JCO INTERVIEWS

Dr. Robert M. Little on the University of Washington Post-Retention Studies

DR. SINCLAIR Would you describe for our readers the source of the unique University of Washington post-retention sample?

DR. LITTLE My teacher, mentor, and good friend Dick Riedel had the idea of recalling his own ABO cases to see how they fared years later. He learned so much that he decided to expand the search to as many of his former patients as he could locate. While chair of the UW Department of Orthodontics, Dick broadened the search to cases treated by our graduate students. Faculty, alumni, and other orthodontic colleagues contributed cases from their own practices. The result is about 900 sets of long-term post-retention records, about one-fourth of the cases having been treated by UW graduate students.

Dr. Sinclair

Dr. Little

Dr. Little retired as a Professor Emeritus, Department of Orthodontics, University of Washington, Seattle, and continues to teach and lecture. E-mail him at bobvallittle@msn.com. Dr. Sinclair is an Associate Editor of the *Journal of Clinical Orthodontics* and a Professor, Department of Craniofacial Science and Therapeutics, School of Dentistry, University of Southern California, Los Angeles; e-mail: sinclair@usc.edu. A related article on the University of Washington studies appeared in the October 2009 issue of JCO.

DR. SINCLAIR Are there clinical procedures that can improve stability?

DR. LITTLE As I mentioned in last month's article, space maintenance during the mixed dentition for cases with enough leeway space to counter the degree of anterior crowding is an excellent way to improve stability for cases that qualify. It is necessary to do an arch-length assessment by measuring erupted and unerupted canines and premolars, using accurate radiographs and casts. If leeway space is favorable, space maintenance can shift a potential extraction case to a nonextraction plan in the permanent dentition without arch development. The success rate is much higher, upwards of 70% success post-retention. For cases with inadequate leeway space for this approach, either extraction or arch enlargement would be considered.

Unfortunately, both extraction and nonextraction enlargement strategies yield poor success post-retention, with extraction cases faring better than arch-development cases. For improved stability, routine mandibular arch treatment should focus on not enlarging and not changing the arch shape. Maintaining the original upper and lower incisor angulations or adjusting them to standard norms would be additional goals.

In almost all cases with generalized spacing,

discontinuing fixed retention after a few years would be fine. For crowded and extracted cases, we can't predict which cases will fail, so lifetime retention seems prudent. For nonextraction treatment of crowded cases, lifetime retention is mandatory, since anything less will predictably fail.

Serial extraction of premolars typically improves alignment during the observation phase, with a simpler full-treatment phase to follow. Unfortunately, long-term alignment success is no better than the 30% success rate of premolar extraction cases treated in one phase.

Supracrestal fiberotomy (sulcus slice) is useful to reduce the percentage of rotational relapse, but does not eliminate all rotational relapse. Interproximal stripping to flatten contacts does not seem to aid stability, nor does reducing incisor width to meet Peck and Peck labiolingual vs. mesiodistal dimension standards.[1] Stripping either or both arches to meet Bolton tooth-size norms can be warranted to meet overbite/overjet/occlusion goals, but this will not necessarily improve the stability of alignment.

Finally, fixed mandibular retention is much preferred over removable retainers to ensure that the retainer is faithfully utilized. Patients need to understand that they are at risk if the fixed retainer becomes disconnected. The patient should be advised to have it reattached as soon as possible.

DR. SINCLAIR What other retention rules do you suggest clinicians should follow?

DR. LITTLE Always obtain and maintain pretreatment and end-of-active-treatment records for future review. These will be quite helpful in guiding the retention and post-retention phase. Pretreatment, perform a Bolton tooth-size analysis for every case and record this information in the chart. A patient with significant discrepancy requires a lab wax setup in order to visualize the problems and treatment needed. Obtain cephalometric and panoramic radiographs during treatment to assess progress, growth, and the need for treatment alteration toward the intended goal. Cephalometric superimposition is critical to fully understand treatment progress.

Employ supracrestal fiberotomy for incisor rotations noted before treatment.

Continue to see your patients following treatment. This may mean every three to six months for several years, and then yearly thereafter. The retainer status needs to be checked, as do signs of relapse. Be available to counsel your patients.

Facilitate interaction with the patient's general dentist, so that the generalist and hygienist do not remove the fixed retainer. Encourage them to send the patient back for repairs. Dialogue with the patient's dental team of professionals so that all are aware of your goals and concerns.

Advise the use of lower-arch fixed retention rather than removable retention to eliminate compliance as an issue. Utilize upper removable retainers full-time for a number of months after treatment—usually a year in my cases—followed by continued use on a declining scale until some minimum is established, such as once a week for an extended time.

Only proceed from active treatment to retention when the very highest treatment standard attainable has been met. Assume that every case is a future ABO case, and treat to that standard.

DR. SINCLAIR How do you advise retaining deep-bite and open-bite cases?

DR. LITTLE Retention of the deep-overbite case can be a challenge, particularly for the growing patient. I overtreat to about 10% overbite and follow with a flat-biteplate removable upper retainer with a circumferential labial/buccal wire. The biteplate is trimmed so that canines and posteriors are in full occlusion, while the lower incisors just make even contact with the biteplate and lingual surfaces of the upper incisors. Six to 12 months of full-time upper retainer wear is recommended, followed by nightly wear.

Retention of open-bite cases in growing individuals is even more of a challenge. Certainly, overtreating to about a 30% or greater overbite is the goal, if it can be attained. Many practitioners, including myself, follow that plan with all sorts of gadgets or spurs added to resist tongue interference. I recall a number of growing open-bite

patients with a vertical growth direction who benefitted from posterior high-pull headgear during treatment and retention.

DR. SINCLAIR Should retention be different for adults vs. children?

DR. LITTLE In my view, the retention strategy should be the same. I am humbled by my inability to predict post-retention changes. I can't reliably predict the post-retention successful cases or the ones that will fail, whether treated as an adult or a child. My best defense is the highest-quality treatment that I can achieve, followed by lifetime retention.

Adults seem to have a few unique problems, such as slight space reopening in extraction sites. This may be due to non-parallel roots of teeth adjacent to the extraction sites; it can also be due to excessively rapid space closure. Cases with inflamed gingivae seem to also have this problem. Improved oral hygiene, such as the use of a water-irrigation device during treatment, and other periodontal strategies should be considered. In some cases, the reason for space reopening may be unclear. My strategy for the case with parallel roots, but space tending to reopen during retention, is to reclose the space and bond a buccal wire to the teeth adjacent to the space, with that wire removed six months later.

DR. SINCLAIR Is there a relapse risk profile that might help us identify patients at the highest and lowest risk of relapse?

DR. LITTLE A patient who has adequate or excess arch length in the mixed or permanent dentition is in the low-risk category. Those with inadequate arch length and crowding before treatment are in the high-risk category, no matter what the treatment. Those crowded cases treated with arch enlargement in the mixed or permanent dentition are in the very high-risk category. Mixed dentition arch development routinely fails if the lower retainer is removed. Permanent dentition arch development is also a very high-risk strategy. Lifetime fixed retention is mandatory for such cases.

When comparing our best and worst UW post-retention cases treated in the permanent dentition, several items stood out as risk factors: pretreatment high PAR score, pretreatment crowding, active post-treatment growth, males, and Class II malocclusion.

DR. SINCLAIR When is extraction treatment a more stable choice than nonextraction therapy?

DR. LITTLE Nonextraction arch development in crowded cases almost guarantees instability. Extraction of first premolars in crowded cases gives variable results, about 30% having success 10 years post-retention. Second premolar extraction yields similar results. Serial extraction can make the case easier to treat, but stability is no better than in cases that are extracted and treated in the full permanent dentition.

For the unique, very crowded case where tooth size permits extraction of either one or two lower incisors rather than premolars, the post-retention scores are much improved (Figs. 1,2). In fact, incisor extraction cases as a group were far better than crowded and premolar-extracted cases and approached the long-term quality level of spaced or adequate-arch-length cases.

DR. SINCLAIR What about the Damon approach to treatment?

DR. LITTLE Dwight Damon and I were classmates in the University of Washington orthodontic class of 1970. Nonextraction enlargement of arches for crowded cases was as far from the philosophy of that time as one could imagine, our school being a Tweed-influenced faculty. If a case was crowded, extraction of premolars was the standard plan. Enlargement of the crowded arch was reluctantly used for the occasional case where there was a concern about facial profile.

We have looked at the degree of arch-width and arch-length enlargement shown on plaster casts in Damon-philosophy-treated crowded cases, as well as cephalometric changes during treatment, such as flaring of anteriors to achieve alignment. The amount of arch-width and -length enlargement and flaring of anteriors was impressive in many cases, but what about stability? All of the cases

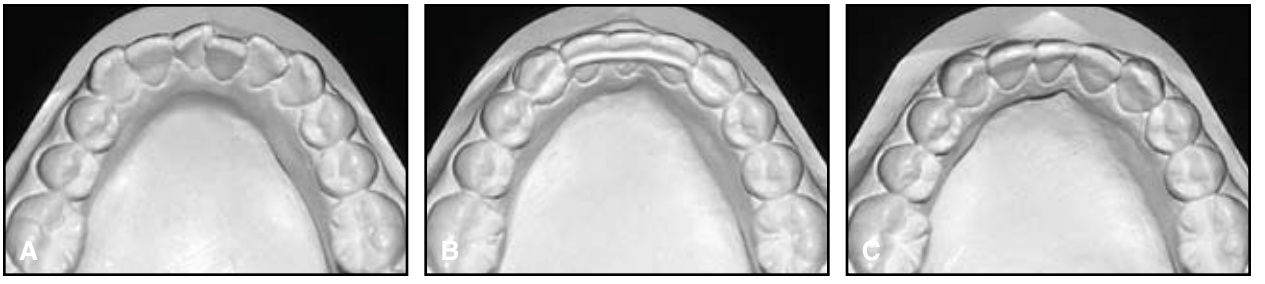

Fig. 1 A. 29-year-old patient before treatment. B. After 28 months of active treatment, with one incisor extracted. C. Good alignment 10 years after retention (age 42).

had permanent retention in both arches, so we were unable to test for stability vs. relapse. Hopefully, we can eventually accumulate cases with post-retention records. My prediction would be severe relapse if the lower retainer is removed or lost.

I'd also like to study long-term records for those Damon cases with long retention times, searching for iatrogenic effects. I noted a few Damon cases anecdotally over the years that had labial and/or buccal gingival dehiscence of some anterior and posterior teeth, a particular concern that needs more study. We have not seen nearly as many problems of this type in cases where there was not arch enlargement.

DR. SINCLAIR Some say, "Little shows that all orthodontic treatment fails." So why bother trying to achieve high-quality results?

DR. LITTLE Our work shows how cases post-retention are susceptible to the ravages of normal physiology and aging. My message is that we should strive for the highest-quality result for every patient in order to achieve the best in health, function, and esthetics. And once achieved, we need to freeze the correction with lifetime retention. What could be better than that?

One of our studies pointed out that the highest-quality treated cases, as measured by ABO standards, showed varying degrees of deterioration once retainers were removed. To me, this does not justify a lesser-quality result. Rather, it shows that even the best treatment needs the crutch of fixed retention to preserve the superior result. I advise to aim high and maintain that correction. Our patients expect and deserve our best efforts not just for a few years, but for their lifetime.

In addition to our studies, I've gained much from my orthodontic colleagues during casual conversations at meetings and conferences on the topic of stability and relapse. We need to be constant students of this topic. I'd recommend that we all maintain pretreatment and end-of-treatment records of every patient and then strive to get every

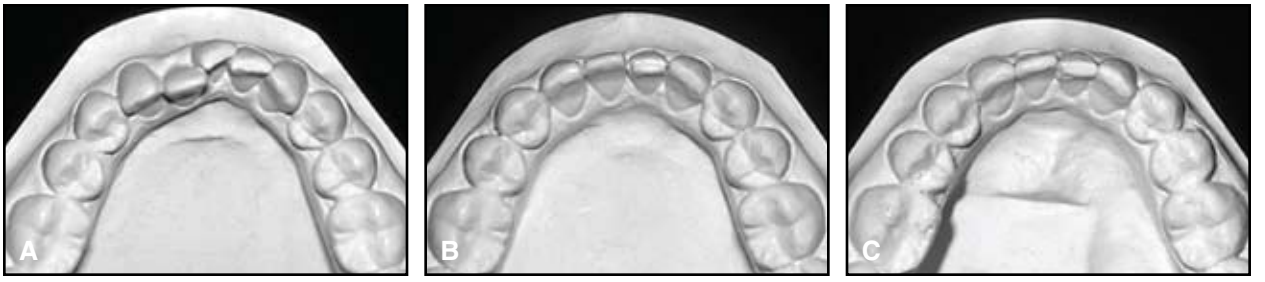

Fig. 2 A. 14-year-old patient with one missing incisor before treatment. B. After 23 months of active treatment, with second incisor extracted. C. Good alignment 10 years after retention (age 30).

one of them back for their benefit and our continued learning.

DR. SINCLAIR Now that you are "retired", are you still busy in professional orthodontics?

DR. LITTLE I continue to enjoy the occasional orthodontic lecture trip. Particularly noteworthy were invitations to New Zealand, Switzerland, Germany, and Sweden, each an outstanding adventure inside and outside the lecture hall. I've gained much from interactions with colleagues while presenting at about 130 lecture trips all over the world. Combined with vacations to explore the local areas, these trips have been truly wonderful.

I continue to enjoy developing teaching modules. My friend and colleague Mike Fey and I did a CD on cephalometric superimposition for ABO applicants. This module has also been incorporated into several graduate orthodontic programs. I've also done a series of modules on cephalometrics for Rebecca Poling's outstanding educational program, the International Training Institute.*

One recent offbeat teaching book plus CD plus web format was quite a challenge, but fun. For a local firm called American Tug that made my own pleasure boat, I spent a year developing 12 chapters called "Tug Training and Tactics". New boat owners get a copy before their first voyage from the dock. I must say that teaching has always been and continues to be my hobby.

DR. SINCLAIR Thank you for sharing your insights on the stability of orthodontic treatment with our readers.

REFERENCES

1. Peck, S. and Peck, H.: An index for assessing tooth shape deviations as applied to the mandibular incisors, Am. J. Orthod. 61:384-401, 1972.

*International Training Institute, 1000 O'Malley Road, Suite 104, Anchorage, AK 99515; www.intltraining.com.