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THE EDITOR'S CORNER

Don't Forget the Second Molars

Second molars pose a considerable challenge to any dental specialist, with the possible exception of a pediatric dentist. The endodontists on my multidisciplinary team report that root-canal therapy on second molars is perhaps the most problematic of all their routine procedures. Our prosthodontists feel the same way about restoring second molars, and our periodontists echo their complaints. Oral surgeons may not be as concerned, but they are quick to admit that, other than third molars, the second molars are the most demanding teeth for them to deal with.

The reasons for these difficulties are myriad. Because of the distance of the second molars from the oral aperture, instrumentation is challenging from the mesial and occlusal aspects, even more limited from the buccal, and essentially impossible from the distal. Access to the buccal surfaces of the second molars is severely restricted in all but the most robust patients with wide mouth openings, extraordinary arch widths, and relatively flaccid buccal tissues. The ascending ramus of the mandible gets in the way in many patients, complicating access to both the buccal and distal surfaces. Access to the lower lingual surfaces is blocked by the tongue, while in the upper arch, attempts to instrument the palatal surfaces frequently trigger gag reflexes. Moisture control in the region of the second molars is vexing because of the proximity of the parotid ducts and the lack of room for effective tissue retraction, which would allow suction or the use of drying aids such as cotton rolls or parotid duct shields.

A number of therapeutic challenges posed by second molars are unique to orthodontics. Given their proximity to the opening/closing fulcrum of the jaws, they are subject to the most extreme forces that the muscles of mastication can generate. This relatively high stress limits vertical development, making it difficult to band the second molars and often requiring some sort of surgical procedure—distal wedge gingivectomy, electrosurgery, or, more recently, laser tissue reduction—to achieve adequate distal seating of the bands. If the clinician opts to

bond the second molars, the problems with moisture control and masticatory force loading will frequently result in bond failures. Despite my best efforts, the bond failure rate on second molars is so high in my practice that I resort to bonding only in cases where banding is completely out of the question.

Another problem caused by the second molar's proximity to the fulcrum of the jaw is that the effect of vertical movement is multiplied considerably when measured in the incisor region. In other words, any extrusion of the second molars will elicit a profound bite-opening effect. Although this can be beneficial in a horizontal case with a deep bite, it can produce an iatrogenic anterior open bite in a patient who has a shallow bite to begin with, and can be catastrophic in a hyperdivergent case with a high mandibular plane angle and either an anterior open bite or a strong open-bite tendency.

Unfortunately, given the many therapeutic difficulties posed by second molars, many doctors opt to take the easy way out and simply ignore them. Personally, since my philosophy of orthodontics was shaped by the teachings of Charles Tweed, I feel strong twinges of guilt whenever I am tempted to forget about the second molars. The dictum I heard in Tweed's Tucson course resonates in my mind every time I do an initial exam: You have to consider all 32 teeth. At the ABO preparatory courses I have attended with my graduate students, the board examiners always report that more ABO failures can be attributed to poor second molar management than to troubles with any other tooth.

With a high percentage of adult patients in my practice, I frequently have to deal with the results of ignoring the second molars the first time around. The issues I see include inappropriate buccolingual alignment, improper mesiodistal tip and axial alignment, incorrect root torque, and marginal ridge discrepancies with the adjacent

first molars. The most annoying problem I face in these retreatments is an isolated crossbite, where a poorly aligned upper second molar is in complete buccal crossbite with its poorly aligned mandibular antagonist. To allow the centric-stop cusps to "jump" into their respective fossae, it becomes necessary to disclude the rest of the dentition. Even a minor posterior disclusion results in a separation of the anterior teeth that can be intolerable for the patient. At that point, there is little that the rescuing orthodontist can do. In a previous Editor's Corner (JCO, September 2006), I recounted such a case, in which I resorted to a midtreatment application of Invisalign, taking advantage of the automatic disclusion provided by the occlusal coverage of the plastic aligners. That finicky patient tolerated the Invisalign trays enough that they could move the aberrant second molars into proper buccolingual orientation in a relatively short time.

A quick review of the JCO Online Archive reveals that our authors have proposed a variety of different biomechanical approaches to second molar issues over the years, ranging from the application of modified transpalatal bars to the ultimate expedient of second molar extractions. This month, Dr. Ki-Jun Choi and colleagues present an application of miniscrew anchorage for intrusion of overerupted second molars, along with the first molars, to resolve an anterior open bite resulting from excessive posterior vertical development.

There is no excuse for failing to address the second molars in our treatment planning, especially considering the wealth of information available to the practicing orthodontist today. It is up to us to apply the therapeutic concepts that have already been developed for dealing with these challenging teeth, so that we can achieve the best possible long-term results for our patients.

RGK