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DEPARTMENT OF ORTHODONTICS AND PAEDIATRIC DENTISTRY

DIVISION OF ORTHODONTICS

PERCEPTION OF FRONTAL FACIAL AESTHETICS BEFORE AND AFTER ORTHOGNATHIC MANDIBULAR ADVANCEMENT

A RESEARCH REPORT SUBMITTED TO THE POSTGRADUATE COMMITTEE

in partial fulfilment of the requirements for the degree of

MASTER OF SCIENCE IN DENTISTRY

BY

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DECLARATION

I, Zaheera Hassen Mia, declare that this research report is my own work. It is being submitted for the degree of Master of Science in Dentistry in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

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Zaheera Hassen MIA

Signed at Johannesburg this Sixteenth day of June, 2016

DEDICATION

This work is dedicated to my loving parents,
Shereen and Hassen Mia,
for their unwavering support and encouragement.

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I would like to thank my supervisor, Professor William Evans, and my co-supervisor, Professor Tarisai Dandajena, for their advice and guidance throughout the research process.

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ABSTRACT

AIM: To establish whether mandibular surgical advancement effected discernible changes in the frontal facial aesthetics of patients, as assessed on photographs by lay persons and dental professionals, and if so, whether the pre- or post operative appearance was preferred. **METHODS**: Observations were made on ten patients who had undergone orthognathic surgery with pre- and post- operative orthodontics in the endeavour to correct mandibular deficiency. The responses of the assessors were recorded on a Microsoft Excel© spread sheet and imported into SAS (SAS Institute, Carrey, NC) for analysis. The data were assessed by way of the Cochran-Mantel-Haenszel (CMH) and Fisher's exact tests. **RESULTS**: The postoperative faces were perceived as more favourable in the majority of observations but more regularly by the specialists (p-value = 0.0091). Stratification by gender concluded that the male specialists predominantly chose the after treatment photograph.

CHAPTER 1

1.0 INTRODUCTION

In a world in which we are often judged by our appearances, the belief that we can change the way we look is liberating. Appearances have been important in human social interaction since ancient times.[1] Modern society has placed great importance on physical attractiveness.[1-5] Facial aesthetics are significant attributes on which opinions and perceptions of character and ability may be formed.[4,6]

In the past, beliefs of beauty were seen as random cultural conventions with no consistent standard of what constituted an attractive face. Facial aesthetics have long been a focus of intense research, resulting in a greater comprehension of the shared preferences for pleasing faces. This led observers to take into account certain aspects of facial attraction as being inherent and definable.[7, 8]

There is, then, a universal idea of what humans like and deem attractive in faces. These preferences are free of cultural conventions and exist in very young babies long before acculturation. Infants as young as three months are consistently able to distinguish between attractive and unattractive faces.[8]

A study conducted by Eagly *et al* showed that attractive individuals were believed to possess more favourable personality traits, enabling them to be more successful and socially competent.[7] Similarly, Dion *et al* reported that a “what is beautiful is good” stereotype existed, in which attractive people were believed to be not only more desirable than their unattractive counterparts, but also to enjoy better lives.[2, 3]

Our perceptions of beauty are collective, cross-cultural, and instinctive. The idea that beauty carries great value in all cultures makes it important to establish the common characteristics that exist among faces seen as being attractive. In the perception of

beauty the three important biologic factors are: averageness, symmetry, and sexual dimorphism.[8]

The concept of *averageness* refers to *a* face derived from composites of many different faces or from mathematic calculation. The composite face therefore constitutes the average traits for a given population. Sir Francis Galton (1822-1911) conducted a study which revealed that the composites were perceived as more attractive than any of the contributing component faces.[8] Almost a century later, Langlois and Roggman established that mathematically averaged faces were seen as more attractive than composites made from fewer faces, and also confirmed that the "mathematic" faces were more attractive than the individual faces from which the composites were derived.[9]

Symmetry is an important factor in facial attractiveness, and it is not easy to separate this from averageness. Composite (averaged) faces are more symmetrical than individual faces, but symmetry remains attractive even when the effects of averageness are statistically managed, indicating that both symmetry and averageness contribute to attractiveness.[8] Averageness was said to be attractive even in profiles, where symmetry is not an issue.[8]

Sexual dimorphism (feminine characteristics in the female face and masculine characteristics in the male face), is a significant aspect of facial attraction. The most attractive of female faces display characteristics of neotony (features characteristic of youth) and sexual maturity. Neotony includes: a high forehead, large eyes, small nose and chin, and voluptuous lips. Features indicating sexual maturity are: high-arched brows and prominent cheekbones. The most attractive male faces are not necessarily the most "masculine" but have masculine features (such as a prominent frontal bone, a wider mandible, and thinner lips) as well as some degree of femininity, suggesting openness and the ability to cooperate.[8]

A study conducted by Phillips *et al.* found that patients and their peers, as well as orthodontists and oral surgeons, rated subjects with Class I profiles as more appealing than those with Class II profiles.[10] Bishara and Jakobsen established that lay-people perceive the profile of normal (Class I) adolescent patients more favourably than those of untreated individuals with Class II division 1 malocclusions.[11]

The need to improve facial aesthetics has been the most common reason for seeking orthodontic or combined orthodontic and surgical treatment.[6,12-15] Taking into account the numerous perceived (and perhaps real), benefits that come with being attractive, it is no surprise that individuals may subject themselves to intrusive procedures which may have the potential to enhance their aesthetic appeal (such as orthodontic treatment and orthognathic surgery), especially during this era in which the media foster perfection.[1-3]

Whilst the milder Class II discrepancies may be successfully treated through growth modification in the younger patient and by camouflaging a poor skeletal relationship through judicious orthodontic placement of the teeth, the more severe skeletal discrepancies pose a distinctly challenging situation. In these latter cases an attempt to treat conservatively by tooth movement to compensate for jaw discrepancy carries the risk of increased facial convexity, increased nasolabial angle and decreased upper lip support, all of which may affect facial aesthetics considerably.[2] The need to maintain or enhance the facial profile balance during treatment has been emphasized by orthodontists ever since Angle pioneered the discipline in the 19th century.[2,16,17] The answer to these problematic cases has been in the development of orthognathic surgery.[18]

The desire to enhance the image we present to the world has stimulated the discipline of reconstructive surgery. It was the occurrence of endemic syphilis at the end of the sixteenth century which provided the initial great incentive.[19] The innovations developed at that time fell into disuse until the late eighteenth century, when a new era of syphalophobia began in Europe. Most modern procedures used in cosmetic surgery date back to the 1880's and 1890's and over the intervening years

the increase in the number of patients seeking these treatments and in the development of the variety of procedures, has been incredible.[12] Amongst these techniques has been the emergence of orthognathic interventions. [18]

Balance in bone structure is what gives the form of the face its greatest attractiveness, called “beauty”.[20] Facial skeletal disfigurement negatively impacts not only on aesthetics and function of the patients but also on their social acceptance and psychological wellbeing.[21, 22] The imbalance of a convex (Class II, division 1) facial profile is the impression of a prominent nose, accentuated by a recessive chin. The endeavour to correct the aesthetics and function in these cases demands a reasoned decision which distinguishes which component requires attention - reduction of the nasal “hump”, advancement of the mandible or both. Whilst the patient frequently identifies nasal protrusion as the culpable feature, and seeks a nasal reduction, it is more often the mandible which actually requires advancement, thus reducing the convexity of the patient’s facial profile.[23] In the last 20 years combined orthodontic and orthognathic treatment to achieve this mandibular enhancement has gained extensive acceptance and popularity.[6, 10, 24, 25]

Orthognathic surgery then sets out to correct skeletal discrepancies and soft tissue imbalances in patients with disharmony of the jaws, so as to achieve the best aesthetic and functional result.[12, 13, 26] Class II patients with poorer pre-treatment aesthetics, inadequate function, facial asymmetry and requiring greater mandibular advancements, generally benefit the most from orthognathic management.[27] However, if skeletal correction is not achieved or is not attainable with these methods, dento-alveolar camouflage treatment may still be necessary.[2]

Altering the position and profile of the mandible posed challenges to the pioneers of orthognathic surgery. Several techniques were developed, either to surgically reduce protrusion or to surgically advance the mandible. The sagittal split ramus osteotomy was introduced in 1957 and was made famous by Obwegeser.[28] This became the standard for the correction of mandibular deformities. The technique has since been modified by, amongst others, Dal, Pont and Hunsuck.[27]

Techniques for mandibular repositioning (advancement or retrusion) are the sagittal split ramus osteotomy (SSRO) and the intraoral vertical ramus osteotomy (IVRO). SSRO is commonly performed for both setback or advancement procedures whereas IVRO is predominantly used when setting back the mandible. In 1992 Choung introduced a surgical design known as the intraoral vertical sagittal ramus osteotomy (IVSRO) which is a method that includes useful features of both SSRO and IVRO.[27]

Surgical advancement of the recessive mandible to enhance aesthetics and function in adults is therefore quite common and is usually well managed.[29] Planning of orthognathic treatment requires clinical guidelines, or a generally agreed "ideal" in which facial proportions are taken into consideration.[11] These aesthetic standards have been developed in different forms including cephalometric analyses, anthropometric measurements, and artistic views.[11,20,23,29] Assessment of soft tissue importantly includes an appreciation of soft tissue-profile aesthetics.[3, 28]

Individuals seeking corrective surgery have diverse expectations with regard to the outcome of their operations.[30] It is important that patients are made aware of the benefits and risks of all treatment options so they may take an informed decision on the treatment approach.[31] It is also essential that the surgeon has a clear understanding of the needs and motives of each patient before undertaking any invasive treatment.[30, 32]

The judgement of aesthetic outcomes, of course, is predominantly dependent on the evaluation of soft tissue changes after orthognathic surgery.[1, 29] Computer software programmes may be used in the meticulous assessment of the lateral cephalometric radiograph.[20,29] Cranio-facial measurements can portray remarkable changes in the soft tissue facial profile subsequent to surgery.[33,34]

The patient, however, habitually surveys his/her face from the frontal aspect. The question may thus be raised as to what changes are visually perceived in *norma frontalis* after a mandibular advancement. Does the patient, or the observer, or both, note changes in this view and are such changes considered favourable? It may be that insufficient attention is given to assessment of the frontal aspect and possibly

whether alterations in the vertical dimension influence the outcome. Indeed this is what emerges when recent relevant literature is examined. Papers have been published reporting on discernible changes in the profile, but a literature search indicates that research into the potential of surgical advancement to effect changes in the frontal perspective is lacking. [27,29,33,34]

Consideration has previously been given to the possible differences in perception by lay people compared with the opinions of dental professionals, but again, referring to the profile view.[34] Some orthognathic surgery patients fail to appreciate major changes in their appearance even after surgical correction, possibly because profile change is more easily seen than frontal change.[14,19] There would therefore be value in a study which investigates the reaction of observers to the full face presentation in *norma frontalis* of patients who had undergone mandibular advancement.

CHAPTER 2

2.0 STATEMENT OF PURPOSE

1. To consider the possible effect of surgical mandibular advancement on the perception of frontal facial aesthetics as assessed by two groups of observers.
2. To compare the preferences recorded by a lay group and by a group of experienced dental professionals of frontal facial aesthetics before and after mandibular advancement.

CHAPTER 3

3.0 MATERIALS AND METHODS

The study was conducted as a comparative exercise using the frontal photographs of six patients who had undergone orthognathic surgery together with pre- and post-operative orthodontics in the endeavour to correct mandibular deficiency. A comparison will be made between the pre- and post- treatment full face photographs as to which appearance is more pleasing.

3.1 Ethics

Permission to proceed with the study was granted by The Human Research Ethics Committee (Medical) of the University of the Witwatersrand, on condition of anonymity of the patients and the responses of the participants. Certificate number: MP140267 (See Appendix One).

3.2 The sample

All the patients included in the sample had received treatment by the same orthodontist and by the same maxillo-facial and oral surgeon who used the same surgical technique for each operation. The records of the orthodontist were examined and patient files were selected in sequence based on the following inclusion criteria:

1) The records included good quality standardised pre- and post- operative photographs in full face frontal views, the post-operative films being taken at least six months after surgery and at the completion of orthodontic treatment.

2) The records also included good quality lateral standardised cephalometric radiographs at the pre- and post-treatment stages.

3) The pre-operative cephalometric ANB measurement of each patient was at least four degrees.
4) Each patient presented a full Class II molar relationship, as seen on the lateral cephalogram.
5) The overjet measured on the cephalogram was at least 5mm.
6) Each patient had undergone full fixed appliance orthodontic treatment as an adjunct to the surgery.

7) Mandibular advancement was the only surgical procedure the patients had received, the minimum advancement being 5mm.
8) Permission from the curator of the records, herein the orthodontist, to use the records for research.
9) Permission from the patients to display to assessor groups their unretouched frontal facial photographs at the pre-operative and post-operative stages.

Each selected patient was sent an explanatory letter seeking their permission to utilise their records in the research project and confirming that the consulting orthodontist had granted access to the records (See Appendix Two). Six of the twenty patients who were approached agreed to permit the use of their photographs and unlabelled cephalometric radiographs, provided that no further identifiers were available to the researcher. At no stage did the researcher have access to the identity of the patient, but details of the gender and age of the patients were provided. The cephalometric data were examined to ensure that the measurements of the defined parameters met the requisite standards (Table 1).

Table 3.1 Cephalometric data of patient sample

	PRE-TREATMENT DATA			POST TREATMENT DATA			
Case	ANB (degrees)	Overjet (mms)	Date of Surgery	Date of last photograph	Amount of mandibular advancement (mms)	ANB (degrees)	Overjet (mms)
1	9	11	24 03 13	01 07 14	6	5.5	3
2	6	6	30 08 13	14 04 14	6	4	4
3	5	6	12 08 13	10 02 14	5	2	3
4	7	8	17 03 14	14 09 14	7.5	3	3
5	4	6	12 03 13	11 11 13	6	5	2.5
6	11	11	10 12 13	30 06 14	6	6.5	2

The frontal facial photographs of each patient were scanned, following a standardised technique and using the same Epson scanner. The images were saved into a Photoshop computer programme and were electronically rendered to the same size. The same colour composition was applied to each photograph and the final images recorded as JPEG files. The files were then imported into Microsoft Power Point.

The before and after images of a particular patient were arranged side by side on a slide, ensuring a random placement so that in some patients the before-treatment picture was on the left, whilst in other instances it was on the right. No demographics of the patients were included and the images were merely labelled with no further identification.

Figure 3.1 Example of the images which were presented for assessment by the panels

3.3. The Assessment Panels

There were two assessment panels, the first including a lay group, the second a group of dental specialists who have experience in orthognathic surgical treatment, i.e. orthodontists and maxillo-facial surgeons.

In preparation for assembling the lay group of assessors, the principal of an educational institution in Greytown, Kwazulu-Natal, was approached requesting permission that senior students and young educators attending his institution could be invited to participate in the study. That permission was granted and letters were sent to 108 staff and students (Appendix Three). The letter described the process which was to be followed and requested the agreement of the recipient to participate. Of the 108 who were approached, 83 signed the Informed Consent document (Appendix Three) signifying their preparedness to be included.

For the second group of assessors, the professionals, approaches were made to orthodontists and to maxillo-facial surgeons. The South African Society of Orthodontists and the Maxillo-Facial and Oral Surgeons Society of South Africa

generously granted permission that their members could be approached by an email letter (Appendix Three) with an invitation to participate. A disappointingly poor response was elicited .In addition, however, copies of these letters were sent to a number of selected South African and international practitioners whose addresses were gleaned from LinkedIn, an online professional network. This approach proved eminently more successful. In this way a combined assessment group of 37 Orthodontists and Maxillo-Facial and Oral surgeons agreed to participate and submitted Informed Consent documents (Group B).

Standard Questionnaires were prepared in which the opinion of the assessor was sought regarding his or her preference of one or the other of the paired images of each of the six patients (Appendix Four). The assessors were requested to record on the questionnaire sheet their response to the question: “Which of these two faces is the more attractive?” with a provision for three answers: A, B or No Difference. That document also requested from the observer details of his/her age, gender and ethnic group, making it clear that these data were to be given voluntarily.

The researcher, based in Greytown, accumulated data from the lay group of assessors (Group A). The participants were assembled in a lecture theatre and each was handed a questionnaire. Each slide of the images was projected sequentially onto a screen for a period of thirty seconds. The participants were requested to enter their choice of preference of image on the questionnaire, for either the left or right image or possibly for neither if no differences were observed. Provision was also made on the questionnaire for comments but few participants made use of this option. There was no collusion or discussion allowed between participants. The completed questionnaires were collected immediately.

For the professional group, Group B, the services of Survey Monkey were used. Each of the participating practitioners was sent an email document which included an instruction sheet, and a copy of the questionnaire. Once the participant had agreed to the survey, the series of patient images were released as a sequence of a pair of “Before” and “After”, every thirty seconds. As had been done for the lay group, the paired images were randomly composed, some with “Before” on the left, some with “After” on the left. The assessor entered his or her preference electronically and

could also record comments if so desired. The responses were collected through Survey Monkey routes and delivered in due course to the researcher.

3.4 Data Analysis

The study was a frequency analysis comparing the responses of two groups: lay and professional. The data was processed using SAS statistical software with the aim of comparing the reactions of the two groups. The outcome variable was the facial preference of which there were three: pre-treatment (A), post-treatment (B) or neither (C). Since there was no predilection of the assessor groups, ethnic group may influence the response. Hence, ethnicity was treated as a confounder. The possible influence of gender on aesthetic preferences was also tested. The Cochran-Mantel-Haenszel test (CMH) was used to assess the preferences of the observers and homogeneity of the sample.

CHAPTER 4

4.0 RESULTS

There were two groups in the study, namely “Specialist” and “Lay”. Of the total 120 participants, 37 were specialist dental practitioners and 83 were lay. In testing the perceptions of the effect of mandibular advancement on frontal facial aesthetics, these observers had to select their preference between two photographs of each of six patients and were offered three sets of choices namely, image “A” on the left, Image “B” on the right, or “No preference”. Some observers left their choices blank, thereby creating a fourth option of “Null”.

4.1 Descriptive Statistics

4.1.1 The Assessment Groups

In the specialist group of 37 participants, there were 32 males, one female and four individuals for whom the gender was not declared. Seventeen were Asian males, fifteen were white males, one was an Asian female and four had not declared their ethnicity (Table 4.1).

In the lay people group, comprised of 83 individuals, 56 were female, 26 were male and one participant had not declared gender. Further examination revealed that there were 34 White females, 10 Black females, seven Asian females and five females declared as “other ethnicity”. Amongst the males, there were 12 White males, five Asian males, three Black males and six males declared as “other ethnicity.” One participant had not declared either of these data (Table 4.2).

Table 4.1 Descriptive Data: Specialist Group

	Males	Females	Unknown	Total
Asian	17	1	0	18
White	15	0	0	15
Unknown	0	0	4	4
Total	32	1	4	37

Table 4.2 Descriptive Data: Lay Group

	Males	Females	Unknown	Total
Asian	5	7	0	12
Black	3	10	0	13
White	12	34	0	46
Other	6	5	1	12
Total	26	56	1	83

4.1.2 The Responses

From the total population that participated in this study, 720 responses were generated. The null choice was eliminated leaving 707 responses, 495 (64.2%) being from lay individuals and 212 (30.8%) from specialists. (Figure 4.1).

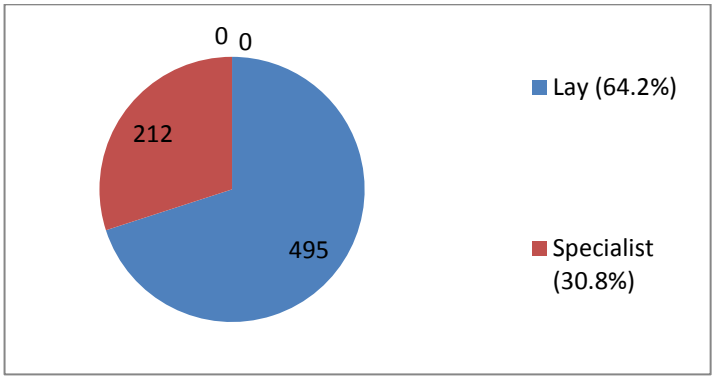

Figure 4.1 The distribution of responses from Groups 1 and 2

Apart from the female Specialist group (which included only the six responses from the single respondent), every category, except Gender Not Known, presented more than 140 responses. The Lay sample contributed nearly five hundred of the total number of responses received.

4.2 Analytical: statistics

4.2.1 Analysis of the Responses

When the opinions of the groups were combined, 51.7% were shown to prefer the faces after treatment, whilst 44.8% identified the faces before treatment as being more attractive (3.5% of the total sample population had no preference (Figure 4.2 and Table 4.3).

Considering the opinions of the Lay group, the data showed that 49.7% preferred faces after treatment, whereas 45.6% selected faces before treatment. 4.7% of the group had no preference. (Figure 4.2 and Table 4.3).

In the Specialist group, a greater proportion appreciated the faces post-treatment, namely 57.1%, as opposed to the 42.9% who preferred faces before treatment. All specialists chose either After or Before, none using the no preference option (Figure 4.2 and Table 4.3).

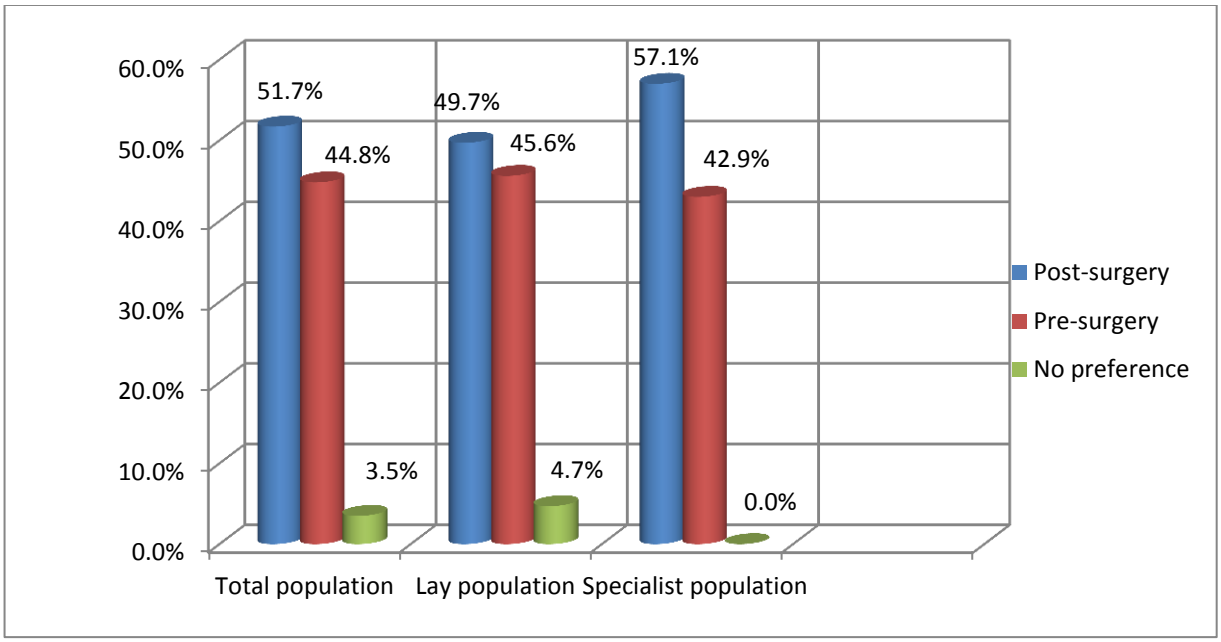

Figure 4.2 Comparison of preferences amongst the Groups

Table 4.3 Breakdown of total responses

	Treatment preference		
Participants	**After**	**Before**	**No preference**
Lay	246	226	23
Specialist	121	91	0
Female	181	158	13
Male	172	148	10
GNN	14	11	0
Lay female	177	156	13
Specialist female	4	2	0
Lay male	66	67	10
Specialist male	106	81	0
GNN lay	3	3	0
GNN specialist	11	8	0

In the combined female sample, 51.4% preferred the face after treatment, 44.9% selected the face before treatment and 3.7% had no preference Figure 4.3).

Of the lay females, 51.2% preferred faces after treatment whilst 45.0% selected faces before treatment and 3.8% had no preference (Figure 4.3).

Of the specialist females, 66.7% showed preference for the post-surgery faces whereas 33.3% favoured the before treatment faces (Figure 4.3).

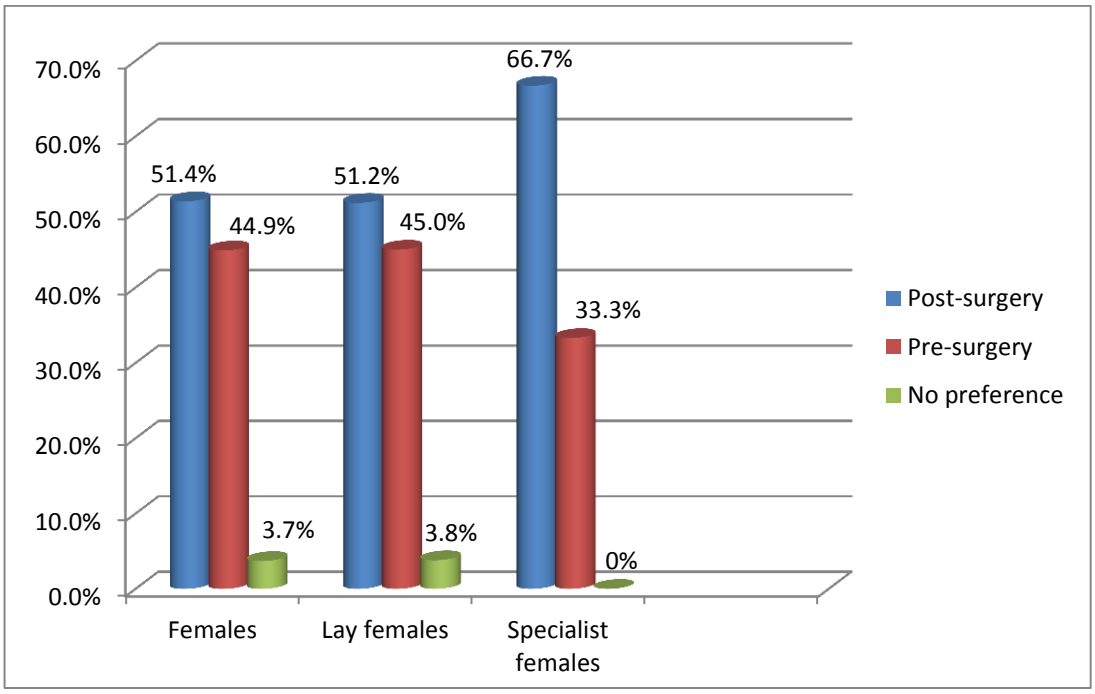

Figure 4.3 Distribution of responses amongst female assessors

In the total male population, 52.1% preferred faces after treatment, 44.1% chose the before treatment faces and 3.8% had no preference (Figure 4.4)

Amongst the lay male assessors, 46.2% preferred the faces after treatment whilst 46.9% selected the faces before treatment (7% had no preference) (Figure 4.4).

The specialist male group was more consistent with the greater preference being for post treatment faces (56.7%) as opposed to the pre-surgery preference of 43.3%. In this group, no assessor was undecided (Figure 4.4).

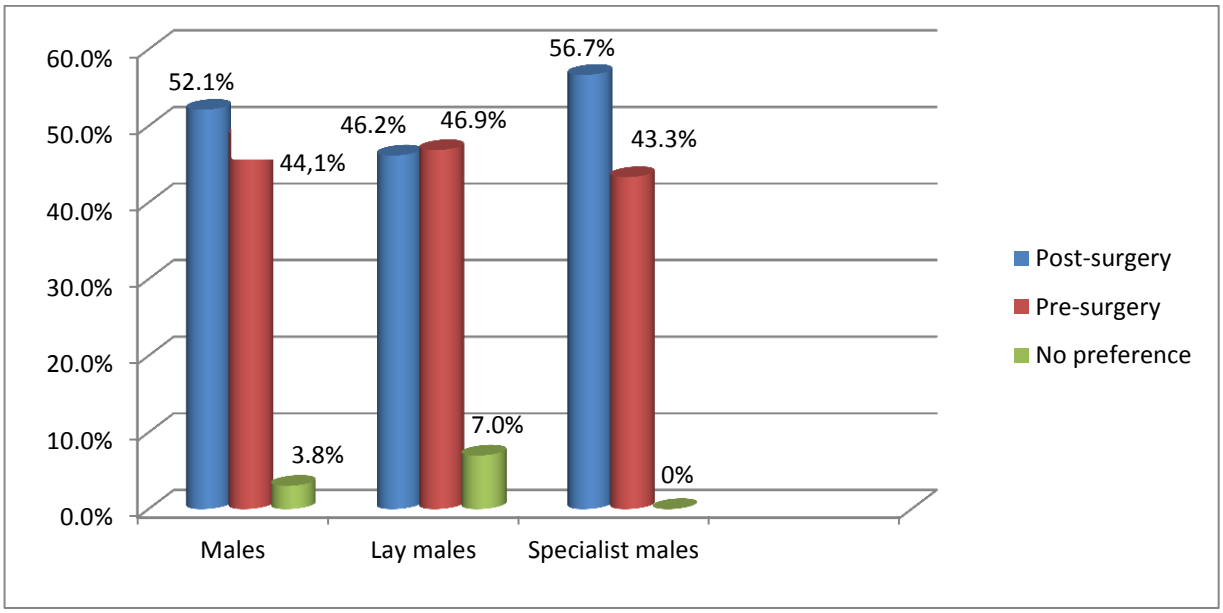

Figure 4.4 Distribution of responses amongst male assessors

In the small Gender Not Known (GNN) group, 56% displayed a preference for faces after treatment whereas 44% preferred the face before treatment. (Figure 4.5)

In the lay GNN group there was an equal preference for pre- and post-treatment (50%:50%), whereas in the specialist GNN group, 57.9% preferred post-treatment faces (Figure 4.5).

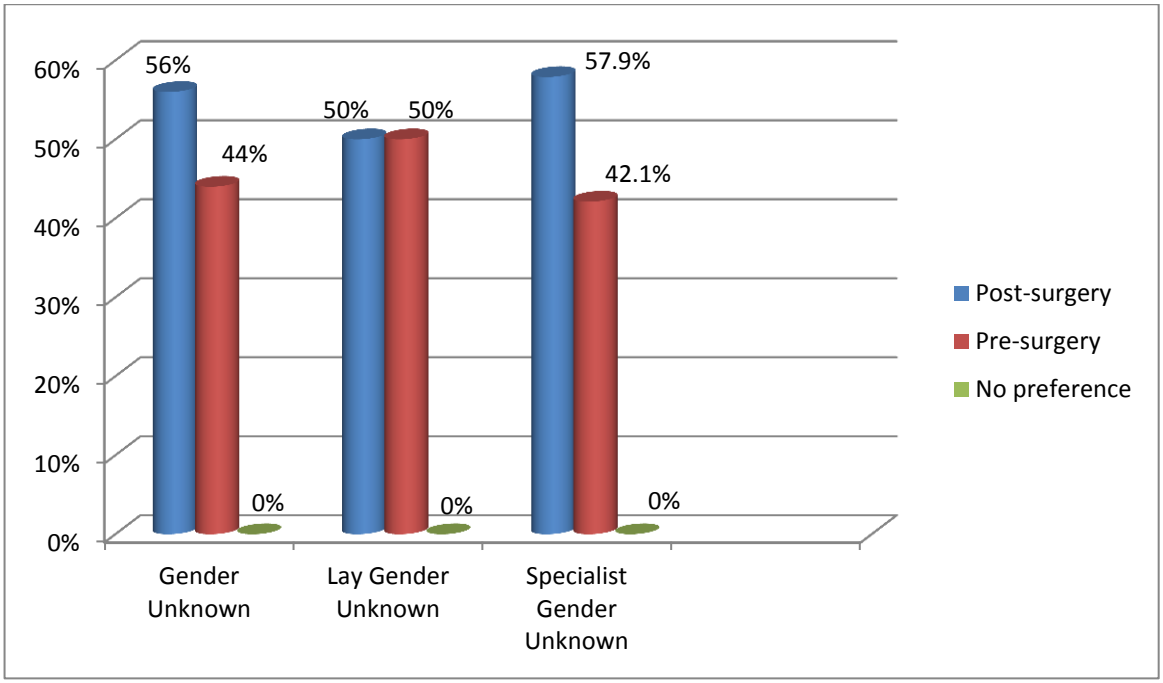

Figure 4.5 Gender Not Known: Distribution of responses

The combined data was analysed to explore the contributions of the responses from the various categories. The Lay sample recorded nearly equal percentages of the combined sample responses at 34.2% and 31.4% of the total responses for the After and Before images respectively (Table 4.4). The Specialists made a contribution of one third of the total votes cast by the combined sample in favour of the After image. Although the Specialists did not record any “No Preference” options a considerable proportion of the “No Choice” (77%) was recorded by this group (Table 4.4, 10 responses of total of 13). This should be seen in the context of the total responses recorded by Specialists, namely 222.

Table 4.4 Responses of the Combined Sample, stratified by Group

Lay Sample					
	After	**Before**	**No Preference**	**No Choice**	**Total**
Number of votes cast for After, Before, No preference, No choice and Total votes	246	226	23	3	498
Votes by Lay sample *as a percentage* of the Total number of votes cast by full Combined sample	34,2	31,4	3,2	0,4	69,2
Votes *as a percentage* of the Total number of votes cast by the Lay sample	49,4	45,4	4,6	0,6	100
Votes cast by Lay sample *as a percentage* of the Combined sample who voted for that choice.	67,0	71,3	100	23.1	
Specialist Sample					
Number of votes cast for After, Before, No preference, No choice and Total votes	121	91	0	10	222
Votes by Specialist sample *as a percentage* of the Total number of votes cast by full combined sample	16,8	12,6	0	1,4	30,8
Votes *as a percentage* of the Total number of votes cast by the Specialist sample	54,5	41.0	0	4,5	100
Votes cast by Specialist sample *as a percentage* of the combined sample who voted for that choice.	33.0	28,7	0	77,0	
COMBINED TOTALS	367	317	23	13	720
Percent	51.0	44,0	3,2	1,8	100

The data was refined by the removal of the “Null” votes, bringing total responses down to 495 for the Lay group and to 212 for the Specialists. Whilst the percentage contribution by the Specialists to the combined votes remained smaller, the Cochran-

Mantel-Haenszel test confirmed that the Specialists were decisive in identifying the after image as presenting more favourable aesthetics (p=0.0091, Table 4.5). There was a demonstrable difference in the choices made by the Lay group as compared with those made by the Specialist group.

Table 4.5 Responses of the combined sample refined by removal of Null (No Choice)

Lay Sample	**After**	**Before**	**No Preference**	**Total**
Number of votes cast for After, Before, No preference, and Total votes cast by Lay sample	246	226	23	495
Votes by Lay sample as a percentage of the Total number of votes cast by Lay sample	49.7	45.7	4.7	100
Specialist Sample				
Number of votes cast for After, Before, No preference, and Total votes cast by Specialist sample	121	91	0	212
Votes by Specialist sample as a percentage of the Total number of votes cast by Specialist sample	57.1	42.9	0	100
COMBINED TOTALS	367	317	23	707.0
Cochran-Mantel-Haenszel Chi Square	**Df**	**value**	**Probability**	
	1	6.8085	0.0091	

Gender may have been a factor influencing the evaluation of facial aesthetics. The data was then stratified by gender, after removal of the Gender Not Known group. Controlling for gender, this group was subjected to analysis using the Cochran-

Mantel-Haenszel (CMH) test. There was a significant association between the preferred profile and the group (CMH_{QSH} = 8.662 and p = 0.003, Table 4.6).

The GNN group was relatively small, (n=25) with overall a small majority preferring the After image (14 responses vs 11) (Table4.6).

Analysis of the Female data revealed a tendency for the Lay group to favour the After image, with 51.2% recording that vote and 45.1% selecting the Before stage (Fig 4.3). However, the CMH analysis failed to demonstrate any significant differences between two female samples (p = 0.4112) (Table 4.7).

Amongst the Specialist Group, two thirds of the votes were recorded for the After image, but this sample was only one female Specialist, Table 4.6). The CMH test is applicable to larger samples.

Recognising this limitation, the female data was subjected to Fischer's Exact Test, which may be applied to smaller samples. This analysis failed to identify any significance between the choices of the Specialist Female (p = 0.752).

Table 4.6 Analysis of the responses, stratified for Gender

		After	Before	No Preference	Total
FEMALE					
	Lay Sample				
	Frequency number	177	156	13	346
	Frequency Percent	51.2	45.1	3,8	100
	Specialist sample				
	Frequency number	4	2	0	6
	Frequency Percent	66.7	33.3	0	100
	Total	181	158	13	352
MALE					
	Lay sample				
	Frequency number	66	67	10	143
	Frequency Percent	46.2	46.9	7.0	100
	Specialist Sample				
	Frequency number	106	81	0	187
	Frequency Percent	56.7	43.3	0	100
	Total	172	148	10	330
GNN					
	Lay Sample				
	Frequency number	3	3	0	6
	Frequency Percent	50	50	0	100
	Specialist Sample				
	Frequency number	11	8	0	19
	Frequency Percent	57.9	42.1	0	100
	Total	14	11	0	25
TOTAL		**367**	**317**	**23**	**707**
		df	**Value**	**Probability**	
	Cochran-Mantel-Haenszel Chi Square	1	8.662	0.003	

Table 4.7 Analysis of the Female responses, stratified for Group

FEMALES				
	After	**Before**	**No Preference**	**Total**
Lay sample				
Number of votes cast by Lay Females for After, Before, No preference, and Total votes	177	156	13	346
Votes as a percentage of the Total number of votes cast by the Lay Female sample	51.2	45.1	3.8	100
Specialists				
Number of votes cast by Specialist Females for After, Before, No preference, and Total votes	4	2	0	6
Votes as a percentage of the Total number of votes cast by the Specialist Female sample	66,7	33.3	0	100
Total number of votes recorded by combined Female sample	181	158	13	352
	Statistic	**df**	**value**	**probability**
Cochran-Mantel-Haenszel Chi Square		1	0.7	0.4112

Amongst the Male group the Specialists in particular identified the After image as presenting the more desirable aesthetics (56.7% *cf* 43.3%, Table 4.8) and the CMH analysis demonstrated their clear statistical preference for the post-treatment image (CMH_{QSH} =7.989, p = 0.0047. The Lay males however were split almost evenly in

their selection, 46.2% choosing the After image and 46.9% preferring the Before image. (Seven percent could not decide their preference).

Table 4.8 Analysis of the Male responses, stratified for Group

MALES				
Lay Sample	**After**	**Before**	**No Preference**	**Total**
Number of votes cast by Lay Males for After, Before, No preference, and Total votes	66	67	10	143
Votes as a percentage of the Total number of votes cast by the Lay Male sample	46.2	46.9	7	
Specialist Sample				
Number of votes cast by Specialist Males for After, Before, No preference, and Total votes	106	81	0	187
Votes as a percentage of the Total number of votes cast by the Specialist Male sample	56.7	43.3	0	
Total number of votes recorded by combined Male sample	172	148	10	330
Cochran-Mantel-Haenszel Chi Square :	**df**	**value**	**Probability**	
	1	7.9892	0.0047	

The possibility that racial group may be a confounder was elucidated by an analysis of the data. There were four racial groups, Asian, Black (BLK) White and Unknown (ENN). Stratification by racial group revealed no significant association between Choice and Ethnic group (p= 0.0626, Table 4.9). As the blacks were all in the Lay group, and in an endeavour to further determine the role played by ethnicity, ENN and BLK were removed from the data to leave only White and Asian as the racial groups. Controlling for race, there was no significant association between racial group and the preferred choice (p = 0.6501, Table 4.9).

Table 4.9 Summary Statistics for Group by Choice, controlling for Race. BLK = Black, ENN = Ethnicity not known.

				Df	**Value**	**Probability**
BLK and ENN included		Row Mean Scores Differ		1	3,5	0,0626
BLK and ENN excluded		Row Mean Scores Differ		1	0,2	0,6501

The Data Sheet had provided an opportunity for assessors to quantify their perceptions of the changes, as Slight, Moderate, Considerable or Uncertain. These data were completed by some of the sample. When the opinions were assessed to ascertain the degree of distinction discerned by individuals between the images, no significant relationship could be demonstrated.

CHAPTER 5

5.0 DISCUSSION

This study set out to investigate whether surgical advancement of the mandible in Class II malocclusions effected consistently noticeable changes in the full frontal view of the face as assessed by two groups of observers Furthermore, the study set out to investigate whether a group of dental Specialists had perceptions of the face different from those of a lay sample. Assessment of the data has revealed some pertinent outcomes:
Overall the combined sample did demonstrate a preference for the After image, for 52%, that is 367 responses, selected the post-treatment full face picture. A smaller proportion (45%) recorded, however, a preference for the Before image (317 responses). There were 23 observers who did not identify a preference (3%). These data offer quite a telling comment for in effect there was a difference of only 7% between the choices made for the Before and After Treatment images.

If a change in aesthetics is truly a dominant factor motivating patients to undergo orthognathic surgery, these results may be of concern. It is evident that changes in the full frontal view of the face are not always perceived and indeed in some instances any changes may be interpreted as retrogressive for a considerable proportion of the sample actually selected the Before images as being preferable.

In contrast, studies which have focused on profile change after mandibular advancement have shown that observers, whether lay or dental professionals, readily identify the after treatment profiles, especially when the advancement has been more than 4mms, or the pre-treatment ANB was at least 6.5 degrees.[22, 27] These criteria were satisfied in the current study but nevertheless the selection of post-treatment full faces as the preferred image was not convincing. Yet, it is the full face that patients see in the mirror and it is the full face that is the prime presentation to others in the social environment.

It is true that social interaction is not confined to viewing faces solely in the frontal perspective. People move, turn their heads and display differing facial contours so an assessment of the success of any orthognathic treatment may be predicated by a mix of views. Nevertheless the prime interaction is a full face confrontation and certainly this view will be of import to the patient. This study may point to the need to demonstrate to the orthognathic patient the anticipated changes to the full face perspective in addition to the commonly used predictions of change to the profile.

Admittedly, the effect of mandibular advancement is more readily demonstrated on the profile view but if the predictions are computer generated, full face constructions may be produced. The patient will then be more fully informed and expectations will be more rationally based.

It is likely that the background, the experience and possibly gender and ethnic considerations may have an influence on how the assessor views the faces .The study did in fact confirm that were some associations between these variables and the responses. Taken into consideration were the variables “Gender” and “Ethnicity”.

The lay males in this study were not perceptive in distinguishing treatment differences on the photographs as this Group recorded an almost equal preference for the Before and “After” images (46.2 % and 46.7 % respectively). Lay females on the other hand demonstrated somewhat greater discrimination in their favoured appreciation of the after-treatment images (51% vs 45.1%), but this difference was not shown to have statistical significance.

If, for discussion purposes, the concept is accepted that lay females may be more alert to subtle changes in appearance, then it may be surmised that this is because females may be associated with an inherently greater focus on aesthetics and symmetry. A comment was recorded by a lay female assessor who noticed that on some images the skin of the patient appeared “clearer”. Such improvements have been observed post surgically and are possibly associated with an enhanced self-esteem and self-confidence after undergoing orthognathic mandibular advancement. A study revealed that acne improvement has been shown to be related to an improvement in self-image.[35]

When the choices of the Specialists were considered, both specialist females and specialist males preferred the post-surgery images. This may not be surprising given that orthodontists and maxillo-facial surgeons are frequently involved in critical analyses of the face. Experience has offered these specialists the opportunity to thoroughly explore the intricacies of facial aesthetics and the contrast with the variations of the Lay group is not entirely unexpected.

Perhaps the question may be whether there is more relevance in the opinion of the Specialist rather than the perception of the Lay observer. Certainly in treatment planning by the specialists the objectives of achieving the best possible symmetry and balance will have been paramount. Recognition of enhancement of those features will have influenced the selection of the After image, a statistically significant decision.

Physical attractiveness is not a new trend. Appearances have played a vital role in human social interaction and human relationships since ancient times and are greatly valued in all cultures. That objective may be the main motivation persuading the patient to undergo invasive treatment. The results of this study reinforce recognition of how essential it is to establish as the reason behind the patient's desire to undergo treatment as well as the patient's needs and motives.

Although this has been a relatively small study, there have been indications that the inclusion of projected changes in *norma frontalis* may be warranted in treatment planning of orthognathic surgery involving mandibular advancement.

5.1 Limitations of the study

The study relied upon a small number of patients who were willing to allow images of their faces to be shown to assessors in both professional and lay fields. Larger numbers would have allowed a more diligent examination of the question. Whilst there was no attempt to deliberately influence the ethnic and gender admixtures of the assessor groups there may be merit in doing so with a larger study to enable better evaluation of the influence of these variables, as also with age. The comparatively small number of specialists, especially females, posed a challenge, necessitating special statistical analysis.

CHAPTER 6

6.0 SUMMARY AND CONCLUSIONS

This study looked at the possible influence which mandibular advancement may exert on the perception of *norma frontalis* by two groups of observers. Although the data revealed that specialists were frequently able to discern the treated face from the untreated, there was a lack of convincing evidence that the outcome of this orthognathic surgery would be regularly recognised, not only by a lay observer but also in many cases by specialists.

It may be concluded that:

1. Observers can indeed recognise changes in the full face view in patients who had undergone orthognathic mandibular advancement.
2. However, this recognition was not universal amongst the observers.
3. Specialists do appear to have a greater perception and discernment of facial changes and have the ability to identify after treatment faces.
4. There is a need to include a prediction of expected changes in the face as observed from the frontal view.

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CHAPTER 7

7. 0 REFERENCES

1 Williams DM, Bentley R, Cobourne MT, Gibilaro A, Good S, Huppa C, Matthews NS, O'Higgins L. Patel S, Newton JT. The impact of idealised facial images on satisfaction with facial appearance: comparing 'ideal' and 'average' faces. J Dent. 2008; 36(9): 711-7.

1. Shell TL, Woods MG. Perception of facial aesthetics: A comparison of similar Class II cases treated with attempted growth modification or later orthognathic surgery. Angle Orthodontist. 2003; 73: 365-73.

2. Williams DM, Bentley R, Cobourne MT, Gibilaro A, Good S, Huppa C, Matthews NS, O'Higgins E. Patel S, Newton JT. Psychological characteristics of women who require orthognathic surgery: comparison with untreated controls. Br J Oral Maxillofac Surg. 2009; 47(3): 191-5.

3. Soh J, Chew MT, Wong HB. A comparative assessment of the perception of Chinese facial profile esthetics. Am J Orthod Dentofacial Orthop. 2005; 127(6): 692-9.

4. Flores-Mir C, Silva E, Barriga MI, Lagravere MO, Major PW. Lay person's perception of smile aesthetics in dental and facial views. J Orthod. 2004; 31 (3): 204-9.

5. Montini RW, McGorray SP, Wheeler TT, Dolce C. Perceptions of orthognathic surgery patient's change in profile. A five-year follow-up. Angle Orthod. 2007; 77(1): 5-11.

6. Bullen RN, Kook YA, Kim K, Park JH. Self-perception of the facial profile: an aid in treatment planning for orthognathic surgery. J Oral Maxillofac Surg. 2014; 72(4): 773-8.

7. O'Ryan F, Lassetter J. Optimizing facial esthetics in the orthognathic surgery patient. J Oral and Maxillofac Surg. 2011; 69(3): 702-15.

8. Langlois JH, Roggman LA. Attractive faces are only average. Psychological Science. 1990; 1(2): 115-21.

9. Phillips C, Hill BJ, Cannac C. The influence of video imaging on patients' perceptions and expectations. Angle Orthod. 1995; 65(4): 263-70.

10. Bishara SE, Jacobsen JR. Profile changes in patients treated with and without extractions by lay people. Am J Orthod Dentofacial Orthop. 1997;112: 639-44.

11. Raschke GF, Rieger UM, Bader RD, Guentsch A, Schaefer O, Schultze-Mosgau S. Soft tissue outcome after mandibular advancement - an anthropometric evaluation of 171 consecutive patients. Clin Oral Investig. 2013; 17(5): 1415-23.

12. Johnston C, Hunt O, Burden D, Stevenson M, Hepper P. Self-perception of dentofacial attractiveness among patients requiring orthognathic surgery. Angle Orthod. 2010; 80(2): 361-6.

13. Fabré M, Mossaz C, Christou P, Kiliaridis S. Orthodontists' and laypersons' aesthetic assessment of Class III subjects referred for orthognathic surgery. Eur J Orthod. 2009; 31(4): 443-8.

14. Bell R, Kiyak HA, Joondeph DR, McNeill RW, Wallen TR. Perceptions of facial profile and their influence on the decision to undergo orthognathic surgery. Am. J. Orthod. 1985; 88(4): 323-32.

15. Varlik SK, Demirbaş E, Orhan M. Influence of lower facial height changes on frontal facial attractiveness and perception of treatment need by lay people. Angle Orthod. 2010; 80 (6): 1159-64.

17. Kuroda S, Murakami K, Morishige Y Takano-Yamamoto T. Severe Class II malocclusion with facial asymmetry treated with intraoral vertico-sagittal ramus-osteotomy and LeFort I osteotomy. Am J Orthod Dentofacial Orthop. 2009; 135(6): 809-19.

18. Sander L, Gilman SL. Making the Body Beautiful: A Cultural History of Aesthetic Surgery. 2001. Princeton University Press, Oxfordshire. pp 3-12.

19. Bell WH, Profitt WR, White RP. Surgical Correction of Dentofacial Deformities. WB Saunders Co. Philadelphia, 1985. 763 pages.

20. Roblony M, Costa F, Dimitri V, Politi M. Simultaneous malaroplasty with porous polyethylene implants and orthognathic surgery for correction of malar deficiency. J Oral Maxillofac Surg. 1998; 56(6): 734-42.

21. Rustenmeyer J, Eke Z, Bremerich A. Perception of improvement after orthognathic surgery: the important variables affecting patient satisfaction. Oral Maxillofac Surg. 2010; 14(3): 155-62.

22. Burcal RG, Laskin DM, Sperry TP. Recognition of profile change after simulated orthognathic surgery. J Oral Maxillofac Surg. 1987; 45(8): 666-70.

23. Tsang ST, McFadden LR, Wiltshire WA, Pershad N, Baker AB. Profile changes in orthodontic patients treated with mandibular advancement surgery. Am J Orthod Dentofacial Orthop. 2009; 135(1): 66-72.

24. Bell R, Kiyak HA, Joondeph DR, McNeill RW, Wallen TR. Perceptions of facial profile and their influence on the decision to undergo orthognathic surgery. Am. J. Orthod. 1985; 88(4): 323-32.

25. Romani KL, Agahi F, Nanda R, Zernik JH. Evaluation of horizontal and vertical differences in facial profiles by orthodontists and lay people. Angle Orthod. 1993; 63(3): 175-82.

26. McCollum AGH, Gardener GJM, Evans WG, Becker PJ. Soft tissue changes following orthognathic surgery procedures: Soft-tissue changes related to mandibular advancement surgery. Seminars in Orthodontics. 2009; 15 : 161-71.

27. Schendel SA, Epker BN. Results after mandibular advancement surgery: an analysis of 87 cases. J Oral Surg. 1980; 38(4): 265-82.

28. Obwegeser H. The indications for surgical correction of mandibular deformities by the sagittal splitting technique. Br J Oral Surg. 1964:2:157-71.

29. Juggins KJ, Nixon F, Cunningham SJ. Patient- and clinician-perceived need for orthognathic surgery. Am J Orthod Dentofacial Orthop. 2005; 128(6): 697-702.

30. Olson RE, Laskin DM. Expectations of patients from Orthognathic urgery. Jnl of Oral Surg: 1980; 38(4):283-5.

31. Stirling J, Latchford G, Morris DO, Kindelan J, Spencer RJ, Bekker HL. Elective orthognathic treatment decision making: a survey of patient reasons and experiences. J Orthod. 2007; 34(2): 113-27.

32. Rivera SM, Hatch JP, Dolce C, Bays RA, Van Sickels JE, Rugh JD. Patient's own reasons and patient-perceived recommendations for orthognathic surgery. Am J Orthod Dentofacial Orthop. 2000; 118(2): 134-41.

33. Li KK, Riley RW, Powell NB, Guilleminault C. Patient's perception of the facial appearance after maxillomandibular advancement for obstructive sleep apnea syndrome. J. Oral Maxillofac Surg. 2001; 59(4): 377-80.

34. Clauser L, Curioni C. Total facial rehabilitation: the evolving concept of reconstructive surgery. J Craniofac Surg. 1997; 8(3): 194-200.

35. Tasoula E, Gregoriou S, Chalikias J, Lazarou D, Danopoulou I, Katsambas A, and Rigopoulos D The impact of acne vulgaris on quality of life and psychic health in young adolescents in Greece. Results of a population survey. An Bras Dermatol. 2012; 87(6): 862–9.

CHAPTER 8

8.0 APPENDICES

8.1 Appendix One

Ethics Approval Certificate

M140267

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140267

NAME: (Principal Investigator)	Dr Zaheera Hassen Mia
DEPARTMENT:	Orthondontics and Paediatric Dentistry Private Practice
PROJECT TITLE:	Perception of Frontal Facial Aesthetics Before and After orthognathic Mandibular Advancement
DATE CONSIDERED:	28/02/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	William Greig Evans
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 28/05/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature M140267Date

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

8.2 Appendix Two

Letter to patients

Dr Zaheera Mia
Department of Developmental Dentistry
School of Oral Health Sciences
Faculty of Health Sciences
University of the Witwatersrand, Johannesburg

Letter sent by Professor McCollum on behalf of Dr Mia.

Dear [PATIENT] (name inserted by Professor McCollum)

I am Dr. Zaheera Mia, postgraduate student at Wits University. I am furthering my studies by reading towards the degree MSc Dentistry with a research component in Orthodontics. The focus of my research is the effect of surgical advancement of the lower jaw on facial appearance.

As part of your orthodontic treatment by Professor McCollum you received surgery to the lower jaw. The purpose of my research is to evaluate the effects of surgical advancement on facial appearance /aesthetics as viewed from the front of the face. The research investigates an important aspect of the outcome of the treatment and the results may contribute to further improvement in our treatment approaches and the management of patients with a deformity similar to yours. Your participation will therefore be of considerable value. We would like to review the records of 10 to 40 people that received your type of treatment from Professor McCollum.

You will recall that at the start of treatment it was explained to you that your records may be used for educational and research purposes and a document recording that option was signed by you, or perhaps by your parents. Based on that consent, Professor McCollum has granted permission for me to approach you. It is important that I should seek definitive permission from you for this particular project. Your agreement will enable the research, which has the potential to impact on the line of treatment used on future patients.

I seek your permission to use in research full frontal photographs of your face before and after the treatment that you received. These pictures were taken as routine records by Professor McCollum. The photographs will not be retouched in any way. The pictures will be shown to approximately thirty lay people, preferably senior students and young educators at an educational institution in my small home-town of Greytown. The pictures will also be evaluated by a mixed group of thirty orthodontists and/or maxillofacial and oral surgeons. For purposes of this research, these people are referred to as assessors.

Whilst your photographs will be clearly displayed there will be no identifying marks or notations. The pictures will be projected side by side for half a minute and the participants will be asked to comment on any observed differences before and after treatment. The research will statistically evaluate the recorded observations and a Research Report will be prepared for submission to the University as part of my requirements for the MSc degree. The outcomes of the research may also be published. However, none of your personal information will be made available to the people outside of the research.

Participation in this research project is voluntary. Your records will be treated with strict confidentiality. Only persons involved in this research will have access to your photographs. You may contact your treating doctor, Professor McCollum at any time if you have any questions about the research. You may also contact the Human Research Ethics Committee of Wits University at [enter phone number] or myself Dr. Mia at [enter phone number]. Please note that none of your details have been made available to me, hence I have no way of identifying you. Only your photographs will be made available to me by your treating doctor, Professor McCollum.

Yours sincerely,

Zaheera Mia

Please complete the details below and return to

ProfessorAGH McCollum
PO Box 67104
Bryanston 2021

Or : Email to : tomacprac@mweb.co.za

Thank you.

Dr Zaheera Mia

I …….. have read and understand the intent of the research project. I understand that my permission is entirely voluntary, and that there will be no consequences should I elect to withdraw from the project at any time.

For the following please indicate your decision:

I hereby

GRANT ☐

DO NOT GRANT ☐

permission for the use in research of unretouched photographs of my face before and after mandibular advancement surgery.

Signed……

Date……..

8.3 Appendix Three

Information Sheet and Informed Consent Document.

Good Day,

Re: *Perception of frontal facial aesthetics before and after orthognathic mandibular advancement.*

I am Dr Zaheera Mia, a postgraduate Student at the University of the Witwatersrand, School of Oral Health Sciences, where I am reading towards the degree MSc(Dent) (Orthodontics). I am conducting a research project and I write to invite your participation.

The background to the study.

Surgical treatment to bring the lower jaw forward is undertaken in cases where it appears that the jaw is too small and is placed too far backwards in the face. Research into the results of this complex procedure has concentrated on looking at the changes in the profile of the patient. I am interested in how the treatment may alter the face when seen from the front.

I am therefore conducting a research project in which before and after treatment full face photographs of patients who have undergone this treatment will be shown to observers. The question will be asked : Which appearance do you prefer? The two pictures of the same individual will be shown side by side for a period of thirty seconds. The observer will be requested to react to the pictures by either selecting one or the other as being the more attractive, or to decide that there is little difference and no clear preference is possible. A questionnaire will be provided in which the choice may be recorded. The results will be analysed to determine whether there is a clear preference. The process should require no more than 45 minutes of your time. There are no risks to your taking part and anonymity would be maintained.

All patients whose photographs will be shown will have agreed to the use of their treatment records in this way. The project has been approved by the Human Research Ethics Committee of the University of the Witwatersrand, Johannebsurg.

The study will be valuable for all who are involved in considering facial appearances. The data base on which treatment planning is based will be enriched and the study will definitively contribute towards improved approaches to the management of patients undergoing repositioning of the lower jaw.

Would you agree to participate as an observer/assessor for the project? At no time would your personal details be disclosed and you will be requested to not discuss the cases amongst your colleagues after the exercise.

Should you agree to take part, I shall be grateful to have you complete the attached Consent Form. I shall soon thereafter be in contact with you to finalise the arrangements for the viewing session.

The results will be published and you would be welcome to request details of the outcome.

Thank you for your kind attention.

Dr Zaheera Mia, Researcher.

Contact numbers : **TELEPHONE NO:** 033 417 1911 **FAX NO:** 033 417 1999

CELL: 083 7869694 **Email:** zshmia@gmail.com

Supervisor W G Evans **CELL** : 082 338 3809 **Email** : bill.evans@wits.ac.za

Agreement

I……., hereby agree to participate as an assessor in a research project being undertaken by Dr Mia. I understand that my identity will not be disclosed in any way and that I may withdraw from the project at any time.

Signed……. Date……..

8.4 Appendix Four

Questionnaire - Study on facial aesthetics

Instructions

A series of photographs showing full faces will be projected onto the screen. Each slide will have two pictures of the same person, but taken at different times. The slide will be shown for a period of 30 seconds.

You are requested to record your preference on this questionnaire, marking with a cross your choice of either Photograph 1 or Photograph 2. There is also provision for a “No difference” answer. Please rate the degree of difference you may recognise between the pictures.

Should you wish to make a brief comment, there is space provided.

Your kind participation is gratefully acknowledged.

Questionnaire

Which of these two full face photographic images of the same patient is the more attractive?

Slide letter	Preference 1	Preference 2	No preference	Do you consider the differences as:			Comment
				Slight	Moderate	Considerable	
A							
B							
C							
D							
E							
F							

Ýour details: please circle the appropriate detail. Thank you.

Gender ……Male / Female

Age group in years: 15 to 20 21 to 30 31 to 40 41 to 50 over 50

Ethnic Group : White Black Asian Other