My interest now is in looking at tooth movement itself

An interview with AAO speaker Dr. Timothy Wheeler

By Kristine Colker, Managing Editor

Dr. Timothy Wheeler presented a session, “Understanding Aligner Treatment,” during the AAO Annual Session in Boston. He took some time to sit down with Ortho Tribune and talk about that session as well as to discuss the research he has been doing with aligners.

Please tell us a little about yourself, including your background and what motivated you to become an orthodontist.

It’s a little bit non-traditional, and I tell this story often, because being a program director and a chair of a program, I hear of people having the dream of always wanting to be a dentist or an orthodontist, but that wasn’t true of me.

I actually was involved in research out of college, and the area of research I was working in was immunology. But when I got to graduate school, you have to choose a mentor in order to oversee your dissertation. The person I ended up working with was Bill Clark, who was a periodontist who graduated from Forsyth/Harvard and had just started down at University of Florida. He was a periodontist, so my research ended up being in the area of periodontology.

He convinced me to go to dental school because I would be more marketable, and I would probably end up with a better career.

But when I was in dental school, I worked with Greg King, who was chairman of the department of orthodontics at Florida at that time, and I did some research for him.

And the only area of dentistry I enjoyed working in was orthodontics.

They maintained a position open for me there at Florida. I went to the ortho program, went on to the faculty and then in five years, I was program director and then later became assistant dean for Advanced and Graduate Education. Dr. King left University of Florida back in 1996, and I became chair then.

Are there any special areas of orthodontics you are interested in?

Yes. That is another thing — as opportunities have arisen, they kind of lead you. I was a basic scientist by training, as an immunologist, so I did a lot of work on root resorption in orthodontics. We had some funding for that in my earlier years. Then Dr. King, Dr. Steve Keeling and myself got involved in Class II clinical trials, and that ran for 15 years. Dr. King left during that time and Dr. Keeling passed away, so it was left with me for the last 10 years or so to really be involved in that trial and run it. I really turned then to clinical research rather than basic science research.

What that has led me to now is to do other clinical-type research in different areas such as with Invisalign. In particular, my interest now is in looking at tooth movement itself, the variability of it, not just with Invisalign but with any appliance.

The AAO session that you presented dealt with understanding aligner treatment. How did you become interested in aligners and start to use them?

Basically, what happened is that around 2000, because we had been involved in clinical research, Align Technology had came to me because they were interested in doing some clinical trial work, looking at tooth movement with aligners, particularly using different types of attachments. So we devised a clinical trial with about 100 patients, and I really learned a lot about Invisalign during that treatment period when we were working with those patients.

Since then, I have done a number of trials with them, looking at different things. One study was on early treatment of aligners. We did another study with Bas Medical, using a hormone called relaxin to try to facilitate tooth movement. We developed at that time the model I’m currently using, which is just moving one individual tooth at a time to study that movement.

The purpose of the relaxin was two-fold: one to see if we could speed up tooth movement and the second to see if it helped with retention. The result of that trial was that neither of those things happened. But what we did do is develop this very nice tooth movement model, as

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I mentioned, and I subsequently have used that to look at different things. Particularly, this year, we used it over an eight-week period — taking impressions on our patients on a weekly basis — to follow movement of one tooth in three dimensions of space in a very short time period. So we now can manipulate a lot of different variables in order to examine tooth movement.

Aligners get criticism from some in the industry, particularly in regard to how well they work compared to traditional braces. How would you respond to that?

Aligners don’t work as well at some things, but that’s true with any bracket. But in some instances, aligners do work better than using brackets. All it is, is a method of applying a force to a tooth, and you can do that with your finger or you can do that with a stainless steel wire. The biggest trick is controlling that force, so what we’re trying to do is really learn, when you apply a force to a tooth, what happens.

Is there reason to be critical of aligner treatment? I think, for the most part, orthodontists probably felt threatened by it because they thought maybe it was something computers were going to take over and allow the market to be dominated by GPs.

But it’s no different — you have to know how to move teeth, you have to know how to treatment plan, and it really takes an orthodontist to do the treatment. The things we’re studying are to try and improve those outcomes even more so.

Treatment with aligners has gotten a lot better in the last nine years since I’ve worked with them. We
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There are a lot of different methods out there in order to move teeth, but this is just a different way. There’s a demand for this, but I feel the role I’m playing is just to get a better understanding of this treatment and of tooth movement and how we can then improve the outcomes for our patients, because I don’t think aligners are going to go away.

In your session, you talked about issues to consider in order to improve the outcomes of tooth movements with aligners. Please expand on those a little.

Most orthodontists treatment plan their patients independent of what they’re using to move the teeth. Based on what we were taught in school, which is physical movement of teeth and then certain parameters we work around, such as impact on the facial profile and then the bony confines and soft tissue confines of the jaw, we use that information to treatment plan.

When you have a wire and a bracket in somebody’s mouth, we are not really concerned on how fast the tooth is moving in one patient as compared to another. If it’s not moving as fast, well, it’s just going to take longer, and you’ll eventually get there.

But when you’re dealing with aligners or something that’s programmed to move at a set rate of time, it is important, because the aligner is programmed to move a tooth at a certain rate.

What we found is there are huge differences and individual variation in rate of tooth movement, and so the things I’m looking at are things we need to think about when we’re diagnosing, treatment planning and staging our cases with aligners in order to have better outcomes.

The easiest thing to think of is age. The one thing we know is teeth move slower with age, so when we’re treating them with traditional appliances and we put braces on a patient and move the teeth, it’s just going to take longer. But when you have aligners, you need to know that so you can stretch out your treatment or program things a little slower in order for your outcome to be better.