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MTM™ No•Trace a Lingual Minor Tooth Movement Solution

White Paper

Brandon Owen DDS, MS
and Heather Hopkins DMD, MS



Brandon Owen

Brandon Owen graduated from the University of Minnesota for both his DDS and his MS with an orthodontic certificate. He is a Diplomate of the American Board of Orthodontics, an affiliate member of the Midwest Angle Society, CDABO, the American Lingual Orthodontic Society, and the American Association of Orthodontists. He is the orthodontic advisor to a Seattle Study Club in his area and has been awarded membership in the Pierre Fauchard Academy, the International College of Dentists, Omicron Kappa Upsilon Honor Society, and Phi Kappa Phi Medical/Dental Honor Society. He is preparing a series of research projects on lingual orthodontic treatment mechanics on the OSIM (Orthodontic Simulator) in conjunction with the University of Alberta, and also serves as a lingual and digital orthodontic consultant for GAC DENTSPLY. His practice with emphasis on TMD, interdisciplinary treatment, lingual orthodontics, digital orthodontics, as well as conventional orthodontics is located in Fort Collins Colorado. He is married to Nicole and has a daughter named Presley, a son, Hudson, and their oldest, Keller, passed away from RSV in 2011.



Heather Hopkins

Heather Hopkins attended Centre College of Kentucky for Undergraduate studies with degrees in Biochemistry and Molecular Biology. She also attended the University of Kentucky College of Dental Medicine for Dental School. Heather obtained her certificate in Orthodontics and Masters Degree in Oral Biology from University of Louisville School of Dentistry. She began her professional career in a high-end office in Los Angeles, CA and she is currently practicing in Charleston, SC. She has lectured internationally on lingual orthodontics.

The Evolution of the Lingual Anterior Solution

Brandon Owen

Lingual orthodontics experienced its genesis via two orthodontists who were working independently of one another on two separate continents. The late Dr. Craven Kurz in 1975 was determined to make a lingual bracket system, and in 1976 he submitted his designs for patents. Dr. Kurz with the help of Ormco began looking into the development of the product. During a similar time frame, Dr. Kinya Fujita of Kanagawa Dental University in Japan was also investigating lingual bracket design. In 1979, he published the first article discussing lingual braces and wires.

Nearly as long as lingual braces have been in use, there has been a largely negative perception to their capabilities. Much of the past discontentment was due to excitement winning over patience. In an ideal developmental scenario several full treatments would have been executed and evaluated prior to market release, this was not the case. As of February 1982, very few of the five-hundred-twenty plus cases had been completed, thus the difficulties of the finishing stage of treatment were not yet realized. The media frenzy that ensued was unmatched by anything in orthodontics before or since, and that drove a nationwide demand by patients for orthodontists to jump on board. Unfortunately, these cases were indeed more difficult to treat, especially during detailing, and the treatment mechanics differed from their labial counterparts. This led to decades of orthodontists who were quick to discredit the use of lingual braces.

Much has changed in the past 3-plus decades with both technology and treatment philosophies, but the negative attitude of many orthodontists toward lingual treatment remains. My experience using the MTM No•Trace system, however, has been overwhelmingly positive.

Having used Ormco's Stb anterior bracket system, the In-Ovation L MTM No•Trace anterior bracket system, Incognito, Harmony, and MTM No•Trace Plus (custom lab set-up with the In-Ovation L bracket) in my practice, I can easily say that THIS is the place to start if you are interested in learning lingual treatment. It is unanimous among my

clinical staff that this is the easiest lingual bracket to work with. When we are training new team members, this is the system they learn on before transitioning to other lingual brackets, and it is how I learned and evolved my clinical abilities with lingual orthodontics. I fear that if I would have started with full-arch, custom made lingual appliances, the lingual cases in my practice would be much more limited or non-existent.

Those using the MTM No•Trace are finding it professionally, personally, and financially rewarding. It is professionally rewarding in that it sets orthodontists apart from their peers allowing for development of new referral sources, and it gives patients the perception that the orthodontist is employing progressive treatment options. It is personally rewarding because these patients are excited to do treatment with this option, they are happy with the process and outcomes, and they tend to be one of the best sources of referrals (they love letting their friends know how easy they are). Finally, it is extremely rewarding financially. Patients are willing to pay a premium for an invisible option, and the treatment times tend to be short relative to conventional orthodontics and clear aligners; this yields a very high cost-per-patient visit to the orthodontic practice.

As an example (keeping the math simple), imagine a \$5000 treatment fee with conventional braces with 14 visits (including bonding, adjustments, and removal). This equates to \$357/visit. Now assume charging the same \$5000 fee for MTM No•Trace taking 7 visits (with the same or shorter appointment times). With this example, the MTM No•Trace fee per visit is double the conventional appliances at \$714. Additionally, the cost for the lingual brackets is not too much different than labial brackets and is much lower than clear aligner lab fees with very predictable outcomes.

	Traditional treatment	MTM No•Trace
Treatment Fee	\$5000	\$5000
Active treatment visits	14	7
Production/visit	\$357	\$714

My journey into this realm of orthodontics began when I was a resident attending the AAO annual session where I heard Vincent Kokich speak on the topic of Problem

Focused Orthodontics for adult patients. The premise that an adult patient without TMD and competency in mastication does not necessarily need to be treated to an ideal Class I occlusion was a paradigmatic shift for me that made complete sense. For many orthodontists, this ideology may not resonate, and the ideal treatment option persists as the only option; however, for those who choose to embrace Problem Focused Orthodontics, MTM No•Trace is a very powerful tool.

The reality is that many adult patients are not willing to commit to optimal treatment plans because they do not want the long treatment times or the invasive treatment mechanics (surgery, extractions). Imperatively enough, treatment time and invasive mechanics becomes a barrier for patient acquisition. Alternate clinical solutions which lower these barriers naturally increase the patient pool which was otherwise out of reach for the doctor.

If you are thinking about trying lingual, THIS is the place to start BECAUSE:

- The doors make ligation easy
- It is easier to bond, do adjustments, and debond in the anterior with lingual
- There are usually fewer restorations on the lingual surfaces of the anterior teeth and the chewing forces are lower leading to a very low debond rate
- Patients usually do extremely well with speech and comfort when the brackets do not extend to the molars

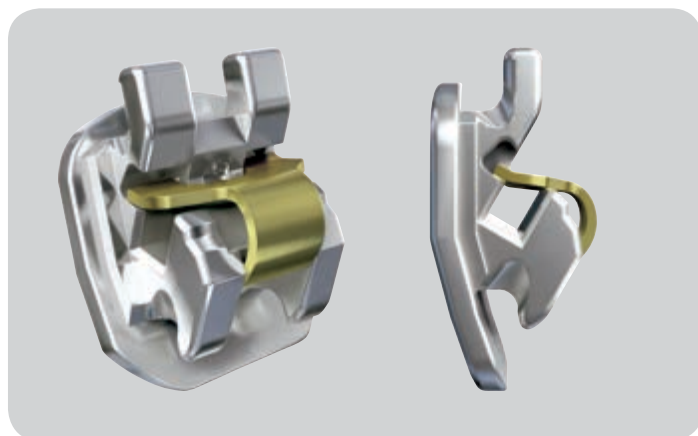
This is a versatile bracket. There are so many wonderful ways to unlock its abilities. For applying the brackets, you can choose direct bonding, in-office indirect bonding or lab-fabricated indirect bonding. For opening space, you can choose NiTi open coils, stop-wound coils, and/or crimpable stops. For closing spaces, elastic threads, powerchains, or closing loops are all reasonable choices. Wire selections can include starting with an .012" or .014" NiTi and finishing in an .014" or .016" BetaTi or stainless steel. Many even utilize these brackets with SureSmile's robotically bent wires. As someone who was 100% self-taught in the realm of lingual orthodontics, I have tried nearly every combination and realize that what works best for me does not necessarily fit for someone else. I, for example, prefer in-office indirect bonding, but Dr. Hopkins bonds cases directly and has wonderful outcomes as well.

The MTM™ No•Trace Bracket

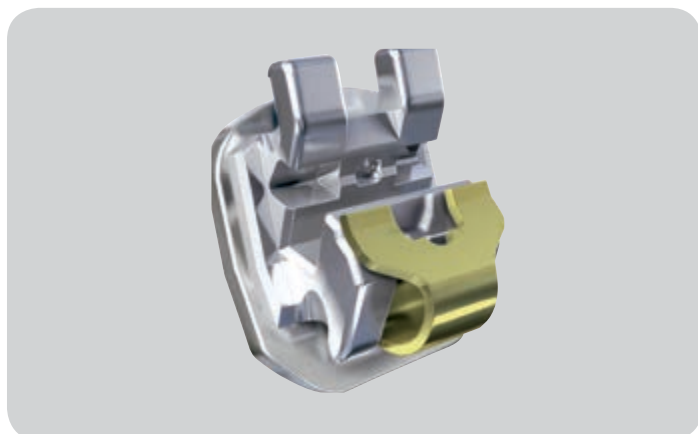
Heather Hopkins

The MTM No•Trace bracket has many advantages over available stock lingual brackets.

- Self Ligating: Cuts down on chair time and allows for quick alignment
- Interactive Clip: Improved rotational control
- Gold Coating for improved visibility
- True Twin design with smooth tie wings
- Clip open towards incisal to avoid gingival damage
- Versatility: Can be bonded directly or indirectly
- Anatomically correct base for ease of placement
- Low profile to limit tongue and speech issues



Closed clip



Open clip



Figure 1 - 14 Weeks Treatment Time, 4 Office Visits, \$3200 fee

Where does MTM No•Trace fit into your practice?

Case selection is the key to success! The MTM No•Trace system is the answer to simple problems that you might have previously addressed with removable appliances, such as retainers with springs or clear aligners (Figure 1).

Due to the superior design of the MTM No•Trace brackets utilizing this system in your office can be quite profitable. The fact that these brackets are self-ligating greatly decreases chair time, and leads to rapid unraveling of teeth. In most cases only one wire change is needed and this leads to fewer office visits. In Figure 1 a case is shown in which 4 office visits were required to complete treatment with a fee of \$3200. This comes out to \$933/visit without having to pay the high lab fee associated with clear aligners.

In order to achieve this type of profitability case selection is very important. MTM No•Trace is designed to correct cosmetic issues only. Many adult patients come to us wanting to address a simple cosmetic issue and why should we not treat them.

“Orthodontists tend to create idealistic treatment objectives on adult patients, when the patient’s dental history might suggest that idealistic might be unrealistic. I propose the creation of realistic objectives to overcome what really needs to be corrected in the adult mouth.”

- Dr. Vincent Kockich

What are the limitations of the MTM No•Trace system?

This system is designed to address cosmetic issues only. The types of cosmetic issues you choose to correct are only limited by the limitations you place on yourself. Figure 2 compares the amount of crowding, spacing, and rotations that MTM No•Trace, Invisalign Express 5 and Invisalign Express 10 are designed to correct. It can be seen that more correction is possible in a shorter time span and

with less out of pocket cost to the doctor when utilizing MTM No•Trace in comparison with Invisalign Express 5 or Invisalign Express 10.

	MTM MTM No•Trace	INVISALIGN® EXPRESS 10	INVISALIGN® EXPRESS 5
How much crowding can I correct?	Up to 6mm	Up to 2mm	< 2mm
How much spacing can I correct?	Up to 6mm	Up to 2mm	< 2mm
What rotations can I correct?	No limitation	Up to 20 degrees	Up to 10 degrees
Time Required	Typically 12-24 weeks	20 weeks	10 weeks

Figure 2

Clear aligners have their place treating more complex cases, along with traditional brackets and 3-Dimensional Lingual brackets. When you are evaluating a patient who needs minor correction, and you do not want to have the lag time of lab processing, or the fee associated, then the MTM No•Trace system may be the best fit in that scenario. Figure 3 shows a more advanced case that can be tackled with MTM No•Trace. This case was treated in 24 weeks with a treatment fee of \$4500 and 5 office visits, \$900/visit. Now that we have seen what can be done with MTM No•Trace and how profitable it can be, let’s discuss how you can begin to use it in your office.



Figure 3 - 24 Weeks Treatment Time

A common theme amongst patients who are seeking esthetic treatment is that they want it done quickly and they want it done NOW! By direct bonding in your office, the patient does not have to wait for laboratory turn around, and you do not have to pay a lab fee. I have found that I do tend to bond 4-4 in more cases than not, because I prefer the extra anchorage when trying to alleviate crowding, or resolve spacing. I do not always add the premolars at the first bonding visit, and I may remove them before the completion of treatment. Below I have outlined the steps for direct bonding.

Steps for Direct Bonding:



Figure 4

1. Clean teeth (cotton rolls or pumice on rotary)
2. NOLA dry field (moisture from breathing)
 - High speed suction adaptor used in our office



Figure 5

3. Add cotton rolls labial to the anterior teeth if the lips are contacting the teeth
4. Etch - 37% Phosphoric acid (I use blue gel for visual)
 - 20-40 seconds per tooth
5. Clean all etch with water and dry completely

6. Apply Assure (Reliance) primer and gently dry
7. Place Transbond LR (3M Unitek) on the brackets, and place brackets on the teeth
8. Position brackets/clean excess adhesive, make sure to remove all composite from around the clip
9. Light cure 10-20 seconds/tooth (depending on light)
10. Add Bite Turbos to MAXILLARY molars to avoid patients biting into brackets.

Ideal Bracket Placement:

- Incisal Bracket Placement
 - Lingual anatomy, namely the cingulum, requires that the bracket be placed more incisally than with conventional brackets. (Figure 6)

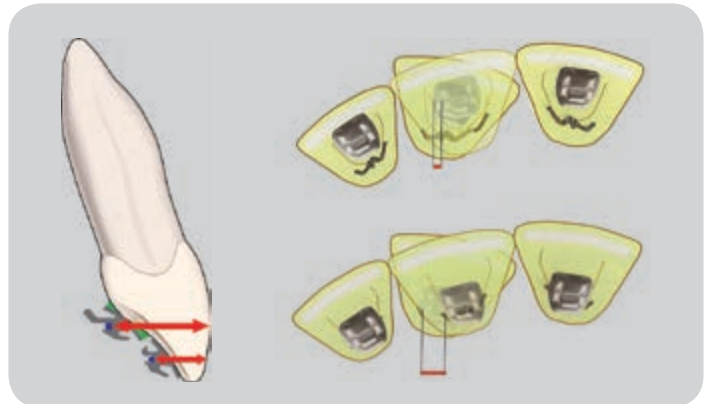


Figure 6

Figure 7

-- Biomechanics -- The more gingival the bracket is placed the longer the distance becomes that the bracket must slide along the wire to allow for proper alignment. (Figure 7)

- Central incisors - 1-2mm from the bracket base to the incisal edge (or 3.5-4.5mm if measuring to the slot)
- Lateral incisors - 0.5mm less than the centrals
- Canines - 1-2mm from incisal edge
 - Stay off of the cingulum. In some cases it may be necessary to place some composite on the lingual surface of the canine to create a flat plane to bond on.
 - If you must bond on the cingulum, warn patients that their canines will become prominent at first and then you can bring them back with wire adjustments (adds 3 months to treatment time) or put inset bends on both the starting and finishing wire to overcome this movement.
- Premolars - Mx - Place in line with canine
 - Mn - May require occlusal buildup or a vertical step in the wire

Staying in light round wires is imperative with this system. Remember we are only correcting first and second order issues. Without a custom 3-dimensional setup, many issues will be encountered if rectangular wires are used. In a lingual system, minor differences in torque values will be expressed as very noticeable vertical discrepancies, which is why only round wires should be used with MTM No•Trace. (Figure 8) There is a decreased interbracket distance with lingual brackets as compared to labial brackets (Figure 9). This affects our force systems. The decreased interbracket distance increases the stiffness of the wires and the tooth will feel much more force. A superelastic wire with a flat load deflection rate such as Sentalloy wires is desired.



Figure 8



Figure 9

An Indirect Approach

Brandon Owen

Obviously, direct bonding is an easy way to achieve wonderful result with lingual treatment. I will now share the approach I take when using MTM No•Trace:

I prefer indirect bonding 3-3 when possible unless we are correcting an overbite, resolving moderate crowding, correcting crowded or rotated canines, closing spaces, performing lower incisor extractions. I use a powerchain that has a large lumen and thin elastic, and I use .120" single ties during detailing to enhance control. To open space, I will use crimpable stops with a longer (advancing) wire if we have severe crowding and open coils for more limited crowding. My wire choice is almost always a .014" NiTi followed by a .014" steel.

Others like to direct bond, routinely bond 4-4, use elastic thread, do not use single ties, use .012" straight NiTi even to the 4's, and finish with a .016" BetaTi wire.

Indirect Bonding Protocol:

Pre-bonding steps:

Technician-

1. Pour up model in strong stone
2. Liquid separator (leave to dry 1+ hours)
3. CLOSE ALL BRACKET DOORS BEFORE PLACING ON THE MODELS
4. Position brackets on teeth with orthodontic composite and clean flash
5. Place model in dark box and give to the Dr.

Doctor-

5. Refine bracket position
7. Light cure (box or gun)
8. Shape NiTi and SS wires
9. Place all items in the box and leave for Technician to retrieve

Technician-

10. Make indirect bonding tray (Clear VPS such as Memosil 2 or mouth guard suck-down)
11. Soak for 15 minutes or more
12. LIGHT CURE COMPOSITE AGAIN TO SET THE MIDDLE OF THE PAD
13. Clean the composite with acetone or rubbing alcohol
14. Store for bonding

Bonding appointment steps:

Technician-

1. Clean teeth (pumice or cotton roll)
2. Flowable composite on each bracket in the tray
3. Isolation - NOLA
4. Etch 37% phosphoric acid blue gel 20-30 sec each tooth to bond and turbos
5. Clean etch and dry
6. Prime (for brackets and for turbos)

Doctor-

7. Seat tray and Light cure 3-10 sec./tooth
8. Compomer band cement for turbos

Technician-

9. Clean flash
10. Insert wires
11. Braces instructions

Doctor-

12. Check wires and clean flash
13. Check turbos in Centric Relation and adjust so there is no shift



Figure 10a



Figure 10b

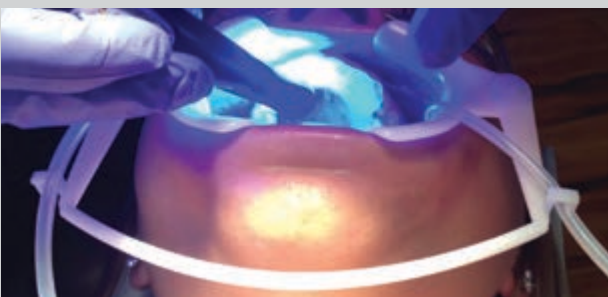


Figure 10c

Which teeth should be bonded:

Canine to canine (3-3) vs. 1st premolar to 1st premolar (4-4)? I bond 3-3 whenever possible (other users prefer using 4-4 almost always-there is no wrong answer)

Bonding canine to canine (3-3)

- It is more comfortable for the patient (anatomy of the teeth)
- Less cost for the brackets and wires
- Less complicated wire bending and wire shaping
- When bonding premolars, I will usually remove the premolar brackets early if possible

Bonding premolar to premolar (4-4)

- Spacing
- Severe crowding
- Opening a deep overbite
- Changing arch shape
- Significant malalignment between canine and premolar
- Incisal plane cants

Wire preparation canine to canine:

Nickel Titanium (.014")

1. Cut a standard lower labial .014"NiTi at the midline
2. Use the anterior (curved portion)
3. Measure appropriate length
4. Leave 3mm excess on each side
5. Heat treat ends and bend an L towards the teeth (90 degrees)

Stainless Steel (.014")

1. Bend a small ring to identify right side
 2. Shape the wire to follow the desired final arch shape and arch length
 3. Leave slight excess in length and bend an L on the left side (leave additional excess if you will be resolving a lot of crowding)
- I recommend the following as these wires are easy to flip:
 - Ring=Right
 - L=Left



Figure 11

Wire preparation premolar to premolar:

Nickel Titanium (.014")

- Use the GAC Lingual arch template to determine which size of wire to use

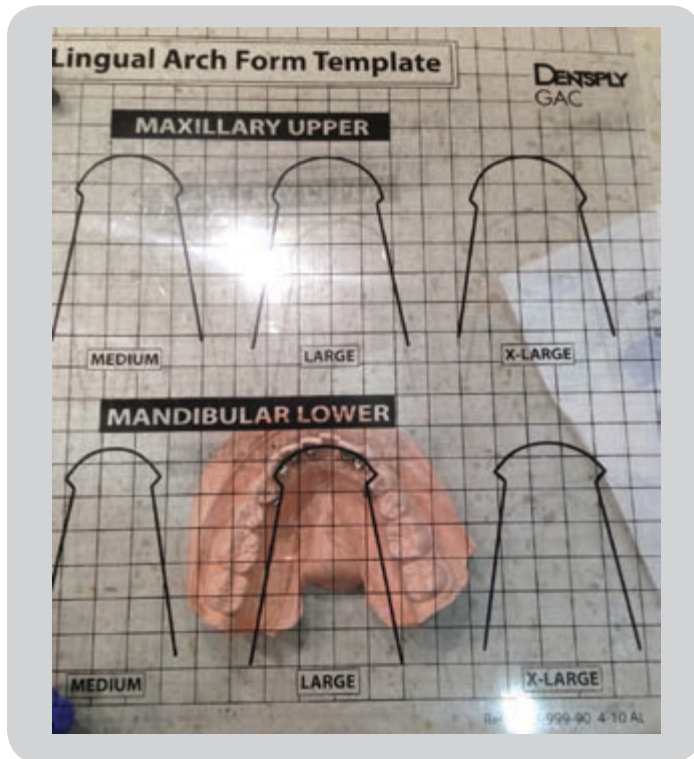


Figure 12

- CHOOSE FINAL ARCH SHAPE FOR CROWDED CASES
- If you don't have the template, you can hold the different sized wires above the model
- If you do not want to use GAC lingual wires, use a lower .014" labial NiTi, measure distal to canines, heat treat and bend the wire in for the premolars
- Trim ends leaving excess for some play and to heat treat and bend 90 degree bends toward the teeth for patient comfort

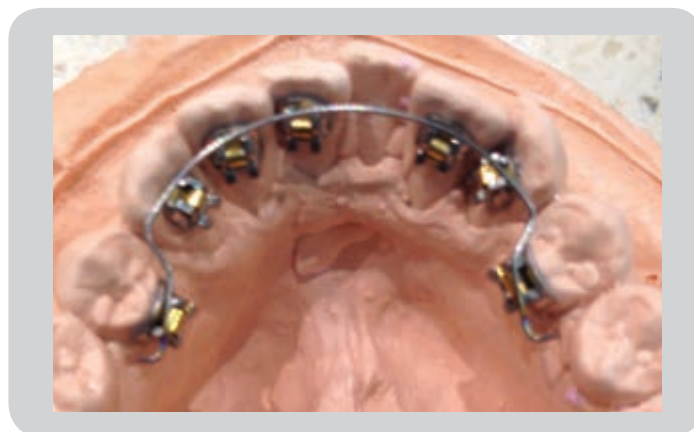


Figure 13

Stainless Steel wire (.014")

- Bend ring for right side
- Leave 3-4 extra mm around bracket (1.5-2mm on each side)
- Bend wire 90 degrees step out and incisally
- Shape desired FINAL arch form
- Measure the arch length and do a 90 degree bend (again estimated based on prediction of how much arch length is needed when the teeth are aligned)
- Make a 90 degree bend in and gingivally
- Leave 2-4 mm depending on anatomy
- Hold over bracket position to verify arch shape and wire length
- Bend 90 degrees again and leave 8-10mm of extra length
- I wait to bend the final L bend and trim the excess length until we insert the steel wire. This way fine tuning is very quick and easy (Huge advantage to Indirect Bonding - very difficult to bend this chair-side)

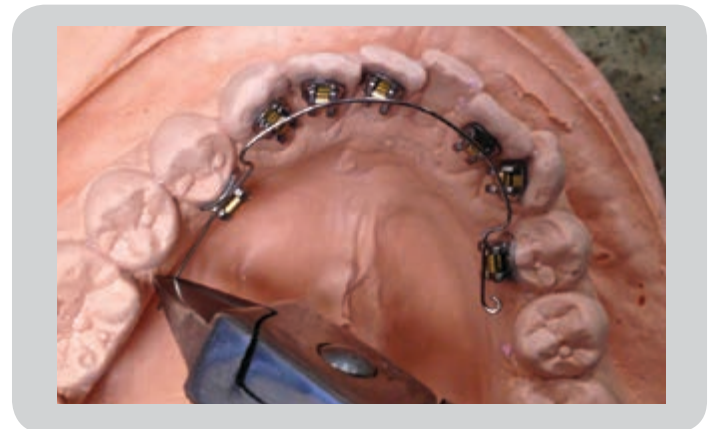


Figure 14

Wire selection:

- I prefer to use 2 wires for each case (usually 14 NiTi and 14 Steel; sometimes I use 16 Steel as my second final wire)
- With digital setup it is beneficial to use 3 wires and finishing in an 18 Steel or TMA

Alignment phase of treatment:

- Use open coil and/or crimpable stops with and advancing wire (crimpable stops just mesial to the premolars.) After premolars are engaged, the wire should be out on the incisal edges of the brackets; then, engage the centrals, laterals and shift the excess wire where the desired space is needed) to resolve crowding
- Use power chain and/or elastic thread for closing space or helping to rotate teeth

Power chain: GAC Super Chain-short, RMO energy chain or closed space Generation II Power chain (or similar)

Open Coil: GAC NITI Open Coil .010x.030

Single ties: Most thin .120" single ties will work (start ligation on the gingival wing)

Detailing phase of treatment:

- Use power chain or single ties to increase control
- Can make significantly larger bends as compared to labial with a .014" Steel wire
- Terminal teeth (canine or premolar) can have significant bends to improve alignment
- With inset bend between the canines and premolars, the interbracket distance is significantly greater than the other teeth and larger adjustments can be made here as well

Debonding:

- 90 degree (posterior) debond plier



Figure 15

Retention:

- Retention with MTM can be more difficult than conventional orthodontics in the past BECAUSE:
- Many are adult patients
- Treatment times are short
- Both these factors increase risk of relapse
- Recommended to use fixed retainers on the lower arch (canine to canine bonded to each tooth)

- For the upper arch a fixed retainer is usually used for the four incisors
- We also make clear retainers to use full time for 2 months on the upper arch
- If bite turbos were used and caused an opening of the bite, the retainers are cut so they do not extend to those teeth to allow them to settle back together
- If the patient chooses not to do fixed retainers, we use clear retainers full time for 3-4 months
- OR the the braces can be left on the teeth with no adjustments for 3 months and then a removable retainer can be employed only at night

Potential issues with lingual:

Common-

- Speaking - typical timeline is less than 1 week but large variation
- Tooth soreness - typically less than labial braces
- Eating - bite turbos make chewing difficult

Very Rare-

- Laceration of the tongue on wire or bracket
- Bite did not close when turbos were removed
- Severe discomfort with lingual braces (tongue braces)
- Patient unable to tolerate lingual treatment

Fees for MTM Lingual:

My office-

- Starting off (while learning) consider charging 70-90% of your labial fee for treatment
- I charge 25-35% less than that for a single arch
- My goal at first was to be less than dentists in the area using Invisalign (clear aligners)
- Once proficient, consider charging 90-110% of your labial metal bracket fee
- For upper lingual/lower labial, I charge the same fee as I would for full upper and lower labial

Additional tips:

- If using indirect bonding, bond every tooth at the beginning if you can get a reasonable position initially (even if you can't engage the wire)
- After bonding, do not spend more than 2 minutes trying to engage a certain tooth (if it doesn't go in this timeline, use coil to open space or elastic thread to rotate the tooth to allow easy engagement at the next visit)

- 4-5 week adjustment intervals
- Use floss wrapped around the wire or an engaging tool to help close the door in teeth that are difficult to engage
- When using an indirect bonding tray with a clear VPS:
 1. Fully surround the bracket with material (best to vibrate the tip to encourage flow as you are going around the brackets themselves)
 2. Start on the lingual, cover all the braces, then pass over the incisal edges, then come back on the facial surface covering just the incisal 1/3
 3. Try to leave no holes in the tray especially on the incisal edges
 4. Once separated from the model, you can trim excess tray material with a ligature cutter

Hopefully, this can serve as a great reference to help those starting with lingual appliances. To get a better handle, I would strongly suggest attending a course to get an even better overview. This is really a great way to distinguish your practice and give you control over a very unique value proposition and value chain. It can also insulate any orthodontic practice from the trend of ortho-pedo combination practice and to offer services that general practitioners are not likely to offer. More importantly, it is fun. It is so satisfying to get such an overwhelming number of positive comments from our patients as they have gone through MTM No•Trace Lingual treatment. The bottom line is that this treatment is one of my favorite things to do with the highest profit margins, and these are some of the happiest patients I see.

Case selection:

Easy:

For your first attempts with lingual, work with mild crowding/mild malalignment cases. Consider starting with a single arch treatment.

Case 1



Case 2



Case 3



Case 4



Intermediate/Advanced:

As you gain experience with a few cases, consider treating dual arch cases and cases with more crowding or mild spacing.

Case 5



Case 6



Case 7: (Extraction of Lower right 1st premolar)



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