New Options for Aesthetic Appliance

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Developing lingual orthodontics

- Dr Kurz placed clear plastic brackets lingually in 1970
- 1st generation of ORMCO’s lingual appliance in 1979 by Dr C Andreiko
- ORMCO formed a task force: Drs C Kurz, J Gorman and JR Smith (first consulting clinicians for a dental company)
- 3 day lingual courses were taught around world
- ORMCO continues to develop the lingual appliances (Kurz brackets upto 7th G)
Lingual Orthodontics

Disadvantages
1. Speech
2. Brushing
3. Food impaction
4. Indirect bonding
5. Technique sensitive

Why lingual approach?

- Patient demand: tendency to choose more aesthetic orthodontic treatment
- Appliance improvement: smaller, thinner.
- Doctor demand: expand his/her patient pool
- Now: indirect bonding + wire fabrication
- 3D CAD/CAM service to plan treatment sequence
Market trend

Recently..
Satisfying patients

- Lingual technique has a unique value of invisibility.
- There are many patient who would benefit functionally and aesthetically if they were to have orthodontic treatment.
- Many of these patients never consider orthodontic treatment unless implementing this therapy.

-M. Alexander

Considerations for lingual approach

- Morphological irregularity of dental arch on lingual side
  Need indirect bonding
- Lingual technique requires specific laboratory setup to make a straight wire system
- Need to compensate mechanics in order to make proper teeth movements
Self-ligating lingual bracket

- Because of design complexity, thicker profile has to be solved
- Durability of clip should be guaranteed during treatment
- Advantage
  1) Shorter chair time
  2) Better hygiene
  3) Low friction
  4) Less pain

Patient comfort

- Bracket profile: reduced dimensions with clip design
  - Clipy-L: 1.8mm
  - STb: 1.5mm
Patient’s comfort

Advancement in lingual system

- Closer to lingual surface:
- Periodontal clearance
- Less bonding failure
- Straight wire system
- Low profile for patient comfort
- 3D CAD/CAM prediction
- No ligation
Design with gingival offset

ORMCO 7G  ORMCO STb  DENTAURUM Time  TOMY InOvationL

Periodontal irritation

Just after debonding lingual brackets

Kurz 7G Br  InOvationL Br
Reliable wire insertion

Friction

Self-ligating bracket has lesser Friction during alignment
**Mechanical forces acting on tooth**

1. $F_{lt}$ ligature-derived force; $F_{wd}$ wire-derived shear force and its counterpart in the opposite direction.
2. $F_{lt}$ and $F_{wd}$ together comprise a resultant normal force.


**Components of normal force**

1. The ligature-derived force depends on the ligation mode and it is constant.
2. The shear force component increases linearly with the wire deflection.
3. The resultant normal force determines friction resistance to sliding.

For sliding mechanics

Clinical studies support the view that resistance to bodily tooth movement by sliding has little to do with friction and, instead, is largely a binding-and-release phenomenon that is about the same with conventional and self-ligating brackets. The clinical trial data do not support the contention that treatment time is reduced with self-ligating brackets.


Play angle during retraction

016x022 archwire : 7.7°
Secure torque during retraction

InOvationL allows X2 more active angle to reduce binding phenomenon
Final thoughts..

- Actually it does not matter which lingual bracket system you use. But it does not take a genius to pick a simpler and reliable system.
- I do not trust wire bending by robotic arms on animated 3D setup models. I’d rather pick the manual setup by a trained technician according to my prescriptions for each different cases.
Conclusion

• Self-ligating lingual bracket system does not shorten treatment time.

• Advancement in lingual bracket design reduces patient discomfort and decrease periodontal irritation.

• Self-ligating lingual bracket may reduce patient pain in initial treatment stage due to lower friction.

• The biggest advantage of using self-ligating lingual bracket system comes from shortening of chair time!