Address all communications to *Journal of Clinical Orthodontics*, 1828 Pearl St., Boulder, CO 80302. Phone: (303) 443-1720; fax: (303) 443-9356; e-mail: info@jco-online.com. See our website at www.jco-online.com.

THE EDITOR'S CORNER

Space Closure and Anchorage Control

Space closure is one of the most common types of tooth movement performed in clinical orthodontics. Interdental spaces generally open because there is more arch length available than is needed to accommodate the total tooth width, for reasons including excessive arch length, congenitally missing teeth, and therapeutic extractions prescribed to correct arch-length deficiencies.

Elastic power chains have probably closed more interdental spaces than all other orthodontic methods combined. Other commonly employed materials and techniques include elastic power thread, closing loops bent into the archwires, elastic modules, coil springs—either stainless steel or nickel titanium—and mechanical appliances such as the Hycon Device.[1] All of these work well under certain circumstances, but all of these can also result in untoward side effects if applied incorrectly, especially if the entire force system generated by the closing mechanics is not well understood and controlled by the clinician.

The most important factor in the success or failure of space closure is anchorage control. We can almost always get a space closed, but unless all the other teeth and the profile end up where we want them, the result cannot be considered successful. In almost every situation, some degree of reciprocal tooth movement occurs when space-closure mechanics are applied. Take, for example, a case where a first premolar is extracted to allow retraction of a canine into the space. This tried-and-true approach allows us to achieve a Class I canine relationship while creating space for the unraveling of crowded incisors. A power chain stretched from the first molar across a second premolar and attached to the tie wings of a canine bracket adjacent to the extraction site will certainly achieve some degree of closure. Ordinarily, the chains have to be changed monthly to account for force decay as they lose their elasticity; the process is repeated until the entire interproximal extraction space is closed. That space closure occurs because of reciprocal tooth movement: both distal movement of the canine and mesial movement of the remaining premolar and molar (or molars). The amount of each movement has to be carefully planned and controlled by the orthodontist. If, as is commonly seen, the facial profile would benefit from retraction of the anterior dental segment, then we want to hold the posterior segments where they are and move the anterior segments distally. This requires maximum-anchorage mechanics, which can take the form of headgear, some sort of transpalatal device (such as a Nance appliance), or both. As pioneered by Tweed, we can "set up the anchorage" before initiating retraction forces. Mini-implants have now offered us another option for achieving maximum anchorage.

The facial profile is one of the most significant considerations in determining anchorage demands. In a patient who requires flattening of a protrusive profile, distal space closure almost always enhances the esthetic outcome by retracting the anterior dental segments. Bimaxillary-protrusion cases do not cause much consternation for the average practitioner; we are all familiar with the biomechanical approaches that can be used for anterior retraction while holding the posterior segments relatively stable. On the other hand, some of the most vexing anchorage cases involve space closure to the mesial—situations where we want to hold the incisors relatively stable while protracting the posterior segments. Given the high anchorage values of the upper and lower molars and the comparatively lower anchorage values of the incisors, bringing the molars forward almost always results in undesirable lingual tipping or bodily retraction of the incisors. Such a dilemma can arise in cases involving congenitally missing lateral incisors or second premolars, severely displaced canines, or extreme trauma to the incisors. Although various approaches have been advocated, most require ligating the anterior teeth together to combine their anchorage values, then pitting them sequentially against one molar on each side until the space has been closed mesially. This method is not only technique sensitive but time consuming for the orthodontist.

In the current issue of JCO, we present two articles addressing the anchorage demands of mesial space closure in the upper arch. Both involve the Mesialslider, a device that uses coupled mini-implants to take advantage of the excellent anchorage offered by the bone of the palate. You will recognize some familiar—and highly respected—names in the list of authors. Drs. Benedict Wilmes, Manuel Nienkemper, Ravindra Nanda, Gudrun Lübberink, and Dieter Drescher introduce the Mesialslider, while Björn Ludwig, Bjorn Zachrisson, and Marco Rosa describe a modification called the T-Mesialslider. For Drs. Rosa and Zachrisson, this is the latest in an ongoing series of JCO articles on upper lateral-incisor space closure.[2-4]

The clinical results presented to illustrate these new appliances are impressive indeed. I look forward to trying them in my practice. RGK

REFERENCES

1. McLaughlin, R.P.; Kalha, A.S.; and Schuetz, W.: An alternative method of space closure: The Hycon Device, J. Clin. Orthod. 39:474-484, 2005.
2. Rosa, M. and Zachrisson, B.U.: Integrating esthetic dentistry and space closure in patients with missing maxillary lateral incisors, J. Clin. Orthod. 35:221-234, 2001.
3. Rosa, M. and Zachrisson, B.U.: Integrating space closure and esthetic dentistry in patients with missing maxillary lateral incisors, J. Clin. Orthod. 41:563-573, 2007.
4. Rosa, M. and Zachrisson, B.U.: The space-closure alternative for missing maxillary lateral incisors: An update, J. Clin. Orthod. 44:540-549, 2010.

The **2013 JCO Orthodontic Practice Study** will be the first in which U.S. orthodontists will be able to enter their responses, securely and anonymously, via an online questionnaire. It will not only be easier to complete, but faster and more accurate to analyze. Watch your inbox and mailbox soon for instructions on how to complete the online form (or how to print out and mail a paper questionnaire); a link will also be provided on the JCO homepage at www.jco-online.com. Results will be published, as usual, in a series of JCO articles in the fall.