



PREFERENCE OF DIFFERENT ORTHODONTIC APPLIANCES IN PATIENTS REPORTING FOR ORTHODONTIC TREATMENT

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Abstract: Background: There has been an increase in the level of self-consciousness among individuals with regard to aesthetics. This has resulted in an increased demand for orthodontic treatment in recent years. There are several types of orthodontic treatment depending on the type of malocclusion. Each person may opt for a different appliance system to bring about orthodontic correction based on their preferences and esthetic needs. Hence this study was done to assess the patient's preference for the use of orthodontic appliances. **Aim:** This study aims in analysing the preference of the patient to the different orthodontic appliance systems. **Materials and method:** This study included an examination of patients visiting our institution. The clinical data of patients aged 10 years to 50 years was collected from the digital archives of our institution. Data like the preference for undergoing orthodontic treatment, the type of orthodontic appliance system that they are willing to undergo was then computed in excel format. The data was then processed and transferred to SPSS software where statistical analysis was done. **Results:** In the current study, about 53% of the patients preferred to undergo orthodontic treatment. 20.3% of the patients preferred fixed metallic appliances, 22.2% preferred fixed ceramic appliances, 9% preferred removable appliances, 16.6% preferred self-ligating appliances, 19% preferred lingual appliances and 23.8% preferred clear aligners. The use of these appliances by male and female patients did not show any statistically significance for all the appliances that were evaluated as part of the study. **Conclusion:** Within the limits of the study, there was a positive approach to orthodontic treatment and clear aligner was more preferred among the patients.

Keywords: orthodontics; preference; type of orthodontic treatment; aesthetics, new insight.

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INTRODUCTION

Facial appearance and attractive smile have a positive impact on psychosocial well-being as it increases personal confidence and self-esteem (Alansari *et al.*, 2019). Children who are teased about their teeth expressed dissatisfaction with their dental appearance and that eventually increases their desire for orthodontic treatment. The demand for orthodontic treatment has increased in recent years (Rosvall *et al.*, 2009). This is due to the high consciousness of aesthetics by the individuals themselves. The esthetic paradigm shift in orthodontics has shown the urgency of incorporating esthetics into the functional goals of orthodontic treatment, leading to an increase in the demand for more inconspicuous orthodontic appliances and more

acceptable orthodontic treatment (Miguel *et al.*, 2010). There are many modalities for orthodontic treatment that are available for the patient. The appliance choice is a dynamic process that depends on a myriad of factors. Studies have shown that the aesthetic appearance of the orthodontic appliance influences how others judge the intelligence, attractiveness, and the social competence of the patient wearing the appliance. Non-visible tooth-coloured and transparent appliances have been shown to be more attractive than other appliances (Russell, 2005). A tremendous effort goes into developing attractive appliances that are both therapeutically efficient and aesthetically acceptable by the patient. Technological advances over the last decades have enabled the evolution of the orthodontic appliance with reduced visibility and increased acceptability. Plastic and ceramic brackets, lingual brackets, white-coated wires, and transparent aligner trays were introduced to the market to overcome the aesthetic disadvantages of the metal brackets (Krishnan, Pandian and Kumar S, 2015). Long treatment duration and non-aesthetic appearance of metal brackets are the main reasons discouraging adult patients to start orthodontic treatment (Sivamurthy and Sundari, 2016). Therefore, clear aligners, lingual, and ceramic brackets are most commonly used in adult patients (Vikram *et al.*, 2017). A study revealed that a third of Swedish adults who want to fix their malocclusion were unwilling to wear visible orthodontic appliances. A study conducted on adults from the central United States showed that clear aligners and lingual brackets were the most acceptable appliances with 90% acceptance rates, followed by ceramic brackets. On the other hand, the acceptability rates of traditional and self-ligating metal brackets were only at 55% and 58%, respectively. Another study looking into the acceptability,

attractiveness, and value of different orthodontic appliances in the Iranian population found that lingual brackets had the lowest acceptability despite high attractiveness ratings. This may be related to concerns that the appliance may cause oral discomfort. Proper diagnosis (Viswanath *et al.*, 2015) and treatment planning is vital to effective orthodontic treatment (Felicita, 2017b)^[15]. Effective orthodontic treatment depends on several factors such as bonding and bracket failure, type of adhesive (Jain, Kumar and Manjula, 2014), the method of recycling brackets (Kumar *et al.*, 2011), tooth movement (Felicita, 2017a), the biomechanics involved and medications (Felicita, Chandrasekar and Shanthasundari, 2012)

The socioeconomic and cultural factors are also at play. The cost of the appliance and patient willingness to pay also determine the particular choice made by the patient. Previous studies suggest that parents are willing to pay more for their child's orthodontic treatment (Dinesh *et al.*, 2013). The aforementioned factors (attractiveness, acceptability, patient preference, and monetary value attributed to various orthodontic appliances) may vary across different cultures and populations. This will in turn affect the treatment planning for the patient and to be in a position to be ready for the chosen orthodontic appliances by the patient. Previously our team has a rich experience in working on various research projects across multiple disciplines (Ramesh Kumar *et al.*, 2011; Jain, Kumar and Manjula, 2014; Krishnan, Pandian and Kumar S, 2015; Keerthana and Thenmozhi, 2016; Sivamurthy and Sundari, 2016; Felicita, 2017a, 2017b; Kumar, 2017; Sekar *et al.*, 2019; Johnson *et al.*, 2020) Now the growing trend in this area motivated us to pursue this project. This study aims in analysing the willingness of patients for orthodontic treatment and their preference on which specific orthodontic treatment they like to undergo to correct their malocclusion.

MATERIALS AND METHODS

Patients reporting our institution were screened for any malocclusion. The patients included in the study had an age range of 10-50 years of age. The various data such as the preference for orthodontic treatment, type of malocclusion, type of orthodontic appliance system that they are willing to undergo was collected. It was computed in excel format and was processed. The processed data were then analyzed statistically. In the current study, IBM SPSS statistical software was used to analyze the data statistically and compare between different groups.

RESULTS AND DISCUSSION

The study primarily aimed at analyzing the preference of patients for orthodontic treatment. Accordingly in the current study 100 patients were examined, of which only 53 patients were willing for orthodontic treatment (table 1). Of these 53 patients 23 were female patients and 30 were male patients (table 2). About 53% of the patients had a positive preference for orthodontic treatment. Males preference for fixed metallic appliances was more than that of females with a P-value of 0.057 and it was not statistically significant (graph 1, table 3). The preference for fixed ceramic appliances was more preferred by females and its preference was low in males with a P value of 0.196 which was non-significant (graph 2, table 4). The removable appliance was more preferred by females than males with a P-value of 0.373 which was not significant (graph 3, table 5). The self ligated

appliance system was more preferred by males than females with a P value of 0.387 and was not significant (graph 4, table 6). The lingual appliance system was more preferred by females when compared to the preference of males with a P value of 0.349 and this was not significant (graph 5, table 7). The clear aligner system was more preferred by males than females with a P value of 1.0 and this was not significant (graph 6, table 8).

A study found the least visible appliance like a clear aligner tray was more preferred by the patients than the metallic appliances (Rosvall *et al.*, 2009). In another study, the ceramic bracket system was more preferred among Saudi adults where the lingual bracket system was least preferred (N. A. Bindayel, 2018). Similarly, another author was able to find more preference for clear aligners and lingual appliances (Alansari *et al.*, 2019).

In the current study, the patient's preference was more on clear aligner followed by fixed ceramic and fixed metallic appliances, followed by the lingual appliance and self-ligated appliance with the least preference for the removable appliance. Although the current study result is almost similar to the previous studies it has some limitations. The sample size was small involving only one geographic area when compared to previous studies. In young patients, the parent preference was considered as it will be one done and not actually child preference. In some cases, this would end in a positive response where the other was an inverse. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh *et al.*, 2018; Ezhilarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai *et al.*, 2019; Sridharan *et al.*, 2019; Vijayashree Priyadharsini, 2019; Mathew *et al.*, 2020). We hope this study adds to this rich legacy

CONCLUSION

In the current study, we were able to find 53% of the patients had preferred to undergo orthodontic treatment. The clear aligner was preferred most followed by fixed ceramic, fixed metallic system, lingual and self-ligated appliance and the least was a removable appliance.

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AUTHOR CONTRIBUTION

Ajrish George S has contributed to data collection, study design, data analysis, results, tables, and manuscript preparation.

Dr. Sumathi Felicita has contributed to the manuscript preparation, proofreading of the manuscript, and reviewing the manuscript.

Dr. Nashra Kareem has contributed in reviewing and formatting the manuscript.

CONFLICT OF INTEREST: There is no conflict of interest

REFERENCES

- i. Alansari, R.A. *et al.* (2019) 'Adult Perceptions of Different Orthodontic Appliances', *Patient preference and adherence*, 13, pp. 2119–2128.

- ii. Bindayel, N. (2018) 'Awareness of orthodontic modalities and preference of appliance and payment options in Saudi Arabia', *Saudi Journal of Oral Sciences*, p. 98. doi:10.4103/sjos.sjoralsci_5_18. ^{xvii.}
- iii. Bindayel, N.A. (2018) 'Knowledge, demand, and the need of lay people for the orthodontic specialty in comparison to other dental disciplines', *Journal of orthodontic science*, 7, p. 9.
- iv. Dinesh, S.P.S. *et al.* (2013) 'An indigenously designed apparatus for measuring orthodontic force', *Journal of clinical and diagnostic research: JCDR*, 7(11), pp. 2623–2626. ^{xviii.}
- v. Ezhilarasan, D., Apoorva, V.S. and Ashok Vardhan, N. (2019) 'Syzygium cumini extract induced reactive oxygen species-mediated apoptosis in human oral squamous carcinoma cells', *Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, 48(2), pp. 115–121. ^{xix.}
- vi. Felicita, A.S. (2017a) 'Orthodontic management of a dilacerated central incisor and partially impacted canine with unilateral extraction - A case report', *The Saudi dental journal*, 29(4), pp. 185–193. ^{xx.}
- vii. Felicita, A.S. (2017b) 'Quantification of intrusive/retraction force and moment generated during en-masse retraction of maxillary anterior teeth using mini-implants: A conceptual approach', *Dental press journal of orthodontics*, 22(5), pp. 47–55. ^{xxi.}
- viii. Felicita, A.S., Chandrasekar, S. and Shanthasundari, K.K. (2012) 'Determination of craniofacial relation among the subethnic Indian population: a modified approach - (Sagittal relation)', *Indian journal of dental research: official publication of Indian Society for Dental Research*, 23(3), pp. 305–312. ^{xxii.}
- ix. Jain, R.K., Kumar, S.P. and Manjula, W.S. (2014) 'Comparison of intrusion effects on maxillary incisors among mini implant anchorage, j-hook headgear and utility arch', *Journal of clinical and diagnostic research: JCDR*, 8(7), pp. ZC21–4. ^{xxiii.}
- x. Jeremiah, H.G., Bister, D. and Newton, J.T. (2011) 'Social perceptions of adults wearing orthodontic appliances: a cross-sectional study', *European journal of orthodontics*, 33(5), pp. 476–482. ^{xxiv.}
- xi. Johnson, J. *et al.* (2020) 'Computational identification of MiRNA-7110 from pulmonary arterial hypertension (PAH) ESTs: a new microRNA that links diabetes and PAH', *Hypertension research: official journal of the Japanese Society of Hypertension*, 43(4), pp. 360–362. ^{xxv.}
- xii. Kamisetty, S.K. (2015) 'SBS vs Inhouse Recycling Methods-An Invitro Evaluation', *JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH* [Preprint]. doi:10.7860/jcdr/2015/13865.6432. ^{xxvi.}
- xiii. Keerthana, B. and Thenmozhi, M.S. (2016) 'Occurrence of foramen of huschke and its clinical significance', *Research Journal of Pharmacy and Technology*, 9(11), pp. 1835–1836. ^{xxvii.}
- xiv. Krishnan, S., Pandian, S. and Kumar S, A. (2015) 'Effect of bisphosphonates on orthodontic tooth movement-an update', *Journal of clinical and diagnostic research: JCDR*, 9(4), pp. ZE01–5. ^{xxviii.}
- xv. Kumar, K.R.R. *et al.* (2011) 'Depth of resin penetration into enamel with 3 types of enamel conditioning methods: A confocal microscopic study', *American Journal of Orthodontics and Dentofacial Orthopedics*, pp. 479–485. doi:10.1016/j.ajodo.2010.10.022. ^{xxix.}
- xvi. Kumar, S. (2017) 'The emerging role of botulinum toxin in the treatment of orofacial disorders: Literature update', *Asian journal of pharmaceutical and clinical research*, 10(9), p. 21. ^{xxx.}
- Mathew, M.G. *et al.* (2020) 'Evaluation of adherence of Streptococcus mutans, plaque accumulation on zirconia and stainless steel crowns, and surrounding gingival inflammation in primary ...', *Clinical oral investigations* [Preprint]. Available at: <https://link.springer.com/article/10.1007/s00784-020-03204-9>.
- Miguel, J.A.M. *et al.* (2010) 'Factors associated with orthodontic treatment seeking by 12-15-year-old children at a state university-funded clinic', *Journal of orthodontics*, 37(2), pp. 100–106.
- Moshkelgosha, V., Salahi, M. and Rostami, S. (2015) 'Evaluation of Perceived Acceptability, Beauty and Value of Different Orthodontic Brackets', *Journal of Dental Biomaterials*, 2(1), pp. 33–38.
- Pc, J., Marimuthu, T. and Devadoss, P. (2018) 'Prevalence and measurement of anterior loop of the mandibular canal using CBCT: A cross sectional study', *Clinical implant dentistry and related research* [Preprint]. Available at: <https://europepmc.org/article/med/29624863>.
- Ramadurai, N. *et al.* (2019) 'Effectiveness of 2% Articaine as an anesthetic agent in children: randomized controlled trial', *Clinical oral investigations*, 23(9), pp. 3543–3550.
- Ramesh, A. *et al.* (2018) 'Comparative estimation of sulfiredoxin levels between chronic periodontitis and healthy patients - A case-control study', *Journal of periodontology*, 89(10), pp. 1241–1248.
- Ramesh Kumar, K.R. *et al.* (2011) 'Depth of resin penetration into enamel with 3 types of enamel conditioning methods: a confocal microscopic study', *American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 140(4), pp. 479–485.
- Rosvall, M.D. *et al.* (2009) 'Attractiveness, acceptability, and value of orthodontic appliances', *American journal of orthodontics and dentofacial orthopedics: official publication of the American Association of Orthodontists, its constituent societies, and the American Board of Orthodontics*, 135(3), pp. 276.e1–12; discussion 276–7.
- Rubika, J., Sumathi Felicita, A. and Sivambiga, V. (2015) 'Gonial Angle as an Indicator for the Prediction of Growth Pattern', *World Journal of Dentistry*, pp. 161–163. doi:10.5005/jp-journals-10015-1334.
- Russell, J.S. (2005) 'Current Products and Practice', *Journal of Orthodontics*, pp. 146–163. doi:10.1179/146531205225021024.
- Samantha, C. *et al.* (2017) 'Comparative Evaluation of Two Bis-GMA Based Orthodontic Bonding Adhesives - A Randomized Clinical Trial', *Journal of clinical and diagnostic research: JCDR*, 11(4), pp. ZC40–ZC44.
- Sekar, D. *et al.* (2019) 'Methylation-dependent circulating microRNA 510 in preeclampsia patients', *Hypertension research: official journal of the Japanese Society of Hypertension*, 42(10), pp. 1647–1648.
- Sivamurthy, G. and Sundari, S. (2016) 'Stress distribution patterns at mini-implant site during retraction and intrusion—a three-dimensional finite element study', *Progress in orthodontics*, 17(1), pp. 1–11.
- Sridharan, G. *et al.* (2019) 'Evaluation of salivary

metabolomics in oral leukoplakia and oral squamous cell carcinoma', *Journal of oral pathology & medicine: official publication of the International Association of Oral Pathologists and the American Academy of Oral Pathology*, 48(4), pp. 299–306.

xxxii. Vijayashree Priyadharsini, J. (2019) 'In silico validation of the non-antibiotic drugs acetaminophen and ibuprofen as antibacterial agents against red complex pathogens', *Journal of periodontology*, 90(12), pp. 1441–1448.

xxxiii. Vikram, N.R. *et al.* (2017) 'Ball Headed Mini Implant',

Journal of clinical and diagnostic research: JCDR, 11(1), pp. ZL02–ZL03.

Viswanath, A. *et al.* (2015) 'Obstructive sleep apnea: awakening the hidden truth', *Nigerian journal of clinical practice*, 18(1), pp. 1–7.

Website (no date a). Available at: sumathifelicita@saveetha.com (Accessed: 23 June 2020).

Website (no date b). Available at: nashrak.sdc@saveetha.com (Accessed: 23 June 2020).

TABLES AND GRAPHS

Table 1. showing the preference of the patients to orthodontic treatment

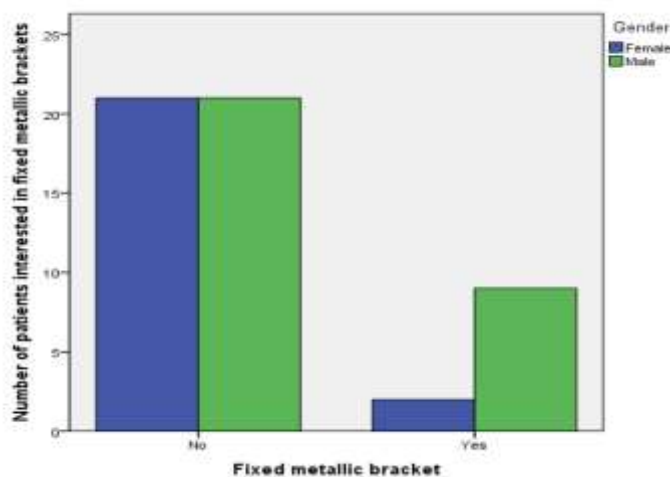
		Preference for orthodontic treatment
N	Yes	53
	No	47
Total		100

Table 2. showing gender distribution among the patient willing for orthodontic treatment

		Frequency	Percent
Valid	Female	23	43.4
	Male	30	56.6
	Total	53	100.0

Table 3. showing the association between fixed metallic bracket and Gender among patients willing for orthodontic treatment

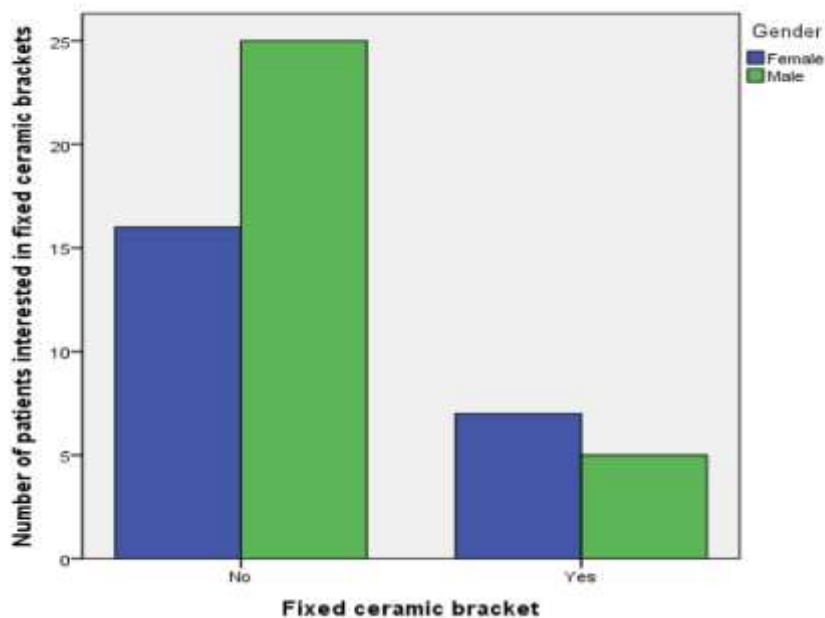
			Gender		Total	Exact Sig. (1-sided)
			Female	Male		
Fixed metallic bracket	No	Count	21	21	42	.057
		% within the Fixed metallic bracket	50.0%	50.0%	100.0%	
		% within Gender	91.3%	70.0%	79.2%	
	Yes	Count	2	9	11	
		% within the Fixed metallic bracket	18.2%	81.8%	100.0%	
		% within Gender	8.7%	30.0%	20.8%	
Total	Count		23	30	53	
	% within the Fixed metallic bracket		43.4%	56.6%	100.0%	
	% within Gender		100.0%	100.0%	100.0%	



Graph 1. showing the association between fixed metallic bracket and Gender. The X-axis shows a preference for a fixed metallic appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value: 0.057- significant

Table 4. showing the association between fixed ceramic bracket and gender

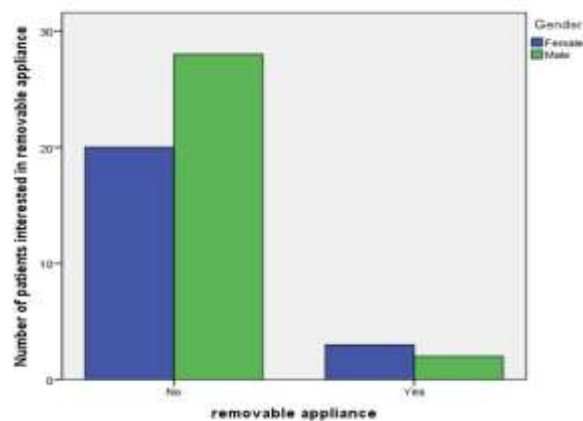
			Gender		Total	Exact Sig. (1-sided)
			Female	Male		
Fixed ceramic bracket	No	Count	16	25	41	
		% within the Fixed ceramic bracket	39.0%	61.0%	100.0%	.196
		% within Gender	69.6%	83.3%	77.4%	
	Yes	Count	7	5	12	
		% within the Fixed ceramic bracket	58.3%	41.7%	100.0%	
		% within Gender	30.4%	16.7%	22.6%	
Total		Count	23	30	53	
		% within the Fixed ceramic bracket	43.4%	56.6%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	



Graph 2. showing the association between fixed ceramic bracket and gender. The X-axis shows a preference for a fixed ceramic appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value 0.196 - non-significant

Table 5. showing the association between removable appliance and gender

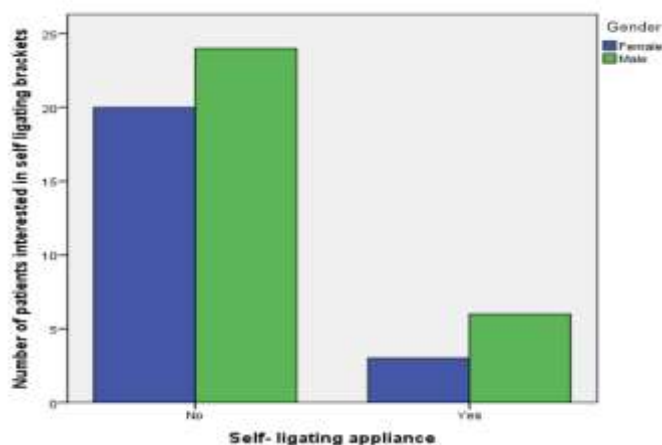
			Gender		Total	Exact Sig. (1-sided)
			Female	Male		
removable appliance	No	Count	20	28	48	
		% within the removable appliance	41.7%	58.3%	100.0%	.373
		% within Gender	87.0%	93.3%	90.6%	
	Yes	Count	3	2	5	
		% within the removable appliance	60.0%	40.0%	100.0%	
		% within Gender	13.0%	6.7%	9.4%	
Total		Count	23	30	53	
		% within the removable appliance	43.4%	56.6%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	



Graph 3. showing the association between removable appliance and gender. The X-axis shows a preference for a removable appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value: 0.373 - non-significant

Table 6. showing the association between self ligated appliance and gender

			Gender		Total	Exact Sig. (1-sided)
			Female	Male		
Self- ligated appliance	No	Count	20	24	44	
		% within Self- ligated appliance	45.5%	54.5%	100.0%	.387
		% within Gender	87.0%	80.0%	83.0%	
	Yes	Count	3	6	9	
		% within Self- ligated appliance	33.3%	66.7%	100.0%	
		% within Gender	13.0%	20.0%	17.0%	
Total		Count	23	30	53	
		% within Self- ligated appliance	43.4%	56.6%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	

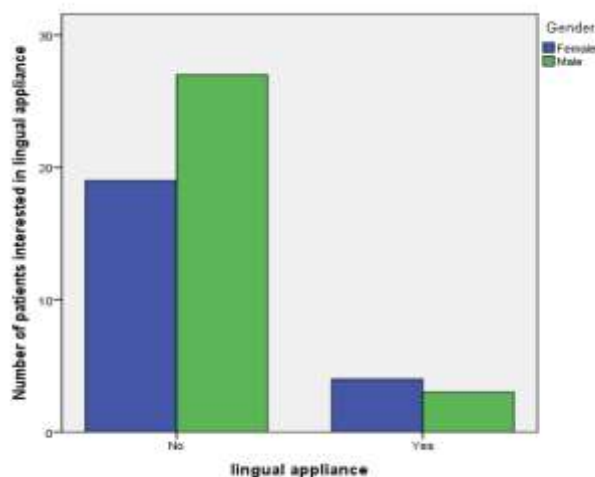


Graph 4. showing the association between self ligated appliance and gender. The X-axis shows a preference for a self ligated appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value: 0.387 - non-significant

Table 7. showing the association between lingual appliance and gender

			Gender		Total	Exact Sig. (1-sided)
			Female	Male		
lingual appliance	No	Count	19	27	46	
		% within the lingual appliance	41.3%	58.7%	100.0%	.349
		% within Gender	82.6%	90.0%	86.8%	
	Yes	Count	4	3	7	

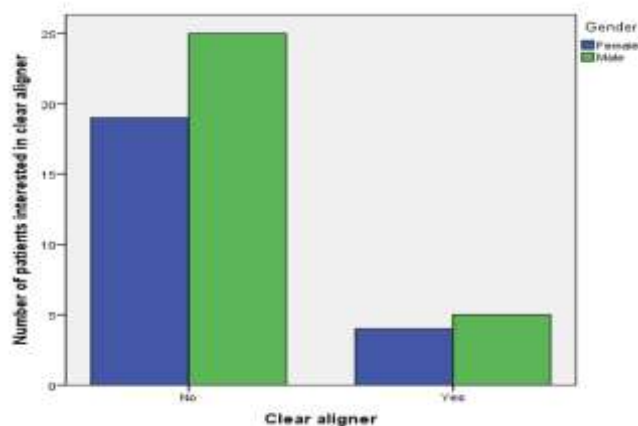
		% within the lingual appliance	57.1%	42.9%	100.0%	
		% within Gender	17.4%	10.0%	13.2%	
Total		Count	23	30	53	
		% within the lingual appliance	43.4%	56.6%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	



Graph 5. showing the association between lingual appliance and gender. The X-axis shows a preference for the lingual appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value: 0.349 - non-significant

Table 8. showing the association between clear aligner and gender

			Gender		Total	Exact Sig. (2-sided)
			Female	Male		
Clear aligner	No	Count	19	25	44	
		% within Clear aligner	43.2%	56.8%	100.0%	
		% within Gender	82.6%	83.3%	83.0%	1.000
	Yes	Count	4	5	9	
		% within Clear aligner	44.4%	55.6%	100.0%	
		% within Gender	17.4%	16.7%	17.0%	
Total		Count	23	30	53	
		% within Clear aligner	43.4%	56.6%	100.0%	
		% within Gender	100.0%	100.0%	100.0%	



Graph 6. showing the association between clear aligner and gender. The X-axis shows a preference for a clear aligner appliance system and the Y-axis shows the number of persons in each gender. The blue bar denotes female and the green bar denotes males. Chi-square test p-value: 1.000 - non-significant