ISSN No: 2456-2165 https://doi.org/10.38124/ijisrt/25jun742

Knowledge and Awareness of Lingual Orthodontics Among Dental Students in Karnataka

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Publication Date: 2025/06/23

Abstract:

- ***Purpose:***
  The purpose of the study was to assess the knowledge and awareness of lingual orthodontics among dental students in Karnataka.

- ***Methods:***
  The participants included 100 BDS students. The knowledge of participants regarding lingual orthodontics were recorded using a specially designed questionnaire.

- ***Results:***
  The results were interprerted in pie chart. More than 36% students have not heard about lingual orthodontics. Many of the respondents felt clear aligners as more comfortable and practical option. Nevertheless manyopined that they would recommend lingual braces treatment and they feel it is effective

- ***Conclusion:***
  Knowledge of lingual orthodontics among BDS students is essential for broader patient awareness and alternative aesthetic treatment plans.

How to Cite: Dr. Sharath Kumar Shetty; Dr. Revanth. S. Soonthodu; Dr. Aashiq Iqbal; (2025) Knowledge and Awareness of Lingual Orthodontics Among Dental Students in Karnataka. *International Journal of Innovative Science and Research Technology*, 10(6), 1494-1500. https://doi.org/10.38124/ijisrt/25jun742

I. INTRODUCTION

Orthodontic treatment has evolved significantly over the past few decades, with a growing emphasis not only on functional and structural correction but also on aesthetic considerations. Conventional labial fixed appliances, although highly effective, are often viewed as unaesthetic by adult patients who seek discreet treatment options. Lingual orthodontics, which involves placing brackets and wires on the lingual (tongue-facing) surfaces of the teeth, has emerged as a viable solution for patients desiring invisible orthodontic treatment [1].

First introduced in the late 1970s by Fujita in Japan and Kurz in the United States, lingual orthodontics initially faced challenges due to limited technology, bracket design, and practitioner experience [2,3]. However, significant advancements in digital orthodontics, indirect bonding techniques, and customized appliances have led to renewed interest and improved outcomes in lingual treatment [4].

Despite its increasing popularity, lingual orthodontics remains underutilized, largely due to technical complexity, longer chair time, and higher costs compared to labial appliances [5]. Lately with the advent of aligners the interest in lingual orthodontics is seeming to wade. Lingual brackets can be a good alternative for many patients if case selection is appropriate.

II. METHODOLOGY

A questionnaire based study over a onemonth period assessed 100 BDS students for their knowledge and awareness of lingual orthodontics.

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A. Questionnaire:

➢ *Demographic Details*

- *Gender:*
  (a) Male, (b) Female
- *Age group:*
  (a) 18-20 years, (b) 21-23 years, (c) >23 years

➢ *Knowledge and Awareness*

- *Have you Undergone Orthodontic Treatment before?*
  (a) Yes, (b) No
- *If you had Undergone Orthodontic Treatment how would you rate your Treatment Experience?*
  (a) Very good, (b) good, (c) Average, (d) Bad, (e) Not applicable
- *Have you heard about Lingual Orthodontics?*
  (a) Yes, (b) No
- *Have you heard about Invisible Orthodontics?*
  (a) Yes, (b) No
- *Do you Consider Lingual braces better than Normal Conventional Braces?*
  (a) Yes, (b) No
- *Which of these would you Consider "truly Invisible " Orthodontics?*
  (a) Ceramic brackets, (b) Clear aligners, (c) Lingual brackets, (d) None
- *Which of these would you Consider a better Treatment Option?*
  (a) Conventional brackets, (b) Lingual brackets, (c) Clear aligners, (d) Don't know
- *Which of the Option do you think is in high Demand in Present Scenario?*
  (a) Lingual brackets, (b) Clear aligners, (c) Conventional brackets, (d) Self ligating
- *Which of these do you think is the Biggest Disadvantage of Lingual Bracketsa?*
  (a) Tongue interference, (b) Cost of treatment, (c) increased chairside time, (d) Oral hygiene maintanence
- *According to you which is the main factor which Decides the Orthodontic Treatment you choose?*
  (a) Comfort, (b) cost, (c) Aesthetics, (d) Mechanics
- *Would you Recommend Lingual braces to Patients?*
  (a) Yes, (b) No

III. RESULTS

Total of 100 students responded to the survey. 60 respondents were females and 40 were males. 25.5% respondents were in 18-20 years' age group. 57% were 21-23 years of age and 17% above 23 years of age.

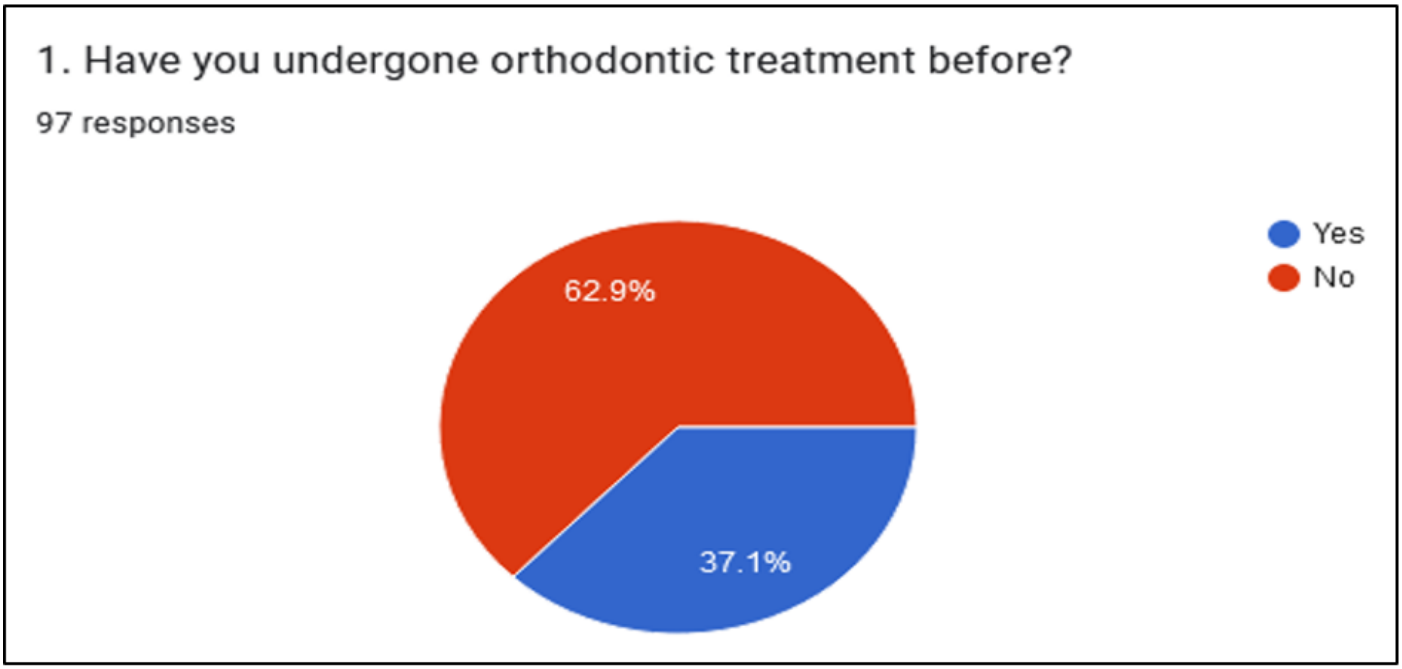

Fig 1: 63% of the Students Had Undergone Orthodontic Treatment Before

ISSN No: 2456-2165 https://doi.org/10.38124/ijisrt/25jun742

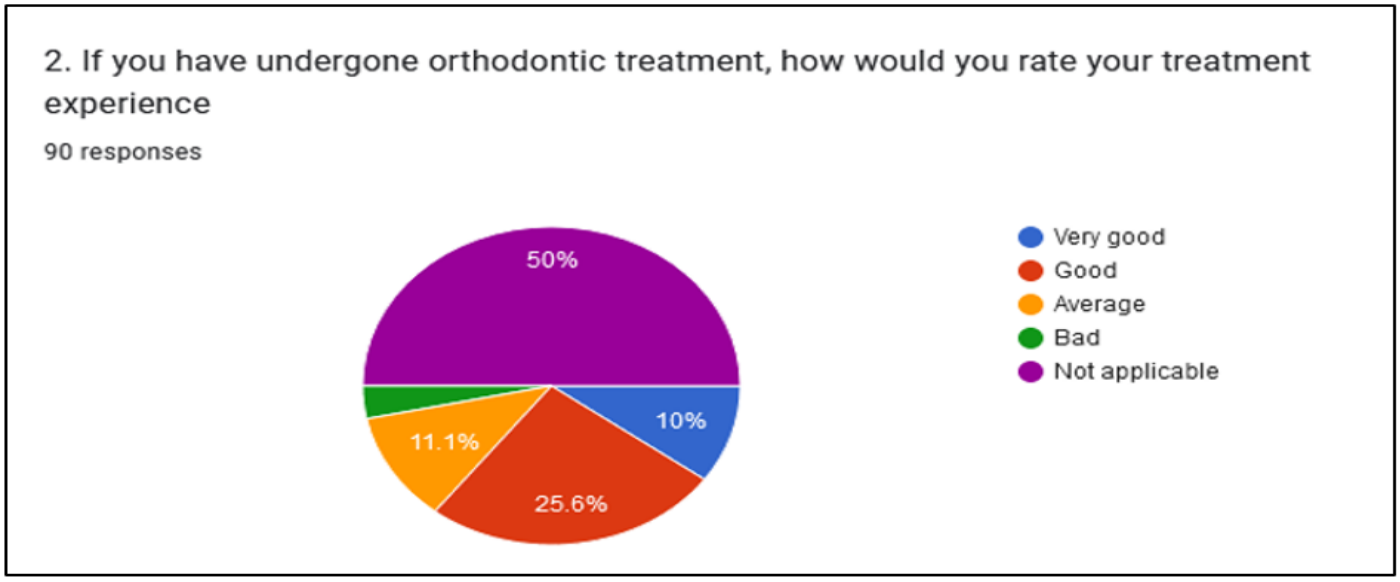

Fig 2: 25.8% Respondents Had a Good Experience, 10% very Good Experience, 11% Average, 4% had a bad Experience

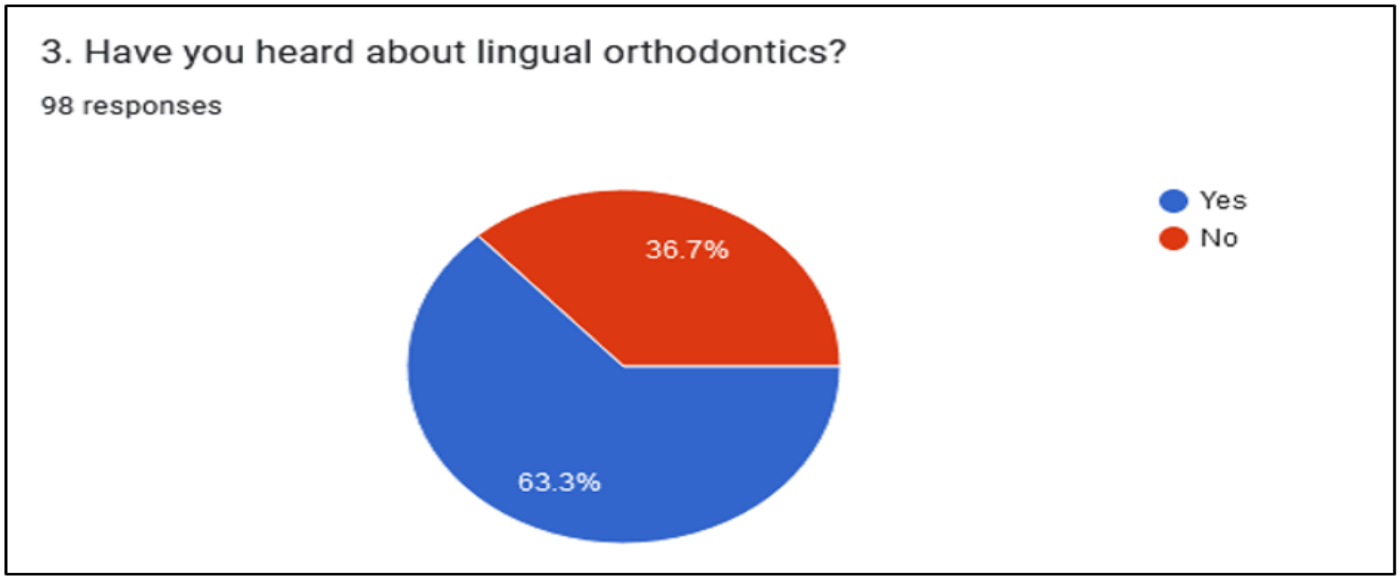

Fig 3: 63.3 % of Respondents Had Heard about Lingual Orthodontics Before

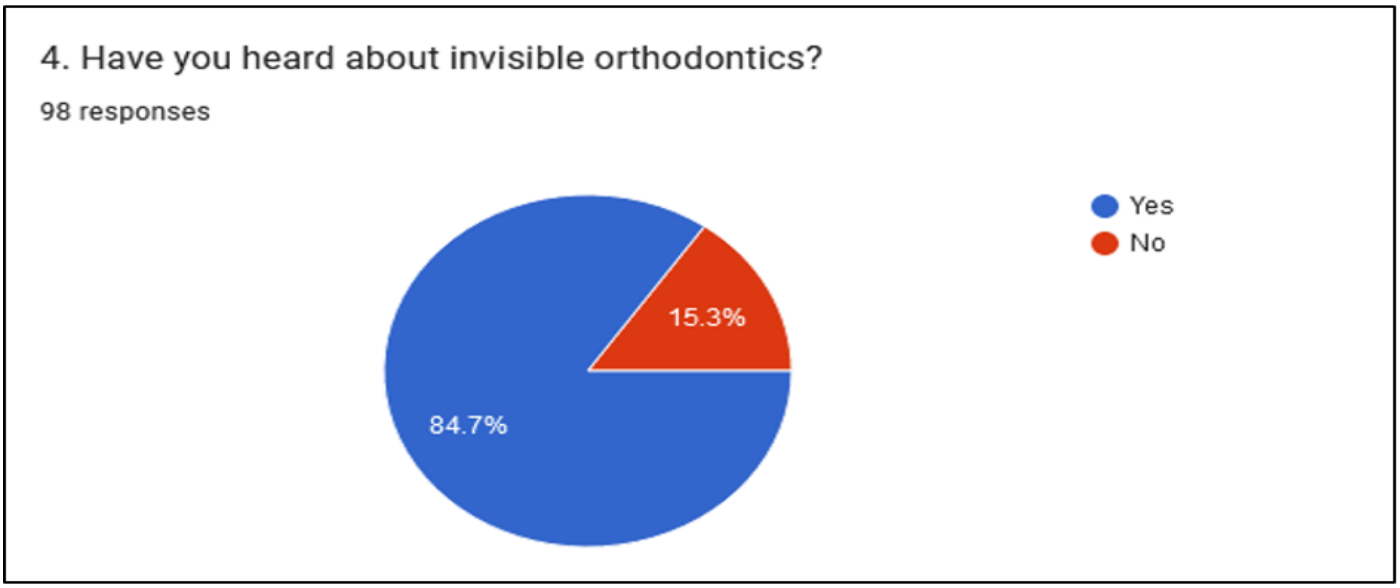

Fig 4: 84.7% of respondents heard about invisible orthodontics

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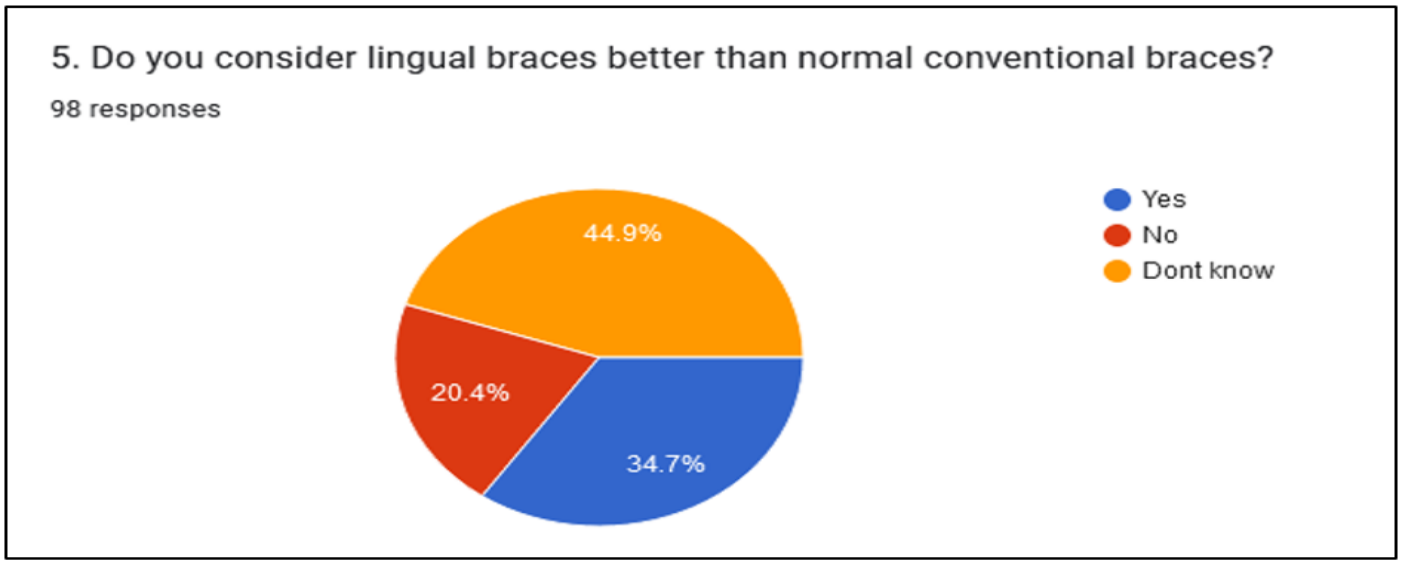

Fig 5: 34.7% Consider Lingual Braces Better than Normal Braces. Whereas 44.9% don't know. 24% feel Normal Braces are Better.

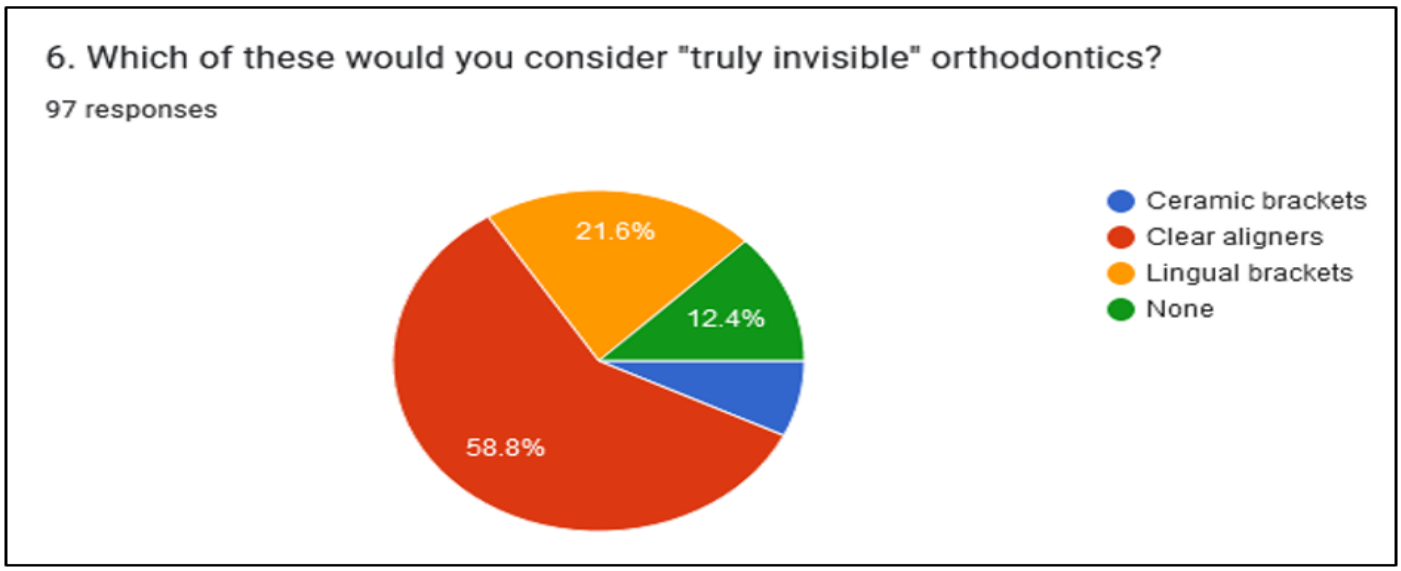

Fig 6: 58.8 % think Clear aligners are truly Invisible Whereas 21.6% think Lingual Braces are truly Invisible

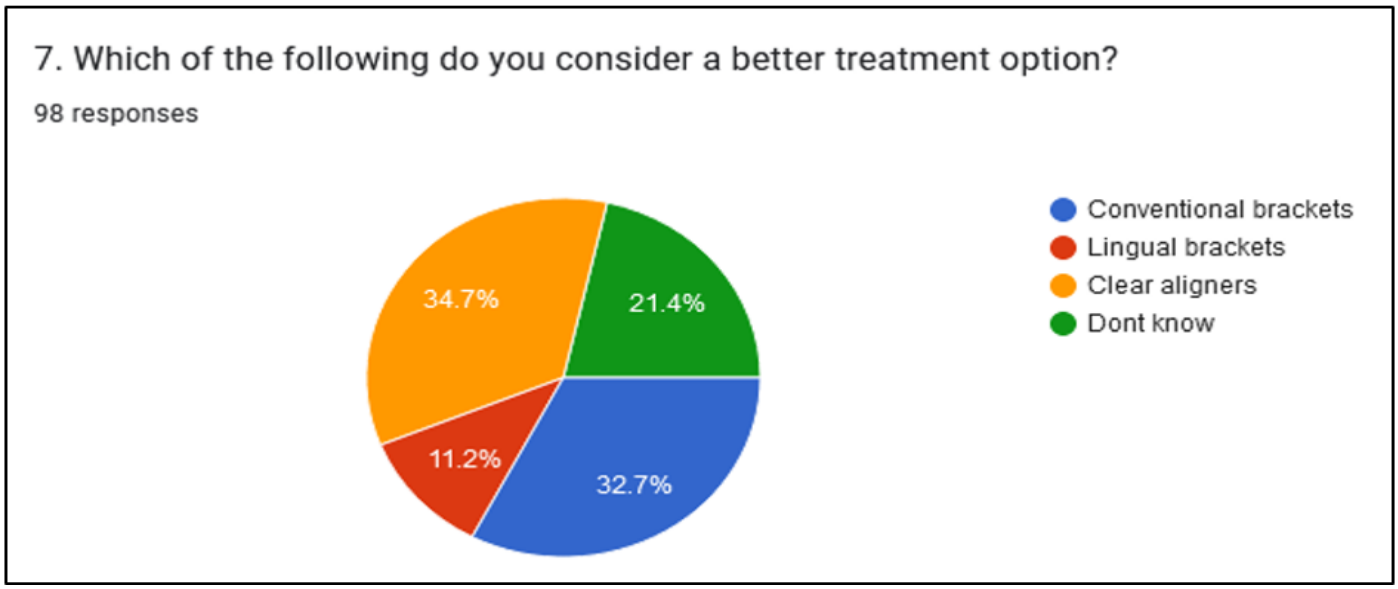

Fig 7: 34.7% of the Respondents Thought Clear Aligners Are Better Treatment Option Followed by Conventional Brackets (32.7%).

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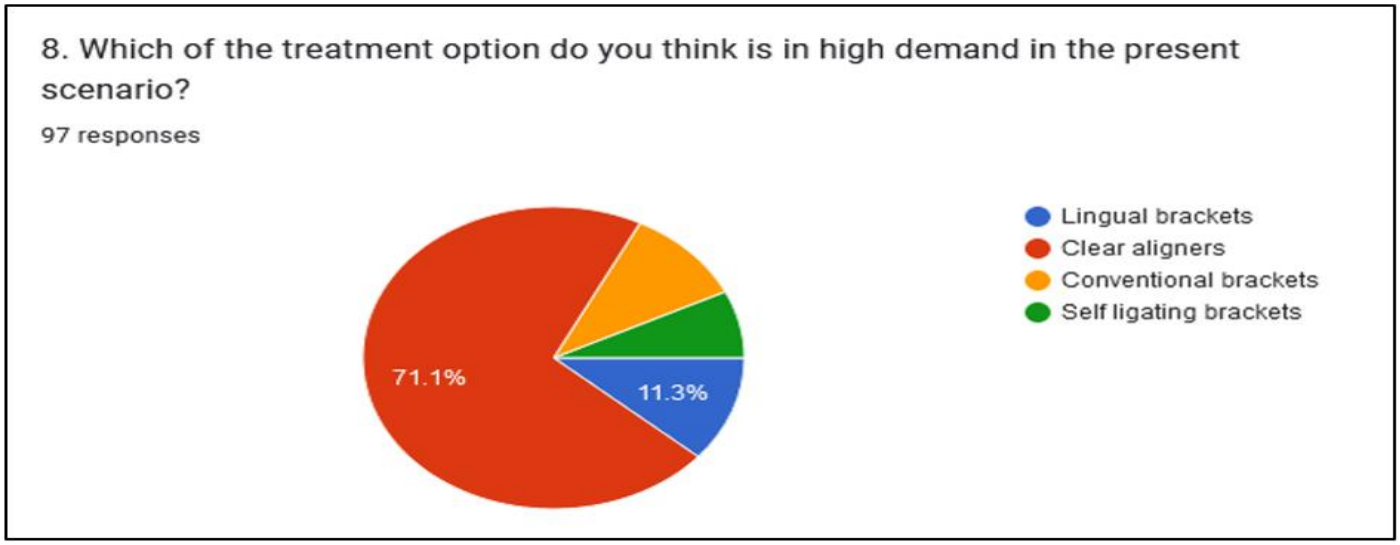

Fig 8: 71.1% Students felt Clear Aligners Are in Highest Demand in Present Scenario, Followed by Lingual Braces (11.3%)

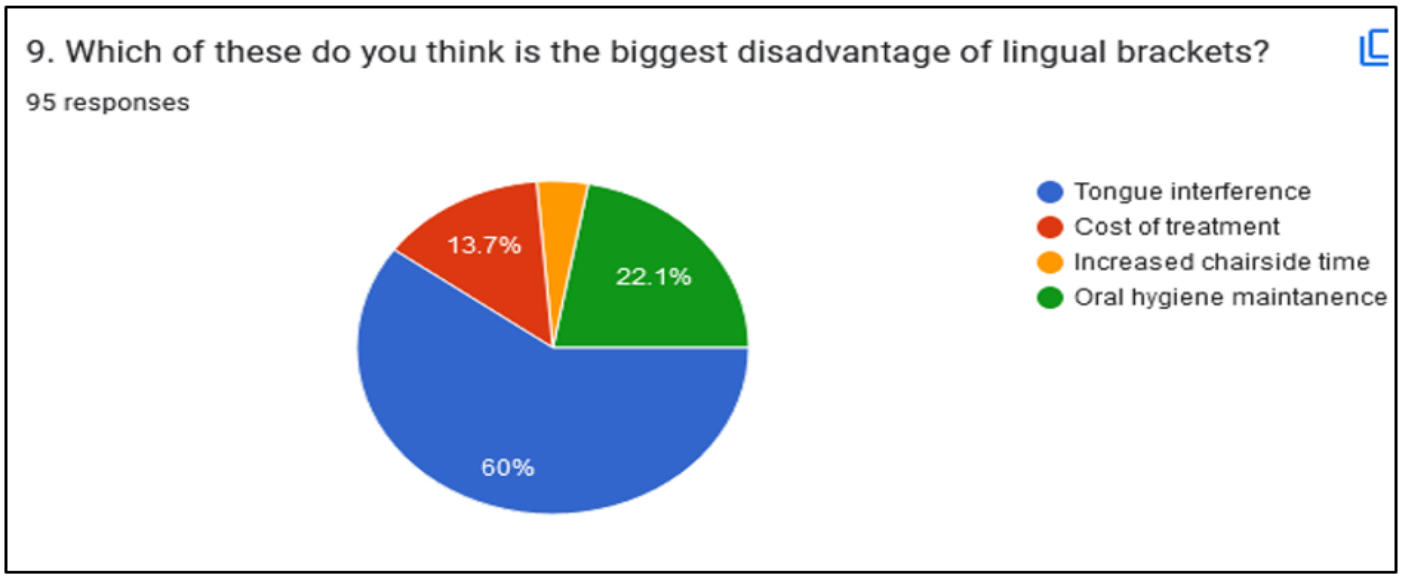

Fig 9: Tongue Interference (60%) followed by Difficult Oral Hygiene Maintanence (32%) were the biggest Disadvantages of Lingual Braces According to the Responses.

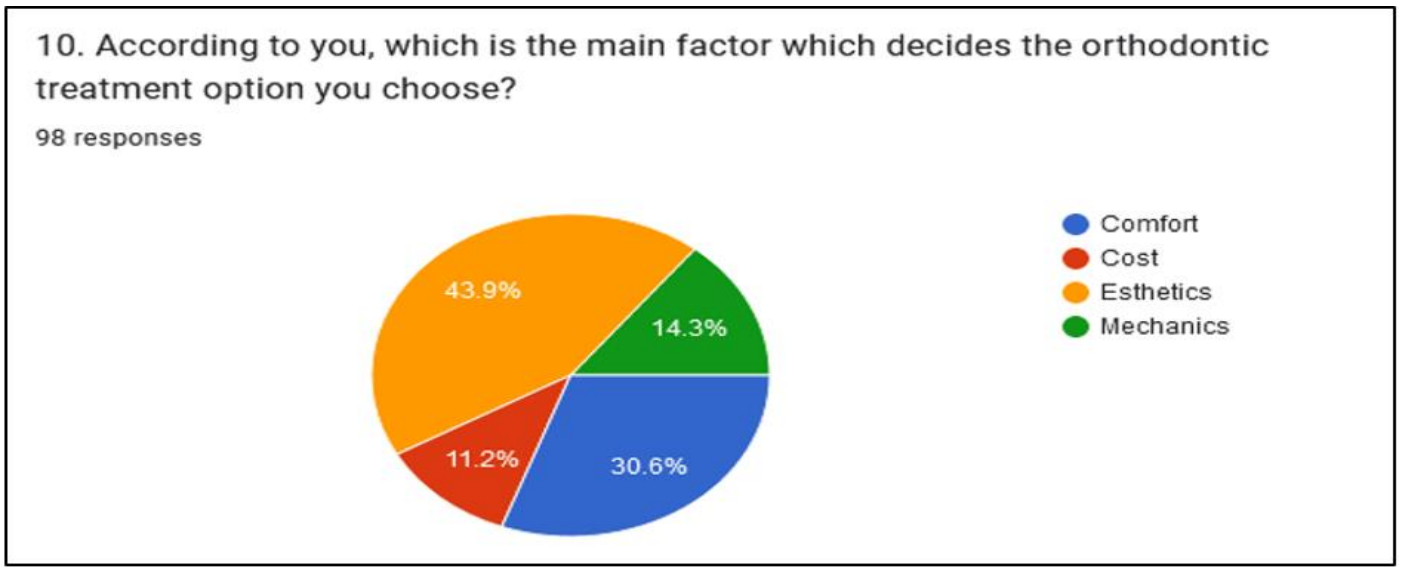

Fig 10: 43.9% had the Opinion that Esthetics is the Main Factor Which Decides the Treatment Option followed by Comfort (30.8%), Mechanics (14.3%) and cost (11.2%)

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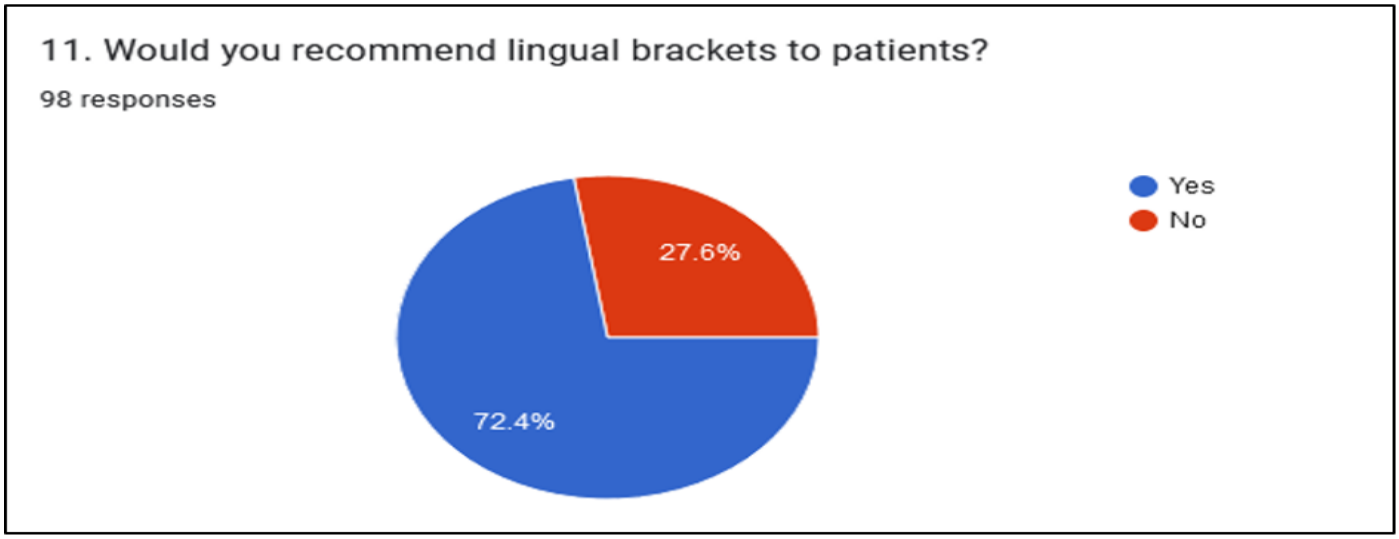

Fig 11: 72.4% Opined that they Would Recommend Lingual Braces Compared to 27.6% who Does not.

IV. DISCUSSION

The journey of lingual orthodontics from a niche technique to a mainstream treatment modality has been propelled by significant technological progress. Early systems were bulky and poorly tolerated by patients due to speech difficulties and tongue irritation [6]. The advent of CAD/CAM (computer-aided design and manufacturing) systems has revolutionized appliance fabrication, allowing for fully customized brackets and archwires tailored to each patient's dental anatomy [7].

Modern systems such as Incognito™, WIN, and Harmony™ utilize digital scans, virtual treatment planning, and robotic wire bending to improve precision and efficiency [8]. These developments have substantially enhanced patient comfort and reduced treatment duration, making lingual appliances more acceptable to both orthodontists and patients.

Biomechanics in lingual orthodontics differs significantly from labial systems. The application of force on the lingual surface results in different force vectors, requiring a modified approach to wire sequencing and torque control [9]. Several studies have demonstrated that lingual orthodontics is as effective as labial treatment in achieving desirable occlusal outcomes [12].

Lingual orthodontics is suitable for a wide range of malocclusions, including Class I and mild to moderate Class II cases. Recent advances have expanded its indications to include complex cases involving extractions, deep bites, and anterior open bites [16].

Proper case selection is critical to success. Factors such as arch width, tongue posture, and the presence of severe crowding or rotations should be considered during treatment planning [17]. Patients must also demonstrate good oral hygiene practices and a willingness to adapt to the learning curve associated with lingual appliance use. Despite its advantages, lingual orthodontics poses several limitations:

- *Speech and Tongue Irritation:*
  Initial lisping and tongue discomfort are common but typically resolve within 2–4 weeks [21].

- *Technical Difficulty:*
  The reduced visibility and access during appliance placement and adjustments require advanced training and precision [22].

- *Cost and Chair Time:*
  Lingual appliances are generally more expensive and time-consuming to fabricate and adjust, which may be a deterrent for some practitioners and patients [23]

Modern orthodontics emphasizes patient-centered care. Studies show that while many patients report higher initial discomfort with lingual appliances, their long-term satisfaction is often higher due to the discrete nature of treatment [24].

Clear communication, proper education on hygiene and speech adaptation strategies, and realistic expectation setting are crucial components of successful lingual treatment [25].

Ongoing research in digital orthodontics, 3D printing, and artificial intelligence holds promise for further refining lingual appliance design and treatment planning. The integration of AI into customized bracket positioning and force system optimization may lead to shorter treatment times and more predictable outcomes [26].

Educational programs and hands-on training courses are also expanding to equip orthodontists with the skills necessary to perform lingual orthodontics competently. As awareness and access improve, the use of lingual systems is expected to grow, particularly in adult populations seeking aesthetic options [27].

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V. CONCLUSION

Study findings point to the fact that some students are not aware of lingual orthodontics. This points to the fact that the knowledge about lingual braces in general population will be very less. The advent of aligners had shifted the focus to more aesthetic , comfort and less visiting solutions and the young generation has found it appealing, according to the survey. Application of lingual orthodontics in suitable cases is required for good results. So an awareness for the same is required.

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