

## Self-Perception of Dentofacial Attractiveness among Patients Requiring Orthognathic Surgery

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### ABSTRACT

**Objective:** To test the hypothesis that the self-perception of dental and facial attractiveness among patients requiring orthognathic surgery is no different from that of control patients.

**Materials and Methods:** Happiness with dental and facial appearance was assessed using questionnaires completed by 162 patients who required orthognathic treatment and 157 control subjects. Visual analog scale, binary, and open response data were collected. Analysis was carried out using a general linear model, logistic regression, and chi-square tests.

**Results:** Orthognathic patients were less happy with their dental appearance than were controls. Class II patients and women had lower happiness scores for their dental appearance. Among orthognathic patients, the “shape” and “prominence” of their teeth were the most frequent causes of concern. Older subjects, women, and orthognathic patients were less happy with their facial appearance. Class III orthognathic patients, older subjects, and women were more likely to have looked at their own face in profile. A greater proportion of Class II subjects than Class III subjects wished to change their appearance.

**Conclusions:** The hypothesis is rejected. The findings indicate that women and patients requiring orthognathic surgery had lower levels of happiness with their dentofacial appearance. Although Class II patients exhibited the lowest levels of happiness with their dental appearance, there was some evidence that concerns and awareness about their facial profile were more pronounced among the Class III patients. (*Angle Orthod* 2010;80:361–366.)

**KEY WORDS:** Orthognathic; Perception; Attractiveness; Self; Malocclusion; Facial

### INTRODUCTION

Orthognathic treatment is used routinely to correct severe jaw discrepancy using a combination of fixed orthodontic appliances and jaw surgery. The main indications for this treatment are dentoskeletal disproportions that are so severe that they cannot be

corrected using less complex treatment options such as orthodontic appliances alone. A recent study estimated that 250,000 patients in the UK have problems severe enough to require this treatment.<sup>1</sup>

It is generally accepted that the main benefits of orthognathic treatment are likely to be psychosocial in nature<sup>2</sup> and that the majority of patients who seek treatment do so because of concerns about their dentofacial esthetics.<sup>2–6</sup> Although dental professionals are generally more critical than laypersons when assessing dentofacial esthetics,<sup>7,8</sup> there is little previous work investigating the self-perception of facial attractiveness among orthognathic patients. However, it has been reported that orthognathic patients perceive their facial profile differently from orthodontists, surgeons, and laypersons.<sup>2,9</sup> A comparative study of skeletal II and skeletal III orthognathic patients has found that skeletal III patients had stronger feelings of insecurity regarding their facial appearance.<sup>10</sup>

A previous study by this research team explored the psychological status of orthognathic and control patients using standardized psychological measures.<sup>11</sup> The aim of the current study, using the same sample of

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orthognathic and control subjects, was to examine the self-perception of dental and facial attractiveness by patients requiring orthognathic surgery and to determine if the type of skeletal discrepancy (skeletal II or skeletal III) influenced their perception of attractiveness.

## MATERIALS AND METHODS

Ethical approval for this study was received from the Northern Ireland Research Ethics Committee.

### The Patient Sample

Over a 3-year period, all patients attending a university teaching hospital orthodontic department who were considered to require orthognathic treatment were invited to participate in the study. All eligible patients were examined by one of two experienced consultant orthodontists. Patients with primarily transverse skeletal anomalies and those with syndromal conditions such as cleft lip and palate were excluded. Patients with serious concomitant medical conditions were also excluded.

Standard orthodontic clinical records were collected for participating patients including study casts and extraoral and intraoral photographs. After all the patients were recruited, the two consultant orthodontists used these clinical records (study casts and intraoral and extraoral photographs) to independently confirm that orthognathic treatment was required and to classify each case as either skeletal Class II ( $n = 67$ ) or skeletal Class III ( $n = 95$ ). Radiographs were recorded when clinically indicated for assessment of the dentition or dentoskeletal relationships or when required for initial treatment planning. However, these were not used for classification of each case.

### The Control Group

Control subjects were recruited by using posters on notice boards on both university and health service premises and through staff newsletters. Subjects with craniofacial anomalies or serious medical conditions were excluded. Standard orthodontic extraoral and intraoral photographs were taken. Two experienced consultant orthodontists (who were not involved in selecting the orthognathic patient sample), independently reviewed the intraoral and extraoral images of all recruited control group subjects to determine if any of these subjects had a dentofacial appearance that might justify orthognathic treatment. This process identified and excluded 11 subjects who had a dentofacial discrepancy that might be considered to require orthognathic treatment.

## Subject Data Collection

Subject responses for controls and orthognathic patients regarding their perceived facial attractiveness were recorded using a specially designed questionnaire. The first section of the questionnaire included two visual analog scales (VAS), which subjects used to record their happiness with their dental and facial appearance. These VAS scores were anchored on the left of the scale by the statement "very happy" for a maximum score and on the right of the scale by "not happy at all" for a minimum score. A third VAS was modified from the Index of Orthodontic Treatment Need Aesthetic Component (IOTN AC) and was anchored on the left of the scale by the AC image 1 (maximum score) and on the right by the AC image 10 (minimum score).<sup>12</sup> Binary response variables (Yes/No) assessed whether the subjects had seen their own face in profile, and if so, whether they were happy with their profile appearance. Subjects were also asked whether they would wish to change their dentofacial appearance, and open response questions were included to allow subjects to report which of their dentofacial features they were unhappy with.

## Analysis

Comparison of the binary response data was carried out using logistic regression and chi-square tests. A general linear model (GLM) regression analysis was used for VAS data.

## RESULTS

The mean ages of the subjects in the control and orthognathic groups were 22.5 years and 22.0 years. The mean ages for the orthognathic subgroups were 25.4 years for Class II and 19.1 years for Class III cases. Overall, the gender balance between controls and all surgery subjects was similar with the proportions of female subjects being 60% for controls and 59% for surgical subjects. Within the surgery subjects, a greater proportion of women was in the Class II group than in the Class III group (67% and 54%, respectively).

### Dental Appearance

The GLM analysis and descriptive statistics for the VAS scores for happiness with dental appearance are summarized in Tables 1 and 2. The initial analysis revealed evidence of a lack of homogeneity of variance. The analysis was therefore repeated using a probit transformation of the VAS scores, which reduced the heterogeneity of variance by more than 75%. However, this transformation had a minimal influence on the  $t$  values and no influence on the

**Table 1.** Descriptive Statistics for Visual Analog Scale (VAS) Data; Higher Scores Represent Greater Happiness<sup>a</sup>

VAS scores	Control (n = 157)		Class II (n = 67)		Class III (n = 95)	
	Mean	SD	Mean	SD	Mean	SD
Happiness with teeth	56.4	26.7	22.0	19.5	37.9	25.5
Happiness with face	65.0	19.8	43.9	20.6	47.0	25.2
Modified IOTN AC	72.7	18.1	54.6	20.0	60.8	21.6

<sup>a</sup> SD indicates standard deviation; IOTN AC, Index of Orthodontic Treatment Need Aesthetic Component.

conclusions from the analysis. Therefore, the untransformed analysis is presented. This revealed that both orthognathic groups were less happy with their dental appearance than controls. Class II patients had lower mean happiness scores than Class III patients and controls. Female patients had lower mean happiness scores than male patients. Age was not found to influence scoring.

The results for the modified IOTN AC scores are shown in Tables 1 and 3. Both orthognathic groups reported lower mean scores than controls, although there was no difference between Class II and Class III cases. Older patients reported lower scores.

Among 198 orthognathic subjects who stated what feature most concerned them about their dental appearance, the most common features cited were “shape of teeth” (42.9%) and “prominence of teeth” (14.1%).

**Facial Appearance**

The GLM results and descriptive statistics for happiness with facial appearance are summarized in Tables 1 and 4. Older subjects and female and orthognathic patients were less happy with their facial appearance than control subjects were. There were no differences between Class II and Class III orthognathic patients.

Only 95 subjects stated which particular feature they liked least about their facial appearance. The most frequent responses were “jaw” (42.1%), “cosmetic appearance” (14.7%), and “teeth prominence or smile” (10.5%).

**Facial Profile**

The proportions of subjects who reported having seen their own face in profile were 67.5% for controls,

67.2% for Class II, and 77.9% for Class III. Logistic regression (Table 5) indicated that Class III orthognathic patients, women, and older subjects were more likely to have seen their own face in profile. Of those subjects who had seen their own faces in profile, orthognathic patients, women, and older subjects were less likely to be happy with their profiles (Table 6).

**Desire to Change Dentofacial Appearance**

Ninety-seven percent of Class II subjects and 86 percent of Class III subjects wished to change their appearance. This difference was statistically significant ( $P < .05$ ). Fifty-nine percent of controls indicated that they would wish to change their appearance.

**DISCUSSION**

This study recruited a large sample of patients who were assessed as requiring orthognathic surgery for correction of their malocclusions. Care was taken to ensure that the control group was matched for age and gender distribution. The age range of the controls and patients is similar to that reported in previous studies of those seeking and undergoing orthognathic surgery in the UK.<sup>2,13,14</sup> The majority of the orthognathic group (60%) was female, supporting the findings of other studies indicating that female patients are more likely to seek orthognathic treatment.<sup>6,14,15</sup> Within the surgery group, the Class III patients had a lower mean age than the Class II patients, and a greater proportion was male. Similar gender distribution differences between Class II and Class III orthognathic patients have also been observed in other studies.<sup>6</sup> The lower mean age of the Class III patients might be due to earlier recognition and/or referral of patients with severe skeletal III anomaly.

**Table 2.** Regression Analysis for Happiness With Appearance of Teeth

	B	P	95% Confidence Interval for B	
			Lower	Upper
Intercept	52.25	.000	42.46	62.05
Female	−9.06	.001	−14.56	−3.55
Control	18.64	.000	12.39	24.89
Class II	−16.27	.000	−23.96	−8.57
Class III	0			

**Table 3.** Regression Analysis for Modified Index of Orthodontic Treatment Need Aesthetic Component (IOTN AC) Scale

	B	P	95% Confidence Interval for B	
			Lower	Upper
Intercept	65.13	.000	59.19	71.07
Age	−0.218	.058	−0.444	0.01
Control	12.51	.000	7.48	17.55
Class II	−5	.117	−11.27	1.26
Class III	0			

**Table 4.** Regression Analysis for Facial Attractiveness

	B	P	95% Confidence Interval for B	
			Lower	Upper
Intercept	71.79	.000	62.54	81.04
Female	-8.574	.000	-13.23	-3.92
Age	-0.576	.000	-0.81	-0.34
Control	19.96	.000	14.65	25.27
Class II	0.348	.918	-6.27	6.97
Class III	0			

The main finding of this study was that orthognathic patients were significantly less happy with their dental and facial appearance than controls. Ninety-one percent of orthognathic patients expressed a desire to change their appearance, which supports previous research indicating that concerns about dentofacial esthetics are the major motivating factor for patients undergoing orthognathic treatment.<sup>2-5</sup> In the present study, the VAS dental attractiveness scores recorded by the Class II patients were worse than the scores recorded by the Class III patients and controls. Interestingly, when subjects were asked to score their dental appearance using a modified IOTN AC VAS scale, no significant differences were found between Class II and Class III patients, although overall orthognathic patients recorded lower attractiveness scores than controls. The image used to anchor the extreme end of this scale (AC image number 10) shows a patient with severe crowding. It could be speculated that the increased esthetic impairment of the overjet characteristic of Class II malocclusions may not have been reflected in the scoring awarded by Class II patients. Instead, they may have rated their own appearance on the scale based mostly on the irregularity of their teeth, and this may explain why no differences were seen between Class II and Class III subjects when using this type of VAS. In our earlier study using standardized psychological measures, no significant differences were found among Class II, Class III, or control subjects, but we did find that the Class II patients had the worst mean scores for nearly all the psychological measures.<sup>11</sup> Together with these

**Table 5.** Logistic Regression for Subjects Having Looked at Their Own Face in Profile

	P	Exp(B)	95% Confidence Interval for Exp(B)	
			Lower	Upper
Control	.040			
Class II	.578	0.84	0.44	1.57
Class III	.027	1.98	1.08	3.61
Female	.023	1.79	1.09	2.96
Age	.007	1.04	1.01	1.07
Constant	.041	0.34		

**Table 6.** Logistic Regression for Being Happy With Facial Profile

	P	Exp(B)	95% Confidence Interval for Exp(B)	
			Lower	Upper
Control	.000			
Class II	.000	0.09	0.04	0.21
Class III	.000	0.07	0.03	0.15
Female	.002	0.32	0.16	0.64
Age	.002	0.95	0.92	0.98
Constant	.000	118.71		

previous findings, the current data support the contention that Class II orthognathic patients have greater levels of concern about their malocclusions.

The current findings suggest that the self-perception of attractiveness among orthognathic patients may be more complex than previously thought, with subtle differences existing between how these patients view their dental appearance and how they view their facial appearance. In the results presented here, although Class II subjects reported lower mean happiness scores for dental appearance than Class III subjects and controls, no differences were found between the Class II and Class III subjects in the scores for self-rated happiness with facial appearance. It is likely that the lower scores for dental appearance in the Class II group were influenced by the unattractive dental appearance often associated with upper incisor prominence, lack of lower lip coverage, and exposure of the upper incisors. In contrast, there was some evidence that Class II patients had lower levels of concern about their facial profile than Class III patients did, as they were less likely than Class III patients to report that they had looked at their own face in profile. Although some investigations have reported that laypeople are relatively more tolerant of Class II profiles,<sup>16</sup> other studies have indicated that Class II profiles may be less favorably rated than Class III profiles.<sup>8,17-19</sup> However, direct comparison of these reports with the current study is inappropriate because none of these studies examined self-perception of profile, and instead used professional or lay panels who rated images of facial profiles. Nevertheless, in the context of these previous studies, the current results are indicative of differences between how orthognathic patients view their own faces and how others view them. At least one previous study has observed that ratings of attractiveness of orthognathic patients by relatives/friends differed from the ratings awarded by the patients themselves.<sup>10</sup>

In the current study, female patients were more likely to be unhappy with their dental appearance. This finding supports previous studies that have indicated that women more frequently report esthetic concerns as a reason for undergoing treatment.<sup>20-22</sup> A study of military



recruits in Italy has demonstrated that female subjects with Class II and Class III profiles were two and four times more likely respectively to be psychologically classified as being unable to successfully manage interpersonal relationships.<sup>23</sup> Those authors failed to find a similar relationship in male subjects and hypothesized that this may be a result of greater social pressure to be physically attractive in women. Other studies have shown no gender differences in esthetic motives for undergoing treatment.<sup>5,6,24</sup> These differences might be explained on the basis that previous studies have been retrospective, have been carried out on different patient populations, and have not controlled for other factors such as skeletal classification and age.

It has been reported that older orthodontists, surgeons, and laypersons are less critical of facial appearance than younger judges when assessing images with different degrees of skeletal discrepancy.<sup>25</sup> In the current study examining self-reported perception of subjects' own attractiveness and happiness with appearance, the opposite relationship was found. Older subjects (regardless of whether they required orthognathic surgery) were less likely to be happy with their facial appearance and profile (in those subjects who had seen their own profiles). This is an important finding because it is further evidence that subjects may view their own appearance in different ways to other people.

## CONCLUSIONS

- Orthognathic patients were less happy with the appearance of their face, teeth, and profile when compared with controls.
- Class II surgical patients reported a higher level of unhappiness with their dental appearance and were also more likely than Class III patients to want to change their overall appearance.
- Older and female subjects were more unhappy with their dental, facial, and profile appearance.

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