Evaluating Facial Esthetics Using Frontal and Three-quarters Views Versus Profile Silhouettes

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Introduction

A major aspect of diagnosing and treatment planning in orthodontics involves the evaluation and analysis of patients from the profile view. Profiles of the patients are assessed for balance, harmony, and overall facial esthetics. Lateral cephalometric radiographs are used to derive measurements that are compared to a set of norms. Studies and papers have documented the variability in the so-called ideal norms due to factors such as sex, ethnicity, and the public's ever-evolving opinion of beauty. Therefore orthodontists often remind themselves not to overemphasize cephalometric numbers and to consider the whole face.

With the previous statement in mind, one wonders whether the profile view and the lateral cephalometric radiograph dictate too much of the diagnosis and treatment plan in orthodontics. After all, people tend not to see others or remember races from a profile view. Instead, people usually socially engage with each other face-to-face or from a slightly turned view. One will probably even find it challenging if asked to mentally picture a friend or relative in profile. Does the perception of a face change when viewed from different angles? Does the perception of esthetics alter when patients are evaluated from the frontal and three-quarters views? The purpose of this study is to determine whether a group of orthodontists will have different perception of facial esthetics when evaluating patients using frontal and three-quarters views versus using profile silhouettes. The hypothesis is that there will be differences in the evaluations.

Literature Review

> "Faces are among the most important parts of the human anatomy. Not only are the senses housed within the immediate vicinity of the face, but the muscles of that area portray expressions and moods such as anger, joy, sadness, frustration, happiness, and laughter. Emotions can be readily read from the face, and negative emotions can be difficult to conceal. Other body parts can be hidden from view by clothing, but faces in most cultures are exposed for all to see." (Jacobson 1984)

The importance of facial esthetics has interested people of different cultures throughout history. Dating back to pre-historic times, man has expressed his appreciation for the human form and beauty with his primitive cave paintings. The great artisans of the Egyptian culture 5,000 years ago left us numerous statues, paintings, monuments, and other works of art that clearly depict their appreciation for their ideal beauties. The idealized Egyptians of the Old Kingdom tended to have round, broad faces with sloped forehead, weak brow ridge, prominent eyes, evenly contoured nose, thickened lips, and a mild yet positive chin (Janson 1963). Bimaxillary protrusion was characteristic of these idealized faces. Queen Nefertiti, who lived over 1,000 years after the Old Kingdom, defined grace and beauty for her time period. Her balanced features and well-developed mandible were not too different from today's standards.

Later, the Greek culture heavily influenced art, philosophy, and way of life in the Western Hemisphere for centuries, even today. Philosophers such as Plato and Aristotle introduced "aesthetics" as both the study of beauty and the philosophy of art. Plato stated "... the qualities of measure and proportion invariably... constitute beauty and excellence" (Beardsley 1966). These philosophers stressed that beautiful creatures respected certain geometrical laws, since true beauty necessarily displayed harmony.

In classical Greek sculptures, the ideal face is oval and slightly tapering towards the chin. The anteriorly prominent forehead was a common feature, as was a straighter sweep from the forehead to the nose tip. The lower face is generally orthognathic and well balanced by today's standards. This is the classical Greek beauty that greatly influenced Edward H. Angle and his artistic friend, E. H. Wuerpel. Specifically, Angle admired the handsome Apollo Belvedere and beautiful Aphrodite of Melos, and stated "...every feature is in balance with every other feature and all the lines are wholly incompatible with mutilation or malocclusion" (Angle 1900).

The Renaissance was a period of revival for music, art, philosophy, and science after the Dark Ages. Art was heavily influenced by both Greek and Roman forms, as statues like the heroic David by Michelangelo expressed the highest aspirations and ideals of that time period.

In 1865, Woolnoth from Britain conducted a rather objective study of human facial esthetics. His paper included classifications for facial forms in the following manner:

> "The general form and outline of all faces, especially as they are seen in profile, are of three orders - the straight, the convex, and the concave. The straight face is considered the handsomest, and may be [detected by drawing] a straight line from the top of the forehead to the bottom of the chin without intersecting more than a portion of the nose and a very small part of the upper lip... Convex faces retain a youthful appearance beyond the natural periods... Concave faces give younger persons somewhat of an old fashioned appearance, and most unfortunately bring the face too soon to its maturity." (Woolnoth 1865)

From a sociological perspective, facial attractiveness plays a crucial role in a person's life, more than one may realize or believe. As Burstone (1958) stated, "In man, the lower face serves not only in the interests of digestion, speech, and respiration, but it also influences to a large extent the social acceptance and psychological well-being of the individual. Appearance, therefore, is one of the primary functions of the face." The effects of facial attractiveness are evident in many different social situations, including friendship, dating and marriage choice, scholastic assessments, helping behaviors and criminal identification (Berscheid et. al. 1974, Adams 1977). In a study by Shaw in 1981, unattractiveness was associated with low perceived intelligence. In another study by Adams in 1974,

parents and teachers were found to bias their expectations of the likely performance of children based on their attractiveness. These same attractive children also tend to be more popular among their peers, have better personal attitudes, and get elected as class representatives at school.

More specifically, evidence suggests that the oral or dentofacial area is of primary importance in determining the overall attractiveness of a face (Terry 1977). As Macgregor (1969) pointed out,

> "The area in and around the mouth is both emotionally charged and strongly connected with one's self image. As an instrument of speech and eating, as well as a mirror of emotions, it also has unique social and psychological implications and symbolic meaning. Any abnormality in this area, therefore, is not only highly visible and obtrusive but, as research has shown, tends to evoke a type of aversion which is both esthetic and sexual."

For those who are esthetically-challenged, their appearance may elicit unfavorable responses from others around them, responses that can eventually lead to psychological issues. Compared to other types of disabilities, little attention is given to facial disfigurement. This lack of acknowledgement is extraordinary considering that defects of the face can be one of the most tragic handicaps a person can possess. This handicap is both social and psychological (Macgregor 1969).

Self-esteem and feelings of social acceptance are often lacking in a person with poor facial esthetics (Stricker 1970). A child with buck teeth, for instance, or a receding chin often becomes a target for teasing, ridicule, or nicknames around his peers. Macgregor's 1969 study at New York University College of Medicine discovered that for those patients whose deformities evoked ridicule, stimulated jokes, and were sources of amusement, the psychological impact was immense. For the victims, "... derisive laughter is one of the most potent and destructive instruments men can use and the shame, anger, and distress it can generate is immeasurable." These patients are often in worse psychological state, are more maladjusted, and have more behavioral disorders than those with more severe deformities. This is because the more severe the deformity, the more likely it is to cause distress to an observer, eliciting strong emotional reactions like sadness or pity. As Aristotle once said, "The thing at which we laugh is a defect or ugliness which is not great enough to cause suffering or injury." Because their handicap is not "severe" or "devastating" enough, these patients are tortured in psychological purgatory. A major part of the psychological stress and trauma comes from the uncertainty and unpredictability these patients experience everyday. Compared to someone who is confined to a wheelchair due to a missing limb, the lack of predictable or consistent response to their facial deformity creates feelings of anxiety and stress in social situations because these sufferers are never sure how others will respond to their looks (Macgregor 1953).

In our industrialized and prosperous society today, the emphasis placed on attractiveness is greater than ever. People are in constant pursuit of toned physiques and beautiful faces. Research has shown that the development of esthetic awareness begins at an early age. Young loved ones are surrounded by cute dolls, pictures, and toys. Fairy tale princesses are always beautiful while the heroic princes are always handsome. Mass media such as film, television, newspapers, and magazines constantly bombard us with images of gorgeous people with perfect faces and bodies while disapproving and antagonizing the unattractive but often more realistic physical features.

The need to be physically attractive has gone beyond the clothing, cosmetics, and jewelry industries: it has extended into medicine and dentistry. Many seek physical alterations to their bodies and faces in otherwise functionally normal situations. One would not be surprised to find a patient who, after orthodontic treatment, desires a rhinoplasty and/or genioplasty to get the "works" done.

There have been studies that have examined the strong desires and motivating factors for those who seek orthodontic and/or orthognathic treatment. In a study conducted by Shaw (1979), cosmetic considerations, more than any other factor, was the greatest motivating factor for the general public to initiate orthodontic therapy. Jacobson's 1984 study revealed similar results with patients considering orthognathic surgery, with seventy-six percent of the subjects citing the desire to improve facial appearance as the biggest driving force, while seventy

percent cited health reasons to improve jaw function. The percentages may be even higher than seventy-six percent, for it is possible that many patients were unwilling to appear too superficial and over-concerned with their own outer appearances.

Those seeking treatment to alter their appearances generally do not make the decision on impulse. An awareness of their disfigurement has been present for quite some time. The two-to-one female-to-male ratio for those seeking treatment relates well to the sociological and psychological factors. The incidence of dysplasia is not sexually dimorphic. Instead, females are usually less inhibited to act upon their desires for physical improvement, especially considering the pressure placed by society today for them to be attractive, have the perfect body, perfect skin, perfect hair, and perfect faces (Jacobson 1984).

The effects of treatment are often undeniably positive afterwards, as demonstrated by the same patients in Jacobson's 1984 study. They reported experiencing many life changes as a result of the procedures. Over sixty-five percent of them claim that they have felt an immediate positive influence on their own personality and self-confidence. This euphoria in turn led others to respond to them in a more positive manner.

Orthodontists realized very early on that facial esthetics plays a big role in diagnosis and treatment planning. Orthodontists possess the ability to alter a patient's facial attractiveness, especially when working in combination with an oral-maxillofacial surgeon. Sergl in 1970 demonstrated that even minor variations

in tooth position can be a significant determinant of the overall esthetic impressions of a face. Because of this special power to have such an influence on a person's life, great efforts have been given to the study and understanding of the human face.

Angle's adoration with the face of Apollo Belvedere influenced the orthodontic thinking for quite some time. He believed that placing the natural denture in normal occlusion would yield ideal esthetic results. This idea he would later retract. Angle wrote in 1907,

> "We know that while all human faces are greatly alike, yet that all differ. Lines and rules for their measurements have been sought by artists, and many have been the plans for determining some basic line or principle form which to detect variations from the normal, but no line, no measurement admits of anything nearly like universal application. The beautiful face of Apollo Belvedere has been largely used as a guide toward the ideal and from which to judge variations, but his is impractical and misleading, for, notwithstanding the beautiful harmony of proportions of that face, with its straight line touching the frontal and mental eminences and the middle of the wing of the nose, its range of application has been found to be very limited in gauging the harmony or inharmony of other faces."

Case (1896, 1907), like Angle, realized the importance of considering facial esthetics in orthodontic diagnoses. He did not employ the use of measurements and relied more upon his power of observation to correct malocclusions with considerations for the facial outlines.

What constitutes a good face? We recognize beauty, yet objective standards are difficult despite many attempts to assign numbers and measurements. Evaluation of facial esthetics is at best subjective because "balance and harmony of facial components do not necessarily mean an attractive face" (Czarnecki 1993). Wuerpel thought that faces can be beautiful even though they may be proportioned differently. The important factor, he thought, is balance, which means that one part of the pattern must not be overemphasized at the expense of another (Wuerpel 1937).

Many great artists believed that the average may serve as a guide to excellent facial form. Albert Durer thought that if one is to represent beauty, he should note deformity and teach himself to avoid it. Leonardo da Vinci, using this same negative approach, said that if he encountered an uncommon face he would carefully study and draw it. Sir Joshua Reynolds preached that beauty is "the medium or center of various forms of individuals within every phase of animal life." This, of course, closely approximates the statistic known as the mean. (Burstone 1958) An interesting note from Goldsman's study in 1959 – a panel of artists, in the same manner as the orthodontists, placed their attention to the lower face and its relations to the entire face.

According to Riedel (1957), there were three primary sources from which he and his contemporaries obtained their esthetic ideals:

> "The first source of esthetic idealism was probably derived from paintings, drawings, and ancient sculptures… For many years, artists have attempted to establish standards for facial esthetics…
> A second source of concepts of esthetics developed through the tremendous influence of such men as Grieve and Tweed, who have developed concepts of esthetics based upon accepting as pleasing or satisfactory a face in which the orthodontist visualizes a denture as stable and incisors in an uncrowded upright position…
> A third concept of esthetics has been taken from cephalometric angular and linear standards which have been established from lateral headfilms by Downs and other workers… Other standards from lateral headfilms have been drawn by Younger, Mayne, Toothaker, Baum, Petraitis, Margolis, Noyes, Rishing, and Sims, Speidel and Stoner, etc."

Riedel also mentioned another possible source, the one of mass media and magazines, although at that time this reason was not accepted by all authors. Today, the reasons that Riedel proposed still hold true, some more than others. Many new studies and authors have contributed thoughts on the topic since.

The cephalometric analysis has been used as the standard for diagnoses and treatment planning because of "… the ease of procuring, measuring, and comparing (superimposition) hard tissue structures and the belief that treating to cephalometric hard norms results in a pleasing face"(Arnett 1993). Great clinicians such as Downs, Steiner, and Tweed have all believed this and have contributed immensely with their studies. Tweed (1953) placed particular emphasis on facial esthetics because he was convinced that good occlusion is

possible only where there is reasonable balance between various component parts of the dentofacial complex and "... only when normal occlusion accompanies a normal face pattern is the ultimate in balance and harmony of the facial lines possible." He introduced the Tweed Facial Triangle to aid in the diagnosis and treatment plan.

It is not the focus of this paper to review or list all the studies or all the cephalometric numbers, but it is important to point out that through the great efforts of the researchers, there exists many different cephalometric standards and analyses to aid in making diagnosis and treatment planning more objective and less subjective.

It is interesting to look at the significance of these studies and cephalometric numbers as applied to the subjective topic of facial esthetics. Utilizing objective standards to achieve a subjective end result like facial esthetics may not be quite so straightforward. Park and Burstone (1986) pointed out that even when they evaluated thirty treated cases with lower incisors approximately 1.5 mm anterior to the A-Pog line, there still can be large variations in facial profile.

Neger attempted in 1959 to quantify soft tissue measurements after he realized the limitations of the hard tissue cephalometric analyses. He concluded by stating that a straight or pleasing profile does not necessarily accompany normal occlusion. He also discovered that extensive dental change does not necessarily translate into extensive soft tissue changes.

In his study in 1987 Wylie analyzed ten patients using five popular cephalometric analyses. He found only forty percent agreement on treatment planning among the different analyses and concluded that this disparity makes cephalometrics a poor choice for the primary diagnostic tool. The selection of the appropriate treatment plan should not be based only upon the clinician's assessment of the final result with regard to esthetics, function, and stability, but also upon the patient's objectives and perceptions of need.

So how well do the clinicians and the patients' ideals and perceptions coincide? Before recommending treatment alternatives to patients, it is important for orthodontists and oral surgeons to know whether their evaluation of facial esthetics in congruent with those of the general public. In 1947 Riedel found that none of the tracings of female Hollywood stars were judged to be anything more pleasing than "fair" in the opinions of orthodontists. Most of the celebrities' profiles were perceived as too protrusive. Peck and Peck's 1970 of the faces of beauty contest winners concluded that the lay public admired a fuller, more protrusive dentofacial relationship than ones based on orthodontic standards. Cox and Van der Liden in 1971 compared the esthetic standards of ten orthodontists and ten lay persons. They concluded that there is no statistical difference between the two groups when asked to compare silhouettes for good facial balance. In another study seven years later, Lines this time found significant differences in the evaluations of facial profile silhouettes among orthodontists, oral surgeons, other dental professionals, and lay persons (Lines 1978). Prahl-Anderson in 1979 found

significant differences between the parents of children participating in the Nymegen Growth Study and dental professionals: the parents were more accepting of dentofacial relationships that deviated from normal (Prahl-Andersen 1979)

Bell in 1985 found that the lay person's ratings of an individual's profile are similar to the ratings given by orthodontists and oral surgeons, but they tend to perceive others as being more normal than do the dental specialists. On the other hand, individuals perceive their own profiles differently than the orthodontists, oral surgeons, and lay persons.

It should be clear by now that given the importance of facial esthetics and the role it plays, it is still an area of study that causes intrigue because of its subjectivity. The concept of beauty is, among other things, heavily influenced by, racial, cultural, and temporal factors. A modern-day orthodontist does not try to fit all his patients into a single mold. Instead he seeks to reach the optimum esthetic result consistent with good function. Are the orthodontists trained and ready to make that call? How does he confirm his perception, his own subjective standards, for beauty? Are his eyes artistic enough to decide? Can he trust his own eyes and mental images of beauty? Can a person be attractive from one view but not another? Does the lateral profile view give the whole picture or is it often overemphasized in diagnosis and treatment planning?

Materials and Methods

Forty-seven cases were selected at random from the archives at the Department of Orthodontics at Oregon Health Sciences University. Despite the random selection, the desire was to choose case files that provided full records and diagnostic-quality photographic slides. The photographic slides became a major screening tool as some cases had pictures that were of poor quality. Some of the contributing factors included significant size discrepancies for the subjects, poor lighting, poor color, or pictures taken at poor angles.

Once the cases were chosen, the following information was extracted from each file, based on initial pretreatment values:

1. Sex
2. Age
3. Ethnicity
4. Angle of Convexity
5. ANB Angle
6. Upper/lower lip Relationship to E-Plane
7. Percent Nasal Height

Each pretreatment lateral cephalometric radiograph was traced, outlining only the soft tissue profile for each subject. The same operator (principle investigator) traced all forty-seven profiles to minimize discrepancy due to interpretation of landmarks. Each tracing was done on a sheet of acetate paper

with the subject's Frankfort Horizontal plane parallel to the top and bottom edges. The slight enlargement for each of the lateral cephalometric radiograph is of no consequence for the purposes of this investigation.

Each subject's frontal and three-quarters view photographic slides were scanned using the AFGA DUOSCAN HiD scanner with transparency adapter. Each digitized image was then imported into Adobe Photoshop 5.5. With Photoshop, the principle investigator was able to crop and move each image in an attempt to standardize the size of the photos for all forty-seven subjects. The standardized frontal and three-quarters photographs were then imported into Microsoft Powerpoint for presentation.

All forty-seven traced profile silhouettes were imported into Microsoft Powerpoint in the same manner using the AFGA scanner and Adobe Photoshop.

The survey was presented to each evaluator using Powerpoint on a Gateway PC laptop computer. The presentation was designed to allow an evaluator to sit at the computer, to be introduced to the project, to be given a set of brief simple instructions on how to proceed through the survey and how to give their responses, and then to be presented each case for evaluation. The evaluator simply needed to hit the arrow keys on the computer's keyboard to either proceed to the next slide or return to a previous slide. The presentation consisted of two parts. Part I included all forty-seven subjects' frontal and three-quarters photographs in random order while Part II included all forty-seven subjects' profile silhouettes in random order. On each Powerpoint slide, whether it

displayed the frontal and three-quarters photographs or displayed the profile silhouette, two questions for this investigation were asked:

1) How would you rate this subject's facial esthetics on a scale of 1 – 10 (1= very poor, 5= average, 10= very good)?
2) Would you treatment plan to alter the subject's facial esthetics (Y/N)?

Each evaluator then manually marked his/her response in the corresponding blank on the provided answer sheet. A sample of the response sheet is included in Appendix Table 20.

The survey results for each evaluator were manually imported into Microsoft Excel for data organization and analysis.

Only orthodontists were selected as evaluators for this investigation. The eighteen evaluators used in this study included seven faculty and eleven residents of the Department of Orthodontics at Oregon Health Sciences University.

Results

A total of eighteen orthodontic examiners took the facial esthetics evaluation survey. Of these eighteen, seven were orthodontic faculty members and eleven were graduate residents of the Department of Orthodontics at Oregon Health Sciences University.

All responses were imported into Microsoft Excel and statistical analysis performed.

The cephalometric measurements and patient data are displayed in the Appendix on Table 1.

The master list of all raw scores from the evaluators' responses is listed in the Appendix on Table 2.

Overall, when considering the esthetics ratings for the frontal and three-quarters photographs and the profile silhouettes given by the examiners, the following means and standard deviations were observed:

Fig. 1: Esthetics Ratings – Overall Mean

	Photographs	Profile Tracings
Mean	5.34 $\pm$ 1.65	5.21 $\pm$ 1.76
Range	1-10	1-10

All the ratings and calculations are listed in the Appendix on Table 3 and Table 4.

Although two-tailed paired t-test did not reveal the difference to be significant ($p<0.05$), the means show a general trend that will be repeated later.

Next, in effort to observe the effects of the different skeletal patterns, the patients' ratings were further analyzed using the following criteria based on their cephalometric measurements: 1) Angle of Convexity, 2) ANB Angle, 3) Upper Lip to E-Plane, 4) Lower Lip to E-Plane, and 5) Percent Nasal Height.

For each criteria analyzed, patients were grouped into one of three categories for the measurement being considered: 1) Below the acceptable range, 2) Within the acceptable range, or 3) Above the acceptable range. The "acceptable ranges" were obtained from the normal cephalometric means and ranges used in common orthodontic cephalometric analyses.

When the patients' ratings were grouped according to their skeletal angle of convexity, the following results were obtained:

Fig 2. Mean Esthetics Ratings - Angle of Convexity

Acceptable Range: -8.5 to +10	Photographs	Profile Tracings
Below Range (N = 1)	**5.61 ± 1.19**	**4.33 ± 1.18**
Within Acceptable Range (N = 35)	**5.57 ± 1.62**	**5.49 ± 1.74**
Above Range (N = 11)	**4.57 ± 1.52**	**4.40 ± 1.54**

The data and calculations are displayed in the Appendix, Table 5 and Table 6.

When the patients' ratings were grouped according to their skeletal ANB angle, the following results were obtained:

Fig. 3: Mean Esthetics Ratings - ANB Angle		
Acceptable Range: -1 to +5	Photographs	Profile Tracings
Below Range (N = 0)	**NONE**	**NONE**
Within Acceptable Range (N = 36)	**5.68 ± 1.55**	**5.48 ± 1.73**
Above Range (N = 11)	**4.19 ± 1.40**	**4.31± 1.54**

The data and calculations are displayed in the Appendix, Table 7 and Table 8.

When the patients' ratings were grouped according to their upper lip to E-plane relationship, the following results were obtained:

Fig. 4: Mean Esthetics Ratings - Upper Lip to E-Plane		
Acceptable Range: -7mm to –3mm	Photographs	Profile Tracings
Below Range (N = 0)	**NONE**	**NONE**
Within Acceptable Range (N = 14)	**5.97 ± 1.47**	**5.78 ± 2.10**
Above Range (N = 33)	**5.07 ± 1.64**	**4.98 ± 1.72**

The data and calculations are displayed in the Appendix, Table 9 and Table 10.

When the patients' ratings were grouped according to their lower lip to E-plane relationship, the following results were obtained:

Fig. 5: Mean Esthetics Ratings - Lower Lip to E-Plane		
Acceptable Range: -5mm to –1mm	Photographs	Profile Tracings
Below Range (N = 2)	**5.50 ± 1.27**	**4.00 ± 1.41**
Within Acceptable Range (N = 20)	**5.61 ± 1.71**	**5.48 ± 1.76**
Above Range (N = 25)	**5.10 ± 1.58**	**5.09 ± 1.72**

The data and calculations are displayed in the Appendix, Table 11 and Table 12.

When the patients' ratings were grouped according to their skeletal percent nasal height, the following results were obtained:

Fig. 6: Mean Esthetics Ratings - Percent Nasal Height		
Acceptable Range: 40%-46%	Photographs	Profile Tracings
Below Range (N = 0)	**NONE**	**NONE**
Within Acceptable Range (N = 38)	**5.29 ± 1.64**	**5.24 ± 1.73**
Above Range (N = 9)	**5.51 ± 1.66**	**5.09 ± 1.85**

The data and calculations are displayed in the Appendix, Table 13 and Table 14.

Overall as a whole, when asked whether they would treatment plan to alter the existing facial esthetics, the examiners gave the answers listed in the Appendix Table 15 and Table 16. They answered "yes" for 45.7% of the cases shown with

facial photographs, with ranges from 12.7% (6 out of 47) of the subjects for one particular examiner to 70.2% (33 out of 47) for another. On the other hand, examiners answered "yes" to 42.8% of the subjects when shown the profile silhouettes, the ranges being from 17.0% (8 subjects) to 63.8% (30 subjects).

Fig. 7: Overall Mean – Decision to Change Facial Esthetics

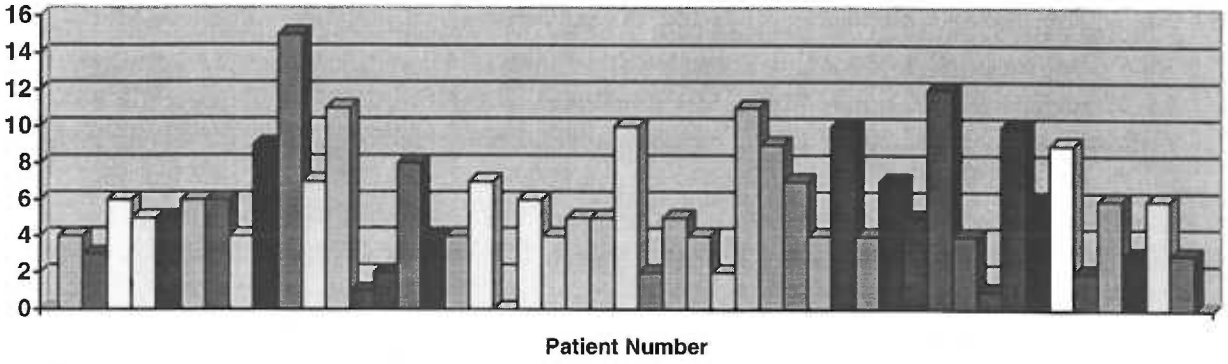
	Photographs	Profile Tracings
Percent "YES"	**45.7%**	**42.8%**
Range for each examiner	**12.7% - 70.2%**	**17.0% - 63.8%**

Using the two-tailed paired t-test, the resulting differences were not significant ($p<0.05$).

To test the examiners' consistency with their own decision to alter the facial esthetics, the number of their own patient evaluations that differed was tabulated (Appendix, Table 17). The average examiner had 14.94 inconsistencies (S.D. 3.22), translating into 31.8% of the total cases. Of the cases disagreed upon, 12 of the 18 examiners tended to give higher esthetic ratings and did not perceive the need for change in facial esthetics when inspecting the traced profile silhouettes, 6 approved of the frontal and three-quarters photographs more, while one examiner had no difference.

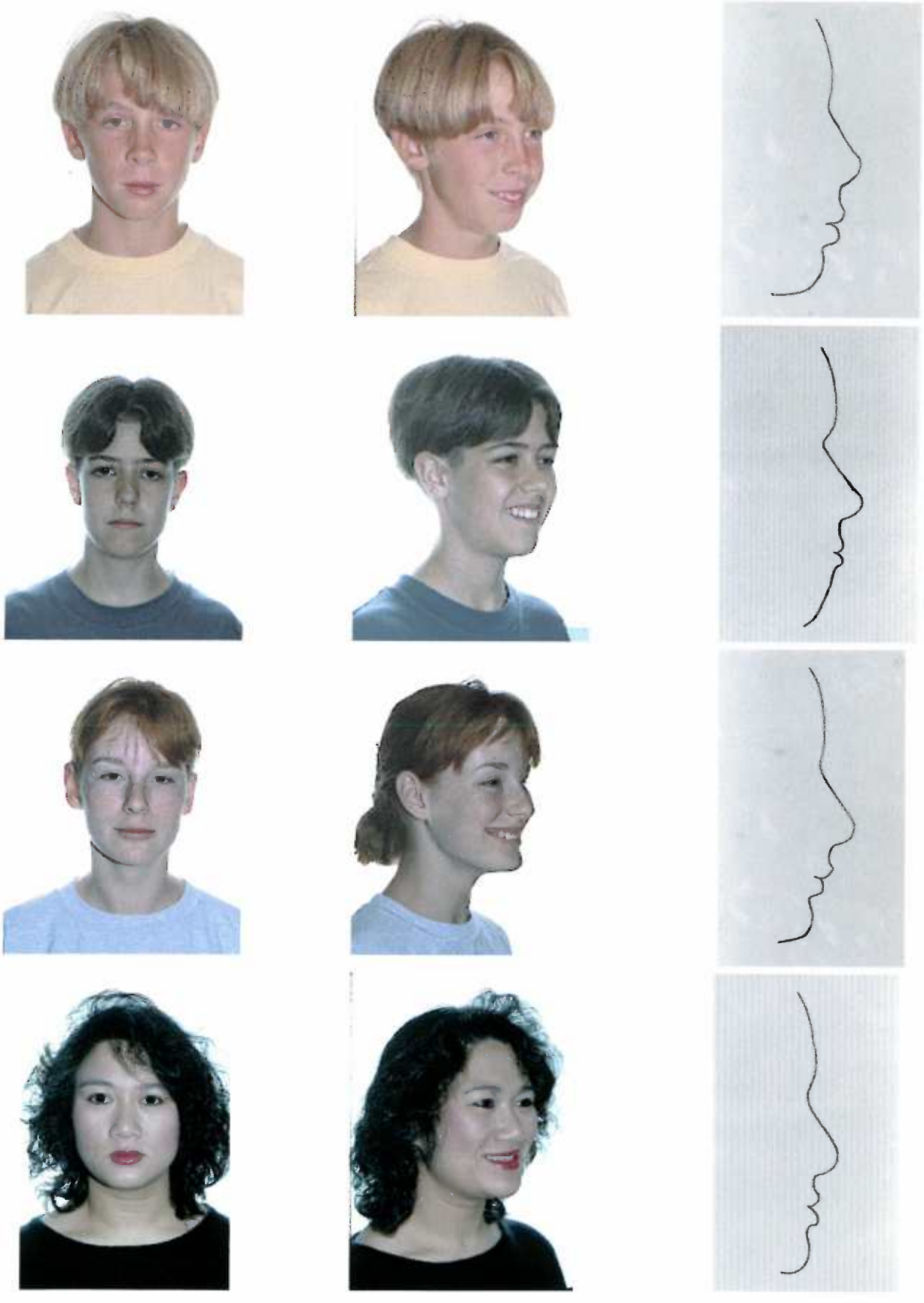
Of the forty-seven patients, there were some who had more intra-examiner disagreements, while there were others who all the examiners tended to agree with themselves (Appendix Table 18). The frequency chart is as follows:

Fig. 8: Frequency of Intra-Examiner Disagreements



The seven subjects with the worst intra-examiner agreement and the seven subjects with the best intra-examiner agreement were selected. Their frontal and three-quarters photographs along with their profile silhouettes are presented in the following Figure 9 and Figure 10. Table 17 in Appendix lists their cephalometric values.

Fig. 9: Patients With the Worst Intra-Examiner Agreement:





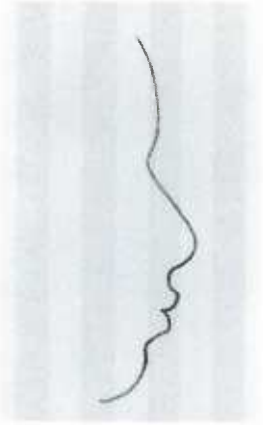
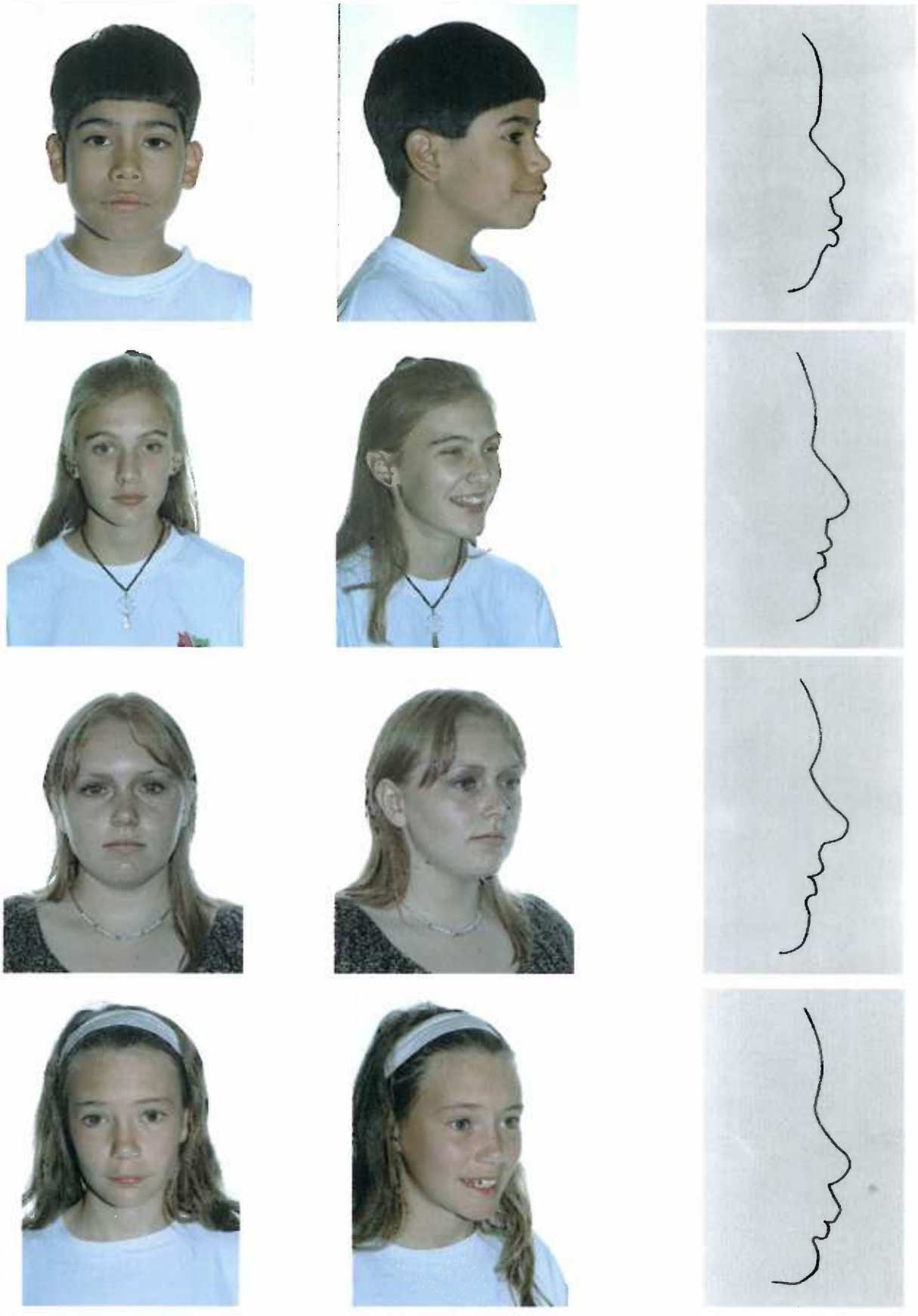






Fig. 10: Patients With the Best Intra-Evaluator Agreement:











Discussion

The subjectivity of facial esthetics, as discussed in the literature review and evident from past studies, can easily be observed from the results obtained during this study. Because of the wide range of ratings and opinions given by each examiner, analyses did not show any differences of statistical significance. Nevertheless, the trends and numbers may still provide a basis for meaningful discussion and further studies.

Although calibration of the examiners did not formally take place before the start of the survey, the option to return or forward to any slide was meant to alleviate this dilemma and improve intra-examiner reliability.

The ratings for the photographs and the silhouettes ran the whole range from 1 through 10. An inspection of the data in the Appendix Table 3 and Table 4 shows that although the scores for each examiner tended to be around the mean of 5, the two extreme scores were still utilized. This may signify the examiners' realization that many people are within acceptable ranges for facial esthetics, either subjectively or objectively speaking. Conservatism and tolerance prevails, especially if one considers the question of how much is too much when it comes to altering someone's appearance based on our own likes and dislikes.

In an effort to evaluate how the different dimensions of the subjects' faces may affect the esthetics ratings, the subjects were grouped according to their

cephalometric measurements based on the following: 1) Angle of Convexity, 2) ANB Angle, 3) Upper Lip to E-Plane, 4) Lower Lip to E-Plane, and 5) Percent Nasal Height. The investigator chose these particular skeletal and soft tissue measurements because of their immediate relevance to facial esthetics.

Overall, the esthetics ratings from facial photograph evaluation tended to average higher than the ratings from profile silhouettes. The overall ratings and trends from Figures 2, 3, 4, 5, and 6 are of interest. Overall, the frontal and three-quarters photographs received higher ratings than the profile silhouettes. This is true even when dividing patients into groups that are either below, within, or above the acceptable test ranges. The only time this did not hold true was for those subjects who were above the acceptable range for the ANB angle (Figure 3). For these patients, examiners rated their facial esthetics higher when judging them from the profile silhouettes.

Figures 2, 3, 4, 5, and 6 also show that the highest ratings are usually given to subjects who fall within the acceptable ranges for each descriptor. This holds true except for two instances: the subjects below the range for angle of convexity (Figure 2) and the subjects above the range for percent nasal height (Figure 6) had higher ratings than the subjects within the norms. Again these differences were not statistically significant. Examiners, through subjective methods, were able to select harmonious, balanced faces.

Trends observed in Figures 2, 3, 4, 5, and 6 suggest the following. Orthodontists are more likely to consider a face favorable and esthetic when given

the opportunity to evaluate the subject from different views versus if only the lateral cephalometric tracing was his only diagnostic tool. The clinician also possessed the ability to discern deviations from the cephalometric norms just from observing the frontal and three-quarters views. Even without the cephalometric measurements he was able to detect these deviations.

Of the different cephalometric groups, the lowest mean ratings from the photographic evaluations were observed in the subjects who were above the acceptable ranges for the angle of convexity and ANB angle (Figure 2, Figure 3). This may be interpreted as the orthodontists' dislike for more convex, fuller faces – a finding that has been reported in previous literature. These same subjects also received low mean ratings from the profile silhouette evaluations.

The generally lower mean ratings given by the examiners for the profile silhouettes may have been for several reasons. As confirmed by at least one of the examiners after the evaluating the survey, orthodontists tend to be more critical with the profile silhouettes because of their biases: they have been trained and are used to critiquing from the lateral cephalometric radiograph. Additional information such as a patient's sex, age, and ethnicity can all aid in making better decisions, but all these factors combine to allow the clinician to make what is still a very subjective decision. These additional pieces of information were not made available to the examiner at the time of the evaluation because of the investigator's unwillingness to complex the issue for the examiners by giving too much information. On the other hand, one has to wonder how the responses may have

differed if a subject's age, sex or ethnicity had been made available. Thirty-eight out of the forty-seven subjects (81%) were Caucasian and twenty-one were male (45%).

In addition, the ratings may have been higher for the photographic view because the photographs allow the examiners to consider the entire face as a whole, allowing attractive eyes, nose, and/or lips a chance to help compensate for a more unaesthetic oral region. The inability to display such features on the profile silhouettes encourages the examiner to focus on the areas that he is most comfortable critiquing when he sees a lateral cephalometric tracing, the oral region.

Interestingly enough, even though they gave higher esthetics ratings to the photographic views, the examiners made the decision to altering the facial esthetics 45.7% of the time when judging the photographs while only 42.8% of the time when judging the profile silhouettes (Figure 7). This inconsistency is open to interpretation, but a possibility is that once prompted to make a decision on whether they would treatment plan to alter facial esthetics, the examiners begins to concentrate more on the oral region, the area where they feel more comfortable and where they can make the biggest difference. Photographs are able to reveal more information, such as a high smile line or proclined incisors that the profile silhouettes cannot. This allows the examiner to be more critical when evaluating the photographs.

Another significant part of the study involves the intra-examiner ratings and answers. Would one elect to extract teeth to correct a perceived unaesthetic bimaxillary protrusive subject based on the profile tracing, but decide otherwise upon seeing the patient in person? After all, a patient can mask a retrognathic mandible very well with something as simple as a beard. The average examiner disagreed with himself 31.8% of the time on whether he would treatment plan to alter a subject's facial esthetics (Appendix Table 17). Obviously, the different evaluation methods gave the examiner very different impressions about the subjects. Of the disagreed cases, twelve of the eighteen examiners gave higher esthetic ratings to the profile silhouettes, while six approved of the frontal and three-quarters photographs more. The differences again may be due to the fact that more oral features are obvious from the photographs versus the profile tracings.

Of the forty-seven subjects, some had very consistent intra-examiner responses while others did not. Seven subjects from the two extremes were selected and their pictures and profile silhouettes are shown in Figure 9 and Figure 10, and their cephalometric values in Appendix Table 17. While no general pattern can be summarized from examining the subjects' cephalometric measurements, some of the subjects who had the best agreement rate were those with the poorest facial esthetics. This reflects on an observation Riedel made in 1950, that there was better agreement on poor profiles than those that were considered good.

The design of this study was made to force the examiner out of his or her comfort zone, asking him to think "outside the box" and to make decisions based on what can be considered "incomplete records." The frontal and three-quarters view photographs were chosen because they better represent live patients and the way people are perceived by others. Photographs were chosen also because they allow the examiner to appreciate all the other features that contribute to the overall facial esthetics. As Cox and Van der Linden expressed in 1971,

> "... lateral head films represent only a certain and limited aspect of the beauty of the face. In the facial beauty appreciated in common life, the profile and full facial view are seldom dominating. Faces are observed primarily from angles situated between the two views indicated above."

Many projects design their studies to use only the silhouettes to eliminate extrinsic "distracting" factors such as eyes, hair, make up, ...etc. It is the investigator's belief that since people are not seen as profile silhouettes, it is imperative that the entire face be considered from different views.

Conclusions

Legan said in 1980, "Planning for facial esthetics is both a science and an art." Facial Balance and harmony are not fixed concepts. The ideals and perceptions of beauty vary tremendously among person to person and are open to a great range of subjective interpretation. In this study eighteen evaluators were asked to evaluate facial esthetics using frontal and three-quarters photographs and profile silhouettes. The data and results suggest that orthodontists give higher esthetic ratings when they are able to observe the patient's face as opposed to profile tracings. The study also suggests that diagnoses and treatment plans that rely heavily on the lateral cephalometric radiograph as the primary tool may not portray the whole picture, as examiners often disagreed with themselves as to the facial esthetics depending on whether photographs or profile tracings were used. The perceived advantages of cephalometric analysis have led to heavy reliance on cephalometry in all aspects of orthodontic treatment. Clinical facial examination has been subordinate to cephalometric examination in treatment planning. Beauty is truly subjective, and the more visual images of a patient that are made available to an orthodontist, the better he or she can make a very subjective decision. With the popularization of 3-D imaging and advanced technology, evaluations of patients will only become better in the future. It is the duty of orthodontists to utilize these records to help achieve a stable, functional, and pleasing result that satisfies both themselves and the patients.

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Appendix

Table 1: Patient Cephalometric Values

Patient #	Sex	Age	Ethnic	Angle Conv (0:-8.5to+10)	ANB (2 :-1 to 5)	Upper Lip-E (-7 to -3)	Lower Lip-E (-5 to -1)	% Nasal Ht (40%-46%)
4528	F	11	W	9	5	-1	1.5	43
4529	F	15	W	7	5	-4	-4	45
4536	F	13	N	10	6	3	3	45
4541	F	13	W	2	3	-5	-3	44
4549	F	12	W	-4	3	-5	-3	45
4551	M	13	W	5	3	-5	-4	46
4557	M	12	W	4	4	-3	-2	47
4559	F	12	W	8	4	-4	-2	46
4562	F	16	W	2	3	-2	0	41
4573	M	10	W	10	4	1	3	42
4574	F	13	W	-10	0	-6	-7	46
4582	F	14	W	5	4	-2	-2	48
4585	F	13	W	2	4	-3	-3	48
4586	F	12	W	7	4	3	1	49
4592	M	14	W	5	3	2	5	40
4593	F	11	W	15	7	2	2	43
4595	M	11	W	7	4	-1	-2	47
4597	M	16	W	-4	-1	-7	-4	44
4600	M	10	N	17	6	6	8	45
4845	F	16	W	3	0	3	0	42
4859	F	30	N	3	3	-3	-5	43
4861	M	12	W	15	6	-1	0	47
4866	F	14	W	16	8	0	-1	43
4868	M	12	N	10	4	-2	-3	46
4869	F	15	W	7	4	6	3	43
4882	F	14	W	13	5	3	2	47
4887	M	12	W	7	5	2	3	47
4893	F	10	N	15	7	-2	-1	42
4898	F	24	N	-1	-1	4	1	44
4902	F	12	W	4	3	3	2	44
4904	M	11	W	-3	-1	7	7	45
4926	F	28	W	0	2	6	5	47
4930	M	17	W	9	5	-1	-1	45
4944	M	28	N	11	7	2	4	43
4945	M	12	W	12	5	0	2	43
4953	F	13	W	-1	0	1	-1	45
4978	M	15	W	2	1	1	-1	44
4986	F	11	W	5	4	-3	-2	45
4989	F	15	W	5	2	-5	-4	42
4990	M	14	N	11	6	0	3	40
4999	M	16	W	-5	4	-3	0	45
5002	M	12	W	12	6	1	4	44
5010	F	27	W	3	6	1	0	42
5020	M	12	W	5	5	3	2	46
5026	M	13	W	1	1	4	3	41
5042	M	14	N	8	5	-6	-8	40
5050	F	17	W	14	7	-1	-3	43

Table 2: Master Raw Scores

Examiner	1				2				3				4				5			
	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch
Patient #																				
4528	5	0	7	0	5	0	6	0	5	1	8	0	8	0	8	0	4	0	5	0
4529	7	0	6	0	7	0	5	0	7	0	7	0	10	0	9	0	5	0	5	0
4536	5	1	5	1	4	1	5	1	5	1	5	1	8	0	6	1	5	0	4	1
4541	4	1	8	0	6	0	6	0	6	1	8	0	7	0	10	0	4	0	5	0
4549	5	1	7	0	5	0	6	0	4	1	6	0	8	0	9	0	5	0	5	0
4551	6	1	5	0	5	0	6	0	7	0	6	0	10	0	8	0	5	0	5	0
4557	7	0	6	0	5	0	6	0	8	0	4	1	8	0	7	0	5	0	5	0
4559	5	1	7	0	4	1	7	0	4	1	4	1	8	0	8	0	4	0	5	0
4562	5	1	5	0	7	1	8	0	5	1	8	0	7	0	10	0	6	0	5	0
4573	4	1	5	0	4	1	6	0	4	1	7	0	8	0	9	0	4	0	4	0
4574	6	1	4	1	7	0	4	1	5	1	4	1	6	0	8	0	5	0	4	1
4582	5	1	5	0	6	1	6	0	4	1	5	0	7	0	8	0	4	0	5	0
4585	7	0	6	0	8	0	8	0	7	0	7	0	10	0	10	0	5	0	5	0
4586	4	1	3	1	7	0	3	1	5	1	1	1	3	1	5	1	4	0	4	1
4592	5	1	5	0	4	0	4	1	4	1	3	1	9	0	8	0	4	0	4	1
4593	4	1	4	1	5	1	5	1	3	1	4	1	7	0	7	0	4	0	4	0
4595	5	1	4	1	6	0	6	0	4	1	5	1	5	0	8	0	4	0	4	0
4597	5	1	5	0	6	1	8	0	4	1	5	0	9	0	10	0	5	0	6	0
4600	6	1	4	1	5	1	2	1	2	1	3	1	5	1	5	1	4	1	4	1
4845	6	0	5	0	5	0	4	1	5	1	3	1	10	0	8	0	5	0	4	0
4859	5	1	3	1	4	1	3	1	3	1	2	1	5	1	4	1	4	0	4	1
4861	7	1	5	0	4	1	5	1	5	1	4	1	8	0	7	0	4	1	4	0
4866	5	1	4	1	4	1	5	1	4	1	5	1	4	1	7	0	4	0	4	0
4868	5	1	5	1	5	0	6	0	5	0	3	1	9	0	5	1	5	0	4	1
4869	5	0	5	0	5	0	7	0	4	1	4	1	8	0	9	0	5	0	4	0
4882	6	1	4	0	6	0	5	0	6	0	5	1	8	0	8	0	5	0	4	0
4887	4	1	3	1	4	1	3	1	4	1	3	1	3	1	6	1	4	0	3	1
4893	4	1	4	1	4	1	3	1	2	1	4	1	2	1	7	1	3	0	3	1
4898	5	1	5	1	5	1	7	0	3	1	6	0	5	1	9	0	5	0	4	1
4902	5	1	6	0	6	0	7	0	5	1	7	0	6	1	10	0	5	0	5	0
4904	4	1	4	1	4	1	5	1	2	1	3	1	8	0	9	0	4	0	4	1
4926	7	0	5	0	8	0	6	0	8	0	7	0	8	0	10	0	5	0	6	0
4930	5	1	5	1	5	0	6	0	5	0	4	1	7	0	7	0	5	0	5	0
4944	5	1	4	1	4	1	3	1	4	1	2	1	6	0	4	1	4	0	3	1
4945	6	0	5	0	6	0	6	0	6	0	4	1	9	0	7	0	6	0	5	0
4953	7	0	7	0	8	0	7	0	9	0	5	1	9	0	10	0	6	0	5	0
4978	7	1	4	1	6	0	4	1	5	1	3	1	10	0	7	0	5	0	4	1
4986	7	0	6	0	5	0	6	0	5	1	4	1	9	0	8	0	5	0	5	0
4989	7	0	7	0	6	0	8	0	7	0	5	1	10	0	9	0	5	0	5	0
4990	6	1	5	1	7	0	4	1	5	1	6	0	9	0	8	0	6	0	4	1
4999	5	0	6	1	6	0	7	0	7	0	8	0	7	1	10	0	4	0	4	1
5002	6	1	6	0	6	0	6	0	5	1	4	1	5	0	6	0	4	1	4	0
5010	4	1	5	1	4	1	5	1	2	1	5	1	2	1	8	0	3	1	4	1
5020	5	1	7	0	7	0	6	0	3	1	6	0	9	0	10	0	6	0	5	0
5026	7	0	6	0	5	0	7	0	6	0	7	0	10	0	9	0	4	0	4	0
5042	6	0	4	1	6	1	3	1	4	1	2	1	5	1	5	0	4	1	4	1
5050	4	1	4	1	5	1	3	1	2	1	4	1	4	1	4	0	3	1	4	0

Table 2: Master Raw Scores

Examiner	6				7				8				9				10			
	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch
Patient #																				
4528	5	1	6	0	7	0	8	0	8	0	8	0	6	0	6	0	7	1	4	1
4529	8	0	6	0	5	1	7	0	8	0	7	0	7	0	6	0	8	0	5	0
4536	3	1	4	1	4	1	5	1	4	1	6	1	4	1	4	1	6	1	3	1
4541	6	0	7	0	5	0	7	0	5	1	8	0	4	1	6	0	8	0	5	0
4549	4	1	7	0	7	0	7	0	8	0	8	0	7	0	5	0	8	0	5	0
4551	7	0	7	0	7	0	7	0	6	1	7	0	4	1	6	0	8	0	5	0
4557	6	0	6	1	8	0	7	0	7	0	6	0	6	0	5	0	8	0	5	0
4559	6	0	7	0	8	0	8	0	6	0	5	1	6	0	6	0	7	0	5	0
4562	4	1	7	0	6	1	8	0	6	0	4	1	8	0	7	0	7	0	6	0
4573	4	1	8	0	7	1	7	0	4	1	8	0	4	1	6	0	4	1	4	0
4574	6	1	3	1	4	1	4	1	5	1	4	1	5	0	5	0	8	0	5	0
4582	6	1	7	0	7	1	8	0	3	1	6	0	5	1	6	0	7	0	6	0
4585	8	0	8	0	9	0	8	0	8	0	8	0	5	1	6	0	8	0	7	0
4586	4	1	4	1	5	1	2	1	5	1	4	1	4	1	4	1	4	1	2	1
4592	6	0	6	1	7	0	6	0	7	1	6	0	6	0	6	0	6	0	3	1
4593	5	1	5	1	7	0	6	0	5	1	6	0	4	1	4	1	5	1	3	1
4595	5	0	6	0	7	0	7	0	5	1	6	0	4	0	5	0	6	0	4	1
4597	5	1	7	0	7	0	9	0	6	1	8	0	5	0	7	0	7	0	7	0
4600	2	1	4	1	5	1	5	1	3	1	4	1	5	1	4	1	4	1	3	1
4845	6	0	7	0	6	0	7	0	8	0	6	0	6	0	5	0	8	0	3	1
4859	6	1	4	1	5	1	5	1	6	1	4	1	5	1	3	1	4	1	2	1
4861	5	1	5	1	4	1	7	0	5	0	6	0	4	1	4	1	4	1	4	1
4866	4	1	5	1	5	1	7	0	4	1	5	1	4	0	4	1	4	1	4	0
4868	6	0	5	1	7	0	6	0	6	0	5	0	4	0	4	1	7	0	3	1
4869	5	1	7	0	7	0	8	0	7	0	5	0	5	0	5	0	5	0	4	0
4882	7	0	6	0	8	0	6	0	7	0	5	0	5	1	4	1	5	0	4	0
4887	4	1	3	1	7	0	2	1	4	1	3	1	4	1	3	1	4	1	2	1
4893	3	1	3	1	4	1	4	1	2	1	3	1	4	1	4	1	3	1	3	1
4898	4	1	6	0	5	1	7	0	4	1	4	1	6	1	5	0	6	0	7	0
4902	6	0	7	0	8	0	7	0	5	1	5	1	5	0	4	1	7	0	7	0
4904	4	1	5	1	6	0	6	1	5	1	4	1	3	1	5	0	4	1	5	0
4926	7	0	7	0	6	0	8	0	10	0	6	0	7	0	6	0	5	0	7	0
4930	7	0	5	1	8	0	7	0	4	1	5	0	4	1	4	1	8	0	3	1
4944	4	1	3	1	5	1	2	1	5	1	3	1	4	1	3	1	4	1	2	1
4945	5	1	7	0	8	0	8	0	7	0	6	1	5	0	4	1	4	1	5	1
4953	8	0	8	0	7	0	9	0	5	1	7	0	7	0	7	0	4	1	8	0
4978	6	0	4	1	7	0	5	1	7	0	4	1	6	0	5	0	6	0	2	1
4986	7	1	6	0	8	0	7	0	7	0	4	1	6	0	6	0	5	0	4	0
4989	7	0	7	0	9	0	8	0	8	0	7	0	6	0	5	0	7	0	7	0
4990	5	1	6	1	8	0	5	1	6	1	5	0	4	1	4	1	4	1	4	0
4999	6	0	8	0	7	0	7	0	4	1	8	0	5	0	7	0	4	1	7	0
5002	5	1	4	1	7	1	6	0	4	1	7	0	4	1	5	0	4	1	4	1
5010	2	1	5	1	5	1	4	1	2	1	8	0	4	1	4	1	3	1	4	1
5020	7	0	6	0	7	0	5	0	5	1	8	0	7	0	6	0	4	1	7	0
5026	5	1	7	0	6	0	5	0	7	0	8	0	5	0	5	0	7	0	5	0
5042	5	1	3	1	6	1	2	1	7	0	5	1	4	1	4	1	5	1	3	1
5050	3	1	4	1	4	1	3	1	5	1	4	1	3	1	3	1	2	1	3	1

Table 2: Master Raw Scores

Examiner	11				12				13				14				15			
	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch
Patient #																				
4528	5	0	7	0	5	1	4	1	5	1	7	0	6	0	5	0	5	0	6	0
4529	4	0	5	0	7	1	7	0	8	0	8	0	7	0	5	1	6	0	5	0
4536	2	1	3	1	5	1	4	0	4	1	6	1	5	0	4	1	4	1	4	1
4541	3	0	6	0	7	0	8	0	5	0	8	0	6	0	7	0	5	0	6	0
4549	4	0	5	0	7	1	6	0	6	1	7	0	5	0	8	0	5	0	5	0
4551	4	1	5	0	7	0	5	1	6	0	7	0	7	0	7	0	5	0	6	0
4557	6	0	4	1	7	0	4	1	8	0	6	1	6	0	5	0	4	0	5	0
4559	5	0	5	0	6	0	4	1	7	1	6	1	7	0	6	0	5	0	5	0
4562	3	1	6	0	8	0	9	0	9	0	8	0	7	0	7	0	3	1	4	0
4573	4	1	5	0	5	1	4	1	4	1	8	0	4	1	7	0	3	1	5	0
4574	5	0	4	0	7	0	4	1	7	1	7	1	4	1	4	1	5	0	4	1
4582	3	1	4	1	5	1	4	1	6	1	7	0	5	0	5	0	4	1	5	0
4585	7	0	7	0	9	0	9	0	8	0	7	0	8	0	7	0	6	0	6	0
4586	4	1	2	1	7	1	3	1	4	1	4	1	3	1	3	1	3	1	3	1
4592	5	0	4	0	6	0	4	1	7	0	7	0	6	0	6	0	5	0	4	0
4593	3	1	3	1	5	1	4	1	6	0	6	1	4	1	5	0	4	1	4	1
4595	4	0	5	0	7	0	5	1	6	0	7	0	6	0	4	1	5	0	5	0
4597	5	0	7	0	7	0	6	0	7	0	7	0	7	0	8	0	4	1	5	0
4600	3	1	2	1	4	1	4	1	7	1	6	1	5	1	4	1	4	1	3	1
4845	6	0	4	1	7	0	5	0	6	0	6	0	7	0	6	0	4	1	4	0
4859	5	0	3	1	5	1	4	1	4	1	4	1	5	1	3	1	3	1	4	0
4861	3	1	4	1	5	1	4	1	6	1	7	0	5	1	4	1	4	1	5	0
4866	4	0	3	1	5	1	4	1	6	0	7	0	6	0	6	0	5	1	4	1
4868	4	1	3	1	6	0	4	1	8	0	7	1	7	0	4	1	5	0	4	0
4869	4	1	5	0	8	0	7	0	6	0	7	0	6	0	7	0	6	0	4	0
4882	5	0	4	0	6	1	4	1	7	0	6	0	7	0	4	1	6	0	4	1
4887	2	1	2	1	6	1	2	1	5	1	4	1	4	1	3	1	5	0	3	1
4893	2	1	3	1	2	1	3	1	4	1	4	1	4	1	4	1	3	1	4	1
4898	4	0	6	0	4	1	6	1	6	0	7	0	6	0	6	0	4	1	5	0
4902	6	0	6	0	6	1	7	0	7	1	8	0	5	0	4	1	6	1	5	0
4904	3	1	4	1	5	1	7	0	6	1	6	0	6	0	5	0	6	0	5	0
4926	5	0	8	0	6	1	9	0	8	0	7	0	8	0	7	1	6	0	5	0
4930	4	0	4	1	7	0	4	1	8	0	5	1	6	0	4	1	4	1	5	0
4944	2	1	1	1	5	0	3	1	4	1	4	1	5	1	3	1	2	1	3	1
4945	7	0	4	1	7	0	5	1	7	1	5	0	6	0	6	0	6	0	5	0
4953	8	0	7	0	7	1	9	0	7	0	8	0	7	0	7	0	7	0	5	0
4978	5	0	3	1	6	0	2	1	8	0	5	1	7	0	4	1	6	0	4	1
4986	5	0	6	0	6	1	5	1	7	1	7	0	6	0	5	0	7	0	4	0
4989	6	0	6	0	8	0	8	0	8	0	8	0	6	0	5	0	5	0	5	0
4990	5	0	4	1	6	1	6	1	6	1	6	1	5	1	4	1	4	0	4	1
4999	6	0	5	0	7	0	8	0	7	1	7	0	6	0	5	0	6	0	5	0
5002	4	1	5	0	5	1	4	1	5	1	5	1	6	0	6	0	4	1	6	0
5010	3	1	4	1	3	1	5	1	4	1	4	1	3	1	4	1	2	1	4	1
5020	5	0	5	0	7	0	7	0	8	0	8	0	7	0	5	1	5	0	5	0
5026	5	0	7	0	6	1	8	0	7	0	8	0	7	0	5	0	6	0	5	0
5042	3	1	3	1	4	1	4	1	8	1	4	1	6	0	3	1	7	0	4	1
5050	3	1	3	1	3	1	3	1	4	1	4	1	3	1	4	1	4	1	5	1

Table 2: Master Raw Scores

Examiner #	16				17				18			
	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch	I-Esth	I-Ch	II-Esth	II-Ch
Patient #												
4528	5	1	5	0	4	1	4	1	5	0	5	0
4529	8	0	7	0	6	0	5	0	5	0	5	0
4536	7	0	2	1	5	0	4	1	4	1	4	1
4541	7	0	6	0	3	1	9	0	5	0	4	0
4549	6	0	6	0	5	0	8	0	5	0	5	0
4551	5	1	7	0	8	0	6	0	4	0	5	0
4557	6	0	9	0	6	0	3	1	5	0	4	0
4559	6	0	8	0	5	0	4	0	5	0	5	0
4562	7	0	7	0	4	0	8	0	4	1	5	0
4573	2	1	5	0	3	1	5	0	3	1	6	0
4574	5	1	5	0	7	0	2	1	4	0	4	1
4582	4	1	7	0	4	1	3	1	3	1	6	0
4585	7	0	7	0	8	0	7	0	6	0	6	0
4586	3	1	1	1	2	1	2	1	4	1	3	1
4592	6	0	2	1	3	1	3	1	5	0	5	0
4593	3	1	4	0	2	1	3	1	4	0	5	0
4595	5	0	4	0	5	0	5	0	4	0	5	0
4597	7	0	9	0	5	0	7	1	4	0	6	0
4600	4	1	3	1	2	1	2	1	5	1	3	1
4845	5	0	4	1	6	0	5	0	5	0	4	1
4859	4	1	2	1	4	0	2	1	4	1	4	1
4861	2	1	4	1	5	0	4	0	5	0	5	0
4866	5	1	3	1	2	1	3	1	4	0	5	0
4868	7	0	4	1	3	1	3	1	5	0	5	0
4869	5	0	6	0	5	0	4	0	4	0	5	0
4882	5	0	4	1	4	0	5	0	5	0	4	0
4887	3	1	2	1	5	0	2	1	4	1	3	1
4893	2	1	2	1	4	0	2	1	3	1	3	1
4898	3	1	5	0	2	1	5	0	4	1	5	0
4902	4	1	7	0	4	0	4	0	5	0	5	0
4904	4	1	4	1	3	1	4	1	4	1	5	0
4926	4	1	9	0	3	1	6	0	7	0	6	0
4930	5	0	5	0	7	0	3	1	5	0	4	0
4944	2	1	1	1	5	0	1	1	3	1	3	1
4945	4	1	5	1	1	1	4	1	5	0	4	0
4953	4	1	8	0	5	0	9	0	6	0	7	0
4978	3	1	2	1	10	0	2	1	5	0	4	0
4986	5	0	7	0	5	0	2	1	4	0	5	0
4989	6	0	6	0	5	0	5	0	5	0	5	0
4990	5	1	3	1	5	0	4	1	4	1	5	0
4999	5	0	5	0	6	0	8	0	5	0	6	0
5002	4	1	5	1	6	0	2	1	5	1	4	0
5010	1	1	4	1	3	1	3	1	4	1	4	1
5020	8	0	8	0	2	1	5	0	6	0	5	0
5026	4	1	5	0	7	0	6	0	6	0	5	0
5042	4	1	2	1	7	0	3	1	6	1	4	1
5050	1	1	2	1	1	1	3	1	3	1	4	0

Table 3: Photographs - Esthetics Ratings

Evaluator		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	sum	Mear	S.D.
Patient #																						
1	4528	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5	100	5.56	1.2
2	4529	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5	123	6.83	1.47
3	4536	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4	84	4.67	1.37
4	4541	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5	96	5.33	1.41
5	4549	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5	104	5.78	1.4
6	4551	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4	111	6.17	1.62
7	4557	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5	116	6.44	1.25
8	4559	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5	104	5.78	1.26
9	4562	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4	106	5.89	1.78
10	4573	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3	75	4.17	1.38
11	4574	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4	101	5.61	1.2
12	4582	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3	88	4.89	1.37
13	4585	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6	134	7.44	1.34
14	4586	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4	75	4.17	1.3
15	4592	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5	101	5.61	1.42
16	4593	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4	80	4.44	1.34
17	4595	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4	93	5.17	0.99
18	4597	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4	105	5.83	1.38
19	4600	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5	75	4.17	1.38
20	4845	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5	111	6.17	1.43
21	4859	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4	81	4.5	0.86
22	4861	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5	85	4.72	1.36
23	4866	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4	79	4.39	0.92
24	4868	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5	104	5.78	1.52
25	4869	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4	100	5.56	1.25
26	4882	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5	108	6	1.14
27	4887	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4	76	4.22	1.11
28	4893	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3	55	3.06	0.87
29	4898	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4	81	4.5	1.15
30	4902	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5	101	5.61	1.04
31	4904	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4	81	4.5	1.47
32	4926	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7	118	6.56	1.72
33	4930	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5	104	5.78	1.48
34	4944	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3	73	4.06	1.16
35	4945	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5	105	5.83	1.76
36	4953	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6	121	6.72	1.49
37	4978	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5	115	6.39	1.72
38	4986	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4	109	6.06	1.31
39	4989	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5	121	6.72	1.45
40	4990	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4	100	5.56	1.38
41	4999	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5	103	5.72	1.07
42	5002	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5	89	4.94	0.94
43	5010	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4	54	3	1.03
44	5020	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6	108	6	1.82
45	5026	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6	110	6.11	1.41
46	5042	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6	97	5.39	1.38
47	5050	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3	57	3.17	1.15

Overall Mean 5.34
Overall S.D. 1.65

Table 4: Profile Silhouettes - Esthetics Ratings

Evaluator Patient #		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	sum	Mear	S.D.
1	4528	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5	105	5.83	1.43
2	4529	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5	106	5.89	1.02
3	4536	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4	81	4.5	1.51
4	4541	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4	124	6.89	1.53
5	4549	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5	114	6.33	1.19
6	4551	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5	108	6	0.84
7	4557	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4	100	5.56	1.76
8	4559	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5	105	5.83	1.38
9	4562	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5	121	6.72	1.6
10	4573	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6	108	6	1.46
11	4574	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4	78	4.33	1.19
12	4582	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6	105	5.83	1.62
13	4585	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6	126	7	0.97
14	4586	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3	52	2.89	1.02
15	4592	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5	85	4.72	1.49
16	4593	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5	85	4.72	1.64
17	4595	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5	96	5.33	1.33
18	4597	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6	127	7.06	1.43
19	4600	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3	69	3.83	1.65
20	4845	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4	89	4.94	1.31
21	4859	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4	62	3.44	1.1
22	4861	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5	89	4.94	1.26
23	4866	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5	87	4.83	1.58
24	4868	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5	80	4.44	1.15
25	4869	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5	101	5.61	1.38
26	4882	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4	85	4.72	0.96
27	4887	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3	50	2.78	0.65
28	4893	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3	64	3.56	1.29
29	4898	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5	101	5.61	0.98
30	4902	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5	111	6.17	1.58
31	4904	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5	89	4.94	1.21
32	4926	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6	122	6.78	1.17
33	4930	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4	86	4.78	1.26
34	4944	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3	49	2.72	1.07
35	4945	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4	98	5.44	1.58
36	4953	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7	131	7.28	1.27
37	4978	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4	69	3.83	1.47
38	4986	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5	98	5.44	1.58
39	4989	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5	117	6.5	1.51
40	4990	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5	87	4.83	1.2
41	4999	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6	118	6.56	1.29
42	5002	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4	91	5.06	1.39
43	5010	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4	85	4.72	1.49
44	5020	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5	114	6.33	1.46
45	5026	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5	109	6.06	1.26
46	5042	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4	66	3.67	1.57
47	5050	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4	68	3.78	1.26

Overall Mean 5.21
Overall S.D. 1.76

Table 5: Comparison of Esthetics Ratings - Angle of Convexity (-8.5 to +10)

Photographs: Esthetics Ratings

Evaluator Patien	Pt #	Angle Convex	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
11	4574	-10	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4
Mean Rating:				5.611																
Standard Deviation:				1.195																
41	4999	-5	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5
5	4549	-4	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5
18	4597	-4	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4
31	4904	-3	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4
29	4898	-1	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4
36	4953	-1	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6
32	4926	0	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7
45	5026	1	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6
4	4541	2	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5
9	4562	2	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4
13	4585	2	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6
37	4978	2	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5
20	4845	3	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5
21	4859	3	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4
43	5010	3	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4
7	4557	4	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5
30	4902	4	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5
6	4551	5	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4
12	4582	5	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3
15	4592	5	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5
38	4986	5	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4
39	4989	5	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5
44	5020	5	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6
2	4529	7	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5
14	4586	7	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4
17	4595	7	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4
25	4869	7	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4
27	4887	7	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4
8	4559	8	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5
46	5042	8	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6
1	4528	9	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5
33	4930	9	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5
3	4536	10	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4
10	4573	10	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3
24	4868	10	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5
Mean Rating:				5.571																
Standard Deviation:				1.623																
34	4944	11	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3
40	4990	11	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4
35	4945	12	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5
42	5002	12	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5
26	4882	13	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5
47	5050	14	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3
16	4593	15	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4
22	4861	15	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5
28	4893	15	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3
23	4866	16	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4
19	4600	17	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5
Mean Rating:				4.576																
Standard Deviation:				1.529																

Table 6: Comparison of Esthetics Ratings - Angle of Convexity (-8.5 to +10)

Profile Silhouettes - Esthetics Ratings

Evaluator Patien	Pt #	Angle Convex	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
11	4574	-10	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4
Mean Rating:				4.333																
Standard Deviation:				1.188																
41	4999	-5	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6
5	4549	-4	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5
18	4597	-4	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6
31	4904	-3	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5
29	4898	-1	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5
36	4953	-1	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7
32	4926	0	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6
45	5026	1	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5
4	4541	2	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4
9	4562	2	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5
13	4585	2	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6
37	4978	2	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4
20	4845	3	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4
21	4859	3	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4
43	5010	3	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4
7	4557	4	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4
30	4902	4	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5
6	4551	5	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5
12	4582	5	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6
15	4592	5	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5
38	4986	5	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5
39	4989	5	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5
44	5020	5	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5
2	4529	7	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5
14	4586	7	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3
17	4595	7	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5
25	4869	7	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5
27	4887	7	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3
8	4559	8	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5
46	5042	8	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4
1	4528	9	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5
33	4930	9	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4
3	4536	10	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4
10	4573	10	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6
24	4868	10	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5
Mean Rating:				5.494																
Standard Deviation:				1.749																
34	4944	11	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3
40	4990	11	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5
35	4945	12	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4
42	5002	12	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4
26	4882	13	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4
47	5050	14	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4
16	4593	15	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5
22	4861	15	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5
28	4893	15	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3
23	4866	16	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5
19	4600	17	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3
Mean Rating:				4.404																
Standard Deviation:				1.547																

Table 7: Comparison of Esthetics Ratings - ANB Angle (-1 to +5)

Photographs: Esthetics Ratings

Evaluator Patient #		ANB Angle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
18	4597	-1	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4
29	4898	-1	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4
31	4904	-1	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4
11	4574	0	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4
20	4845	0	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5
36	4953	0	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6
37	4978	1	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5
45	5026	1	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6
32	4926	2	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7
39	4989	2	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5
4	4541	3	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5
5	4549	3	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5
6	4551	3	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4
9	4562	3	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4
15	4592	3	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5
21	4859	3	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4
30	4902	3	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5
7	4557	4	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5
8	4559	4	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5
10	4573	4	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3
12	4582	4	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3
13	4585	4	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6
14	4586	4	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4
17	4595	4	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4
24	4868	4	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5
25	4869	4	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4
38	4986	4	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4
41	4999	4	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5
1	4528	5	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5
2	4529	5	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5
26	4882	5	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5
27	4887	5	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4
33	4930	5	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5
35	4945	5	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5
44	5020	5	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6
46	5042	5	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6
Mean Rating:			5.688																	
Standard Deviation:			1.556																	
3	4536	6	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4
19	4600	6	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5
22	4861	6	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5
40	4990	6	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4
42	5002	6	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5
43	5010	6	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4
16	4593	7	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4
28	4893	7	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3
34	4944	7	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3
47	5050	7	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3
23	4866	8	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4
Mean Rating:			4.197																	
Standard Deviation:			1.402																	

Table 8: Comparison of Esthetics Ratings - ANB Angle (-1 to +5)

Profile Silhouettes - Esthetics Ratings

Evaluator Patient #		ANB Angle	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
18	4597	-1	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6
29	4898	-1	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5
31	4904	-1	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5
11	4574	0	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4
20	4845	0	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4
36	4953	0	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7
37	4978	1	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4
45	5026	1	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5
32	4926	2	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6
39	4989	2	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5
4	4541	3	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4
5	4549	3	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5
6	4551	3	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5
9	4562	3	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5
15	4592	3	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5
21	4859	3	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4
30	4902	3	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5
7	4557	4	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4
8	4559	4	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5
10	4573	4	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6
12	4582	4	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6
13	4585	4	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6
14	4586	4	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3
17	4595	4	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5
24	4868	4	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5
25	4869	4	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5
38	4986	4	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5
41	4999	4	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6
1	4528	5	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5
2	4529	5	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5
26	4882	5	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4
27	4887	5	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3
33	4930	5	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4
35	4945	5	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4
44	5020	5	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5
46	5042	5	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4
Mean Rating:			5.488																	
Standard Deviation:			1.73																	
3	4536	6	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4
19	4600	6	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3
22	4861	6	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5
40	4990	6	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5
42	5002	6	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4
43	5010	6	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4
16	4593	7	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5
28	4893	7	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3
34	4944	7	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3
47	5050	7	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4
23	4866	8	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5
Mean Rating:			4.318																	
Standard Deviation:			1.543																	

Table 9: Comparison of Esthetics Ratings - Upper Lip to E-Plane (-7 to -3)

Photographs: Esthetics Ratings

Evaluator Patient #		Upper Lip:E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
18	4597	-7	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4
11	4574	-6	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4
46	5042	-6	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6
4	4541	-5	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5
5	4549	-5	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5
6	4551	-5	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4
39	4989	-5	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5
2	4529	-4	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5
8	4559	-4	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5
7	4557	-3	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5
13	4585	-3	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6
21	4859	-3	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4
38	4986	-3	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4
41	4999	-3	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5
Mean Rating:				5.972																
Standard Deviation:				1.471																
9	4562	-2	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4
12	4582	-2	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3
24	4868	-2	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5
28	4893	-2	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3
1	4528	-1	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5
17	4595	-1	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4
22	4861	-1	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5
33	4930	-1	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5
47	5050	-1	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3
23	4866	0	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4
35	4945	0	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5
40	4990	0	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4
10	4573	1	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3
36	4953	1	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6
37	4978	1	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5
42	5002	1	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5
43	5010	1	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4
15	4592	2	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5
16	4593	2	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4
27	4887	2	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4
34	4944	2	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3
3	4536	3	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4
14	4586	3	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4
20	4845	3	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5
26	4882	3	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5
30	4902	3	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5
44	5020	3	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6
29	4898	4	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4
45	5026	4	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6
19	4600	6	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5
25	4869	6	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4
32	4926	6	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7
31	4904	7	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4
Mean Rating:				5.071																
Standard Deviation:				1.645																

Table 10: Comparison of Esthetics Ratings - Upper Lip to E-Plane (-7 to -3)

Profile Silhouettes - Esthetics Ratings

Evaluator Patient #		Upper Lip:E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
18	4597	-7	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6
11	4574	-6	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4
46	5042	-6	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4
4	4541	-5	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4
5	4549	-5	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5
6	4551	-5	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5
39	4989	-5	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5
2	4529	-4	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5
8	4559	-4	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5
7	4557	-3	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4
13	4585	-3	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6
21	4859	-3	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4
38	4986	-3	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5
41	4999	-3	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6
Mean Rating:				5.78																
Standard Deviation:				2.106																
9	4562	-2	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5
12	4582	-2	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6
24	4868	-2	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5
28	4893	-2	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3
1	4528	-1	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5
17	4595	-1	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5
22	4861	-1	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5
33	4930	-1	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4
47	5050	-1	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4
23	4866	0	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5
35	4945	0	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4
40	4990	0	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5
10	4573	1	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6
36	4953	1	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7
37	4978	1	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4
42	5002	1	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4
43	5010	1	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4
15	4592	2	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5
16	4593	2	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5
27	4887	2	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3
34	4944	2	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3
3	4536	3	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4
14	4586	3	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3
20	4845	3	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4
26	4882	3	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4
30	4902	3	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5
44	5020	3	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5
29	4898	4	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5
45	5026	4	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5
19	4600	6	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3
25	4869	6	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5
32	4926	6	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6
31	4904	7	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5
Mean Rating:				4.987																
Standard Deviation:				1.723																

Table 11: Comparison of Esthetics Ratings - Lower Lip to E-Plane (-5 to -1)

Photographs: Esthetics Ratings

Evaluator	Patient #	Lower Lip:E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
46	5042	-8	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6
11	4574	-7	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4
Mean Rating:				5.5																
Standard Deviation:				1.276																
21	4859	-5	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4
18	4597	-4	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4
6	4551	-4	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4
39	4989	-4	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5
2	4529	-4	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5
4	4541	-3	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5
5	4549	-3	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5
13	4585	-3	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6
24	4868	-3	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5
47	5050	-3	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3
8	4559	-2	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5
7	4557	-2	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5
38	4986	-2	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4
12	4582	-2	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3
17	4595	-2	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4
28	4893	-1	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3
33	4930	-1	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5
23	4866	-1	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4
36	4953	-1	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6
37	4978	-1	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5
Mean Rating:				5.611																
Standard Deviation:				1.718																
41	4999	0	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5
9	4562	0	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4
22	4861	0	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5
43	5010	0	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4
20	4845	0	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5
14	4586	1	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4
29	4898	1	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4
1	4528	1.5	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5
35	4945	2	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5
16	4593	2	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4
26	4882	2	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5
30	4902	2	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5
44	5020	2	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6
40	4990	3	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4
10	4573	3	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3
27	4887	3	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4
3	4536	3	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4
45	5026	3	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6
25	4869	3	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4
42	5002	4	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5
34	4944	4	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3
15	4592	5	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5
32	4926	5	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7
31	4904	7	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4
19	4600	8	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5
Mean Rating:				5.109																
Standard Deviation:				1.582																

Table 12: Comparison of Esthetics Ratings - Lower Lip to E-Plane (-5 to -1)

Profile Silhouettes - Esthetics Ratings

Evaluator Patient #		Lower Lip:E	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
46	5042	-8	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4
11	4574	-7	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4
Mean Rating:				4																
Standard Deviation:				1.414																
21	4859	-5	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4
18	4597	-4	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6
6	4551	-4	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5
39	4989	-4	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5
2	4529	-4	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5
4	4541	-3	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4
5	4549	-3	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5
13	4585	-3	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6
24	4868	-3	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5
47	5050	-3	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4
8	4559	-2	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5
7	4557	-2	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4
38	4986	-2	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5
12	4582	-2	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6
17	4595	-2	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5
28	4893	-1	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3
33	4930	-1	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4
23	4866	-1	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5
36	4953	-1	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7
37	4978	-1	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4
Mean Rating:				5.481																
Standard Deviation:				1.766																
41	4999	0	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6
9	4562	0	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5
22	4861	0	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5
43	5010	0	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4
20	4845	0	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4
14	4586	1	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3
29	4898	1	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5
1	4528	1.5	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5
35	4945	2	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4
16	4593	2	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5
26	4882	2	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4
30	4902	2	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5
44	5020	2	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5
40	4990	3	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5
10	4573	3	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6
27	4887	3	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3
3	4536	3	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4
45	5026	3	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5
25	4869	3	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5
42	5002	4	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4
34	4944	4	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3
15	4592	5	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5
32	4926	5	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6
31	4904	7	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5
19	4600	8	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3
Mean Rating:				5.098																
Standard Deviation:				1.726																

Table 13: Comparison of Esthetics Ratings - Percent Nasal Height (40-46)

Photographs: Esthetics Ratings

Evaluator			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Patient #		% Nasal Ht																		
15	4592	40	5	4	4	9	4	6	7	7	6	6	5	6	7	6	5	6	3	5
40	4990	40	6	7	5	9	6	5	8	6	4	4	5	6	6	5	4	5	5	4
46	5042	40	6	6	4	5	4	5	6	7	4	5	3	4	8	6	7	4	7	6
9	4562	41	5	7	5	7	6	4	6	6	8	7	3	8	9	7	3	7	4	4
45	5026	41	7	5	6	10	4	5	6	7	5	7	5	6	7	7	6	4	7	6
10	4573	42	4	4	4	8	4	4	7	4	4	4	4	5	4	4	3	2	3	3
20	4845	42	6	5	5	10	5	6	6	8	6	8	6	7	6	7	4	5	6	5
28	4893	42	4	4	2	2	3	3	4	2	4	3	2	2	4	4	3	2	4	3
39	4989	42	7	6	7	10	5	7	9	8	6	7	6	8	8	6	5	6	5	5
43	5010	42	4	4	2	2	3	2	5	2	4	3	3	3	4	3	2	1	3	4
1	4528	43	5	5	5	8	4	5	7	8	6	7	5	5	5	6	5	5	4	5
16	4593	43	4	5	3	7	4	5	7	5	4	5	3	5	6	4	4	3	2	4
21	4859	43	5	4	3	5	4	6	5	6	5	4	5	5	4	5	3	4	4	4
23	4866	43	5	4	4	4	4	4	5	4	4	4	4	5	6	6	5	5	2	4
25	4869	43	5	5	4	8	5	5	7	7	5	5	4	8	6	6	6	5	5	4
34	4944	43	5	4	4	6	4	4	5	5	4	4	2	5	4	5	2	2	5	3
35	4945	43	6	6	6	9	6	5	8	7	5	4	7	7	7	6	6	4	1	5
47	5050	43	4	5	2	4	3	3	4	5	3	2	3	3	4	3	4	1	1	3
4	4541	44	4	6	6	7	4	6	5	5	4	8	3	7	5	6	5	7	3	5
18	4597	44	5	6	4	9	5	5	7	6	5	7	5	7	7	7	4	7	5	4
29	4898	44	5	5	3	5	5	4	5	4	6	6	4	4	6	6	4	3	2	4
30	4902	44	5	6	5	6	5	6	8	5	5	7	6	6	7	5	6	4	4	5
37	4978	44	7	6	5	10	5	6	7	7	6	6	5	6	8	7	6	3	10	5
42	5002	44	6	6	5	5	4	5	7	4	4	4	4	5	5	6	4	4	6	5
2	4529	45	7	7	7	10	5	8	5	8	7	8	4	7	8	7	6	8	6	5
3	4536	45	5	4	5	8	5	3	4	4	4	6	2	5	4	5	4	7	5	4
5	4549	45	5	5	4	8	5	4	7	8	7	8	4	7	6	5	5	6	5	5
19	4600	45	6	5	2	5	4	2	5	3	5	4	3	4	7	5	4	4	2	5
31	4904	45	4	4	2	8	4	4	6	5	3	4	3	5	6	6	6	4	3	4
33	4930	45	5	5	5	7	5	7	8	4	4	8	4	7	8	6	4	5	7	5
36	4953	45	7	8	9	9	6	8	7	5	7	4	8	7	7	7	7	4	5	6
38	4986	45	7	5	5	9	5	7	8	7	6	5	5	6	7	6	7	5	5	4
41	4999	45	5	6	7	7	4	6	7	4	5	4	6	7	7	6	6	5	6	5
6	4551	46	6	5	7	10	5	7	7	6	4	8	4	7	6	7	5	5	8	4
8	4559	46	5	4	4	8	4	6	8	6	6	7	5	6	7	7	5	6	5	5
11	4574	46	6	7	5	6	5	6	4	5	5	8	5	7	7	4	5	5	7	4
24	4868	46	5	5	5	9	5	6	7	6	4	7	4	6	8	7	5	7	3	5
44	5020	46	5	7	3	9	6	7	7	5	7	4	5	7	8	7	5	8	2	6
Mean Rating:			5.298																	
Standard Deviation:			1.64																	
7	4557	47	7	5	8	8	5	6	8	7	6	8	6	7	8	6	4	6	6	5
17	4595	47	5	6	4	5	4	5	7	5	4	6	4	7	6	6	5	5	5	4
22	4861	47	7	4	5	8	4	5	4	5	4	4	3	5	6	5	4	2	5	5
26	4882	47	6	6	6	8	5	7	8	7	5	5	5	6	7	7	6	5	4	5
27	4887	47	4	4	4	3	4	4	7	4	4	4	2	6	5	4	5	3	5	4
32	4926	47	7	8	8	8	5	7	6	10	7	5	5	6	8	8	6	4	3	7
12	4582	48	5	6	4	7	4	6	7	3	5	7	3	5	6	5	4	4	4	3
13	4585	48	7	8	7	10	5	8	9	8	5	8	7	9	8	8	6	7	8	6
14	4586	49	4	7	5	3	4	4	5	5	4	4	4	7	4	3	3	3	2	4
Mean Rating:			5.512																	
Standard Deviation:			1.669																	

Table 14: Comparison of Esthetics Scale - Percent Nasal Height (40-46)

Profile Silhouettes - Esthetics Ratings

Evaluator			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Patient #		% Nasal Ht																		
15	4592	40	5	4	3	7	4	6	6	6	6	3	4	4	7	6	4	2	3	5
40	4990	40	5	4	6	8	4	6	5	5	4	4	4	6	6	4	4	3	4	5
46	5042	40	4	3	2	9	4	3	2	5	4	3	3	4	4	3	4	2	3	4
9	4562	41	5	8	8	9	5	7	8	4	7	6	6	9	8	7	4	7	8	5
45	5026	41	6	7	7	6	4	7	5	8	5	5	7	8	8	5	5	5	6	5
10	4573	42	5	6	7	8	4	8	7	8	6	4	5	4	8	7	5	5	5	6
20	4845	42	5	4	3	7	4	7	7	6	5	3	4	5	6	6	4	4	5	4
28	4893	42	4	3	4	8	3	3	4	3	4	3	3	3	4	4	4	2	2	3
39	4989	42	7	8	5	10	5	7	8	7	5	7	6	8	8	5	5	6	5	5
43	5010	42	5	5	5	9	4	5	4	8	4	4	4	5	4	4	4	4	3	4
1	4528	43	7	6	8	4	5	6	8	8	6	4	7	4	7	5	6	5	4	5
16	4593	43	4	5	4	10	4	5	6	6	4	3	3	4	6	5	4	4	3	5
21	4859	43	3	3	2	6	4	4	5	4	3	2	3	4	4	3	4	2	2	4
23	4866	43	4	5	5	9	4	5	7	5	4	4	3	4	7	6	4	3	3	5
25	4869	43	5	7	4	7	4	7	8	5	5	4	5	7	7	7	4	6	4	5
34	4944	43	4	3	2	5	3	3	2	3	3	2	1	3	4	3	3	1	1	3
35	4945	43	5	6	4	10	5	7	8	6	4	5	4	5	5	6	5	5	4	4
47	5050	43	4	3	4	8	4	4	3	4	3	3	3	3	4	4	5	2	3	4
4	4541	44	8	6	8	10	5	7	7	8	6	5	6	8	8	7	6	6	9	4
18	4597	44	5	8	5	10	6	7	9	8	7	7	7	6	7	8	5	9	7	6
29	4898	44	5	7	6	5	4	6	7	4	5	7	6	6	7	6	5	5	5	5
30	4902	44	6	7	7	10	5	7	7	5	4	7	6	7	8	4	5	7	4	5
37	4978	44	4	4	3	8	4	4	5	4	5	2	3	2	5	4	4	2	2	4
42	5002	44	6	6	4	8	4	4	6	7	5	4	5	4	5	6	6	5	2	4
2	4529	45	6	5	7	5	5	6	7	7	6	5	5	7	8	5	5	7	5	5
3	4536	45	5	5	5	9	4	4	5	6	4	3	3	4	6	4	4	2	4	4
5	4549	45	7	6	6	8	5	7	7	8	5	5	5	6	7	8	5	6	8	5
19	4600	45	4	2	3	9	4	4	5	4	4	3	2	4	6	4	3	3	2	3
31	4904	45	4	5	3	8	4	5	6	4	5	5	4	7	6	5	5	4	4	5
33	4930	45	5	6	4	8	5	5	7	5	4	3	4	4	5	4	5	5	3	4
36	4953	45	7	7	5	8	5	8	9	7	7	8	7	9	8	7	5	8	9	7
38	4986	45	6	6	4	9	5	6	7	4	6	4	6	5	7	5	4	7	2	5
41	4999	45	6	7	8	7	4	8	7	8	7	7	5	8	7	5	5	5	8	6
6	4551	46	5	6	6	6	5	7	7	7	6	5	5	5	7	7	6	7	6	5
8	4559	46	7	7	4	8	5	7	8	5	6	5	5	4	6	6	5	8	4	5
11	4574	46	4	4	4	7	4	3	4	4	5	5	4	4	7	4	4	5	2	4
24	4868	46	5	6	3	5	4	5	6	5	4	3	3	4	7	4	4	4	3	5
44	5020	46	7	6	6	10	5	6	5	8	6	7	5	7	8	5	5	8	5	5
Mean Rating:				5.243																
Standard Deviation:				1.736																
7	4557	47	6	6	4	10	5	6	7	6	5	5	4	4	6	5	5	9	3	4
17	4595	47	4	6	5	9	4	6	7	6	5	4	5	5	7	4	5	4	5	5
22	4861	47	5	5	4	8	4	5	7	6	4	4	4	4	7	4	5	4	4	5
26	4882	47	4	5	5	7	4	6	6	5	4	4	4	4	6	4	4	4	5	4
27	4887	47	3	3	3	4	3	3	2	3	3	2	2	2	4	3	3	2	2	3
32	4926	47	5	6	7	7	6	7	8	6	6	7	8	9	7	7	5	9	6	6
12	4582	48	5	6	5	10	5	7	8	6	6	6	4	4	7	5	5	7	3	6
13	4585	48	6	8	7	7	5	8	8	8	6	7	7	9	7	7	6	7	7	6
14	4586	49	3	3	1	4	4	4	2	4	4	2	2	3	4	3	3	1	2	3
Mean Rating:				5.093																
Standard Deviation:				1.851																

Table 15: Photographs - Decision to Change?

Evaluator		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean
Patient #																				
1	4528	0	0	1	0	0	1	0	0	0	1	0	1	1	0	0	1	1	0	0.39
2	4529	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0.11
3	4536	1	1	1	0	0	1	1	1	1	1	1	1	1	0	1	0	0	1	0.72
4	4541	1	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0.28
5	4549	1	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0.28
6	4551	1	0	0	0	0	0	0	1	1	0	1	0	0	0	0	1	0	0	0.28
7	4557	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4559	1	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0.22
9	4562	1	1	1	0	0	1	1	0	0	0	1	0	0	0	1	0	0	1	0.44
10	4573	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.89
11	4574	1	0	1	0	0	1	1	1	0	0	0	0	1	1	0	1	0	0	0.44
12	4582	1	1	1	0	0	1	1	1	1	0	1	1	1	0	1	1	1	1	0.78
13	4585	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.06
14	4586	1	0	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	0.89
15	4592	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0.22
16	4593	1	1	1	0	0	1	0	1	1	1	1	1	0	1	1	1	1	0	0.72
17	4595	1	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.17
18	4597	1	1	1	0	0	1	0	1	0	0	0	0	0	0	1	0	0	0	0.33
19	4600	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	4845	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0.11
21	4859	1	1	1	1	0	1	1	1	1	1	0	1	1	1	1	1	0	1	0.83
22	4861	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	0	0	0.78
23	4866	1	1	1	1	0	1	1	1	0	1	0	1	0	0	1	1	1	0	0.67
24	4868	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0.17
25	4869	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0.17
26	4882	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0.17
27	4887	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	0	1	0.78
28	4893	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	0	1	0.89
29	4898	1	1	1	1	0	1	1	1	1	0	0	1	0	0	1	1	1	1	0.72
30	4902	1	0	1	1	0	0	0	1	0	0	0	1	1	0	1	1	0	0	0.44
31	4904	1	1	1	0	0	1	0	1	1	1	1	1	1	0	0	1	1	1	0.72
32	4926	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0.17
33	4930	1	0	0	0	0	0	0	1	1	0	0	0	0	0	1	0	0	0	0.22
34	4944	1	1	1	0	0	1	1	1	1	1	1	0	1	1	1	1	0	1	0.78
35	4945	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	1	1	0	0.28
36	4953	0	0	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0.22
37	4978	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0.17
38	4986	0	0	1	0	0	1	0	0	0	0	0	1	1	0	0	0	0	0	0.22
39	4989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40	4990	1	0	1	0	0	1	0	1	1	1	0	1	1	1	0	1	0	1	0.61
41	4999	0	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	0	0.22
42	5002	1	0	1	0	1	1	1	1	1	1	1	1	1	0	1	1	0	1	0.78
43	5010	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
44	5020	1	0	1	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	0.28
45	5026	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0.17
46	5042	0	1	1	1	1	1	1	0	1	1	1	1	1	0	0	1	0	1	0.72
47	5050	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
																				0.46
Sum		33	19	34	12	6	28	18	28	23	22	19	27	24	13	20	27	17	17	
% Yes		0.7	0.4	0.72	0.26	0.13	0.6	0.38	0.6	0.49	0.47	0.4	0.57	0.51	0.28	0.43	0.57	0.36	0.36	

Overall: 387 out of 846 = 45.7 %

Table 16: Profile Silhouettes - Decision to Change?

Evaluator	Patient #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	Mean
1	4528	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	1	0	0.17
2	4529	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.06
3	4536	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	0.94
4	4541	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	4549	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4551	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.06
7	4557	0	0	1	0	0	1	0	0	0	0	1	1	1	0	0	0	1	0	0.33
8	4559	0	0	1	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0.22
9	4562	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0.06
10	4573	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0.06
11	4574	1	1	1	0	1	1	1	1	0	0	0	1	1	1	1	0	1	1	0.72
12	4582	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0.17
13	4585	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	4586	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
15	4592	0	1	1	0	1	1	0	0	0	1	0	1	0	0	0	1	1	0	0.44
16	4593	1	1	1	0	0	1	0	0	1	1	1	1	1	0	1	0	1	0	0.61
17	4595	1	0	1	0	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0.28
18	4597	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0.06
19	4600	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20	4845	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0.33
21	4859	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0.94
22	4861	0	1	1	0	0	1	0	0	1	1	1	1	0	1	0	1	0	0	0.5
23	4866	1	1	1	0	0	1	0	1	1	0	1	1	0	0	1	1	1	0	0.61
24	4868	1	0	1	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0	0.72
25	4869	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
26	4882	0	0	1	0	0	0	0	0	1	0	0	1	0	1	1	1	0	0	0.33
27	4887	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
28	4893	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
29	4898	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0.22
30	4902	0	0	0	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0.17
31	4904	1	1	1	0	1	1	1	1	0	0	1	0	0	0	0	1	1	0	0.56
32	4926	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.06
33	4930	1	0	1	0	0	1	0	0	1	1	1	1	1	1	0	0	1	0	0.56
34	4944	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
35	4945	0	0	1	0	0	0	0	1	1	1	1	1	0	0	0	1	1	0	0.44
36	4953	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
37	4978	1	1	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1	0	0.83
38	4986	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0.22
39	4989	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.06
40	4990	1	1	0	0	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0.72
41	4999	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.11
42	5002	0	0	1	0	0	1	0	0	0	1	0	1	1	0	0	1	1	0	0.39
43	5010	1	1	1	0	1	1	1	0	1	1	1	1	1	1	1	1	1	1	0.89
44	5020	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0.06
45	5026	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46	5042	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0.94
47	5050	1	1	1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	0.83
																				0.42
Sum		21	19	30	8	17	22	14	19	19	21	22	30	19	22	15	21	26	11	
% Yes		0.45	0.4	0.64	0.17	0.36	0.47	0.3	0.4	0.4	0.45	0.47	0.64	0.4	0.47	0.32	0.45	0.55	0.23	

Overall: 356 out of 846 = 42.8 %

Table 17:Differences in Ratings Between Photographs and Profile Silhouettes

Evaluator	1		2		3		4		5		6		7		8		9	
Part #	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Patient #																		
4528	-2	0	-1	0	-3	1	0	0	-1	0	-1	1	-1	0	0	0	0	0
4529	1	0	2	0	0	0	1	0	0	0	2	0	-2	1	1	0	1	0
4536	0	0	-1	0	0	0	2	-1	1	-1	-1	0	-1	0	-2	0	0	0
4541	-4	1	0	0	-2	1	-3	0	-1	0	-1	0	-2	0	-3	1	-2	1
4549	-2	1	-1	0	-2	1	-1	0	0	0	-3	1	0	0	0	0	2	0
4551	1	1	-1	0	1	0	2	0	0	0	0	0	0	0	-1	1	-2	1
4557	1	0	-1	0	4	-1	1	0	0	0	0	-1	1	0	1	0	1	0
4559	-2	1	-3	1	0	0	0	0	-1	0	-1	0	0	0	1	-1	0	0
4562	0	1	-1	1	-3	1	-3	0	1	0	-3	1	-2	1	2	-1	1	0
4573	-1	1	-2	1	-3	1	-1	0	0	0	-4	1	0	1	-4	1	-2	1
4574	2	0	3	-1	1	0	-2	0	1	-1	3	0	0	0	1	0	0	0
4582	0	1	0	1	-1	1	-1	0	-1	0	-1	1	-1	1	-3	1	-1	1
4585	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	-1	1
4586	1	0	4	-1	4	0	-2	0	0	-1	0	0	3	0	1	0	0	0
4592	0	1	0	-1	1	0	1	0	0	-1	0	-1	1	0	1	1	0	0
4593	0	0	0	0	-1	0	0	0	0	0	0	0	1	0	-1	1	0	0
4595	1	0	0	0	-1	0	-3	0	0	0	-1	0	0	0	-1	1	-1	0
4597	0	1	-2	1	-1	1	-1	0	-1	0	-2	1	-2	0	-2	1	-2	0
4600	2	0	3	0	-1	0	0	0	0	0	-2	0	0	0	-1	0	1	0
4845	1	0	1	-1	2	0	2	0	1	0	-1	0	-1	0	2	0	1	0
4859	2	0	1	0	1	0	1	0	0	-1	2	0	0	0	2	0	2	0
4861	2	1	-1	0	1	0	1	0	0	1	0	0	-3	1	-1	0	0	0
4866	1	0	-1	0	-1	0	-3	1	0	0	-1	0	-2	1	-1	0	0	-1
4868	0	0	-1	0	2	-1	4	-1	1	-1	1	-1	1	0	1	0	0	-1
4869	0	0	-2	0	0	0	-1	0	1	0	-2	1	-1	0	2	0	0	0
4882	2	1	1	0	1	-1	0	0	1	0	1	0	2	0	2	0	1	0
4887	1	0	1	0	1	0	-3	0	1	-1	1	0	5	-1	1	0	1	0
4893	0	0	1	0	-2	0	-5	0	0	-1	0	0	0	0	-1	0	0	0
4898	0	0	-2	1	-3	1	-4	1	1	-1	-2	1	-2	1	0	0	1	1
4902	-1	1	-1	0	-2	1	-4	1	0	0	-1	0	1	0	0	0	1	-1
4904	0	0	-1	0	-1	0	-1	0	0	-1	-1	0	0	-1	1	0	-2	1
4926	2	0	2	0	1	0	-2	0	-1	0	0	0	-2	0	4	0	1	0
4930	0	0	-1	0	1	-1	0	0	0	0	2	-1	1	0	-1	1	0	0
4944	1	0	1	0	2	0	2	-1	1	-1	1	0	3	0	2	0	1	0
4945	1	0	0	0	2	-1	2	0	1	0	-2	1	0	0	1	-1	1	-1
4953	0	0	1	0	4	-1	-1	0	1	0	0	0	-2	0	-2	1	0	0
4978	3	0	2	-1	2	0	3	0	1	-1	2	-1	2	-1	3	-1	1	0
4986	1	0	-1	0	1	0	1	0	0	0	1	1	1	0	3	-1	0	0
4989	0	0	-2	0	2	-1	1	0	0	0	0	0	1	0	1	0	1	0
4990	1	0	3	-1	-1	1	1	0	2	-1	-1	0	3	-1	1	1	0	0
4999	-1	-1	-1	0	-1	0	-3	1	0	-1	-2	0	0	0	-4	1	-2	0
5002	0	1	0	0	1	0	-1	0	0	1	1	0	1	1	-3	1	-1	1
5010	-1	0	-1	0	-3	0	-6	1	-1	0	-3	0	1	0	-6	1	0	0
5020	-2	1	1	0	-3	1	-1	0	1	0	1	0	2	0	-3	1	1	0
5026	1	0	-2	0	-1	0	1	0	0	0	-2	1	1	0	-1	0	0	0
5042	2	-1	3	0	2	0	0	1	0	0	2	0	4	0	2	-1	0	0
5050	0	0	2	0	-2	0	0	1	-1	1	-1	0	1	0	1	0	0	0
# of Differences		16		12		18		10		17		16		12		21		12

10		11		12		13		14		15		16		17		18	
I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
3	0	-2	0	1	0	-2	1	1	0	-1	0	0	1	0	0	0	0
3	0	-1	0	0	1	0	0	2	-1	1	0	1	0	1	0	0	0
3	0	-1	0	1	1	-2	0	1	-1	0	0	5	-1	1	-1	0	0
3	0	-3	0	-1	0	-3	0	-1	0	-1	0	1	0	-6	1	1	0
3	0	-1	0	1	1	-1	1	-3	0	0	0	0	0	-3	0	0	0
3	0	-1	1	2	-1	-1	0	0	0	-1	0	-2	1	2	0	-1	0
3	0	2	-1	3	-1	2	-1	1	0	-1	0	-3	0	3	-1	1	0
2	0	0	0	2	-1	1	0	1	0	0	0	-2	0	1	0	0	0
1	0	-3	1	-1	0	1	0	0	0	-1	1	0	0	-4	0	-1	1
0	1	-1	1	1	0	-4	1	-3	1	-2	1	-3	1	-2	1	-3	1
3	0	1	0	3	-1	0	0	0	0	1	-1	0	1	5	-1	0	-1
1	0	-1	0	1	0	-1	1	0	0	-1	1	-3	1	1	0	-3	1
1	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	0	0
2	0	2	0	4	0	0	0	0	0	0	0	2	0	0	0	1	0
3	-1	1	0	2	-1	0	0	0	0	1	0	4	-1	0	0	0	0
2	0	0	0	1	0	0	-1	-1	1	0	0	-1	1	-1	0	-1	0
2	-1	-1	0	2	-1	-1	0	2	-1	0	0	1	0	0	0	-1	0
0	0	-2	0	1	0	0	0	-1	0	-1	1	-2	0	-2	-1	-2	0
1	0	1	0	0	0	1	0	1	0	1	0	1	0	0	0	2	0
5	-1	2	-1	2	0	0	0	1	0	0	1	1	-1	1	0	1	-1
2	0	2	-1	1	0	0	0	2	0	-1	1	2	0	2	-1	0	0
0	0	-1	0	1	0	-1	1	1	0	-1	1	-2	0	1	0	0	0
0	1	1	-1	1	0	-1	0	0	0	1	0	2	0	-1	0	-1	0
4	-1	1	0	2	-1	1	-1	3	-1	1	0	3	-1	0	0	0	0
1	0	-1	1	1	0	-1	0	-1	0	2	0	-1	0	1	0	-1	0
1	0	1	0	2	0	1	0	3	-1	2	-1	1	-1	-1	0	1	0
2	0	0	0	4	0	1	0	1	0	2	-1	1	0	3	-1	1	0
0	0	-1	0	-1	0	0	0	0	0	-1	0	0	0	2	-1	0	0
-1	0	-2	0	-2	0	-1	0	0	0	-1	1	-2	1	-3	1	-1	1
0	0	0	0	-1	1	-1	1	1	-1	1	1	-3	1	0	0	0	0
-1	1	-1	0	-2	1	0	1	1	0	1	0	0	0	-1	0	-1	1
-2	0	-3	0	-3	1	1	0	1	-1	1	0	-5	1	-3	1	1	0
5	-1	0	-1	3	-1	3	-1	2	-1	-1	1	0	0	4	-1	1	0
2	0	1	0	2	-1	0	0	2	0	-1	0	1	0	4	-1	0	0
-1	0	3	-1	2	-1	2	1	0	0	1	0	-1	0	-3	0	1	0
-4	1	1	0	-2	1	-1	0	0	0	2	0	-4	1	-4	0	-1	0
4	-1	2	-1	4	-1	3	-1	3	-1	2	-1	1	0	8	-1	1	0
1	0	-1	0	1	0	0	1	1	0	3	0	-2	0	3	-1	-1	0
0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
0	1	1	-1	0	0	0	0	1	0	0	-1	2	0	1	-1	-1	1
-3	1	1	0	-1	0	0	1	1	0	1	0	0	0	-2	0	-1	0
0	0	-1	1	1	0	0	0	0	0	-2	1	-1	0	4	-1	1	1
-1	0	-1	0	-2	0	0	0	-1	0	-2	0	-3	0	0	0	0	0
-3	1	0	0	0	0	0	0	2	-1	0	0	0	0	-3	1	1	0
2	0	-2	0	-2	1	-1	0	2	0	1	0	-1	1	1	0	1	0
2	0	0	0	0	0	4	0	3	-1	3	-1	2	0	4	-1	2	0
-1	0	0	0	0	0	0	0	-1	0	-1	0	-1	0	-2	0	-1	1
	13		13		19		15		13		17		16		19		10

Table 18: Number of Disagreements - by Patients and Examiner

Evaluator	Disagree	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18	
Part	Frequency	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Patient #																																			
4528	4					-3	1					-1	1													-2	1					0	1				
4529	3													-2	1									0	1			2	-1								
4536	6							2	-1	1	-1													1	1			1	-1			5	-1	1	-1		
4541	5	-4	1			-2	1									-3	1	-2	1															-6	1		
4549	5	-2	1			-2	1					-3	1											1	1	-1	1										
4551	6	1	1													-1	1	-2	1			-1	1	2	-1							-2	1				
4557	6					4	-1					0	-1									2	-1	3	-1	2	-1							3	-1		
4559	4	-2	1	-3	1											1	-1							2	-1												
4562	9	0	1	-1	1	-3	1					-3	1	-2	1	2	-1					-3	1							-1	1					-1	1
4573	15	-1	1	-2	1	-3	1					-4	1	0	1	-4	1	-2	1	0	1	-1	1			-4	1	-3	1	-2	1	-3	1	-2	1	-3	1
4574	7			3	-1					1	-1													3	-1					1	-1	0	1	5	-1	0	-1
4582	11	0	1	0	1	-1	1					-1	1	-1	1	-3	1	-1	1							-1	1			-1	1	-3	1			-3	1
4585	1																	-1	1																		
4586	2			4	-1					0	-1																										
4592	8	0	1	0	-1					0	-1	0	-1			1	1			3	-1			2	-1							4	-1				
4593	4															-1	1									0	-1	-1	1			-1	1				
4595	4															-1	1			2	-1			2	-1			2	-1								
4597	7	0	1	-2	1	-1	1					-2	1			-2	1													-1	1			-2	-1		
4600	0																																				
4845	6			1	-1															5	-1	2	-1							0	1	1	-1			1	-1
4859	4									0	-1											2	-1							-1	1			2	-1		
4861	5	2	1							0	1			-3	1											-1	1			-1	1						
4866	5							-3	1					-2	1			0	-1	0	1	1	-1														
4868	10					2	-1	4	-1	1	-1	1	-1					0	-1	4	-1			2	-1	1	-1	3	-1			3	-1				
4869	2											-2	1									-1	1														
4882	5	2	1			1	-1																					3	-1	2	-1	1	-1				
4887	4									1	-1			5	-1															2	-1			3	-1		
4893	2									0	-1																							2	-1		
4898	11			-2	1	-3	1	-4	1	1	-1	-2	1	-2	1			1	1											-1	1	-2	1	-3	1	-1	1
4902	9	-1	1			-2	1	-4	1									1	-1					-1	1	-1	1	1	-1	1	1	-3	1				
4904	7									0	-1			0	-1			-2	1	-1	1			-2	1	0	1									-1	1
4926	4																							-3	1			1	-1			-5	1	-3	1		
4930	10					1	-1					2	-1			-1	1			5	-1	0	-1	3	-1	3	-1	2	-1	-1	1			4	-1		
4944	4							2	-1	1	-1													2	-1									4	-1		
4945	7					2	-1					-2	1			1	-1	1	-1			3	-1	2	-1	2	1										
4953	5					4	-1									-2	1			-4	1			-2	1							-4	1				
4978	12			2	-1					1	-1	2	-1	2	-1	3	-1			4	-1	2	-1	4	-1	3	-1	3	-1	2	-1			8	-1		
4986	4											1	1			3	-1									0	1							3	-1		
4989	1					2	-1																														
4990	10			3	-1	-1	1			2	-1			3	-1	1	1			0	1	1	-1							0	-1			1	-1	-1	1
4999	6	-1	-1					-3	1	0	-1					-4	1			-3	1					0	1										
5002	9	0	1							0	1			1	1	-3	1	-1	1			-1	1							-2	1			4	-1	1	1
5010	2							-6	1							-6	1																				
5020	6	-2	1			-3	1									-3	1			-3	1							2	-1					-3	1		
5026	3											-2	1											-2	1							-1	1				
5042	6	2	-1					0	1							2	-1											3	-1	3	-1			4	-1		
5050	3							0	1	-1	1																									-1	1
Disagreements		16		12		18		10		17		16		12		21		12		13		13		19		15		13		17		16		19		10	
Higher Score To:		Tracing		Neither		Tracing		Tracing		Photo		Tracing		Tracing		Tracing		Tracing		Photo		Photo		Photo		Tracing		Photo		Tracing		Tracing		Photo		Tracing	

Avg # disagreements = 14.94

S.D. 3.226

Percent of total 269 out of 846= 31.8%

Higher scores to:

Tracing:	12	examiners
Photo:	5	examiners
Neither:	1	examiners

Table 19: Subjects with Most and Least Disagreements

Worst Intra-examiner agreement		Best Intra-examiner agreement	
4573	15	**4600**	0
4978	12	**4585**	1
4582	11	**4989**	1
4898	11	**4586**	2
4868	10	**4869**	2
4930	10	**4893**	2
4990	10	**5010**	2

Subjects' Cephalometric Measurements

Patient #	Sex	Age	Ethnic	Angle Conv	ANB	Upper Lip-E	Lower Lip-E	% Nasal Ht	# of Disagreements	
4573	M	10	W	10	4	1	3	42	15	
4978	M	15	W	2	1	1	-1	44	12	
4582	F	14	W	5	4	-2	-2	48	11	
4898	F	24	N	-1	-1	4	1	44	11	
4868	M	12	N	10	4	-2	-3	46	10	**[Worst agreed]**
4930	M	17	W	9	5	-1	-1	45	10	
4990	M	14	N	11	6	0	3	40	10	
4600	M	10	N	17	6	6	8	45	0	
4585	F	13	W	2	4	-3	-3	48	1	
4989	F	15	W	5	2	-5	-4	42	1	
4586	F	12	W	7	4	3	1	49	2	
4869	F	15	W	7	4	6	3	43	2	**[Best agreed]**
4893	F	10	N	15	7	-2	-1	42	2	
5010	F	27	W	3	6	1	0	42	2	

Table 20: Examiner Response Sheet							
YOUR NAME:							
		PART I			PART II		
Patient Number		Facial Esthethics 1-10	Change Y/N		Facial Esthethics 1-10	Change Y/N	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
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42							
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45							
46							
47							