

# CASE REPORT

## Combined Orthodontic, Orthognathic, and Plastic Surgical Treatment of an Adult Class II Malocclusion

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**T**reatment options for a skeletal Class II malocclusion include:

1. Growth modification with headgear, a removable functional appliance, or fixed hyperpropulsion.
2. Nonextraction treatment involving compensatory dental changes.
3. Camouflage treatment with premolar extractions.
4. Orthognathic surgery after completion of growth.

Growth modification is, of course, impossible in adult patients. Compensatory or camouflage orthodontic treatment often achieves an acceptable occlusal result, but in some cases the cosmetic outcome may be less than desirable for the patient, the clinician, or both.

With the recent popularity of “makeover” television shows, a whole new world of facial esthetic treatment has been opened to a fascinated public. Although lay persons are now being educated about the capabilities of plastic surgeons and cosmetic dentists, the esthetic benefits of orthodontics, particularly when combined with orthognathic surgery, have been relatively neglected. Since the introduction of rigid internal fixation in the mid-

1980s, however, orthodontists and their interdisciplinary teams have had even more options. With the patient’s jaws no longer wired together, it is possible to incorporate other procedures, such as rhinoplasty, to enhance the esthetic outcome.

The present article shows such a case. It is important to note that the orthodontic and surgical planning reflects a movement away from cephalometrically and occlusally dictated treatment objectives toward an evaluation and treatment of overall facial proportions.

### Esthetic Diagnosis

A 17-year-old female presented with the chief complaint of “I don’t like my profile and I don’t have a chin”. She had un-

dergone orthodontic treatment as an adolescent, resulting in a Class I occlusion with normal overbite and overjet (Fig. 1). The cephalogram reflected a steep mandibular plane angle, a lack of functional chin projection, and severely proclined and procumbent lower incisors (Fig. 2). The patient had no history of temporomandibular joint disorders and had a remarkably good occlusion, despite her Class II skeletal discrepancy.

Contemporary diagnosis of dentoskeletal deformity requires both a good clinical examination and an appraisal of the patient’s esthetic and functional characteristics. In the esthetic evaluation, we assess three broad areas: macroesthetic (the face), miniesthetic (the smile), and microesthetic (the teeth and gingivae).

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**Fig. 1** 17-year-old female patient with Class I occlusion and severe Class II skeletal pattern. In profile, middle and upper facial proportions are normal, but lower face is extremely recessive.

**Macroesthetic Evaluation**

Ideal frontal vertical proportions consist of equal facial thirds, with the lower third further divided into one-third upper lip and two-thirds lower lip and chin (Fig. 3). This patient had a short lower face with a short chin (Fig. 4). In the frontal view, her esthetic features were dominated by the chin-height discrepancy and her nasal appearance. The ideal nasal form, from the brow through the dorsum to the scroll of the alar base, resembles a “gull in flight”, with the alar base width equal to the intercanthal distance (Fig. 5). This patient had an asymmetry of the nasal dorsum and a wide alar base (Fig. 6). Her profile view reflect-

ed a severe mandibular deficiency, with a short chin-neck length and an obtuse cervicomental angle secondary to the mandibular deficiency.

**Miniesthetic Evaluation**

The patient exhibited all the elements of an esthetic smile: excellent transverse smile dimensions, ideal incisor display, and a consonant smile arc.

**Microesthetic Evaluation**

The patient presented with mottled enamel and poor oral hygiene, which had resulted in marginal gingival bleeding and hypertrophic gingival contours.



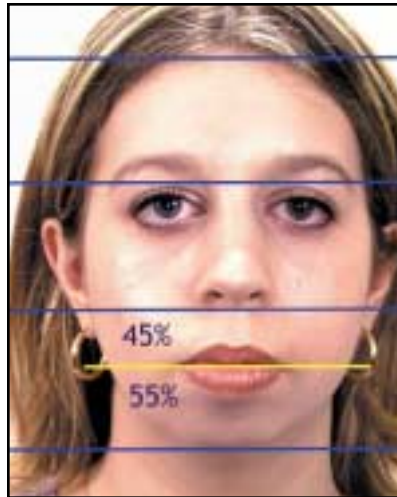
**Fig. 2** Lateral cephalogram taken before presurgical orthodontic treatment.

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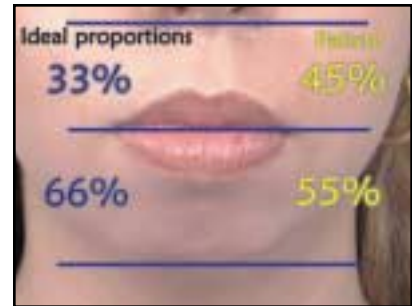
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**Fig. 3** Ideal vertical proportions: one-third of lower facial height is from upper lip to base of nose.



**Fig. 4** Patient's upper lip makes up 45% of lower facial height; lower-lip-to-chin height accounts for only 55%.



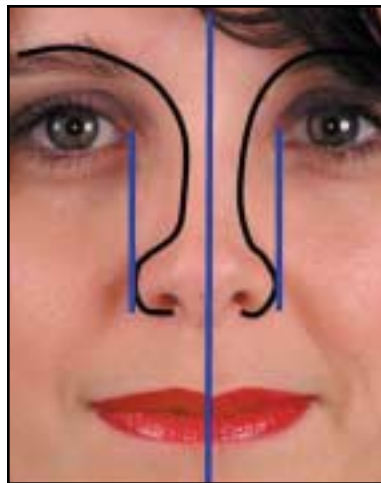
### Treatment Objectives and Plan

The primary macroesthetic objective of treatment was to improve the projection and proportion of the lower face and the nasal esthetics. We also wanted to maintain the patient's upper incisor position and preserve her smile arc. A comprehensive surgical approach was presented, consisting of mandibular advancement, genioplasty, and rhinoplasty.

To decompensate the severely proclined lower incisors, the lower first premolars would be extracted, and the lower incisors retracted. The objective of the presurgical orthodontic treatment was to create a Class II malocclusion to match the face.

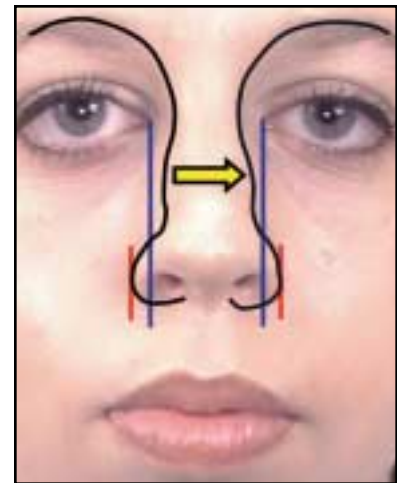
### Treatment Progress

After extraction of the lower first premolars, .018" Orthos\* brackets were placed,



**Fig. 5** Ideal nasal form, with smooth transition from brow through dorsum to scroll of alar base, and alar base width equal to intercanthal distance.

and the arches were aligned with a lower .016" stainless steel archwire and an upper .017" × .025" Copper Ni-Ti\*\* archwire. The mandibular extraction spaces were closed with traction coils from the lower second molars to the lower cuspids, thus produc-



**Fig. 6** Patient's alar base width is greater than intercanthal distance; dorsum is broad, with septum deviated to left (arrow).

ing maximum anchorage to maximize overjet. To upright the proclined lower incisors, the lower anterior teeth were retracted on a round archwire with sliding mechanics, supplemented by Class III elastics.

The presurgical cephalo-

gram showed an overjet of 10mm (Fig. 7). For final surgical planning, the patient and her parents were brought in for an integrated cephalometric-profile imaging session (Kodak Ortho-Trac,\*\* Fig. 8). Advantages include the ability of the clinician and patient to visualize the esthetic outcome, precise quantification of the surgical plan, and involvement of the patient in the decision-making process.

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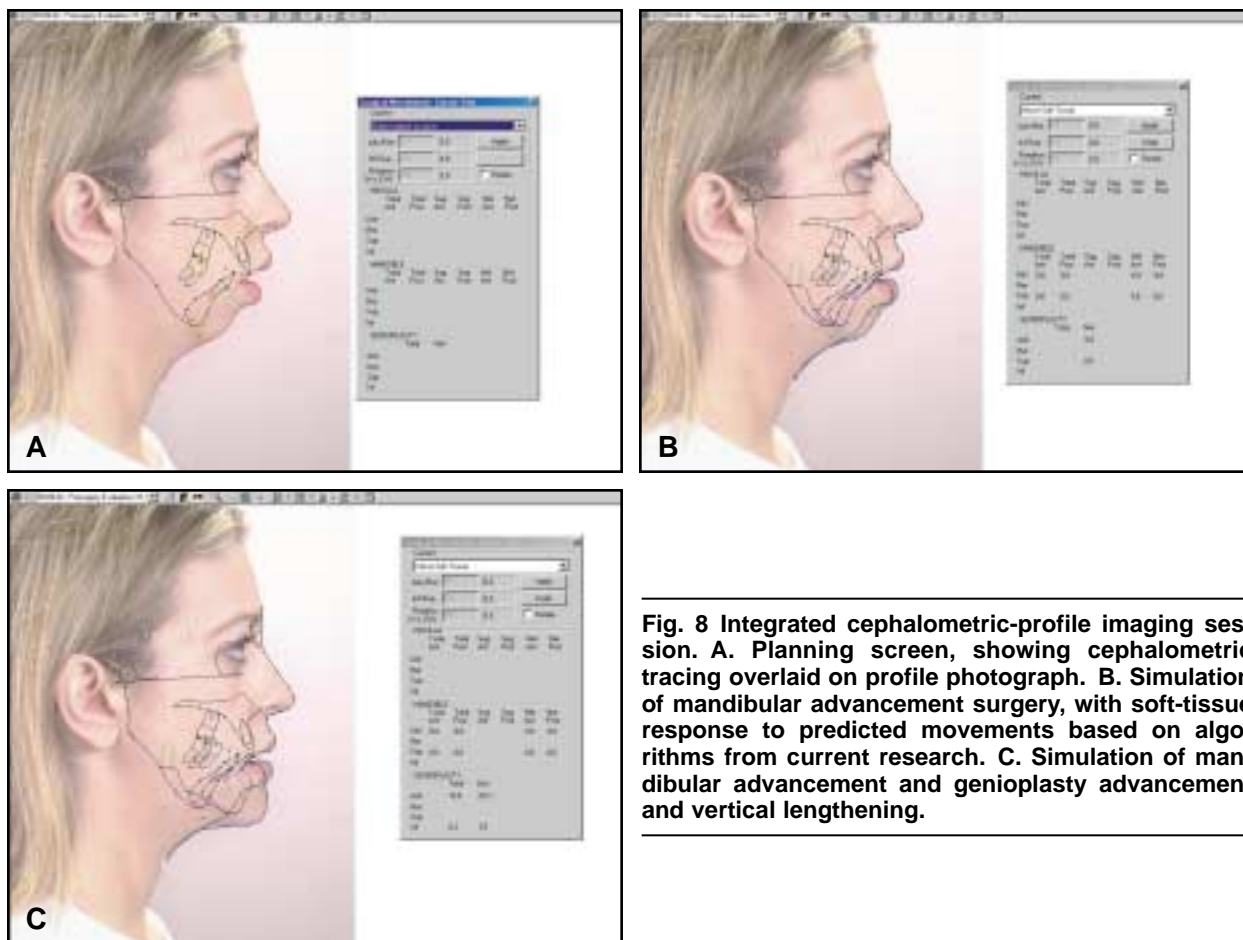
After detailing and finishing (including laser contouring of the gingival architecture), the patient was debonded, and a lower fixed 3-3 retainer and upper Hawley retainer were delivered.

## Results

Rhinoplasty is seldom considered as a simultaneous adjunct to orthognathic surgery. This case, however, illustrates the elegance that it can lend to



**Fig. 7** Presurgical lateral cephalogram shows 10mm overjet from lower premolar extractions and orthodontic decompensation.



**Fig. 8** Integrated cephalometric-profile imaging session. A. Planning screen, showing cephalometric tracing overlaid on profile photograph. B. Simulation of mandibular advancement surgery, with soft-tissue response to predicted movements based on algorithms from current research. C. Simulation of mandibular advancement and genioplasty advancement and vertical lengthening.

the final outcome (Fig. 9). The patient's esthetic appearance was dramatically enhanced by the rhinoplasty, combined with a marked improvement in the projection of the lower facial third and the chin-neck contour. The occlusion was treated to a Class III molar relationship and a Class I cuspid relationship. Her maxillary incisor position was maintained, and the smile arc

was preserved.

### Conclusion

The esthetic expectations of our patients have been raised in recent years. Orthodontists need to be cognizant of these concerns and address them as part of their overall treatment planning. When patients require surgery for occlusal correction,

orthodontists and their interdisciplinary teams should consider esthetic issues that, until now, have not been deemed significant within the field of dentistry.

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**Fig. 9** Patient after treatment, showing dramatic improvement in lower facial projection and elegant appearance from rhinoplasty.