

New orthodontic technology makes smiling easier

By Alice Lang

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It is almost a rite of passage. By the time your children become teenagers, they may have metal in their mouths worth the price of a year's mortgage payments.

Braces cost between five and eight thousand dollars, depending on the type of treatment. Some dental insurance plans cover a percentage of the cost, but others pay nothing.

Many children and adults get braces to correct problems with teeth overcrowding.

"You can inherit one parent's jaw size and another parent's tooth size. That is one theory about where dental crowding comes from. I tell my patients that they have Hummer size teeth trying to squeeze into Punch Buggy size parking spaces," said Spartanburg orthodontist Dr. Steven Smiley.

Whether you need braces for medical reasons or aesthetic purposes, the latest breakthroughs in orthodontics will make it easier for you to smile.

These advancements include smaller, redesigned brackets, high-tech, heat sensitive wires, indirect bonding techniques, and virtual models of teeth, all of which add up to shorter treatment times and less discomfort for patients.

"I couldn't have imagined these changes when I became an orthodontist 25 years ago. We've gone from metal bands which took all morning to apply to self-ligating braces which take only one hour to put on!" exclaimed Dr. Goodwin Thomas of Rock Hill.

Dr. Thomas teaches orthodontics at the Medical University of South Carolina in Charleston.

One invention being adopted by many Upstate orthodontists is the passive, self-ligating braces system.

"The main difference arises in how the archwire is held in place in the bracket/brace slot. With the traditional brace, the wire is tied (ligated) into place with an elastomeric ligature or a very thin stainless steel ligature wire. In the newer "self-ligating" braces, a sliding door built into the brace opens and closes to hold the wire in place, explained Dr. Smiley.

"With the passive system, there is nothing forcing the wire to the back of the bracket, so you have less friction and less force. With the traditional brackets, we have been hurting the blood supply by pressing on capillaries and causing discomfort," said Dr. Jeff Summers of Greenville.

The most popular brand of these braces was developed by Dr. Dwight Damon, an orthodontist from Spokane, Washington.

"The era of self-ligating braces is a paradigm shift in our profession. With this concept you are more efficient, you have fewer visits and wear braces for less time," said Dr. Thomas.

As with any new technology, there is a trial-and-error process to overcome design flaws.

"These braces have been around in different variations for several years. I first tried them in 2001, but I didn't have a lot of luck with them. In September 2006, I decided to go back to them after they made changes and I have found them to be great," said Dr. Eric Neese of Spartanburg.

Dr. Neese is thrilled with the results he is seeing in his patients.

"It is unbelievable how the teeth move. I can do things with these braces that I couldn't do before, such as doing expansion with just arch wires, and not having to remove a tooth in very overcrowded cases. For example, before, I'd have a patient who required an extraction and a two year treatment. Now I can treat that same condition with no extraction and only one and a half years of treatment," said Dr. Neese.

Dr. Smiley described his experiences with the new braces.

"When I first started using the Damon braces there were some inherent problems with the braces themselves such as doors falling off and braces falling apart, but they have been redesigned and retooled and that doesn't seem to be much of a problem anymore.

I've had great results with the self-ligating braces, although I sometimes have a tougher time making the fine detailed adjustments often required at the end of treatment. I still don't use Damon braces exclusively. I think their greatest advantage is in crowded situations. Sometimes I feel the conventional braces can do just as nice a job," said Dr. Smiley.

Dr. Summers uses the Damon system for most of his patients.

"There are very few of my patients on which I use the traditional brackets. The new technology is great. I don't understand how people would pick and choose between these and the traditional brackets. The treatment time has been reduced, with fewer appointments and longer intervals between them," said Dr. Summers.

Dr. Summers also praised the hygienic advantage of the new braces, saying that studies had shown that they trapped less food and bacteria than the traditional edgewise brackets with the A-elastic ligatures.

Brackets alone are only half of the equation. They would not be successful without the latest high-tech archwires.

"The technological wire changes began in the 1970's. The late Dr. George Andrenson developed a wire called NiTol, an alloy of nickel and titanium," said Dr. Thomas.

In the last decade, the wire has been upgraded by adding copper. The CoNiT wire is thermally sensitive and moves when it warms up to body temperature.

"The old stainless steel wires were ugly and heavy and you had to take more teeth out because you couldn't work the wire around the severely overcrowded teeth. I can take the new wire, which has memory shape, cool it

in a configured shape, put it in a bracket, and it will unravel the teeth more efficiently," said Dr. Thomas.

The bonus for patients is less pain and fewer appointments.

"Because it is a lighter wire, there is less discomfort for the patient because you don't need heavy forces to move the teeth," said Dr. Smiley.

"As a result of the more efficient brackets and wires, the treatment interval times goes from once every four weeks to ten to twelve weeks," said Dr. Neese.

The method for placing the brackets onto patient's teeth has also been improved.

"Each bracket has a prescription. The front teeth have a different prescription from the back teeth. You progress to a different shape and size wire to express the prescription in the bracket," explained Dr. Summers.

"Bracket placement is the key. You have to get the bracket exactly where it needs to be and then you have minimal adjustments throughout treatment," said Dr. Smiley.

There are two techniques to place braces on teeth - direct and indirect. With the traditional, direct method a bracket is placed by hand on each tooth.

In employing the indirect method, Dr. Smiley makes a plaster model of a patient's teeth and sends it to the OrthoCAD lab in New Jersey. The lab uses the plaster model to create a computer model of the teeth with virtual braces on. Using the computer model, Dr. Smiley positions the virtual brackets according to the patient's treatment plan. He then emails the final plan to the lab. The lab places the brackets on a transfer tray matching Dr. Smiley's set-up on the virtual teeth.

"I transfer the laboratory positioned braces from the model to the patient's mouth - an entire arch at a time. The advantage is that more precise positioning of brackets is usually possible," said Dr. Smiley.

In the near future, plaster models will become obsolete.

"I predict that in three years, you won't be taking impressions in people's mouths. We will use virtual 3-D pictures and x-rays. The technology is already available, but it is not yet cost effective. It will use small infrared or laser cameras," said Dr. Thomas.

New orthodontic technology provides impressive tools, but in the end orthodontists have to rely on their knowledge and experience when using them.

"The key to successful orthodontic treatment is a proper diagnosis and treatment plan. That starts with a good clinical exam and quality diagnostic records. The braces themselves are a way to carry out the treatment plan," emphasized Dr. Smiley.