

## Pitfalls and advantages of camouflage treatment

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### ABSTRACT

**Background:** Camouflage treatment in orthodontics aims to correct dental misalignment without addressing underlying skeletal discrepancies. By extracting teeth and repositioning others, it achieves acceptable dental relationships despite jaw imbalances. While primarily focused on improving dental function and aesthetics, it doesn't resolve the underlying skeletal issue. This approach was prevalent when growth modification was deemed ineffective and surgical options were limited.

**Keywords:** Camouflage treatment, Orthodontics, dentistry.

### INTRODUCTION

Beyond the adolescent growth spurt, even though some facial growth continues, too little remains to correct skeletal problems. The possibilities for treatment, therefore, are either displacement of the teeth relative to their supporting bone, to compensate for the underlying jaw discrepancy, or surgical repositioning of the jaws. Displacement of the teeth, as in retraction of protruding incisors, often is termed camouflage. The name is well chosen. because the objective of the treatment is to correct the malocclusion while making the underlying skeletal problem less apparent.

With extraction of teeth to provide space for the necessary tooth movement, often it is possible to obtain correct molar and incisor relationships despite an underlying skeletal Class II or Class III jaw relationship. For Class II correction the extraction of upper first premolars alone or upper first and lower second premolars often is the choice. Similarly, for class III lower first pre molars alongside upper second pre molars can be the

choice. The method was developed as extraction treatment was reintroduced into orthodontics in the mid 20th century. In that era it was the major approach to treating skeletal problems. At the time that extraction for camouflage became popular, growth modification as a treatment approach had been largely, rejected as ineffective, and surgical techniques to correct skeletal problems had barely begun to be developed. It seemed appropriate therefore, for the orthodontist to accept the limitations in skeletal relationships and Concentrate on the dental occlusion.

Camouflage implies that repositioning of the teeth will have a favorable, or at least not a detrimental effect on facial esthetic. For patients with mild to moderate skeletal Class II problems. Displacement of the teeth relative to their bony bases to achieve good occlusion is compatible with reasonable facial esthetics, and the camouflage can be quite successful.

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The characteristics of a patient who would be a good candidate for camouflage treatment are:

Too old for successful growth modification

Mild to moderate skeletal Class II or mild skeletal class III

Reasonably good alignment of teeth (so that the extraction spaces would be available for controlled anteroposterior displacement and not used to relieve crowding)

Good vertical facial proportions. neither extreme short face (skeletal deep bite) nor long face (skeletal open bite)

And camouflage should be avoided in :

Severe Class II, moderate or severe Class III, and vertical skeletal discrepancies

Patients with severe crowding or protrusion of incisors, in whom space created by extractions will be required to achieve proper alignment of the incisors

Adolescents with good growth potential (in whom growth modification should be tried first) or non-growing adults with more than mild discrepancies (in whom orthognathic surgery usually offers better long-term results)

## **Camouflage Vs surgery**

### Treatment planning

#### **Treatment outcome prediction**

Computer imaging in the decision for Camouflage versus Orthognathic Surgery  
The ultimate judgment as to whether orthodontic treatment alone, to camouflage a skeletal problem, would be an acceptable result, or whether orthognathic surgery to correct the jaw discrepancy would be required, must be made by the patient and the parents. The orthodontist's role is to supply the information they need to make that decision and in that context, computer image predictions of the outcome without and with surgery are an important tool to help the patient and parents understand.

## **Computer simulation of alternative treatment outcomes**

Computer image predictions are particularly valuable in helping patients decide between camouflage and surgery, and in planning surgical treatment. The patient can view the impact on the soft tissue profile or orthodontic camouflage versus surgery when these are realistic treatment alternatives and also view the effect of varying amounts of surgical change—more or less mandibular advancement, for example, or the effect of genioplasty or rhinoplasty in addition to change in jaw position. Only the Patient can decide whether the difference between surgical correction of jaw relationships and orthodontic camouflage would be worth it in terms of the additional risk and cost of surgery. Computer simulations help them do that.

### **Decision between extraction/ surgery**

The decision for camouflage or surgery must be made before treatment begins, because the orthodontic treatment to prepare for surgery often is just the opposite of orthodontic treatment for camouflage. It is a serious error to attempt camouflage on the theory that if it fails, the patient can then be referred for surgical correction. At that point, another phase of "reverse orthodontics" to eliminate the effects of the original treatment will be required before surgery can provide both normal jaw relationships and normal occlusion.

### **Goal**

The goal of treatment in an orthodontic camouflage or masking procedure is to maximize dental compensations without compromising the esthetic result. If the patient chooses not to move the skeletal components responsible for the discrepancy, then the only other option for improving the occlusion is to move the teeth (except in children with remaining growth potential, where growth modification would be a preferred approach).

In many cases, forces exerted on teeth from surrounding soft tissues, have contributed to their axial inclinations, which reduce the severity of the occlusal discrepancy. In such cases, the orthodontic treatment plan may be to continue or exaggerate the dental compensation to minimize or eliminate the dental discrepancy. In some patients such as

some class II div 1 malocclusions, few natural dental compensations have occurred and the orthodontic goal is to initiate the process.

Ideally the ability to identify specifically abnormal structures should lead to elimination of the malocclusion by normalization of the defective organ(s). If normalization of the skeletal components is outside the realm of conventional orthodontic and facial orthopedic procedures, correction of the malocclusion by compensatory tooth movement may prove to be undesirable for both cosmetic and functional reasons. Treatment planning for orthognathic surgery aims to remove the dental compensations to allow the surgeon to carry out more extensive movements of the jaws, whilst achieving class I molar, canine and incisor relations.

### **The borderline patient**

One indication for surgery obviously is a malocclusion too severe for orthodontics alone. It is possible now to be at least semi-quantitative about the limits of orthodontic treatment in the context of producing normal occlusion. The limits vary both by the tooth movement that would be needed (teeth can be moved further in some directions than others) and by the patient's age (the limits for tooth movement change little if any with age but growth modification is possible only while active growth is occurring)

It shows the amount of change in all 3 planes of space that could be produced by

- 1) Orthodontic tooth movement alone
- 2) Orthodontic tooth movement combined with growth modification in a growing child
- 3) Orthognathic surgery.

Envelope of discrepancy thus outlines the limit of hard tissue change toward ideal occlusion, if other limits due to the major goals of treatment do not apply. Drawback: soft tissue limitations not reflected in the envelope of discrepancy are often a major factor in the decision for camouflage or surgical-orthodontic treatment.

### **Key features:**

- The possibilities for each type of treatment are not symmetric with regard to the planes of space.
- More potential to retract than procline teeth.
- More potential for extrusion than intrusion.
- More tooth movement is possible anteroposteriorly than vertically.
- Growth modification is more effective in mandibular deficiency than in mandibular excess.
- Surgery to move the lower jaw back has more potential than surgery to advance it.
- Esthetic and psychosocial decisions

### **MAIN GOAL**

#### **AGE OF THE PATIENT**

#### **Surgical Risks**

1. Nerve Injury
2. Infection
3. Bleeding
- 4, TMJ Problem
5. Dissatisfaction with results
6. Relapse

Properly selected patients for orthodontic camouflage treatment are as likely or more likely to be satisfied with the outcome of treatment as those who have surgery. Proper selection of patients, of course, is neither simple nor easy. When alternative treatment approaches are possible, the ratio of benefit to risk must be considered for each procedure. For orthodontic camouflage versus surgery, the important decision is whether the greater improvement in dentofacial image that is possible with surgery would be worth the increased cost and risk.

How patients perceive the severity of their problems is a factor in the decision to have surgery rather than camouflage or no treatment. There is good evidence that the more the person perceives herself (or himself) as normal, the more likely he or she is to choose orthodontics alone and to be satisfied with the outcome. Conversely, patients who perceive themselves as outside the normal range are more likely to prefer surgery and to be dissatisfied with tooth movement alone. Because of these perception effects, we cannot set physical characteristics as the sole definition of whether

surgical correction is required or whether orthodontics alone would be satisfactory.

## Various protocols for camouflage treatment

### Dental decompensations

As deviations from harmonious skeletal base relations occur, teeth may undergo alteration in their normal axial inclinations and vertical position. The alterations are due to the influence of the lips, cheeks & tongue and they may overcome skeletal base disproportions and maintain a functional occlusion. Alterations of axial inclination and vertical position in response to disharmonious skeletal growth are termed “dental compensations”.

### Class II correction

Camouflage would be more successful in patients with maxillary protrusion, than in patients with mandibular deficiency.

#### Factors to consider:

- Effect on facial esthetics
- Nasolabial angle, mentolabial sulcus
- Lower incisor inclination.
- Degree of crowding.
- Non-extraction is favourable in patients with increased overjet & spacing in upper arch and normal/ retroclined lower incisors

### Drawbacks of Class II camouflage

Dishing in of profile: although there is no conclusive evidence that extraction of teeth causes retrusive profiles, proper case selection is imperative. This problem is more likely to occur if a patient with a normal maxilla and deficient mandible is selected for camouflage.

Class II cases often have a typical dorsal hump of the nose. This can be exaggerated when extraction for camouflage is carried out and the teeth are retracted. Patients with lack of upper lip support, an obtuse nasolabial angle, a large nose, and a long lower face height, all of these may become more apparent as a result of orthodontic camouflage treatment. (Tucker, JOMS 1995) Adverse effect on TMJs: individual case reports and viewpoint articles have reported increased prevalence of joint signs/symptoms and posterior displacement of the

condyles in patients treated with 4 premolar extractions.

Excessive proclination of lower incisors with class II elastics can cause labial gingival recession. Increased chance of root resorption: A major risk factor for severe resorption of maxillary incisor roots during orthodontic treatment, is contact of the roots with the lingual cortical plate; Risk of resorption increases 20 fold, when lingual plate contact occurs. Two circumstances can cause the roots to contact the lingual cortical plate: torquing the upper incisors back during class II camouflage, and tipping them facially in class III camouflage. Adolescent class II patient : The boundary between orthodontic and surgical treatment is particularly troublesome for teenagers with Class II problems. Given the risk of camouflage failure vs. the greater cost and morbidity of orthognathic surgery.

Treatment of a rather mature 14 year old with a full cusp Class II malocclusion, 10 mm overjet, and an obvious mandibular deficiency is rather controversial. The choices are retraction of the upper incisors (with maxillary premolar extraction or implant anchorage) or surgical mandibular advancement . Although no clinical trial has occurred (and probably never will given the problems in randomly assigning patients to surgery, some data are now available to indicate the limits of camouflage and therefore indications for surgery for post adolescent Class II Patients

### Drawbacks

Class III malocclusions that present with compensations in the form of retroclined mandibular anteriors, typically display exaggerated root prominence that gives a characteristic “washboard” appearance. This is further worsened if the compensations are increased with camouflage. In patients with mandibular prognathism, the chin prominence may be increased as the lower teeth are retracted. Single lower incisor extraction can cause collapse of the intercanine dimension and unesthetic gingival contour.

Unfortunately, in even moderately severe skeletal Class III problems, camouflage is much less successful. Extraction of lower premolars combined with Class III elastics and extraoral force can improve the dental occlusion for many Class III

patients but the treatment rarely produces successful camouflage and frequently makes the facial appearance worse. Even minimal retraction of the lower incisors often magnifies the chin prominence that was a major reason for seeking treatment initially

### **Vertical dimension**

Vertical maxillary excess is least amenable to orthodontic camouflage. It Presents with increased lower anterior facial height and gummy smile. Camouflage options: depend on the clinical crown height. If it is larger than the normal range, and if some amount of deep bite is present, then may be carried out. However, this approach is not suitable if a concurrent open bite is present. If the clinical crown height is below the normal range, gingival recountouring can be done to reduce the excessive gingival display, and camouflage the VME. Another option reported recently, is the use of Botox injections to reduce mobility of the upper lip on smiling, hence improving excessive gingival display.

### **Skeletal deep bite**

Usually seen in hypodivergent facial patterns, with reduced lower anterior facial height.

### **Camouflage options:**

Extrusion of premolars and molars : According to Nanda & Burstone long-term stability is questionable in adults. Strong musculature increases the risk of post-treatment relapse .Also it results in clockwise rotation of the mandible, which can worsen the Class II profile and negate any positive changes occurring during adolescent mandibular growth.

The major disadvantages of correcting deep overbite by extrusion are an excessive incisor display, an increase in the interlabial gap, and worsening of a gingival smile.

### **Incisor intrusion**

Upper incisor display has been shown to decrease with maturity in the 40s and 50s as lip musculature gradually loses its tonicity. In a clinical situation where a patients incisor display at rest measures 3-4 mm, with a deep overbite, the treatment of choice may be lower incisor intrusion. In adult patients,

intrusion of the upper incisors should be planned only if their display at rest is more than 3 mm.

### **Drawbacks:**

Risk of root resorption.

At least 2 mm of incisor display at rest should be seen, else the effect may appear like premature ageing.

### **Skeletal Open bite**

Vast majority presents with vertical maxillary excess. Thus, camouflage by extrusion of upper incisors may result in an excessive display of the incisors and gingival tissues, compromising not only the esthetic results, but also the long term stability.

Another option is molar intrusion. Rationale: mandibular autorotation, as the molars intrude, resulting in anterior open bite closure. For every millimeter of molar intrusion, approx. 3 mm of open bite reduction is seen anteriorly.

Methods: Bite plates, High pull headgear, Active vertical corrector, Implants.

Drawback: difficult to achieve absolute intrusion without use of implants.

### **Transverse plane**

If the transverse discrepancy is less than 4 mm, the clinician may elect to camouflage it by tipping the teeth. However if the discrepancy is greater than 4 mm, then attempts to camouflage it by only moving the teeth, may cause periodontal problems, mainly buccal gingival recession, and instability of the occlusal scheme. So in such situations, orthopedic expansion in preadolescents, and Surgically-assisted Rapid Maxillary Expansion in adults are the preferred approaches

### **Comparison of treatment outcomes**

#### **Surgery Vs camouflage**

Proffit, Phillips & Douvartidis reviewed treatment outcome for skeletal Class II malocclusion in 33 nongrowing patients who were treated with orthodontics alone (by premolar extraction and tooth movement to camouflage the skeletal problem) and in 57 patients treated for similar

problems with surgery and orthodontics (with mandibular advancement). Both orthodontic treatment and surgical-orthodontic treatment improved the malocclusion as judged from dental casts. Surgery resulted in greater reduction of overjet and greater improvement in most cephalometric skeletal, dental, and soft tissue criteria. Before treatment, the surgical patients had lower esthetic ratings than the orthodontics-only patients. After treatment, the esthetic ratings for the orthodontic patients were unchanged. The surgical patients had improved but not to the pretreatment level of the orthodontics patients.

Phillips, Trentini & Douvartzidis showed Pretreatment and posttreatment frontal and profile slides of 13 orthodontic camouflage and 13 orthognathic surgery patients were shown to three panels of judges: an orthodontic, an oral surgery, and a "lay" panel of first-semester dental students.

Each judge rated the facial attractiveness of the pretreatment and posttreatment views of each patient using a visual analog scale.

The orthodontic camouflage group was rated as significantly more attractive than the orthognathic surgery patients before treatment. There was no significant change in the facial attractiveness mean score for the orthodontic group, whereas the orthognathic surgery group was rated as showing a significant improvement. However, the orthognathic surgery group was still rated as being significantly less attractive after treatment than the orthodontics-only group.

Mihalik , Proffit , Phillips conducted a long-term follow-up of Class II adults treated with orthodontic camouflage and compared with orthognathic surgery outcomes.

In the camouflage patients, small mean changes in skeletal landmark positions occurred in the long term, but the changes were generally much smaller than in the surgery patients.

The percentages of patients with a long-term increase in overbite were almost identical in the orthodontic and surgery groups, but the surgery patients were nearly twice as likely to have a long-term increase in overjet. The patients' perceptions of outcomes were highly positive in both the orthodontic and the surgical groups The

orthodontics-only (camouflage) patients reported fewer functional or temporomandibular joint problems than did the surgery patients and had similar reports of overall satisfaction with treatment, but patients who had their mandibles advanced were significantly more positive about their dentofacial images

## GROWTH MODIFICATION VS CAMOUFLAGE

Battagel evaluated 62 children exhibiting class II div 1 malocclusion and an average starting overjet > 11 mm. 30 were treated by the extraction of upper first premolars and edgewise mechanics, while the remainder wore Frankel appliances. She reported that in the camouflage group, despite good positioning of the lower incisor with respect to A-Po, both lips finished well behind the esthetic plane, and the resulting profile was undesirably retrusive, while the Frankel appliance produced a more pleasing, well balanced profile with a more ideal position of the lips to the esthetic plane

## CONCLUSION

Camouflage treatment offers several advantages: reduced patient discomfort, affordability, and suitability for mild to moderate cases. It delivers reasonably good outcomes and may even simplify additional procedures like genioplasty. Importantly, it can be undertaken before growth completion, providing early psychological benefits. However, camouflage treatment has limitations. It's unsuitable for severe malocclusions with significant overjet or vertical discrepancies. The risk of root resorption exists, and aesthetic results may not be as perfect as surgical correction, as it ultimately represents a compromise solution.

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