonging to the Central-Lateral, Central –Canine and Lateral –Canine teeth were given in Table 5.

Table 5: The comparative table of the ΔE* values belonging to the Central-Lateral, Central –Canine and Lateral –Canine teeth

When examining the ΔE* values belonging to the all participants' Central-Lateral, Central –Canine and Lateral –Canine teeth, the ratio of below the 2.6 ΔE* value which was accepted as the threshold value below the limit detectable by the human eyes was 37.6% in the Central-Lateral teeth, 25.2% in the Central-Canine teeth and 27.2% Lateral –Canine teeth. When investigating the ΔE* values of the Central-Lateral, Central-Canine and Lateral –Canine teeth according to the gender, in men the ratio of being below the 2.6 threshold rate was 41.5% in the Central-Lateral teeth, 32.5% in the Central-Canine and 24.71% in the Lateral Canine teeth, while in women this ratio was 35.4% in the Central-Lateral teeth, 19.4% in the Central-Canine teeth and 29.20% in the Lateral-Canine teeth.

DISCUSSION

The teeth does not have uniform colour and the ratio of tone (Hue), density (Chroma) and the brightness (Value) determine the colour (Rosenstiel et al. 2006; Winkler et al. 2006). In the aesthetic success of the fixed prosthetic restoration with adjacent teeth natural form of the tooth must also be compatible with the color (Dozić et al. 2007; Rosenstiel et al. 2006). Especially in anterior restoration when making the tooth colour selection the dentists determine a single colour for the central, lateral and canine teeth and as a result natural appearance cannot be created for the anterior teeth due to the uniform colour appearance (Eiffler et al. 2010).

Many studies have been conducted on the measurement and distribution of the tooth colour. In these studies conventional and digital methods were used in the determination of the tooth colour (Chen et al. 2012; Dozić et al. 2007; Hugo et al. 2005; Lasserre et al. 2011; Pop-Ciutrila et al. 2015). Digital devices provide standard measurement of the tooth and are more reliable (Bahannan 2014; Chen et al. 2012; Tuncdemir et al. 2012). Studies conducted on the comparison of the conventional and digital tooth colour measurement method stated that the digital devices provided better results (Bahannan 2014; Chen et al. 2012; Kröger et al. 2015; Pimental and Tiossi 2014). In the compilation study conducted by Chen et al. which studied the difference between the tooth colour measurements carried out by visual and device measures it was reported that the measurements carried out by spectrophotometer device were more precise (Chen et al. 2012).

In the studies of tooth color measurement, it was reported that significant result was not detected between the gender and the tooth colour (Al-Saleh and Tashkandi 2007; Hasegawa et al. 2000b; Tuncdemir et al. 2012; Zhu et al. 2001). Beside the studies stating that the gender and the age did not affect the colour of the tooth there are also researches defending the opposite that there was a significant result between the gender and the tooth colour (Gozalo-Diaz et al. 2008; Odioso et al. 1999). The studies investigating the relationship between the age and the tooth colour reported that the central incisors became darker with the age and got more red and yellow tone (Hasegawa et al. 2000a; Juszczyk et al. 2009). When the gender was compared with the L*,a* and b* values of the teeth; statistically significant difference was not found among the L* and b* values and the gender ($P>0,05$), while statistically significant difference was detected between the a* values and the gender ($P<0,05$).

Different processes were performed in relation with the tooth surface before the measurement. The measurements were carried out without polishing the tooth surface (AlSaleh et al. 2012; Ardu et al. 2008), cleaning the surface with toothbrush (Özat et al. 2013; Pop-

Ciutrila et al. 2015) and without performing any kind of process (Kuzmanovic and Lyons 2009; Pimental and Tiossi 2014). The plaque index scores of the teeth to be measured were taken and the measurements were performed on the surfaces of the teeth which received 0 score.

Many studies were conducted in order to investigate the impact of the background on the restoration and on the selected tooth colour during the tooth colour measurement. These studies reported that the background did not affect the colour of the restoration (Ma et al. 2010) while other studies stated that the background was effective in the colour of the restauration (Ardu et al. 2014; LEE et al. 2005; Ritter et al. 2016; Turgut and Bagis 2013). In the research of Ardu et al, which investigated the impacts of the background on the tooth colour measurement detected that there was significant difference between the spectrophotometric measurements taken with white, black and grey background and the measurements taken without any background. Additionally it was reported that the black and grey background stimulated the conditions of the mouth better during the colour measurements (Ardu et al. 2014). There are also studies carrying out direct measurements without using any kind of colours in the background (Meireles et al. 2008; Özat et al. 2013; Pimental and Tiossi 2014; Pop-Ciutrila et al. 2015). Our study anterior teeth color measurements were performed grey background to stimulate oral condition.

The colour of the light used in the environment also affected the colour of the teeth, so the researchers carried out the tooth colour measurements between 5500 K (AlSaleh et al. 2012; Pimental and Tiossi 2014) and 6500 K (Al-Dosari 2010; Ardu et al. 2008; Pop-Ciutrila et al. 2015). The average temperature value of the daylight was determined as 6500 K and the different times of the day, the cloud in the air, the humidity and pollution may all lead to changes in the colour temperature (Shammas and Alla 2011). In our study the tooth colour measurements were carried out in clear weather, under the daylight between 10 and 12 o'clock am.

CONCLUSIONS

In our study when examining the general distribution according to the Vitapan Classical and the VITA Toothguide 3D MASTER colour scale without considering the age and gender, the A2 and 2M2 tooth colours were observed the most often in the central teeth, the A2 and 3M2 colours were detected the most often in the lateral teeth while in the canine teeth the B3 and 2M3 tooth colours were measured the most often. When comparing the gender with the L*, a* and b* value of the teeth, statistically significant difference was not found between the gender and the L* and b* values (P>0,05) while statistically significant difference was detected between the gender and the a * values (p<0,05).

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FIGURE LEGENDS

Figure 1: The general distribution of the Maxillary Right Central, Lateral and canine teeth according to the Vitapan Classical colour scale.

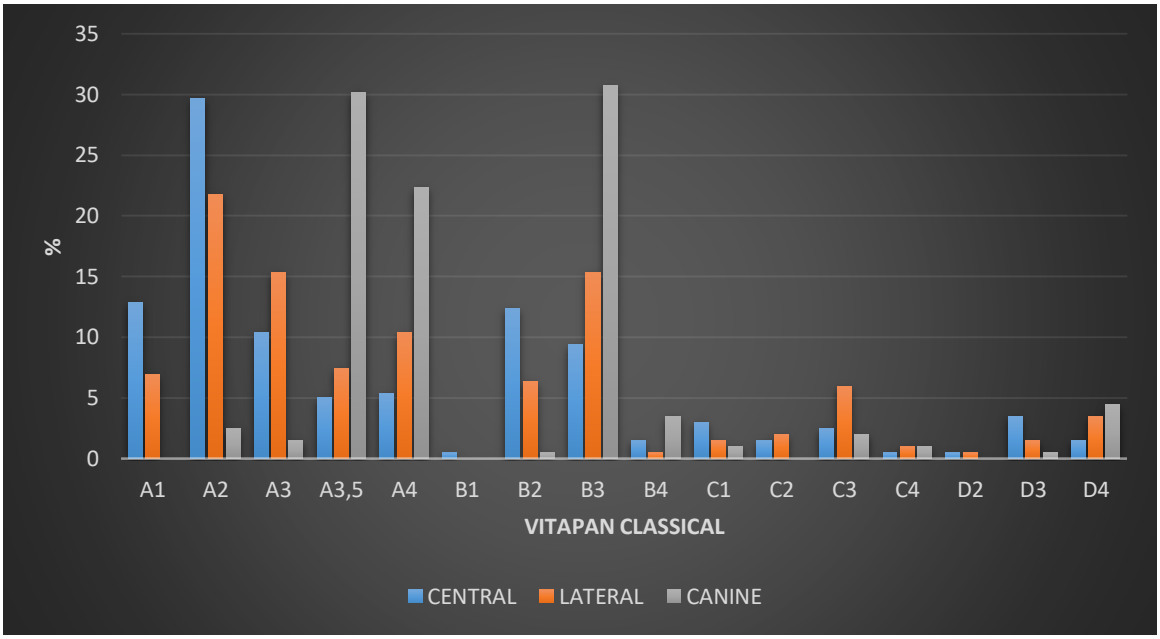

Figure 2: The general distribution of the Maxillary Right Central, Lateral and canine teeth according to the VITA Toothguide 3D-MASTER colour scale

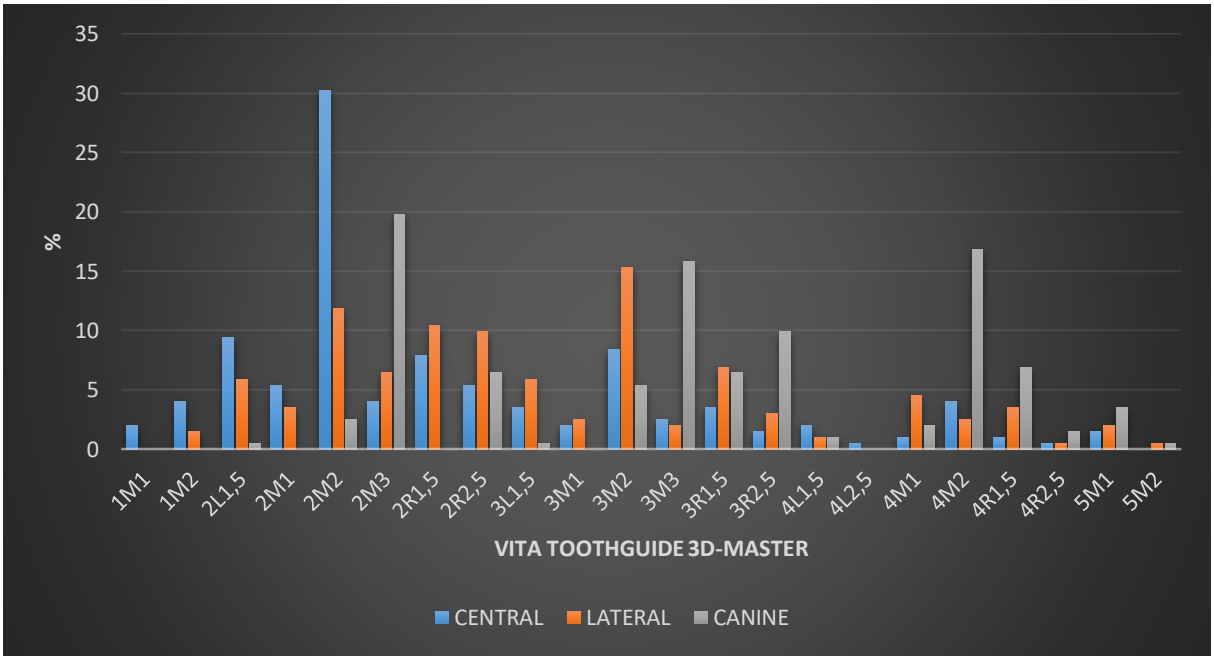

Table 1: The distribution of the right maxillary central, lateral and canine teeth according to the Vitapan Classical colour scale.

%	A1	A2	A3	A3,5	A4	B1	B2	B3	B4	C1	C2	C3	C4	D2	D3	D4
CENTRAL, AGES 15-24	16,9	35,2	9,9	4,2	4,2	0,0	7,0	12,7	1,4	4,2	0,0	1,4	0,0	0,0	1,4	1,4
CENTRAL, AGES 25-34	12,7	27,3	14,5	1,8	3,6	1,8	16,4	5,5	1,8	1,8	3,6	3,6	0,0	0,0	3,6	1,8
CENTRAL, AGES 35-44	10,9	32,6	8,70	4,30	4,30	0,0	15,2	10,9	2,2	0,0	2,20	0,0	0,0	2,2	6,5	0,0
CENTRAL, AGES 45 AND OVER	6,7	16,7	6,7	13,3	13,3	0,0	13,3	6,7	0,0	6,7	0,0	6,7	3,3	0,0	3,3	3,3
LATERAL, AGES 15-24	2,8	25,4	14,1	7,0	11,3	0,0	2,8	19,7	1,4	0,0	1,4	5,6	2,8	1,4	2,8	1,4
LATERAL, AGES 25-34	9,1	23,6	16,4	5,5	14,5	0,0	7,3	7,3	0,0	3,6	0,0	7,3	0,0	0,0	0,0	5,5
LATERAL, AGES 35-44	8,7	17,4	17,4	10,9	2,2	0,0	13,0	21,7	0,0	2,2	2,2	2,2	0,0	0,0	2,2	0,0
LATERAL, AGES 45 AND OVER	10,0	16,7	13,3	6,7	13,3	0,0	3,3	10,0	0,0	0,0	6,7	10	0,0	0,0	0,0	10,0
CANINE, AGES 15-24	0,0	1,4	1,4	26,8	25,4	0,0	0,0	31,0	1,4	1,4	0,0	2,8	2,8	0,0	1,4	4,2
CANINE, AGES 25-34	0,0	0,0	0,0	32,7	20,0	0,0	1,8	34,5	3,6	0,0	0,0	1,8	0,0	0,0	0,0	5,5
CANINE, AGES 35-44	0,0	8,7	2,2	34,8	15,2	0,0	0,0	32,6	2,2	0,0	0,0	0,0	0,0	0,0	0,0	4,3
CANINE, AGES 45 AND OVER	0,0	0,0	3,3	26,7	30,0	0,0	0,0	20,0	10	3,3	0,0	3,3	0,0	0,0	0,0	3,3

Table 2: The distribution of the Right Maxillary Central, Lateral and Canine teeth according to the VITA Toothguide 3D-MASTER colour scale

(%)	1M1	1M2	2L1,5	2M1	2M2	2M3	2R1,5	2R2,5	3L1,5	3M1	3M2	3M3	3R1,5	3R2,5	4L1,5	4L2,5	4M1	4M2	4M3	4R1,5	4R2,5	5M1	5M2
CENTRAL, AGES 15-24	2,8	7,0	8,5	4,2	32,4	8,5	8,5	5,6	1,4	1,4	7,0	2,8	1,4	0,0	1,4	0,0	1,4	2,8	0,0	1,4	0,0	1,4	0,0
CENTRAL, AGES 25-34	3,6	3,6	10,9	7,3	29,1	0,0	5,5	7,3	7,3	3,6	10,9	0,0	1,8	3,6	0,0	0,0	1,8	0,0	0,0	1,8	1,8	0,0	0,0
CENTRAL, AGES 35-44	0,0	0,0	10,9	6,5	32,6	4,3	8,7	4,3	4,3	2,2	8,7	2,2	6,5	2,2	0,0	2,2	0,0	4,3	0,0	0,0	0,0	0,0	0,0
CENTRAL, AGES 45 AND OVER	0,0	3,3	6,7	3,3	23,3	0,0	10,0	3,3	0,0	0,0	6,7	6,7	6,7	0,0	10,0	0,0	0,0	13,3	0,0	0,0	0,0	6,7	0,0
LATERAL, AGES 15-24	0,0	1,4	2,8	1,4	16,9	9,9	5,6	12,7	1,4	1,4	18,3	1,4	9,9	4,2	1,4	0,0	2,8	2,8	0,0	1,4	0,0	2,8	1,4
LATERAL, AGES 25-34	0,0	0,0	9,1	5,5	12,7	3,6	9,1	9,1	9,1	3,6	9,1	1,8	10,9	0,0	0,0	0,0	7,3	1,8	0,0	5,5	0,0	1,8	0,0
LATERAL, AGES 35-44	0,0	2,2	8,7	4,3	6,5	8,7	15,2	13,0	4,3	2,2	19,6	2,2	2,2	4,3	2,2	0,0	0,0	2,2	0,0	0,0	2,2	0,0	0,0
LATERAL, AGES 45 AND OVER	0,0	3,3	3,3	3,3	6,7	0,0	16,7	0,0	13,3	3,3	13,3	3,3	0,0	3,3	0,0	0,0	10,0	3,3	3,3	10,0	0,0	3,3	0,0
CANINE, AGES 15-24	0,0	0,0	1,4	0,0	2,8	16,9	0,0	5,6	0,0	0,0	9,9	11,3	11,3	7,0	1,4	0,0	4,2	16,9	1,4	4,2	2,8	2,8	0,0
CANINE, AGES 25-34	0,0	0,0	0,0	0,0	0,0	25,5	0,0	5,5	0,0	0,0	5,5	18,2	5,5	12,7	0,0	0,0	0,0	10,9	0,0	12,7	0,0	3,6	0,0
CANINE, AGES 35-44	0,0	0,0	0,0	0,0	4,3	21,7	0,0	8,7	0,0	0,0	2,2	21,7	2,2	13,0	0,0	0,0	0,0	15,2	0,0	6,5	2,2	2,2	0,0
CANINE, AGES 45 AND OVER	0,0	0,0	0,0	0,0	3,3	13,3	0,0	6,7	3,3	0,0	0,0	13,3	3,3	6,7	3,3	0,0	3,3	30,0	0,0	3,3	0,0	6,7	3,3

Figure 3: The distribution of the maxillary central, lateral and canine teeth according to the gender and according to the Vitapan Classical colour scale (M:Male, F:Female)

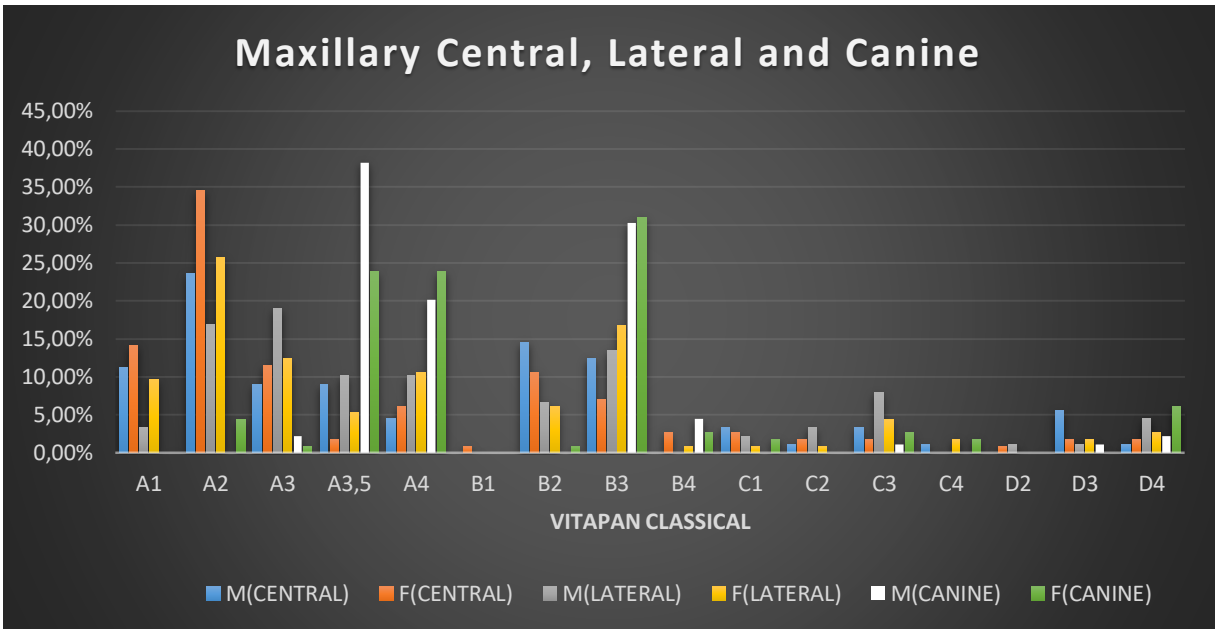

Figure 4: The distribution of the maxillary central, lateral and canine teeth according to the gender and according to the VITA Toothguide 3-D MASTER colour scale (M:Male, F:Female)

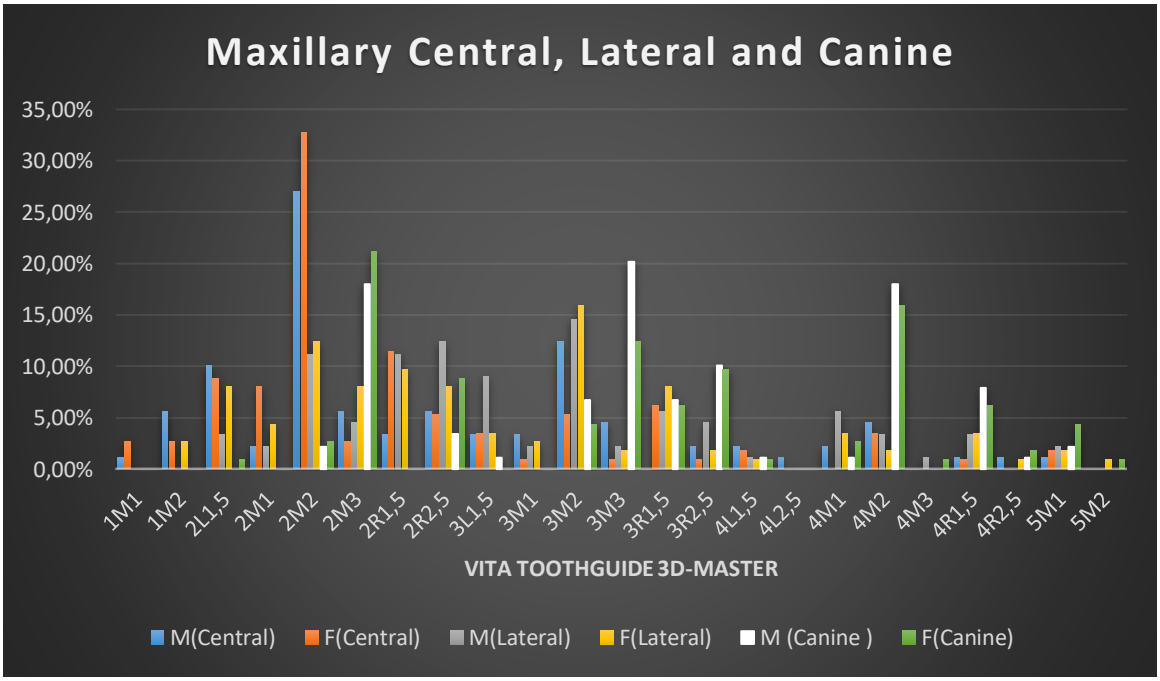

Table 3: The general distribution of the colour measurement of all individuals' Right Maxillary Central, Lateral and Canine teeth

		MIN.	MAX.	MEAN	STD. DEV.
CENTRAL	L*	-5,3	10,0	1,98	3,16
	a*	-5,5	7,0	1,61	2,17
	b*	-0,57	0,35	-0,03	0,10
LATERAL	L*	-8,8	10,2	1,13	3,15
	a*	-5,5	13,6	1,05	2,57
	b*	-0,87	0,74	-0,03	0,13
CANINE	L*	-4,4	11,9	1,68	3,11
	a*	-2,5	10,1	2,53	2,59
	b*	-0,68	0,24	-0,08	0,12

Table 4: The colour measurement distribution of the Right Maxillary Central, Lateral and Canine teeth according to the gender distribution

		MIN.	MAX.	MEAN	STD. DEV.
CENTRAL (Male)	L*	-5,3	10	1,85	3,25
	a*	-5,5	7	1,44	2,20
	b*	-0,57	0,35	-0,02	0,10
LATERAL (Male)	L*	-4,6	6,9	0,85	2,56
	a*	-3,4	13,6	0,70	2,63
	b*	-0,87	0,13	-0,05	0,13
CANINE (Male)	L*	-3,6	11,9	1,62	3,17
	a*	-2,1	8,6	2,30	2,43
	b*	-0,52	0,11	-0,07	0,09
CENTRAL (Female)	L*	-5,2	9,4	2,09	3,10
	a*	-3,3	6,9	1,74	2,15
	b*	-0,42	0,13	-0,03	0,10
LATERAL (Female)	L*	-8,8	10,2	1,35	3,54
	a*	-5,5	7,7	1,33	2,49
	b*	-0,51	0,74	-0,05	0,14
CANINE (Female)	L*	-4,4	9,5	1,72	3,08
	a*	-2,5	10,1	2,72	2,70
	b*	-0,68	0,48	-0,09	0,14

Table 5: The comparative table of the ΔE* values belonging to the Central-Lateral, Central – Canine and Lateral –Canine teeth

ΔE*		CENTRAL-LATERAL	CENTRAL-CANINE	LATERAL-CANINE
	Min.	0,36	0,41	0,32
Male (89)	Max.	13,43	15,44	10,27
	Mean.	3,66	4,21	4,29
	Std. Dev.	2,50	2,80	2,46
	Min.	0,32	0,61	0,22
Female (113)	Max.	10,56	10,97	17,61
	Mean.	3,91	4,67	4,47
	Std. Dev.	2,24	2,44	2,72
	Min.	0,32	0,41	0,22
Total (202)	Max.	13,43	15,44	17,61
	Mean.	3,80	4,47	4,39
	Std. Dev.	2,36	2,61	2,60