Class II Camouflage with Maxillary Bicuspid Extraction

How to choose the correct patient, bicuspid, and finishing position

By Neal D. Kravitz, DMD, MS

Many patients present to an orthodontic office with some degree of Class II malocclusion. The treatment approach for correcting a Class II malocclusion depends on various factors, including the type and degree of skeletal dysplasia, facial profile, remaining growth, anteroposterior molar and canine relationship, degree of crowding, malposition or malformation of teeth, patient compliance, and the patient's acceptance of the treatment plan. This article will focus on one particular means of Class II correction: dental camouflage with maxillary premolar extraction.

The Benefits of Maxillary Premolar Extraction

Dental camouflage by maxillary premolar extraction allows for retraction of the anterior segment into a proper canine Class I occlusion. When appropriate, this treatment offers numerous benefits to both the patient and the orthodontist.

1) It provides a treatment alternative to orthognathic surgery;
2) it obviates the need for uncomfortable and expensive Class II correctors;
3) it shortens treatment time,

Figure 1: An adult patient presented with a Class II skeletal dysplasia due to combined maxillary hyperplasia and mandibular retrognathia, severe overjet, and protrusive incisors. She was treated with upper Incognito® (3M Unitek) and lower Synergy Lux ceramic braces (Rocky Mountain Orthodontics) with first bicuspid extraction for 14 months. A-D Pretreatment photos. E) Bonding of Incognito brackets, skipping the first premolars. F) Extraction of the maxillary first premolars and placement of 0.016 x 0.024 SS wire with clear Energy Chain® (Rocky Mountain Orthodontics). G) Quick consolidation and reduction in overjet. H and J) Debonding. J and K) Before-and-after smile photos show significant enhancement in smile aesthetics.
particularly in cases of labially ectopic canines or palatally displaced second premolars;
4) it often requires less patient compliance, though a brief period of elastics may be indicated;
5) it minimizes stress on the lower anterior teeth and periodontium;
6) it preserves the mandibular dentition; and
7) it may be more stable than Class II correctors or Class II elastics.

Choosing an Appropriate Patient

Dental camouflaging by definition is a compromise. The orthodontist is knowingly retracting and retroclining the maxillary anterior dentition into a less than ideal cephalometric position to achieve acceptable overjet and improved smile aesthetics. An appropriate patient to receive this treatment may present with one or more of the following characteristics: refusal of orthognathic surgery, maxillary hyperplasia, moderate retrognathia with an acceptable facial profile, greater than 50% Class II canine, aversion to a Class II corrector, ectopic maxillary canines or premolars, presence of maxillary third molars, lower incisor proclination, compromised periodontal health, treatment-duration restraints, or a metal allergy (Figure 1, page 16).

Among the many diagnostic tools I use during an orthodontic consultation in my office, I pay particular attention to canine relationship when determining treatment modality. After all, canine Class I, not simply molar Class I, is my primary objective. In the absence of a Bolton Discrepancy or missing teeth, canine Class I occlusion ensures appropriate overjet and coinciding dental midlines. Furthermore, if the canines are in proper occlusion, often the posterior teeth follow. If the canines are less than 50% Class II occlusion, I am confident that I can achieve ideal occlusion with orthodontic elastics. If the patient presents with greater than 50% Class II

Figure 2: Two cephalometric superimpositions of two different patients. The one on the left is a patient who presented with a metal allergy and refused orthognathic surgery. He was treated with maxillary bicuspid extraction as a result of the lower incisor proclination and pretreatment crowding. The superimposition on the right is a growing patient with acceptable lower incisor angulation. This patient was successfully treated with a mandibular advancing appliance.

Figure 3: Successful nonextraction correction of a Class II malocclusion with a Herbst appliance. The patient is ideal for treatment with a mandibular advancing appliance: a growing adolescent with greater than 50% Class II canine relationship and acceptable lower incisor angulation.
occlusion, I may favor bicuspid extraction or a mandibular advancing appliance.

In my office, I enjoy using a variety of mandibular advancing appliances to provide Class II correction. The one key determinant when presenting maxillary premolar extraction as a more appropriate treatment alternative is lower incisor angulation. Fixed Class II correctors that reduce overjet by mandibular advancement, such as the Herbst appliance, MARA®, Crossbow®, and Forsus Fatigue Resistant Springs®, always provide some degree of mandibular incisor advancement. Therefore, in the absence of severe crowding and periodontal attachment loss, when using such appliances I prefer my patient's pretreatment incisor inclination to be less than 105°. Mandibular advancing appliances used in the presence of mandibular incisor proclination will result in incisor dumping, attachment loss, and creation of an anterior open bite, regardless of whether there is labial support (Figures 2 and 3, page 18).

Choosing Between First and Second Bicusps

Choosing between extracting the maxillary first or second bicusps depends on the severity of pretreatment overjet, anchorage requirements, aesthetic demands, tooth position, and presence of restoration or caries. Commonly, the maxillary first premolars are extracted to allow for maximum retraction of the anterior teeth with minimal anchorage loss or correction of an ectopic maxillary canine. For example, I might choose extraction of the maxillary first premolars if the patient presents with a greater than 75% canine and molar Class II malocclusion with severe overjet and healthy second premolars.

However, I might favor extraction of the maxillary second premolars if the presenting overjet is less severe and anchorage requirements are lower, or if these teeth are palatally ectopic, severely malrotated, or have a large restoration or root canal treatment (Figure 4).

Also, extraction of the second premolars may be favorable if the patient is concerned with the visibility of extraction spaces during the consolidation phase. In patients receiving maxillary lingual braces, extraction of the maxillary second premolars rather than the first premolars was traditionally encouraged. The thought was that wire engagement and sliding mechanics might be easier if the extraction spaces were further from the "mushroom" bend of the lingual archwire. However, with the advancement of custom-lingual brackets (such as Lingualjet from Rocky Mountain Orthodontics), this archwire bend has been eliminated altogether.

Controversy of Finishing Class II Molar

Some controversy exists among a select few dentists and orthodontists as to whether finishing in a Class II molar relationship is acceptable. So-called gnathological dentists and orthodontists (such as Pankey-Dawson and Roth) believe that the mandible should remain in precise centric relation. Neuromuscular dentists (such as the Las Vegas Institute) believe that the muscles of mastication should remain balanced throughout orthodontic treatment. Both philosophies recommend a full complement of teeth to prevent against "cranio-mandibular" or temporomandibular disorder. Their belief is that premolar extraction leads to dentoalveolar retrusion, posterior bite collapse, and a "locked" set-back mandibular position, which results in parafunction, muscle hypertonicity, and pain.

But what if my patient is skeletally Class II and refuses orthognathic surgery? Should I leave him or her with overjet if this is the chief concern? Class II elastics or
mandibular advancing appliances may allow for nonextraction treatment; however, the mandible will be advanced away from centric and the muscles of mastication may become tender. Simply advancing the mandible with an orthotic—a common practice by neuromuscular dentists—tends to relax the muscles of mastication, though it does not allow for dental compensation (advancement). An orthotic creates a dual bite that has a high tendency toward relapse, even if the posterior teeth are extruded into proper Class I occlusion.

I propose that nonsurgical orthodontic treatment of Class II skeletal dysplasia via maxillary bicuspid extraction and retraction of the anterior dental segment helps to develop a stable Class I canine relationship without significantly moving condylar position and straining muscle position, thus addressing the concerns of the dentists who practice under both philosophies, despite their preference for nonextraction treatment.

Despite ample research, to date no single scientific study exists to definitively show that occlusion—and molar relationship in particular—is directly correlated to the onset or absence of jaw pain. Therefore, an appropriate final occlusion must take into account numerous treatment factors and limitations, and should not be defined only by achieving a Class I molar relationship. After all, the ABO considers Class II molar finishing acceptable, and Andrews has modified his Six Keys of Occlusion to accommodate maxillary bicuspid extraction. Sometimes, all we can do is the best that we can do with the choices we have.

In my office, maxillary premolar extraction is a valuable, efficient, and stable treatment alternative for correcting a Class II malocclusion in patients who present with greater than 50% canine Class II occlusion, lower incisor proclination, and aversion to orthognathic surgery or a mandibular advancing appliance. OP

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