

## LINGUAL ORTHODONTICS – A REVIEW

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### Abstract

With the advent of lingual orthodontics, malocclusions could now be corrected without the device being visible inside the mouth. Lingual orthodontics is widely accepted worldwide. With the help of the invisible equipment, the patient's cooperation and confidence have grown. The labial approach is entirely different in terms of biomechanics, indirect bonding, and anchorage control. The idea of lingual orthodontics has been discussed in this article.

Key words : Lingual bracket , Lingual bonding, Retention

### Introduction

Numerous occlusions can now be treated with novel fixed appliance solutions thanks to advancements in orthodontic research. The creation of lingual appliances is a result of the growing acceptability of orthodontic treatment and the aesthetic impairment of labial fixed appliances.<sup>1</sup>When establishing human connections, a pleasing appearance gives people more assurance and boosts their self-confidence. Being attractive is usually advantageous, particularly in adult relationships. People tend to think better of those who are more attractive to them. The most common reason for people to seek orthodontic treatment is aesthetics, which is of utmost importance.<sup>2</sup>

The intraoral tissues were injured and the tongue was not given enough room during the lingual appliance therapy. A full 99% of patients reported being satisfied with the lingual approach. Additionally, 87% of patients said they would tell friends and family about the lingual appliance.<sup>3</sup> Around 1975, lingual orthodontics started to flourish. The acceptance of the lingual method among adults is growing.<sup>4</sup>Dr. Craven Kurz made a substantial contribution to lingual orthodontics by using brackets on the lingual surface for the first time. This device consists of brackets that are specifically made to be positioned on the lingual surface of teeth.<sup>5</sup>

## Lingual history

The Kinja Fujita was the first to propagate lingual technique using mushroom shaped arch wire. He began working on lingual technique in 1968 and then went on for Research in 1971 and finally published the concepts of Fujita Bracket in 1978.<sup>6,7</sup>

1889-Lingual Removable Arch by John Farrar

1918-Lingual Arch was developed by John Mershon

1922 –labial and lingual arches presentation with finger springs developed by Mershon

1942 -.Development of labiolingual appliance by Dr.Oren Oliver

*Labio-loop-lingual appliance developed by Dr William Wilson*

1975-Dr Craven Kurz who made an important contribution to orthodontics by using a lingual bonded edgewise appliance for the first time. The Kurz lingual bracket evolved further as Ormco 7th Generation Bracket.<sup>6</sup>

1979- Mushroom shaped arch wires and lingual bracket design was developed by Dr Kinya Fujita of Kanagawa Dental University, Japan<sup>7</sup>

## Evolution of lingual brackets<sup>8</sup>

- First generation (1976)
- Second generation (1980)
- Third generation (1981)
- Fourth generation (1982-1984)
- Fifth generation (1985-1986)
- Sixth generation(1987-1990)
- Seventh generation (1990- present)

## Difficulties encountered with lingual technique

1. Speech problems and tongue inflammation
2. Occlusal interferences and gingival impingement
3. Command over the device
4. Modifications to the base pad, appliance positioning, and bonding
5. Positioning of wires
6. Ligations and attachments

## Advantages of lingual technique

1. Adult preference and rising demand<sup>9</sup>
2. Stylish and completely undetectable appearance<sup>10,11</sup>

3. The surface of the labial enamel is undamaged.
4. No decalcification of the labial enamel
5. Effective biomechanically during retraction

### Disadvantages of lingual appliances

1. Accurate bracket placement was impeded by indirect vision
2. Speech distortion produced by occlusal interferences, which occasionally prevented tooth development and frequently resulted in bond failures
4. The tongue is cut by the jagged edge.
5. Plaque buildup causing gingival discomfort
6. Extended chair side time as a result of the arch wire's problematic insertion and ligation

### Indications of lingual appliances

1. Intrusion of Anterior teeth
2. Expansion of the Maxillary Arch
3. Repositioning of the mandible with orthodontic tooth movements
4. Distalisation of maxillary molars
5. Treatment of cases with case complicated with an existant tongue thrust habit

### Ideal cases

1. Low Angle Deep bite
2. Class II Division 2
3. Class 2 upper arch extraction cases
4. Class I minor crowding<sup>12</sup>
5. Diastema Closure
6. Pre-Prosthetic Tooth movement and Surgical cases
7. Class III Cases<sup>13</sup>

### Difficult Cases

1. Premolar extractions
2. Crossbite in the posterior
3. High Angle
4. Open bite

### Anchorage considerations in lingual orthodontics

1. Anchorage is important in non-growing adults
2. In cases of mutilation, the anchorage is essential
3. Loss of bone and inadequate periodontal support
4. Patients in this category have extremely high aesthetic demands.
5. The introduction of a biting plane causes an intercuspation and occlusion loss, which leads to an anchoring loss.

## Bracket system

Over the past 25 years, a variety of lingual brackets have been created, and adjustments have also been made for patient control, precise tooth alignment, and mechanical efficiency.<sup>2</sup>

1. Conceal Bracket
2. Fujita lingual Bracket
3. STB (Scuzzo-Takemoto Bracket)
4. Stealth Brackets
5. Philippe self ligating lingual bracket
6. Kelly Bracket: Horizontal insertion bracket
7. In-ovation 1 bracket from gac
8. Kurz lingual bracket
9. Braces (Incognito)

## Bonding in lingual orthodontics

Precise and accurate placement is essential for the successful repair of a malocclusion with lingual orthodontics.<sup>2</sup>

1. Customized lingual appliance set up service system
2. Torque Angulation Reference Guide (TARG)
3. Bonding with equal specific thickness (BEST) System
4. Slot Machine
5. Lingual bracket jig
6. Transfer optimising positioning
7. Korean indirect bonding set up system

8. Hiro system
9. Convertible resin core system
10. Hybrid system
11. Simplified technique
12. Orapix system

## Retention in lingual orthodontics

- Fixed Bonded retainer
  - Begg wrap around retainer
  - Hawley retainer
- Clear retainer <sup>2</sup>
- Spring Retainer
- Passive lingual retainer
- Active lingual retainer ( bonded)<sup>14</sup>

## CONCLUSION

The basic steps of the labial and lingual techniques have been codified in the last few years thanks to the efforts of a small number of professionals. This makes the procedure simpler for less experienced orthodontists. Wider use of linguistic orthodontics is necessary, and it ought to be ingrained in the cultural background of all orthodontists. Lingual orthodontic courses are currently being offered by numerous universities and orthodontic societies worldwide. Orthodontics is rapidly changing in the future. There is a growing global desire for aesthetics as well as awareness of lingual orthodontics. In the future, a large number of patients will choose bilingual orthodontics.

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