JCO INTERVIEWS

Dr. William Proffit on the Present and Future of Orthodontics

DR. SHOAF There is a move today toward the use of more sophisticated technologies in diagnosis and treatment planning. Do you think the average solo orthodontist should be investing in three-dimensional radiography?

DR. PROFFIT At the present time, the cost of 3D radiography is beyond the means of most solo practitioners. Eventually, these units may decrease in cost, as many technologies do over time. But practitioners may find these units are already available at a centralized location within their community, and that gives them access to these services. I'm not convinced that all orthodontic patients should have 3D imaging, but it certainly makes sense that these radiographs should be utilized for selected patients, most notably the ones with impacted canines—to make it easier to locate the canine prior to surgical intervention—and those with facial asymmetry. In the latter group, 3D imaging will allow the orthodontist to gain a better data base to determine goals and select an appropriate treatment plan.

DR. SHOAF Technology has also brought us "frictionless" brackets. Are these new self-ligating brackets simply a fad, or do they truly represent an advance in orthodontic treatment?

DR. PROFFIT Self-ligating brackets are said to have advantages in decreasing chairtime to tie in archwires, in decreasing treatment time, and in decreasing frictional resistance to sliding archwires through the bracket. Unfortunately, despite the length of time these appliances have been on the market, there is a paucity of data to support the

Dr. Proffit

Dr. Shoaf

Dr. Proffit is Kenan Professor and former Chairman, Department of Orthodontics, School of Dentistry, University of North Carolina, Chapel Hill, NC 27599; e-mail: proffitw@dentistry.unc.edu. Dr. Sarah Shoaf is an Associate Professor, Wake Forest University School of Medicine, Department of Dentistry, Winston-Salem, NC, and is in the private practice of orthodontics in Winston-Salem; e-mail: sshoaf@wfubmc.edu.

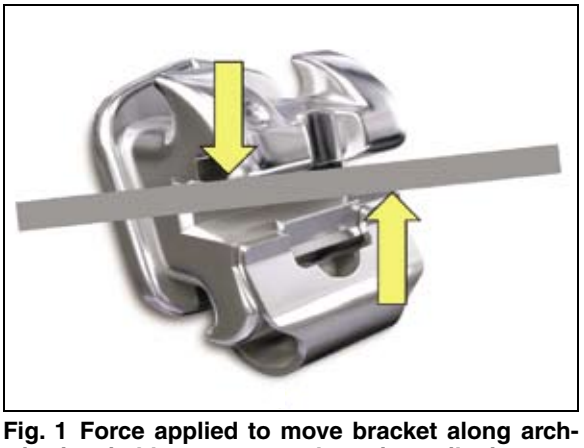

Fig. 1 Force applied to move bracket along archwire inevitably causes tooth to tip until wire contacts corners of bracket. At that point, resistance to sliding becomes combination of friction and elastic binding of wire against contact points—and friction becomes only minor component of total resistance.

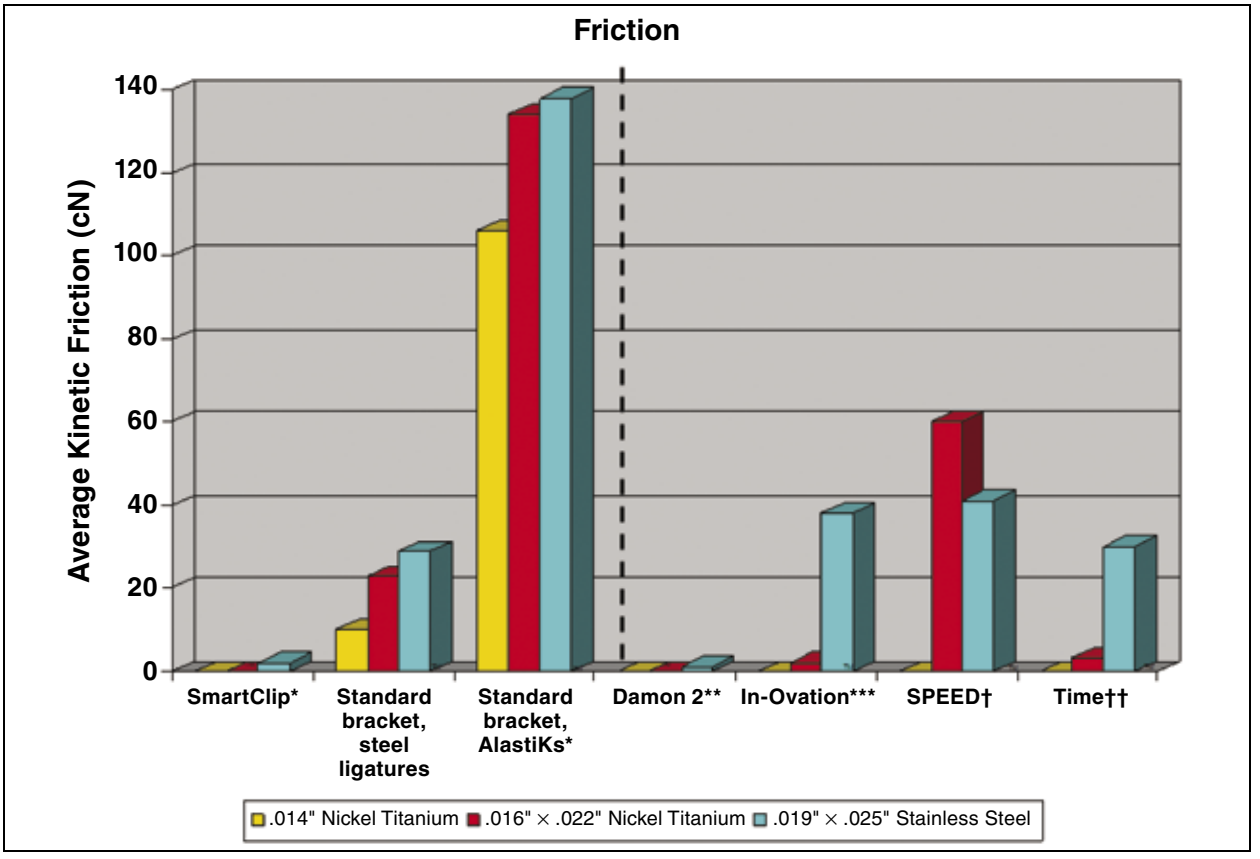

Fig. 2 Laboratory data showing resistance to sliding caused by friction alone (bracket was not allowed to tip relative to wire), using three different archwires and conventional vs. self-ligating brackets. Note low friction level associated with any self-ligating bracket using small nickel titanium archwire, as in initial alignment. Claims that "our bracket has the lowest friction" ignore this lack of significant differences with small wires. Self-ligating brackets with active clips show higher friction with larger archwires. Friction is quite high when wire is held in conventional bracket with elastomeric ligatures, but almost surely would drop as elastomerics degrade under intraoral conditions. (Graph and data on left side from Thorstenson[3]; data on right side from Thorstenson and Kusy.[4])

claims. Friction is not the key element in resistance to sliding. In the laboratory, it is possible to maintain a wire within a bracket so that the wire barely touches the sides of the bracket. But in the mouth, as soon as a force is applied to move a tooth along an archwire, the tooth tips, and this creates a binding force on the corners of the bracket (Fig. 1). Henao and Kusy of the University of North Carolina showed quite clearly that when this occurs, the self-ligating brackets have the same resistance to sliding as other bracket systems[1,2] (Figs. 2,3). There are no good data for changes in

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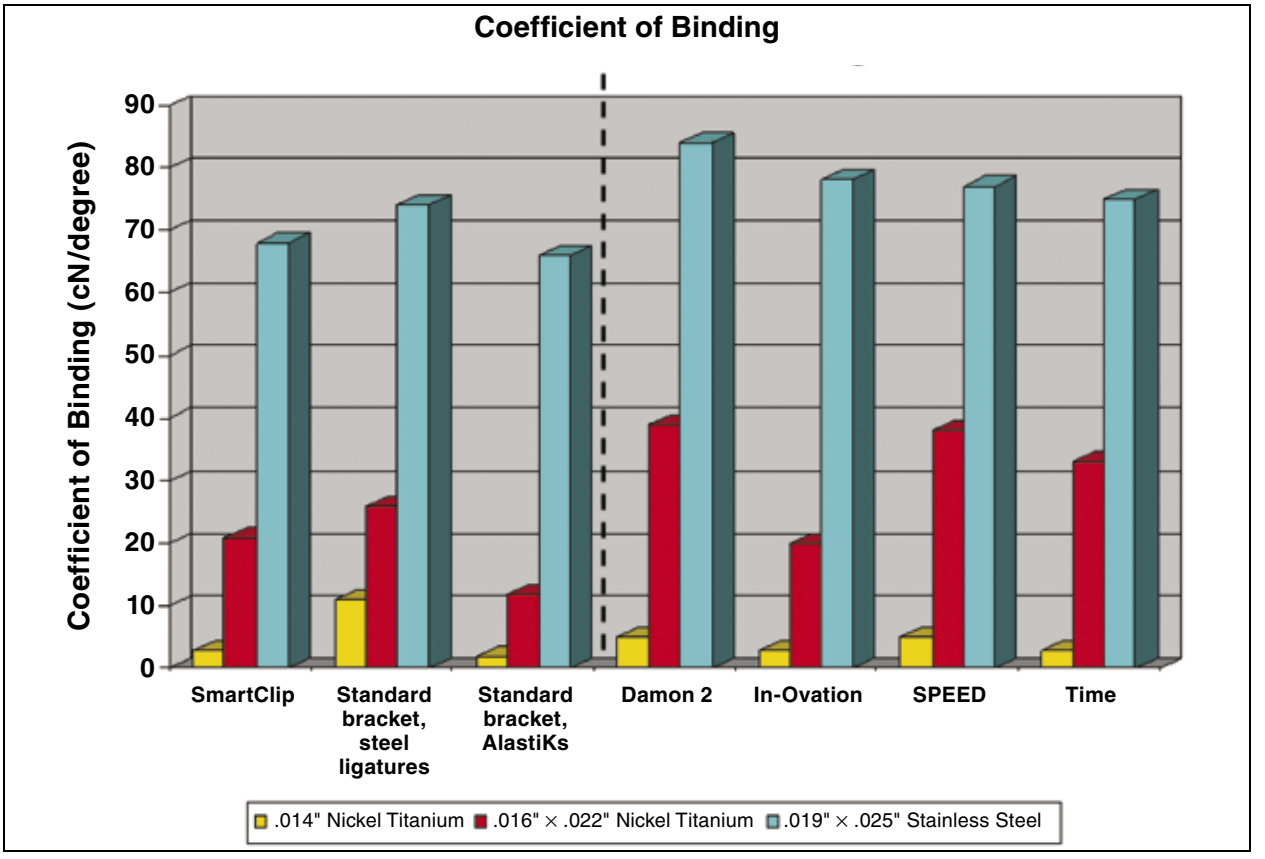

Fig. 3 Laboratory data showing resistance to sliding as elastic binding of wire against corners of bracket comes into play, as it inevitably does after any amount of tooth movement. In contrast to friction, resistance created by elastic binding is quite similar for self-ligating and conventional brackets whenever clinician needs to close space while maintaining control of root positions. (Graph and data on left side from Thorstenson[3]; data on right side from Thorstenson and Kusy.[4])

either chairtime or total treatment time with comparable cases treated with conventional or self-ligating brackets. Until studies produce evidence to back up the advertising claims, the current marketing campaigns have to be looked at with considerable doubt.

DR. SHOAF What about miniscrews? Has in-office placement become a necessary skill for all orthodontists to learn?

DR. PROFFIT At UNC, we have benefited from a partnership with the University of Louvain in Belgium in research on temporary anchorage devices. The evidence shows that miniplate anchorage in the maxilla can do some things that we are otherwise unable to do with the present orthodontic systems. The best example is intrusion of posterior teeth, so that anterior open bites that are not too severe can be closed nonsurgically (Fig. 4). Screws in the alveolar process certainly make it easier to control anchorage for other types of tooth movement. Miniplates for major movement are anchored in the maxilla with more than one screw, and an oral surgeon should be the one to place such devices. Orthodontists can place single screws, and most will want to learn to do this, but I think it would be best to have an oral surgeon install miniplates.

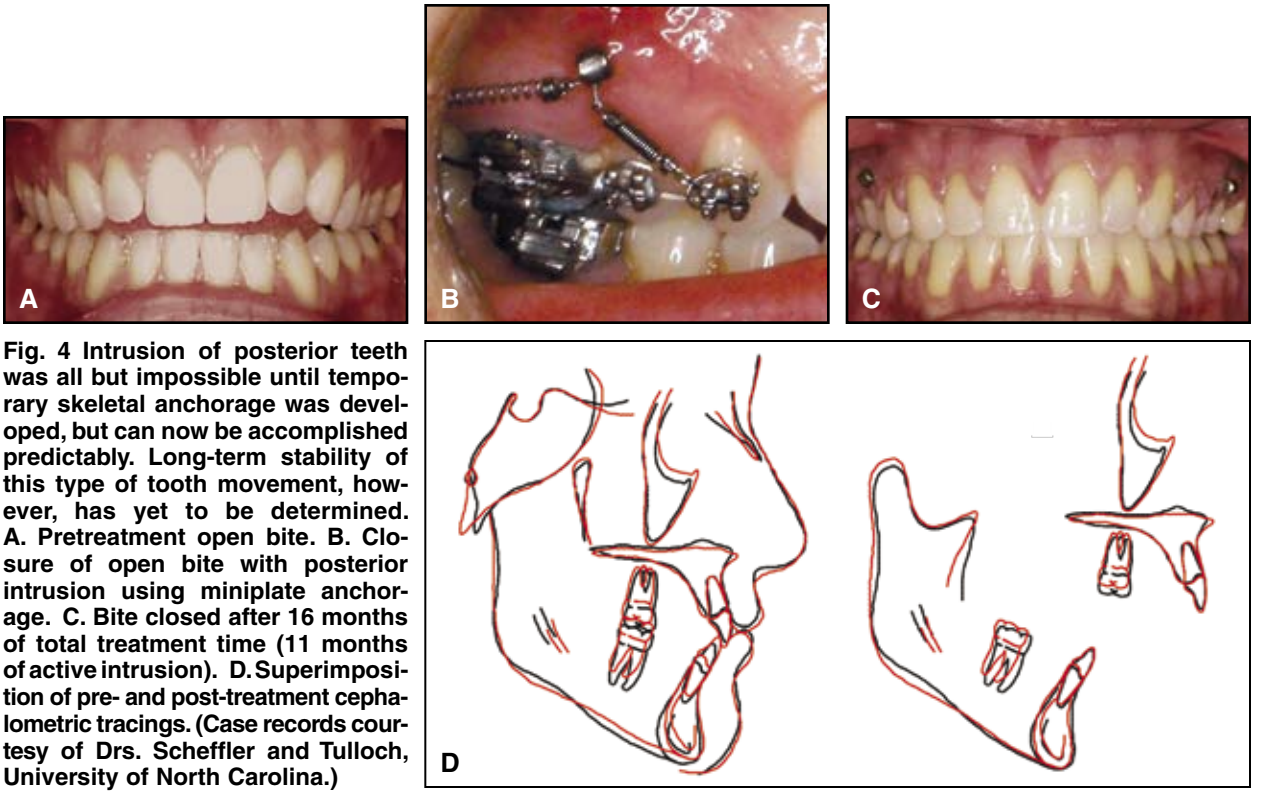

Fig. 4 Intrusion of posterior teeth was all but impossible until temporary skeletal anchorage was developed, but can now be accomplished predictably. Long-term stability of this type of tooth movement, however, has yet to be determined. A. Pretreatment open bite. B. Closure of open bite with posterior intrusion using miniplate anchorage. C. Bite closed after 16 months of total treatment time (11 months of active intrusion). D. Superimposition of pre- and post-treatment cephalometric tracings. (Case records courtesy of Drs. Scheffler and Tulloch, University of North Carolina.)

DR. SHOAF Is there a place for removable plastic aligners in an orthodontist's armamentarium?

DR. PROFFIT This is another treatment modality that has been on the market long enough to produce some evidence of its effectiveness, but none is presently available. There are a lot more advertising claims than data concerning the system. But it is clear now that plastic aligners can be used effectively when fixed attachments are placed on teeth that need rotation, extrusion, or root movement (Fig. 5). The attachments used with aligners still are not very visible. In my view, aligners are best used in selected cases, but can be effective in those cases.

DR. SHOAF Many adult patients ask for limited treatment of only one aspect of their malocclusion. Should clinicians agree to provide only the minor treatment, or should they refuse treatment unless all aspects are considered and addressed?

DR. PROFFIT In all health care, the maxim is, "Do no harm." Any request for orthodontic treatment that would make things worse for the patient should be refused, no matter how much the patient wants it. But if doing Treatment A would provide one unit of benefit, and Treatment B would provide two units of benefit, in a choice of simple vs. complex treatment, the patient and practitioner may ethically make the choice to do the lesser treatment. However, the patient needs to understand the difference in the potential benefits of the treatments. If the patient is comfortable with the limited benefit to be obtained and they make that choice, we as service providers should agree to that choice. Teaching and educating the patient are different from "selling" the patient on a treatment modality that is unnecessary. Instead of "selling" treatment to patients, orthodontists should educate their patients in establishing goals and determining if orthodontic solutions will achieve those goals.

DR. SHOAF You've mentioned the need for evidence to support clinical findings. How does "evidence-based orthodontics" differ from research that was conducted in the past?

Fig. 5 Fixed vertical attachments used with Invisalign†† appliances.[5]

DR. PROFFIT In the past, orthodontics was largely an opinion-driven profession rather than one based solidly on scientific data. It is almost as if the artist in each of us is reluctant to accept the science of the field. Evidence-based orthodontics means that for given types of cases and procedures, we know the chance of success, the type of problems that will arise from that particular treatment modality, and the probability of those difficulties appearing. Dr. Ray White, my surgeon friend, says, "You have to know the numbers!" when it comes to any treatment. This is to say that you have to have research that tells you from the data collected why a certain treatment is likely to be the best choice, the chances of success of that treatment, and why treatment success is predicted. A large body of research has been devoted to what causes certain types of malocclusions, but the data have not been gathered to show what treatment procedures give the best outcomes. Evidence-based orthodontics gives us the ability to make treatment choices from scientific data rather than opinions and advertising. The bottom line is that we didn't really do research into treatment outcomes very well in the past, and we greatly need to do solid research evaluations into this now.

DR. SHOAF You gave an extensive interview to JCO in 1977 on myofunctional therapy for treatment of tongue thrust and open bite. Have your views on this subject changed since then?

DR. PROFFIT As Mark Twain said, the truth is a fragile and gossamer thing, but a lie well told is immortal. The idea that myofunctional therapy would correct an improper swallowing habit or correct a tongue-thrust problem, and in turn that this would correct a malocclusion, is nonsense. There is no evidence to support any treatment effectiveness of myofunctional therapy for tongue thrust. However, these ideas tend to resurface on a regular schedule, mostly due to a failure to understand the true etiology of malocclusions. As we proceed with research that clarifies the basic etiologies, we will be less drawn in by these claims.

DR. SHOAF In fact, the history of orthodontics has seen various philosophies and treatment methods wax and wane in popularity over the years. How do you view the present state of orthodontics, and where do you see the profession heading in the future?

DR. PROFFIT I'm pretty optimistic about the profession. We are in a position to help people feel better about themselves and improve their quality of life. "Crooked teeth" are seen as handicapping one socially, and this is the major reason that patients seek orthodontic care. I expect that orthodontists will focus more on facial soft-tissue characteristics in the future, will manage tooth movement to be sure that incisor display and smile characteristics are optimal, and perhaps will not place so much emphasis on tooth alignment and occlusion, at least to the point that it overrides the

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other aspects of tooth and jaw positioning.

DR. SHOAF Education has been the hallmark of your career. How do you advise practitioners who have been out of school for some time to stay conversant with new subjects?

DR. PROFFIT I've now been in orthodontics for over 40 years, and I've certainly seen a lot of changes. During that time both the goals and methods of orthodontic treatment have changed a lot. I tell orthodontic residents that if they're still doing exactly the same things we taught them 10 years after they leave school, we failed to educate them. It's difficult to say exactly what new areas will be important as things continue to change. It seems to me that if you're in orthodontic practice, you have to look critically at new things in the literature and at meetings, and evaluate them. If you never change anything, you've made a mistake—and if you accept every new thing uncritically, you've also made a mistake. A major goal of orthodontic education, or of education of any type, is to develop the facility for critical thinking, so that you can evaluate for yourself the new ideas as they come along.

DR. SHOAF What opportunities are there for acquiring new skills other than attending proprietary courses?

DR. PROFFIT University-sponsored continuing education has a much higher level of credibility than courses sponsored by companies that have something to sell. I am concerned about the increasing tendency for orthodontic suppliers to hire orthodontists to present their marketing approaches—which is a lot easier if they sponsor the courses themselves, of course, because conflicts of interest are taken into account when the university is involved. Proprietary courses have a tendency to present more than 100% of the truth (what Mark Twain called "a stretcher"). Of course, that doesn't mean that just because a university provides a course, commercial considerations won't influence what is presented. But at least an effort is made to prevent distortions. In this area, critical thinking is a particularly important skill.

DR. SHOAF How has the need for continuing education changed since the advent of so many high-tech tools and procedures, as we discussed earlier?

DR. PROFFIT Continuing education always has been important, and because the pace of change seems to be faster than ever, it's even more important. If the new tools and procedures are high-tech, continuing education needs to become more high-tech as well. It will be interesting to see how distance education is used in disseminating new information in an appropriately critical manner. I think that before long, practitioners will find themselves sitting at the computer in their office to receive a significant proportion of their continuing education—and I hope it comes via the university, with discussion and questions available, rather than as a slick marketing effort.

DR. SHOAF How does the new AAO Distance Education Program fit in?

DR. PROFFIT The AAO has funded several pilot projects to determine the best way to use our limited resources of orthodontic faculty. One project used a simulcast of a teacher to a classroom of students, but there were too many students involved, which limited interaction. I think interaction between faculty and students is crucial for the development of the critical thinking that is necessary to create the best treatment plan. One way to get the interaction is to allow small resident groups at various locations to view a recorded interactive seminar on a website, and then have them follow that up with an interactive session with the leader of the recorded seminar, or perhaps with one of their own faculty. This type of distant seminar has gotten good feedback from the educators and students, and it is less expensive than a truly interactive satellite feed that requires a lot of technological expense and working connectivity. But at this point, we only have opinions on the best way to extend the limited educational resources of teachers, and no true data. We're collecting data now on the acceptability and effectiveness of distance-learning seminars in graduate orthodontic education, with support from AAO. I think the

new approach has the potential to improve orthodontic education—and hope that the data from controlled experiments will demonstrate this.

DR. SHOAF The average orthodontist is a solo practitioner who is primarily interested in providing the best clinical care. What advice do you have for such a clinician?

DR. PROFFIT We've already talked about one important thing: the need to continue to learn throughout a career. I have seen several distressing examples of orthodontists who just dropped out intellectually, while progress occurred all around them. After getting behind in that way, it's almost impossible to catch up again. I would also tell all orthodontists to remember that they were selected for a subsidized education, and that the larger society helped to pay for it. I feel that every orthodontist should feel a need to give back to society. That means helping some unfortunate individuals get treatment even if they can't manage the usual fees. If an orthodontist will not take Medicaid cases (and I think everybody should take a few), he or she should do pro bono work for a few patients, in the form of cases that are charged at $10 a month to the patient or something like that. I'm pleased that so many orthodontists do feel an obligation to support orthodontic education by giving back to the schools, either by monetary support or by serving as a clinical instructor, and I encourage clinicians to stay in touch with the local educational institutions and help out as they can.

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