As orthodontists, we pride ourselves on the ability to evaluate a patient based on clinical and radiographic findings, and derive a treatment plan that meets both the esthetic expectation of the patient and the functional occlusal goals of the doctor.

An experienced clinician finds that the majority of his or her patients' malocclusions fall into categories that repeatedly can be treated in methodical ways with favored appliances and systematic sequences (a somewhat “cookbook” approach). Such an approach provides order and practice efficiencies, and makes running a busy practice with good quality possible.

Not every patient gives us the gift of a malocclusion that treats on autopilot. Occasionally we have to put on the brakes from the seven-minute consults and same-day starts, and think. Patients who present with difficult malocclusions require a different roadmap with diagnostic forks in the road:

Start with Plan A.
Monitor for response
Continue same
Alternate Plan B

The following is one of the most difficult cases I’ve treated without any cookbook to follow, requiring periods of treatment response vigilance before deciding upon the final plan.

A 14-year-old female presented with the chief complaint of crooked teeth. Menses had started at age 12, leaving her near the conclusion of her pubertal growth. The profile was straight and there was a small chin deviation to the left.

There was a significant mandibular arch asymmetry deviating left. Cephalometric evaluation revealed a two-degree ANB angle but a negative Wits analysis, and mild skeletal hyperdivergence. The maxillary incisors were retroclining, contributing to an edge-to-edge overbite and overjet. The mandibular incisors were mildly retroclining. She had a Class III malocclusion subdivision right with a Class II relation on the left side.

Also present were anterior (UR2) and bilateral posterior crossbites (more pronounced on the left side), deviant midlines (upper deviated 2mm right, lower deviated 3-4mm left), severe maxillary crowding...
Consideration of age and growth

Given the conflicting measures of a positive ANB angle (normoskeletal) and negative Wits analysis (Class III tendency), I gave more weight to the Class III tendency. Given the volatility of a high-angle Class III malocclusions during puberty, I always consider limiting care to the maxillary arch first, until mandibular growth is complete.

I believe treating the mandibular arch before the cessation of growth invites the possibility of treatment planning to one malocclusion—which may differ from the malocclusion that may result from a later pubertal growth spurt (such as mandibular overgrowth with asymmetry).

Retreatment could then be more difficult than if one had waited for the cessation of mandibular growth before initiating lower-arch treatment.

Regardless of later mandibular growth, whatever gains are made on the maxillary arch can be maintained for later surgery if necessary.

Preliminary treatment plan

The following treatment plan outline was developed, with specifics (choice and number of extractions, need for jaw surgery) yet to be determined:

1. Maxillary expansion (Hyrax appliance) for posterior crossbite correction and some contribution to crowding relief and maxillary midline correction
2. Fixed appliance therapy to align the maxillary dentition and relieve crowding of the blocked UR3 via labial advancement of the incisors and development of a symmetrical arch form. This would create overjet, remove the occlusal constraints of the edge-to-edge bite, and allow the mandibular arch to reposition and possibly close the open bite.
3. Upon re-evaluation of the centric relation and occlusion, verify maxillary and mandibular midline positions and begin mandibular treatment.
4. Evaluate occlusion and need for orthognathic surgery.
5. Perform extractions to resolve midline deviations and relieve crowding as indicated at this juncture in treatment.

Discussion

Expansion: The etiology of this crossbite was partially maxillary constriction and partially mandibular asymmetry (left deviation). At best, maxillary expansion would correct the posterior crossbite on the right side and...
improve the crossbite on the left side, but not completely correct it.

Some mandibular left posterior dental constriction would be necessary. How much? Too much to realistically achieve? I wouldn’t know until maxillary expansion had ended. An increase in arch circumference would also occur, offering some crowding relief.

Attempting maxillary expansion carried with it the possibility of failure to expand the palatal suture and cause unfavorable tipping of the buccal segments. If this occurred, either the mandibular posterior teeth could be constricted, or surgically assisted rapid palatal expansion (SARPE) would have been an option. With or without SARPE there was also a risk of creating an anterior open bite that would require orthognathic surgery to close.

**Crowding:** At the outset it was unknown if the maxillary arch could be successfully treated without extractions. Given the mandibular asymmetry and crowding, it was likely that an extraction from the lower right side would be needed if mandibular orthognathic surgery to close.

**Timing:** Maxillary expansion and maxillary fixed appliance therapy was expected to exceed one year in duration, at which time any residual pubertal growth would be minimal or unlikely.

**Treatment progression:** Treatment began with a fixed Hyrax expansion appliance anchored to the upper first molars, and activated 0.20mm daily to a total of 10mm of expansion (the limit of the jackscrew in the appliance). Only a small diastema developed during expansion, suggesting a lack of sutural expansion.

A second expansion appliance was fabricated and activated an additional 4mm, at which time I found the posterior teeth were tipped buccally, so expansion was stopped and maxillary fixed appliances (SPEED brackets, Roth .022 slot prescription) were bonded. The expansion appliance was maintained for an additional four months before it was debanded.

A progression of NiTi wires (.016, .020 x .020) was used for preliminary leveling, and an open compression coil was placed between the upper right lateral and second premolar. This resulted in labial advancement of the upper incisors, left midline shift, and creation of space for the upper right canine. Since the patient still had an anterior interference on the upper right lateral incisor, an open compressed coil was placed between the upper left lateral and canine to further advance the incisors to create overjet.

During this phase, adequate space to accommodate UR3 was created and the tooth was subsequently erupted into the arch utilizing elastic thread over a five-month period. Overjet was created to clear the anterior interference. The left lateral open bite was still present, and no change in mandibular position had occurred. At this time (after 13 months of treatment), progress records were taken (cephalometric and panoramic radiographs, study models) to evaluate progress to date and plan the next steps. (See photos below.)

As the maxillary midline was now acceptable, I considered the extraction of LR4 to allow for a midline shift toward the right and relief of crowding using fixed appliances. To determine how the occlusion would look with such a plan, I scanned the progress study models using an Orascanner and created a treatment simulation in SureSmile software.

The simulation predicted an improved occlusion and coincident midlines without any significant tooth size discrepancies. The right side would finish with a “super” Class III molar occlusion.

The lower right first bicuspid was extracted and mandibular fixed appliances were bonded. A progression of NiTi wires followed by stainless-steel wires was used to align the arch, and elastomeric chains were used to retract the lower right canine and shift the midline to the right. As an asymmetric extraction carries the tendency for lingual tipping into the extraction space and warping of the archform, expanded wires and “box” cross elastics with a Class III vector were used to support space closure and lateral bite closure and resist the lingual tipping tendency.

The patient wore a myriad of elastic configurations:
- Class III (on the right), anterior diagonal and Class II elastics (on the left) to shift the lower midline, and close the extraction space
- Lateral box elastics (sometimes with a cross-elastic vector) to close open bites, and
- A cross elastic on the left side which completed crossbite correction via mandibular posterior constriction.

The patient’s compliance with hygiene, diet and elastic wear was exemplary. Final adjustments to the dentition were achieved using .019 x .025 beta titanium wires. Buccal and lingual torque adjustments were applied to the posterior quadrants to manage residual crossbites and some rotational and vertical corrections.

The mandibular appliances were worn for 17 months, after which appliances were removed. A removable upper Essix retainer was fabricated, as well as a bonded lower fixed retainer (.022 stainless steel) bonded to the canines. Total treatment time was 34 months.

**Results**

A Class I occlusion of the left side and right canines was achieved with midline coincidence and normal overbite and
overjet. The right canine finished with an end-on Class II tendency, and the molars and premolars, “super Class III.” The lateral open bites were closed and all crossbites were corrected. The patient had a functional occlusion with cuspid and incisal guidance.

**Conclusion**

Not all of our patients present with problems that have a predictable course of treatment. Cases like this one require the clinician to initiate treatment, monitor response, and then reevaluate, in order to steer treatment in the right direction.

Fortunately, excessive mandibular growth did not occur, partially accounting for the success of treatment. In hindsight, the mandibular arch treatment could have been initiated earlier, but I wasn’t able to determine how the maxillary arch would finish at the outset: If expansion failed, two upper bicuspid extractions might have been necessary to shift the midline to the left and accommodate UR3. In turn, either orthognathic surgery or mandibular arch extractions would have been necessary. Neither of these options would have provided as esthetic a result as was achieved.

Our education and experience equip us with a compass that points us toward landmarks that provide improved esthetics and occlusion. How we get to our destination sometimes requires exploration without the security of a road map—or in this case, a recipe for extractions or archwire sequences. With an analytical approach, patience, favorable growth and patient compliance, wonderful results are possible.

**Author Bio**

Dr. Richard Schechtman is a board-certified orthodontist who has practiced in Westchester County, New York for 29 years and is a provider of Smiles Change Lives. He recently lectured on the value of 3D diagnostic simulations at the SureSmile Symposium on the Island of Curaçao. Schechtman also recently published an article, “Treatment Planning for Orthodontic-Restorative Cases with SureSmile Technology,” in the October 2014 issue of the Journal of Clinical Orthodontics.

Schechtman graduated from CUNY Queens College with a B.A. in biopsychology, and then attended SUNY Stonybrook School of Dental Medicine, earning his Doctor of Dental Surgery (DDS). He completed his orthodontic residency at Columbia University. Dr. Schechtman has also served as a clinical instructor at Columbia University’s Division of Orthodontics.

*Questions for the author? Comment on this article at Orthotown.com/magazine.aspx.*