The Great Debate
.018 vs. .022

After many years in private practice, treating 15 thousand patients, I have deduced that without question, .018 slot is a more efficient, and simpler slot system to use; most markedly in self ligation technology.

1 Archwire Dimension and Slot Dimension

After many years using a competitor's self-ligating bracket with a .022 slot, it became very obvious that finishing my treatment cases became an arduous chore. The extreme difference in archwire dimension and slot dimension became a finishing problem in my practice. In an attempt to finish in .019x.025 wires, which were being engaged in a .022x.030 or larger slot, many finishing errors arose.

In the first order, rotational coupling of the wire in the slot depth, mesial-distally, occurs in such a way that the maximum width of the .025 wire cannot fully engage the .030 plus slot depth; thus resulting in a loss of about 5 degrees plus or minus of rotational control depending on the width of the slot in any particular bracket.

Competing .022
Self-Ligating Bracket

TenBrook T1™

The rotational coupling arm, resulted in rotational control problems clinically, most notably in the mandibular incisors; but rotational control problems were noted in other teeth as well.

Secondly, third order, or tortional control of anterior teeth is a problem. It became obvious in many cases, especially in extraction cases or in cases where retraction of overjets was needed, that in the tortional interface of a .019x.025 in an .022 slot height, I was losing about 5 to 7 degrees of torque due to the "play" in arch wire to slot dimension as the wire twists and engages torque in the third order.

Competing .022
Self-Ligating Bracket

.022 Slot (9 Wires)	.018 Slot (4 Wires)
.014 NiTi	.014 TenBrook NiTi
.014 x .025 NiTi	.016 x .016 TenBrook NiTi
.016 x .025 NiTi	.016 TenBrook Round Working Wire
019 x .025 NiTi	.016 x .022 TenBrook Finishing NiTi
.019 x .025 Stainless Steel	
.016 x .022 NiTi (Pick up second molars or reposition brackets as needed)	
.016 x .025 NiTi	
.019 x .025 NiTi	
.021 x .025 NiTi	

This lack of dimensional "fill" of the slot height, resulted in varying insufficiencies in torque, resulting in less than ideal finishes in my cases.

2 I used more wires with .022 systems and less wires with .018 systems

Because of the extremely large slot size, you have to use many more wires to move from the lower force, smaller wires; to the larger wires that are necessary to fulfill your straightwire prescription (see above/left), by engaging the slot's pre-constructed dimensions, with .019x.025 or .021x.025 wires, the largest and highest force wires in orthodontics.

"The TenBrook System of archwires are calibrated to precise levels of force to optimize the bodies' natural response for tooth movement, in a constant responsive state."

Typically I will use 3 to 5 wires in my .018 slot cases; whereas when I would use .022 slot systems, I would use between 6 and 10 wires per case. I used twice as many wires to fulfill my slot dimension requirements in an .022 slot system, as I did using an .018 slot.

Thus, an .018 slot system is vastly more efficient for 2 reasons:

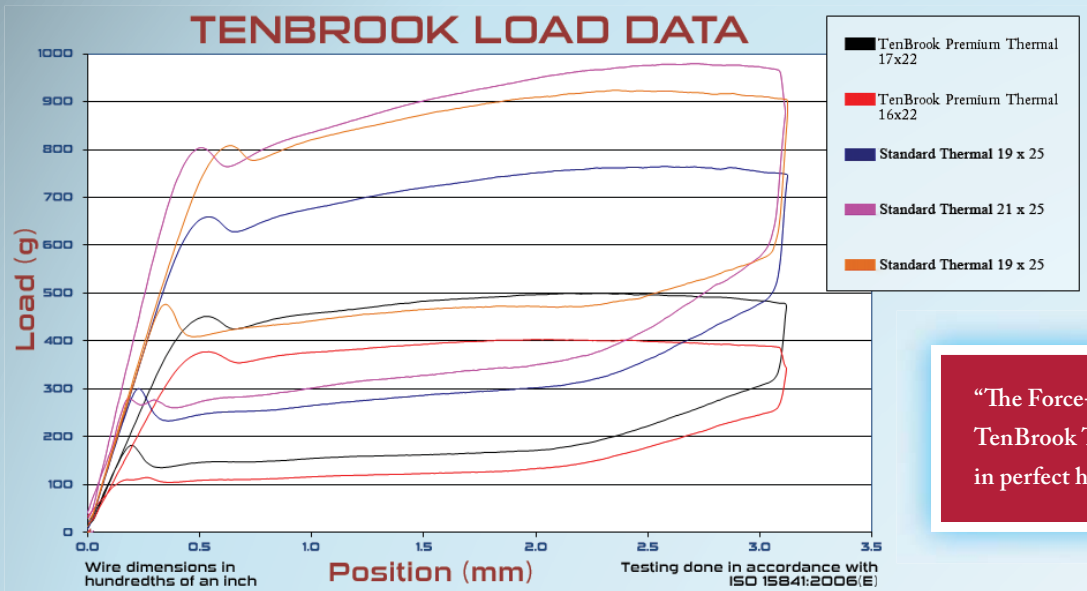
A. I use fewer wires in treatment, so my inventory and wire costs are much lower.

B. I can treat in fewer appointments, resulting in a significant savings in overhead.

TenBrook T1™

3 Larger wires produce higher forces

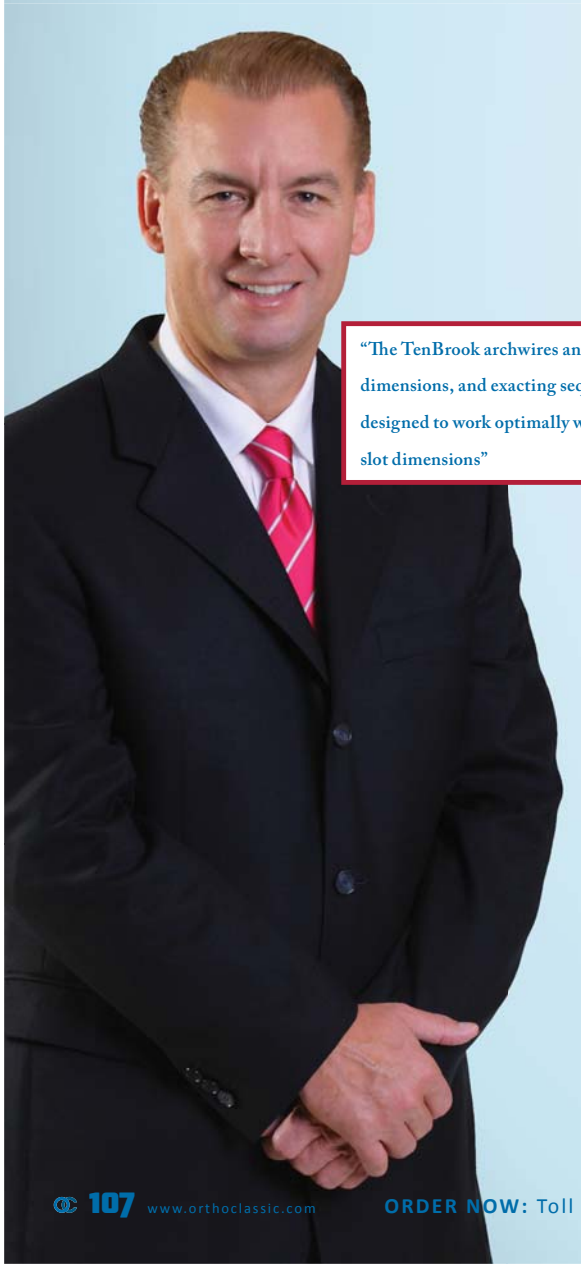
After testing force levels of some popular wire sizes from well known orthodontic companies (see graph on next page); it became obvious that the "low force, low friction system" I was purchasing, was not low force at all. In fact many of my Nickel Titanium and Copper NiTi wires were delivering forces of 400, 500, and 600 grams of force; as measured by the industry standard three point bend test. Force levels this



"The Force-Dimension properties in the TenBrook T1 System are ideal and work in perfect harmony with the body."

high are not conducive to an optimum physiologic response in moving teeth. At these high force levels, tooth movement slows as a result of capillary occlusion due to such high pressures in the periodontal ligament space.

Smaller wires produce less force, resulting in greater patient comfort, and less root pathology.



"The TenBrook archwires and their unique dimensions, and exacting sequences, are designed to work optimally with the unique slot dimensions"

4 Sliding on large rectangular wires results in more binding and friction

Large .018x.025 or .019x.025 stainless steel wires, that are level and unforgiving, often used for arch form preservation in the second order (so the bite does not deepen), causes increased binding and friction sliding in a static rectangular .022 slot. As the large rectangular wire is forced through the .022 rectangular tubes, it twists and turns, slides and drags, resulting in increased binding and friction. To overcome increased binding and friction at the wire-slot interface, the clinician must use higher force levels to overcome the binding and friction, in order for the wire to slide in the tube, and the tooth to move. Higher forces result in greater patient discomfort, more root pathology, slower tooth movement, more traumatic occlusions, and longer treatment times.

Dr. James TenBrook

For greater treatment efficiency, cost control, and patient comfort, the .018 system is a better choice.

Dr. James J. TenBrook D.M.D., M.M.Sc. (Harvard)

Dr. James J. TenBrook is a practicing orthodontist in Southern New Jersey and co-creator of the TenBrook T1 Self-Ligating System. Dr. TenBrook received his Bachelor of Arts Degree in Biology from Gettysburg College in Gettysburg, Pennsylvania, his Doctorate of Dental Medicine degree from the Medical University of South Carolina, and his Masters of Medical Sciences and Orthodontic Degree from Harvard Medical School and Forsyth Dental Center respectively. He also performed his internship in Oral and Maxillofacial Surgery at Emory University.