



# The Influence of the Demographic Factors of Nigerian Dental Practitioners on their Perception of Accelerated Orthodontics

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## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## Article Information

DOI: 10.9734/AJMAH/2024/v22i2982

## Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/112566>

Original Research Article

Received: 21/11/2023

Accepted: 25/01/2024

Published: 06/02/2024

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## ABSTRACT

**Background:** Although there are many studies on the reviving subject of accelerated orthodontics, there is paucity of information on the factors that could influence a dental practitioner's perception of the concept.

**Aim:** To investigate the influence of the demographic factors of some Nigerian dental practitioners on their perception of accelerated orthodontics.

**Materials and Methods:** Electronic and physical methods of surveying the Nigerian dental practitioners were carried out between January and June 2023. The contents of the questionnaire involving their perception of accelerated orthodontics were analysed for associations with the participants' demographics, using the IBM SPSS version 25. Descriptive statistics, the ANOVA and independent t-test were used with the significance level set at  $P < .05$ .

**Results:** No statistically significant associations were found between the participants' demographics and their perception of accelerated orthodontics ( $P > .05$ ), except for age group of 40-49 that revealed significant association with the local use of some medications intraorally ( $P < .05$ ).

**Conclusion/Recommendation:** Generally, the participants' demographics did not have significant influence on their perception of accelerated orthodontics, and further related studies are advocated.

*Keywords: Demographics; Nigerian dental practitioners; perception; accelerated orthodontics.*

## 1. INTRODUCTION

Perception has been defined in several ways. It is the brain's interpretation of sensory information, and can become a person's reality because it has a potent influence on how we look at reality [1]. In other words, perception is the process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment [1]. Perception can be influenced by many factors, such as the characteristics of the perceiver, the target, the situation and attitude of the individual [1,2].

Orthodontic treatment signifies a transformative journey for individuals seeking not only enhanced oral health but also a boost in aesthetics and self-confidence. Nonetheless, the protracted timeline associated with conventional orthodontic care has been a persistent concern for both patients and practitioners [3]. Prolonged orthodontic treatment may also be associated with longer treatment time and various adverse effects such as increased decalcification, root resorption, dental cavities, gingival irritation, temporomandibular disorders, etc [3]. It has long been a goal of orthodontics to accelerate tooth movement since it may have several advantages, including a shorter treatment time, better post-treatment stability, and fewer negative effects from prolonged therapy [3]. There are several ways to perform rapid orthodontics, including invasive, minimally invasive, and non-invasive methods. It has been

successfully demonstrated that these techniques can cut treatment times by up to 70% [4].

Relatively, many authors have written on accelerated orthodontics [5-19], but there are not many reports on the factors that could influence the perception of dental practitioners about accelerated orthodontics [20-24]. As stated earlier, several factors could influence the perception of an individual about anything positively or otherwise such as the attitude of the person, characteristics of the perceiver, etc [1,2]. Concerning accelerated orthodontics, there is still need to further investigate such factors that could influence either the practitioners or the patients. Therefore, this study aimed at assessing the influence of some demographics of some Nigerian dental practitioners on their perception of this growing important aspect of orthodontics.

The hypotheses were that: there would not be any statistically significant influence or impact of the age of the dental practitioners on their perception of accelerated orthodontics; that there would not be any statistically significant influence or impact of the gender of the dental practitioners on their perception of accelerated orthodontics; and that there would not be any statistically significant influence or impact of the years of practice of dentistry by the dental practitioners on their perception of accelerated orthodontics.

## 2. MATERIALS AND METHODS

### 2.1 Study Design

A national self-administered questionnaire-based cross-sectional survey of Nigerian dentists was carried out, which targeted the teaching hospitals across the nation, as well as other hospitals where dentists work.

### 2.2 Sampling / Data Collection

This national survey was carried out using Google forms through the Nigerian Dental Association social platform and other different social platforms of Nigerian dentists such as the Consultants' and Resident doctors' platforms. According to the Nigerian Dental Association (NDA), the estimated number of dentists registered in Nigeria is currently about 4000 to 4500. However, it must be noted that many of these dentists have left the country for greener pasture overseas. Therefore, it is very difficult to know the exact number of them practising presently in the country because the medical and dental practitioners are leaving the country on daily basis due to the poor practising environment and poor remunerations in Nigeria. While ensuring that no dentist filled the questionnaire more than once, some of the teaching hospitals were visited with the questionnaire physically. In all, one hundred and twenty five (125) dentists filled and returned the questionnaire. The aspect of the questionnaire that is reported here is attached as an Appendix.

### 2.3 Inclusion and Exclusion Criteria

1. Only dentists with temporary or permanent registrations with the Nigerian Medical and Dental Council of Nigeria (MDCN) who are currently practising dentistry in Nigeria were surveyed.
2. Those that have left the country were not involved in this study.
3. A few elderly dentists who are retired from active practice were left out of this study.

### 2.4 Null Hypotheses

The following null hypotheses were generated and tested:

**Ho1** –that there would not be any statistically significant influence or impact of the age of the dental practitioners on their perception of accelerated orthodontics

**Ho2** – that there would not be any statistically significant influence or impact of the gender of the dental practitioners on their perception of accelerated orthodontics

**Ho3** – that there would not be any statistically significant influence or impact of the years of practice of dentistry by the dental practitioners on their perception of accelerated orthodontics

### 2.5 Data Analysis

Using the SPSS version 25, the whole data was analysed descriptively, as well as using student's t-test statistics and ANOVA for the hypotheses. The significance level was set at  $P < .05$ .

## 3. RESULTS

Table 1 shows the ANOVA analysis of the age of the participants against their responses to the questions 1 and 2 with statistically significant value found for the use of medications locally intraoral ( $P = .044$ ).

The independent t-test analysis of the impact of age of the participants against questions 1 and 2 is provided in Table 2, indicating no statistically significant impact or influence ( $P > .05$ ).

Table 3 has the ANOVA statistics of the years of practice of dentistry by the participants with the same questions 1 and 2. Again, no statistically significant impact or influence was found ( $P > .05$ ).

## 4. DISCUSSION

This Nigerian study has revealed that the assessed demographic factors of the Nigerian dental practitioners generally did not significantly influence their perception of accelerated orthodontics, except for the significant influence or impact of age in relation to the use of some local medications intraorally. Therefore, the null hypotheses of this study have been largely accepted.

In a similar study by Al-Attar et al [7], it was reported that 42.4% of the orthodontists preferred to use accelerated orthodontics for 20%-30% in treatment time, followed by 23.7% for 30%-40% reduction in treatment time. However, they did not investigate the impact of any of the demographics on their perception of accelerated orthodontics, which the present Nigerian study has done.

**Table 1. The ANOVA statistics of the influence of the age of the participants on their perception of accelerated orthodontics**

	Age group										F	P-value
	20-29		30-39		40-49		50-59		60-69			
	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)	Mean	(SD)		
<b>Q1</b>												
Use of medication locally intraoral	2.90	(1.26)	2.92	(1.50)	3.40	(1.50)	2.70	(1.42)	2.50	(2.12)	0.79	.531
Administration of biologic sub	3.29	(1.42)	3.03	(1.35)	3.53	(1.50)	2.70	(1.42)	2.50	(2.12)	1.06	.378
Direct light electric	3.00	(1.67)	3.10	(1.28)	3.60	(1.40)	2.70	(1.42)	2.50	(2.12)	1.22	.305
LLLT	3.33	(1.59)	3.10	(1.33)	3.53	(1.41)	2.90	(1.45)	2.50	(2.12)	0.78	.540
Resonance vibration	3.29	(1.65)	3.03	(1.38)	3.57	(1.55)	2.90	(1.45)	2.50	(2.12)	0.88	.474
Corticotomies	3.38	(1.60)	3.31	(1.43)	3.93	(1.26)	2.90	(1.45)	2.50	(2.12)	1.61	.177
Piezocision	3.43	(1.47)	3.31	(1.39)	3.83	(1.18)	2.90	(1.45)	2.50	(2.12)	1.38	.245
<b>Q2</b>												
Use of some medication locally intraoral	2.71	(1.59)	2.19	(1.46)	3.17	(1.70)	2.30	(1.89)	1.00	(.00)	2.53	.044*
Administration of biological substance	2.95	(1.43)	2.35	(1.40)	3.17	(1.56)	2.30	(1.89)	1.50	(.71)	2.18	.076
Direct light electric current	3.14	(1.49)	2.63	(1.33)	3.23	(1.59)	2.30	(1.83)	2.00	(1.41)	1.58	.184
Low level laser therapy	3.43	(1.54)	2.85	(1.29)	3.53	(1.59)	2.60	(1.84)	2.00	(1.41)	1.94	.108
Resonance vibration	2.90	(1.30)	2.79	(1.29)	3.37	(1.54)	2.80	(1.87)	2.00	(1.41)	1.11	.355
Corticotomies	3.05	(1.36)	2.95	(1.53)	3.57	(1.43)	2.80	(1.81)	2.00	(1.41)	1.27	.295
Piezocision	3.33	(1.15)	2.97	(1.49)	3.50	(1.53)	2.80	(1.87)	2.00	(1.41)	1.16	.329

Q9:1=0-10%, 5=&gt;40%; \*statistically significant

Q10:1=increase in fee by 10%, 5=increase in fee by 50%,

Q1: How much reduction in treatment time would you consider to undergo/give your child treatment or use any acceleration technique to treat patient?

Q2: If you were to use any of the acceleration techniques, indicate your preference for percentage increase in fee for a percentage reduction in treatment time

**Table 2. The independent t-test analysis of the influence of the gender of the participants on their perception of accelerated orthodontics**

	Gender				T-Test	P-value
	Male		Female			
	Mean	(SD)	Mean	(SD)		
<b>Q1</b>						
Use of medication locally intraoral	2.94	(1.45)	3.09	(1.47)	.314	.576
Administration of biologic sub	3.10	(1.35)	3.23	(1.50)	.262	.610
Direct light electric	3.07	(1.42)	3.27	(1.39)	.596	.442
LLLT	3.22	(1.38)	3.21	(1.45)	.000	.990
Resonance vibration	3.14	(1.44)	3.23	(1.54)	.107	.744
Corticotomies	3.35	(1.34)	3.52	(1.57)	.427	.515
Piezocision	3.36	(1.26)	3.46	(1.51)	.169	.682
<b>Q2</b>						
Use of some medication locally intraoral	2.55	(1.62)	2.45	(1.61)	.129	0.720
Administration of biological substance	2.65	(1.47)	2.61	(1.57)	.027	0.869
Direct light electric current	2.75	(1.57)	2.91	(1.38)	.346	0.558
Low level laser therapy	3.12	(1.50)	3.04	(1.46)	.090	0.764
Resonance vibration	2.87	(1.40)	3.02	(1.43)	.339	0.562
Corticotomies	3.06	(1.47)	3.13	(1.56)	.061	0.806
Piezocision	3.10	(1.44)	3.16	(1.56)	.049	0.826

Q9: 1=0-10%, 5=>40%

Q10: 1=increase in fee by 10%, 5= increase in fee by 50%,

Q1: How much reduction in treatment time would you consider to undergo/give your child treatment or use any acceleration technique to treat patient?

Q2: If you were to use any of the acceleration techniques, indicate your preference for percentage increase in fee for a percentage reduction in treatment time

This present Nigerian study revealed significant relationship between the 40-49 age group and the use of some medications locally intraorally. This could be attributed to the fact that this age group are mainly of the senior registrars and the relatively young consultants who have been involved recently or in the immediate past in professional examinations and have been reading and studying hard for their examinations. Therefore, such category of dentists is more likely to have been influenced by their knowledge than those who are younger in the profession such as internship dentists and junior registrars who might not know much about accelerated orthodontics because it is currently not being taught in our undergraduate dental curricula in Nigerian Dental Schools. Meanwhile, the much older consultants and the older general dental practitioners are less likely to know about this relatively new treatment concept in orthodontics because they were not taught about it. It is noteworthy that a recent Nigerian related report [24] revealed some knowledge-deficit about these participants on accelerated orthodontics, despite their general positive perception and such knowledge deficit could possibly play some role in their perception.

In another related study by Uribe et al [20], approximately 70% of the orthodontists who replied to the survey were interested in adopting additional clinical procedures to reduce treatment time. No significant association was found between practice characteristics and interest in adopting clinical procedures to reduce treatment time. Most orthodontists are willing to pay only up to 20% of their treatment fee to companies for the use of technologies that reduce treatment time, and most patients and parents were willing to pay only up to a 20% increase in fees for these approaches. Orthodontists thought that increases in the rate of tooth movement could pose a problem for fee collection. According to Kim [8], the number of practitioners who had been involved with at least one corticotomy per annum was low for orthodontists (12%) and periodontists (18%). The majority of those surveyed believed that more research was required on corticotomy-facilitated orthodontic tooth movement (OTM) and would not recommend the procedure to patients without greater investigation of the technique. More than half of the sampled orthodontists indicated that they would never recommend corticotomy-facilitated orthodontics to their patients. The

minority who were willing to recommend the procedure would limit involvement to adult patients, the management of ankylosed teeth, impacted canines and patients susceptible to root resorption. However, their study did not investigate the role of the practitioners' characteristics on the findings.

According to Abid et al. [7], although most of the orthodontists aimed to decrease orthodontic treatment duration by using biomechanical and surgical approaches, gender and clinical experience to a certain extent affected the participants' choice during orthodontic treatment. Their study revealed that gender, degree acquired and practice duration had significant relation with the orthodontists being able to reduce treatment time, especially their duration of practice (years of practice of the profession) was found very significant in their ability to do so through the use of different methods of

accelerated orthodontics. Interestingly, recently qualified orthodontists used contemporary treatment modalities while senior clinicians used traditional techniques. Overall, both males and females were consistent and agreed in most of the questions with minimal variations in the percentages. However, what stands out from the present study is that higher percentages of males performed the surgical approach and used treatment mechanics to decrease treatment time than females which included the use of MBT and self-ligating brackets, avoiding aesthetic brackets, using heat activated NiTi, sliding mechanics and one-step retraction. The higher the educational level responders used mechanical approaches to decrease treatment time, including using more auxiliaries, MBT conventional and self-ligating bracket, NiTi wires and sliding mechanics. The current Nigerian study did not investigate the impact of the degree acquired by the participants.

**Table 3. The ANOVA statistics of the influence of the participants' year of practice on their perception of accelerated orthodontics**

	Year of practice						F	P-value
	0-5		6-10		>10			
	Mean	(SD)	Mean	(SD)	Mean	(SD)		
<b>Q1</b>								
Use of medication locally intraoral	3.08	(1.50)	2.80	(1.39)	3.16	(1.49)	0.75	0.477
Administration of biologic substance	3.25	(1.44)	2.98	(1.25)	3.27	(1.56)	0.56	0.571
Direct light electric LLLT	3.19	(1.60)	3.02	(1.27)	3.27	(1.39)	0.35	0.708
Resonance vibration	3.36	(1.55)	3.05	(1.29)	3.27	(1.40)	0.54	0.584
Corticotomies	3.33	(1.59)	3.05	(1.43)	3.20	(1.46)	0.37	0.687
Piezocision	3.47	(1.56)	3.39	(1.42)	3.42	(1.41)	0.04	0.966
	3.50	(1.48)	3.32	(1.29)	3.42	(1.39)	0.18	0.840
<b>Q2</b>								
Use of some medication locally intraoral	2.56	(1.52)	2.48	(1.55)	2.49	(1.77)	0.03	0.974
Administration of biological substance	2.83	(1.40)	2.52	(1.50)	2.58	(1.62)	0.46	0.633
Direct light electric current	2.86	(1.46)	2.77	(1.46)	2.84	(1.55)	0.04	0.960
Low level laser therapy	3.25	(1.57)	3.00	(1.36)	3.02	(1.53)	0.33	0.717
Resonance vibration	2.97	(1.34)	2.86	(1.49)	2.98	(1.42)	0.09	0.916
Corticotomes	3.06	(1.45)	3.14	(1.56)	3.07	(1.53)	0.04	0.966
Piezocision	3.06	(1.37)	3.14	(1.53)	3.18	(1.56)	0.07	0.935

Q9: 1=0-10%, 5=>40%

Q10: 1=increase in fee by 10%, 5= increase in fee by 50%,

Q1: How much reduction in treatment time would you consider to undergo/give your child treatment or use any acceleration technique to treat patient?

Q2: If you were to use any of the acceleration techniques, indicate your preference for percentage increase in fee for a percentage reduction in treatment time

The observed general lack of significant impact of the studied demographics of the Nigerian dentists on perception of accelerated orthodontics could be due to their relative knowledge-deficit of these treatment options, which has been mentioned earlier [24]. It is important to note also that the concept of accelerated orthodontics is relatively gaining increasingly global attention, which was not so for a long time. This suggests a relative poor awareness of this new treatment concept in Nigeria. Both male and female dentists went through the same dental curricula and the dental undergraduate curricula as indicated earlier also did not incorporate lectures on accelerated orthodontics over the years. Therefore, this could have affected the findings in respect to the duration of practice because most of the Nigerian dentists studied dentistry in Nigeria, except a very few elderly ones who studied abroad and are now retired from active practice, who did not participate in this study.

#### 4.1 The Strengths and Limitations of this Study

This study is the first from Africa that investigated the impact or influence of Nigerian dental practitioners' demographics on their perception of accelerated orthodontics. In addition, the study sample has a fairly good representation of Nigerian dental practitioners because the dental practitioners from different parts of the country were involved in the survey. However, stratified random sampling method could be a better option. While this study has provided a useful information for further research, it is important to still be careful in generalizing the findings from this investigation since a larger sample size would have been preferred.

#### 5. CONCLUSION

Generally, the participants' demographics did not have significant influence on their perception of accelerated orthodontics, except only in relation to age and the use of some intraoral medications locally.

#### 6. RECOMMENDATION

While considering larger sample sizes, future studies are encouraged to investigate this further in African environment and other parts of the world with different environmental factors to ascertain the potential influence of such demographics in the perception and use of accelerated orthodontics in the profession.

#### CONSENT

As per international standards or university standards, Participants' gave their consent before participating in the study.

#### ETHICAL APPROVAL

It is not applicable.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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**APPENDIX**

**QUESTIONNAIRE ON ACCELERATED ORTHODONTICS**

Please, we need your help to respond to the questions below. This is purely for academic purposes and your responses will be confidentially handled. Please, provide honest responses as much as possible. Thank you.

**SECTION A** (Please, tick your choice out of any of the options)

(1) Age ----- (2) Gender: Male / Female (3) Duration of Practice -----

**SECTION B**

(4) Are you satisfied with the duration of active orthodontic treatment for patients?

(a) very satisfied (b) somewhat satisfied (c) neutral (d) somewhat dissatisfied (e) very dissatisfied

(5) How much reduction in treatment time would you consider to undergo/give your child treatment or use any acceleration technique to treat patient? Please, tick of the options below:

Technique	0% -10%	10%-20%	20%-30%	30%-40%	Greater than 40%
Use of some medications injected locally intraoral:					
Administration of Biological Substance and Hormones (local or systemic):					
Direct Light Electric Current-electric current application of about 20 µA for 5 h daily:					
Low Level Laser Therapy (LLLT):					
Resonance Vibration:					
Corticotomies:					
Piezocision:					

(6) If you were to use any of the acceleration techniques, indicate your preference for percentage increase in fee for a percentage reduction in treatment time

Reduction in time (%)	Increase in fees by 10%	Increase in fees by 20%	Increase in fees by 30%	Increase in fees by 40%	Increase in fees by 50%
Use of some medications injected locally intraoral:					
Administration of Biological Substance and Hormones (local or systemic):					
Direct Light Electric Current-electric current application of about 20 µA for 5 h daily:					

<b>Reduction in time (%)</b>	<b>Increase in fees by 10%</b>	<b>Increase in fees by 20%</b>	<b>Increase in fees by 30%</b>	<b>Increase in fees by 40%</b>	<b>Increase in fees by 50%</b>
Low Level Laser Therapy (LLL):					
Resonance Vibration:					
Corticotomies:					
Piezocision:					

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