WEST AFRICAN JOURNAL OF ORTHODONTICS

ISSN 2315-9502

VOLUME 12, NUMBER 2

December 2023

OFFICIAL PUBLICATION OF ORTHODONTIC ASSOCIATIONS IN THE WEST AFRICAN SUB-REGION

"DENTISTRY'S FIRST SPECIALTY JOURNAL IN SUB SAHARAN AFRICA"

West African Journal of Orthodontics

Website: www.nao-ng.com

West African Journal of Orthodontics

Contents

Editorial

Virtual Reality [VR] in Medical Education

The setback experienced in medical education during COVID-19 era revealed other alternative teaching and assessment models including digital technologies such as Virtual Reality [VR] models which have become more attractive and gained significant momentum during the post COVID-19 period.
Virtual reality [VR] is an emerging technology that delivers a computer-generated simulation of an environment that may be interacted with in an apparent real-time manner. The technology has been employed in a variety of industries like medical and dental training, engineering, and entertainment, but holds a significant educational potential including orthodontics. The concept of Virtual Reality [VR] has enabled educators to develop a wide range of learning experiences, from virtual field trips to interesting complex simulations, that may be utilized to engage students and help them to learn. It gives teachers the opportunity to make their students fall in love with the process of learning.

VR in education allows learners to interact with real life scenarios without leaving the virtual classroom. One advantage of implementing VR in medical and dental education is that it provides a more immersive and engaging learning experience. VR can take learners to difficult-to-access places like historical monuments, outer space or even within the human body. Students can gain better understanding of subject of interest and engage with the learning material when presented with such opportunities. It is known that virtual reality learners are 4 times more focused than e-learners and traditional classroom learners. However, It is important to distinguish between Virtual Reality [VR] and Artificial Intelligence [AI] which are two technologies with different purposes and applications. VR focuses on creating a virtual environment, while AI develops intelligent machines. VR is virtually used for interactive immersive experiences, while AI is used for automation, analysis and decision making. The VR relies on hardware and software to create an immersive experience, while AI relies on algorithms and data to enable machine learning and intelligence. While both technologies are distinct, they can be combined to create innovative applications, such as AI powered virtual assistants in VR environment. Overall, the relevant literature suggests that the use of VR has great potential to enhance learning outcomes. It is envisaged that this will revolutionize the way we learn and teach in the nearest future.

Olayinka Donald Otuyemi
Editor-in-Chief, WAJO

References

1. Marougkas A, Troussas C, Krouska A, Sgouropoulou C. Virtual reality in education: A review of learning theories, approaches and methodologies for the last decade. Electronics 2023, 12(13), 2832. doi.org/10.3390/electronics 12132832.
2. Gao Y, Chang C, Yu X, Pang P, Xiong N, Huang C. VR-based volumetric medical segmentation and visualization system with natural human interaction. Virtual Real. 2022; 26, 415-424.

Unintended Errors in Orthodontic Clinical Practice: A Cross-sectional Survey

Aghimien OA[a], Adeyemi TE[b]

Abstract

Background: The use of fixed orthodontic appliance is usually accompanied with complex mechanotherapy involving several steps. The complex processes involve band placement, bonding of orthodontic brackets, archwire selection and ligation amongst others. This study aims to estimate the incidence and the causes of unintended errors during fixed orthodontic treatment among orthodontic practitioners.

Methods: This study was an electronic questionnaire-based survey conducted among 53 orthodontics practitioners. Data was collected over a 7-month period (September, 2022 to March, 2023). Simple descriptive analysis of the data was done on Statistical Package for the Social Sciences (SPSS) version 22.

Results: Wrong bracket positioning 53 (100%), missed bracket ligation 51 (96.2%) and non-placement of bend-backs (when indicated) 51 (96.2%) were the errors mostly reported by the respondents while the least reported errors were: placement of bend-back when not indicated 23 (43.4%), unintentional use of wrong archwire materials 28 (52.8%) and swapping archwires between the arches, 28 (52.8%). Majority of the participants were of the opinion that stressful working environment (67.9%), inadequate materials (52.8%) and shortage of manpower (35.8%) were responsible for the mistakes commonly encountered. Majority of the participants also agreed that orthodontic checklist would help to reduce the incidence [30 (56.6%)] of the unintended errors and were willing to apply [35(66.0)] the orthodontic checklist in their practices.

Conclusion: Wrong bracket position was the most occurring error among the participants and majority of the participants agreed that orthodontic checklist would reduce the incidence of the errors. Therefore, there is the need to develop a workable orthodontic checklist.

Keywords: Clinical practice, Orthodontics, Unintended errors

Authors' affiliations

[a]Orthodontic Unit, Department of Preventive Dentistry, Dental Centre. Edo Specialist Hospital, Benin City. Edo State. Nigeria.

[b]Department of Child Dental Health, Faculty of Dentistry, Bayero University, Kano/Aminu Kano Teaching Hospital, Kano State. Nigeria.

Correspondence:

Dr. Aghimien O A

Orthodontic Unit, Department of Preventive Dentistry, Dental Centre

Edo Specialist Hospital, Benin City. Edo State.

E-mail- osaronse@yahoo.com,

Phone Number: +2347030857943

ORCID Numbers: 0000-0002-6737-7959

ORIGINAL ARTICLE

Introduction

Orthodontic treatment involves the placement of removable or fixed appliances for the purpose of the desired tooth movement. The placement of fixed appliance involves several steps and requires the application of appropriate mechanotherapy to bring about expected treatment outcome. These steps involve but not limited to: molar bands cementation, bonding of orthodontic brackets, ligation of archwires within the bracket slot and the application of auxillaries like power chain and elastics.

Andrew recommended that orthodontic brackets should be accurately positioned midway mesio-distally on the clinical crown and along the facial axis of the clinical crown.[1] Accurate bracket positioning is a pre-requisite for ideal orthodontic detailing and finishing because it brings about three-dimensional tooth positioning that is in-built in the various bracket prescriptions.[2] Errors in bracket positioning between clinicians and even by the same clinician when bonding in various areas of the mouth have been reported.[2,3,4] making ideal tooth positioning difficult if not impossible.[5] Also, Kravit & Miller noted reversal in bracket prescription torque when there is an inversion of orthodontic brackets.[6] It is therefore important to note that proper bracket positioning

amongst other biomechanics, contributes to improved smile aesthetic, functionality and stability of the treatment.[7]

Orthodontic archwires are used to deliver optimal force required to bring about desired tooth movement without causing damage to the periodontium.[8] There is a wide range of archwires available in clinical practice and the choice of archwire at a particular stage of treatment is key to achieving expected outcome. The choice of arch wire material, dimension and form (whether upper or lower jaw) should be intended to achieve a specific purpose during treatment. Archwires are specific for each jaw especially with regard to the inter-canine and inter-molar widths; and when chosen rightly, it contributes to improved stability.[9] Clinicians may find themselves making the wrong choices especially when they have limited knowledge on the mechanical property and the application of orthodontic archwires. Additionally, the use of wrong archwire may be an oversight due not stress.

The ligation of orthodontic archwires within the bracket slot can be achieved either by elastomeric module, stainless steel ligation or the more recently developed self-ligating bracket.[10] Ligation tends to have a direct effect on the biomechanics through the friction between the archwire and the bracket slot. The friction generated between the wire-bracket interfaces is particularly useful during the leveling and alignment phase of treatment. In order to maximize the springiness of the superelastic wire and reduce treatment time, all bonded teeth are usually ligated. When a bracket is missed during ligation, the tooth is cut-off from the entire biomechanics, which could lead to prolonged treatment time.

Sometimes the orthodontists may modify the treatment protocol by incorporating bend-backs which help to reinforce anchorage by preventing flaring of the anterior teeth. In addition, the choice of elastic gauge, power chain for space closure and placement of molar band are also important considerations.

When clinicians, out of omission fail to adhere strictly to treatment protocol, poor aesthetic and unstable outcome will inevitably occur. In several scenarios, there will be unwanted tooth movement, undue discomfort to the patient, prolong treatment time and ultimately poor treatment finishing.[11]

In order to reduce the incidence of these errors, the use of checklist could serve as a vital tool. Checklist is an organized tool that simplifies conceptualization and recall of information which leads to improved clinical performance and error prevention.[12] Orthodontic checklist could be applied before, during and post orthodontic treatment. Applying the checklist during treatment especially at initial set-up and follow-up visits will help improve treatment outcome. Several contributing factors such as inadequate supervision, non-availability of materials and stressful working conditions amongst others will be evaluated in this study as possible causes of the errors encountered in practice. The incidence of these errors appear to be scarcely reported in the literature.

The aim of this survey was to estimate the incidence and the causes of these unintended errors during fixed orthodontic treatment among orthodontics practitioners in Nigeria. The authors also discussed the clinical importance of adhering to standard protocols and the need for checklist in order to minimize the occurrences of these errors. The rationale of the study was to ensure that orthodontists manage their patients with very minimal errors.

Materials and Methods

Ethical approval was obtained from the research and ethics committee of the Edo State Hospital Management Agency (A732/T/5). This cross-sectional descriptive study was an electronic questionnaire-based survey conducted among consultant orthodontists, certified orthodontic practitioners and post-graduate students undergoing training as residents in the specialty. Confidentiality was ensured as the request to participate was sent via the Nigeria Association of Orthodontist WhatsApp platform and respondents were not required to give personal information specific to themselves like names and specific centre of practice in the survey tool. Only orthodontists practicing in Nigeria and post-graduate orthodontist residents receiving training in Nigeria participated in the survey. Orthodontists who are not in active clinical practice or practice outside the shore of Nigeria were excluded from the study. Participants were recruited using the volunteer (opt-in) sampling panel. Participants volunteered themselves to willingly participate in the survey. Data was collected over a period of 7-months (September, 2022 to March, 2023) through an online self-administer questionnaire designed in Google form and shared on

the WhatsApp platform of the Nigeria Association of Orthodontists. A total of 53 participants filled the online questionnaire, which accounted for a 75.7% response rate. The participants who completed the survey include: 20 post-graduate students (4 registrars, 16 senior registrars), 2 certified orthodontic practitioners and 31 consultant orthodontists.

Surveying Tool

The questionnaire used in this study was in 4 sections. Demographic information like age group, gender, location of practice, designation and duration of practice were part of the first section of the questionnaire. The second section of the questionnaire comprised of eleven questions centered on errors encounter in the orthodontic clinic and participants were to tick an option from a 5-point Likert scale of frequency (Never-Rarely-Sometimes-Often-Always). The third part included causes of the errors encountered by the respondents and they were asked to tick as many options as possible among the seven possible causes provided. The importance and willingness of the clinicians to utilize orthodontic checklist to reduce the incidence of these errors were considered in the fourth part of the questionnaire in a 3-point Likert scale of likelihood (Yes-No-Maybe).

Data Analysis

The data collected from the questionnaire were coded and entered into Statistical Package for the Social Sciences (SPSS) version 22 and descriptive statistic were used to analyze the categorical variables.

Results

Consultants 31(58.5%) formed a large percentage of those who took part in the survey. Majority of the participants practice in the tertiary health facility 40(75.5%) and 41.5% of the respondents have been practicing for more than 10 years. (Table 1).

Table 1. Distribution of the study participants

	Groups	n (%)
Age (Years)		
	≥ 30 - < 40	48 (45.3)
	≥ 40 - < 50	16 (30.2)
	≥ 50 - < 60	11 (20.8)
	≥ 60	2 (3.9)
Gender		
	Male	22(41.5)
	Female	31 (58.5)
DOP (Years)		
	≥ 1 - < 5	15 (28.3)
	≥ 5 - < 10	16 (30.2)
	≥ 10	22 (41.5)
LOP		
	PP	8 (15.1)
	SHF	5 (9.4)
	THF	40 (75.5)
Designation		
	Registrar	4 (7.5)
	S/Registrar	16 (30.2)
	Certified	2 (3.8)
	Consultant	31 (58.5)

Key: S/Registrar: Senior Registrar, DOP: Duration of practice, LOP: Location of practice, PP: private practice, SH: Secondary health facility, THF: Tertiary health facility

The results shows that 15(28.3%) participants had only be practicing for less than 5 years and registrars form 3(20%) of the group. Among the 22(41.5%) participants that have been practicing for more than 10 years, majority 16(72.7%) were consultants. Majority of the participants 40 (75.5%) practiced in tertiary health facility and a larger percentage 19(47.5%) of them were consultants. All the registrars, 4 (10%) and senior registrars 16 (40%), were all receiving training in the tertiary health facility (Table 2).

Table 2. Distribution of study participants in relation to duration and location of practice.

	Registrar n (%)	S/Registrar n (%)	Certified n (%)	Consultant n (%)	Total n (%)
DOP (Years)					
>1 - <5	3 (20.0)	5 (33.3)	0 (0.0)	7 (46.7)	15 (28.3)
>5 - <10	1 (6.3)	6 (37.5)	1 (6.3)	8 (30.2)	16 (30.2)
>10	0 (0.00)	5 (22.7)	1 (4.5)	16 (72.7)	22 (41.5)
LOP					
PP	0 (0.00)	0 (0.00)	1 (12.5)	7 (87.5)	8 (15.1)
SHF	0 (0.00)	0 (0.00)	0 (0.00)	5 (100.0)	5 (9.5)
THF	4 (10.0)	16 (40.0)	1 (2.50)	19 (47.5)	40 (75.5)

Key: S/Registrar: Senior Registrar, DOP: Duration of practice, LOP: Location of practice, PP: private practice, SHF: Secondary health facility, THF: Tertiary health facility

The errors mostly encountered by the respondents were wrong bracket positioning, missed ligation and non-placement of bend-backs when they are indicated. All 53(100%) respondent either rarely 14(26.4%) or sometimes 39 (73.6%) make the error of positioning brackets wrongly. Among the 53 respondents, 51 (96.2%) make the mistake of missed ligation and non-placement of bend-back when indicated. Also, among those that encountered failure to place bend-back when indicated, 26(49.1) rarely, 19(35.8%) sometimes while 6(11.3%) often make that mistake. Unintentional inversion of brackets during bonding 38(71.7%) and wrong choice of power chain 37(69.8%) followed closely among the errors encountered by respondents. The least errors mostly encountered were the placement of bend-back when not indicated 23(43.4%) followed by unintentional use of wrong archwire materials and the error of swapping archwires between the arches, 28(52.8%) each (Table 3).

Table 3. Estimation of the errors commonly encountered in clinical practice

Variables	Never n (%)	Rarely n (%)	Sometimes n (%)	Often n (%)	Always n (%)	Total n (%)
Unintentional inversion of bracket	15 (28.3)	36 (67.9)	2 (3.8)	-	-	38 (71.7)
Wrong bracket position	-	14 (26.4)	39 (73.6)	-	-	53 (100)
Unintentional use of wrong archwire material	25 (47.2)	22 (41.5)	6 (11.3)	-		28 (52.8)
Wrong archwire gauge	23 (43.3)	22 (41.5)	6 (11.3)	2 (3.8)	-	30 (56.6)

Mistakenly swap upper and lower archwires	25 (47.2)	22 (41.5)	6 (11.3)	-	-	28 (52.8)
Missed ligation	2 (3.8)	30 (56.6)	20 (37.7)	1 (1.9)	-	51 (96.2)
Forgot to place cinch/bend back when indicated	2 (3.8)	26 (49.1)	19 (35.8)	6 (11.3)	-	51 (96.2)
Place cinch/bend back when not indicated	30 (56.6)	21(39.6)	2 (3.8)	-	-	23 (43.4)
Wrong elastic gauge	18 (34.0)	21 (39.6)	14 (26.4)	-	-	35 (66)
Wrong power chain	16 (30.2)	19 (35.8)	18 (34.0)	-	-	37 (69.8)
Wrong molar band	22 (41.5)	27 (50.9)	4 (7.5)	-	-	31(58.4)

Key: TOTAL-ECE; Total error commonly encountered.

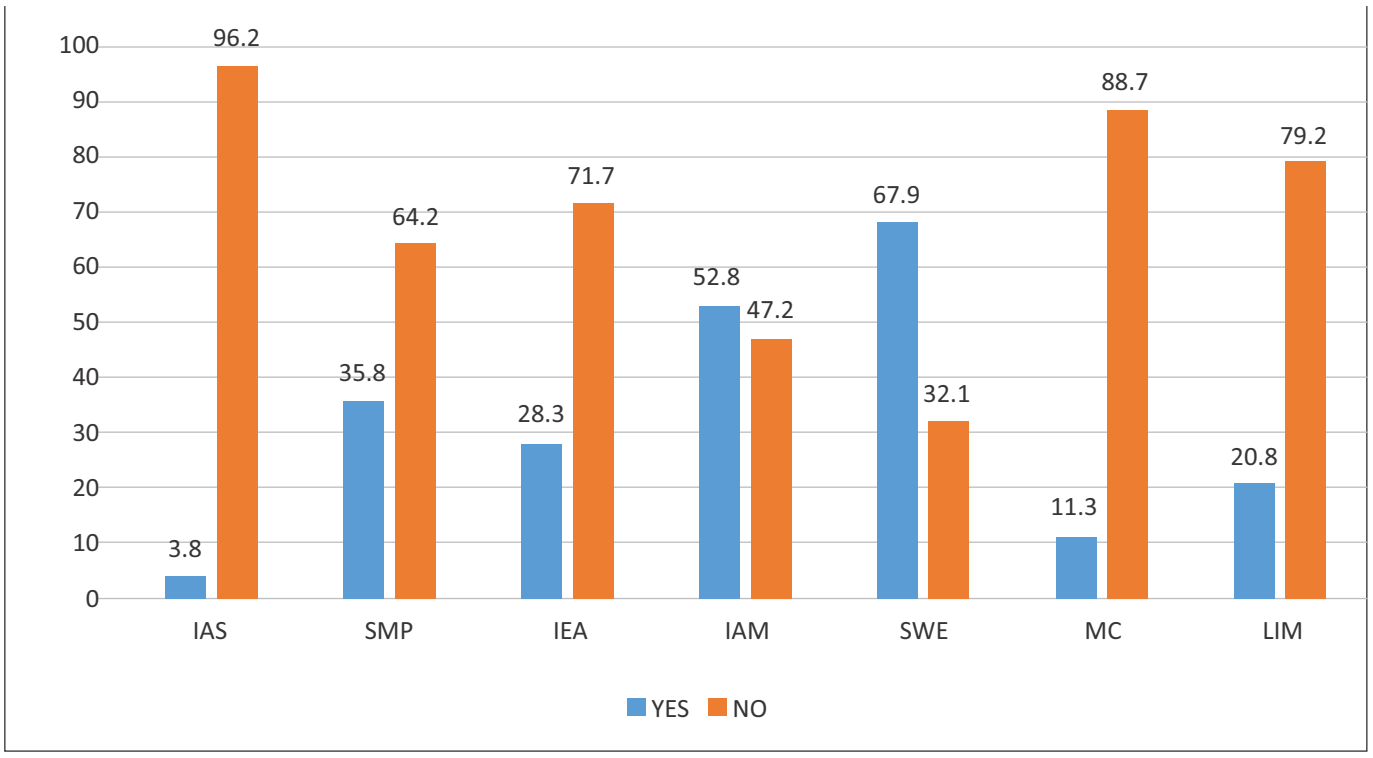

Figure 1. Estimation of the common causes of the errors encountered in orthodontic practice

Key: IAS; Inadequate supervision; SMP; Shortage of man power; IEA; Inexperienced assistant; IAM; Inadequate materials; SWE; Stressful working environment; MC: Medically compromised; LIM: Lack of identification mark

Stressful working environment 67.9%, inadequate materials 52.8% and shortage of manpower 35.8% were responsible for the errors commonly encountered by the respondents (Fig. 1)

Table 4 shows that most of the participants 30(56.6%) agree that orthodontic checklist will help to reduce the incidence of unintended errors in orthodontic clinical practice. Majority of the registrars, 75%, agree that orthodontic checklist will reduce such errors. Among the consultants, 15(48.4%) were in the affirmative while another 15(48.4%) were not sure.

Larger percentages of senior registrars 13(81.3%) and registrars 3(75%) were willing to apply orthodontic checklist in their practice. In total, 35(66.6%) of the participants were willing to apply the orthodontic checklist in their practice.

Table 4. Relevance of the orthodontic checklist and willingness of participants to apply it

	Designation				
	Registrar	**S/Registrar**	**Certified**	**Consultant**	**Total**
	n (%)	n (%)	n (%)	n (%)	n (%)
ROCL					
Yes	3(75.0)	11 (68.8)	1 (50.0)	15 (48.4)	30(56.6)
No	1 (25)	-	-	1 (3.2)	2(3.8)
Maybe		5(31.3)	1(50.0)	15(48.4)	21(39.6)
WTAOCL					
Yes	3(75.0)	13(81.3)	1(50.0)	18(58.1)	35(66.0)
No	1(25.0)	-	-	1(3.2)	2(3.8)
Maybe	-	3(18.8)	1(50.0)	12(38.7)	16(30.2)

KEY: ROCL: Relevance of orthodontic checklist; WTAOCL: Willingness to apply orthodontic checklist.

Discussion

Excellent treatment outcome is the goal of every orthodontic treatment. This expected outcome can only be achieved through thorough treatment planning and implementation. Fixed orthodontic appliance therapy involves a lot of bio-mechanotherapy that requires the skill and knowledge of the orthodontist. The implementation of the treatment plan therefore means that errors should be eliminated or reduced to the barest minimum. Errors in orthodontic clinical practice can be encountered during bracket positioning, archwire selection, archwire ligation and the proper application of the right gauge of power chain, among others. Even though the various aspects as listed, form an integral part of fixed orthodontic treatment, the incidence of unintended errors usually encountered by clinicians appear not to be sufficiently indexed in the literature. This present study was conducted to estimate the incidence of the errors commonly encountered in orthodontics clinical practice in Nigeria.

In this current study, wrong bracket position with regard to placement on the facial axis of the clinical crown was mostly encountered by the respondents. The respondents either rarely (26.4%) or sometimes (73.6%) make the error of placing orthodontic brackets wrongly. The risk of errors in bracket positioning had earlier been reported between

clinicians when bonding in various areas of the mouth.[1] Errors in bracket positioning are usually expressed during the leveling and alignment stage and the ability to recognize and activate early corrective measures would reduce the need for wire bending. Clinicians are advised to always take into consideration the use of even adhesives, pressure application, crown morphology, assessment of root positioning on dental panoramic radiograph and possible repositioning of brackets for best treatment outcome.[1] In order to minimize the error of wrong bracket positioning, several guidelines have been suggested.[13,14] Recently, with the incorporation of customized orthodontic philosophy and digital orthodontics, customize bracket can now be transferred accurately to the tooth surface thereby leading to significant reduction in the errors encountered during bracket positioning.[1] In another study, it was reported that the use of bracket holding plier also helps to prevent and reduce the incidence of error encountered during bracket position and that the method was adjudged to be simple, convenient with less chair side time.[15] The 5-step protocol proposed by Carlson & Johnson could be useful in order to reduce errors encountered during bracket positioning in clinical practice.[16]

Also in this present study, errors associated with archwire (choice of archwire materials [52.6%], archwire gauge [56.6%] and erroneous archwire swab [52.6%] were among the least reported errors. In order to be able to make the right selection of archwire, orthodontists must have the requisite knowledge of the biomechanical property and clinical application of archwires. For example, the need for light and continuous force during the initial stages of fixed orthodontic therapy informs the choice of the clinician towards selecting superelastic wire like nickel-titanium alloy with long range of action and shape memory. On the other hand, stainless steel wire is more rigid with less springback making them suitable for the finishing stage of treatment.[17] Preservation of arch form is key in achieving stable outcome and unintended expansion caused by wrong choice of archwire would lead to instability. The use of identification marks on the archwire could minimize the errors of swapping arch wires between the jaws.

Furthermore, stressful working environment, inadequate materials and shortage of manpower were the major factors considered to be responsible for the errors encountered. Stress in orthodontic workplace has been reported as a critical factor to be considered in clinical practice. Stressors among orthodontic practitioners are related to poor patient compliance and having to deal with uncooperative patients and also those related to time management such as patients arriving later than their scheduled appointment time.[18] Attending to a patient that presents late for clinic appointment could make the clinician hurryingly treat the patient thereby predisposing to errors. Therefore, proper time management could address most of the problems related to stress among orthodontists.[19] The challenges of inadequate orthodontic materials like brackets, bands, archwires and power chain is a key factor that determines what is available in the clinic at every given time for the treatment of patients during clinic appointments. Orthodontic treatments in most of the tertiary health facility in Nigeria are funded by the government and when there is shortage of orthodontic materials, the clinician may be forced to make use of what is available. This is a major cause of the error of archwire swab, wrong power chain and wrong molar bands.

Also, in this study majority of the respondents (56.6%) agree that the orthodontic checklist is an invaluable tool in orthodontic practice, out of which 66.0% were willing to apply it. This finding agrees with the position of another a previous who reported that checklist helps to reduce errors in clinical practice and strengthen adherence to standard guidelines.[20] After every clinical appointment, it is therefore needful to carry out an immediate post-treatment review using the checklist, to ensure that the intended mechanotherapy will result in an expected outcome.

Conclusion

Estimation of unintended errors in orthodontic clinical practice among clinicians in Nigeria has shown that the most occurring errors were: wrong bracket position, missed ligations of the archwires into the bracket slots and non-placement of bend-

back when it was indicated. The respondents identified three topmost causes of the errors they encounter in clinical practice which include: stressful working environment, inadequate materials and shortage of manpower. Furthermore, the participants also believed that the use of orthodontic checklist would help to reduce the incidence of these errors.

Recommendation

There is a need to develop a standard and universally applicable orthodontic start-up and follow-up checklists. This will help clinician adhere to standard treatment protocol and reduce the errors encountered. This checklist will also reduce the stress encountered by orthodontists in practice.

Contribution to Authorship

Author OAA developed the concept of the research work, Authors OAA and TEA designed the study and participated in the data collection and data interpretation. Both authors approved the paper for publication and agreed to be accountable for all aspects of the research. Both authors read and approved the final manuscript.

Funding: The authors declare that no external funding was received as the study was self-sponsored.

Conflicting Interests

Authors have declared that no competing interests exist.

References

1. Andrews LF. The straight wire appliance: Origin, controversy, commentary. J Clin Orthod. 1976;10:99-114.
2. Alrbata RH. Accurate bracket positioning as a prerequisite for ideal orthodontic finishing. Int J Orthod Rehabil. 2017;8:3-4.
3. Seehra J, Pandis N. Pay attention to the analysis: Common statistical errors in orthodontic Randomised Clinical Trials. InSeminars in Orthodontics. WB Saunders; 2024, Jan 10.
4. Jepsen K, Sculean A, Jepsen S. Complications and treatment errors involving periodontal tissues related to orthodontic therapy. Periodontology 2000. 2023, Jun;92(1):135-58.
5. Creekmore TD, Kunik RL, Straight wire: The next generation. Am. J. Orthod. 1993; 104:8-20.
6. Kravit ND, Miller S. The rules of bracket flipping and switching. J Clin Orthod. 2019; 53:518-520.
7. Pitts TR. Bracket positioning for smile arc protection. JCO. 2017;51(3):142-156.
8. Malik N, Dubey R, Kallury A, Chauksye A, Shrivastav T, Kapse BR. A review of orthodontic archwires. J Orofac Res. 2015; 5:6-11.
9. Felton JM, Sinclair PM, Jones DL, Alexander RG. A computerized analysis of the shape and stability of mandibular arch form. Am J Orthod Dentofacial Orthop. 1987;92:478–483.
10. Vinay K, Venkatesh MJ, Nayak RS, Pasha A, Rajesh M, Kumar P. A comparative study to evaluate the effects of ligation methods on friction in sliding mechanics using 0.022" slot brackets in dry state: An In-vitro study. J Int Oral Health. 2014;76-83
11. Chung CH, Tadlock LP, Barone N, Pangrazio-Kulbersh V, Sabott DG, Foley PF, Trulove TS, Park JH, Dugoni SA. Common errors observed at the American board of orthodontics clinical examination. Am J Orthod Dentofacial Orthop. 2017; 152:139-142.
12. Hales B, Terblanche M, Fowler R, Sibbald W. Development of medical checklist for improved quality of patient care. Int J quality in health care. 2008;20:22-30.
13. Ricketts MR. Bioprogressive therapy as an answer to orthodontic needs. American J Orthod. 1976;70:241-267.
14. McLaughlin RP, Bennett JC. Bracket placement with the preadjusted appliance. J Clin Orthod. 1995;29:302-311.
15. Rathi AJ, Ahmed SF, Kalladka G, Iyer Kavitha. A clinical guide for vertical positioning of bracket. Int J Cur Res Rev. 2021;13:166-171.
16. Carlson SK, Johnson E. Bracket positioning and resets: Five steps to align crowns and roots consistently. Am J Orthod Dentofacial Orthop. 2001;119:76-80.

17. Silvia-Izabella P, Mariana1 P, Cristina BD, Pop RV, Chibelean Manuela C. Clinicians' choices in selecting orthodontic archwires. Acta Medica Marisiensis. 2013;59(4):212-218. .
18. Aikins EA, Anosike AN, Yemitan TA. Occupational stress among nigerian orthodontists and orthodontic residents: A cross-sectional study. JAMMR. 2021;33: 195-204.
19. Alqahtani ND, Aljajji S, Alshalan N, Aljabaa A, Aldosari M, Albarakati S. Occupational stress among orthodontists in Saudi Arabia. J Int Soc Prevent Communit Dent. 2020;10:350-358. DOI:10.4103/jispcd.JISPCD_376_19
20. Thomassen Ø, Storesund A, Søftland E, Brattebø G. The effects of safety checklist in medicine: A systematic review. Acta Anaesthesiol Scand. 2014;58:5-18.

Knowledge and Awareness about Cleft Lip and Palate among Undergraduate Dental Students in a Nigerian Teaching Hospital

Otaren NJ[a], Umweni AA[a], Otuyemi OD[b]

Abstract

Background: To assess knowledge and awareness about cleft lip and palate among undergraduate dental students in Benin City, Nigeria.

Design: This was a cross-sectional study carried out among undergraduate dental students in Benin City, Nigeria.

Methods: The study population consisted of twenty-four (24) final-year students, thirty (30) 500-level students and thirty (30) 400-level students giving a total population of 84. The study instrument was a 12-item self-administered questionnaire, which was pre-tested on ten clinical dental students two weeks before the commencement of the study. The research was approved by the Research Ethics Committee of the University of Benin Teaching Hospital. Data was computed and analyzed using SPSS version 21.0 software. P values at <0.05 were set as significant.

Results: The minimum age of the study population was 20 years, and the maximum age was 35 years. The mean age was 24.61±2.796 years. Seventy (83.9 %) of the study population had knowledge and awareness of cleft lip and palate, while 14 (16.1 %) had no knowledge and awareness of the deformities. All the respondents 84 (100 %) knew that cleft lip and palate can be managed, hence, there was no relationship between level of education and knowledge and awareness of cleft lip and palate. The majority of the population 73 (87.1 %) agreed that children with cleft lip and palate deformities have problems with feeding, speech, and development of teeth.

Keywords: Knowledge, Undergraduate dental students, cleft.

Authors' affiliations

[a]Department of Preventive Dentistry, University of Benin/university Of Benin Teaching Hospital, Benin City, Nigeria

[b]Department of Child Oral Health, Obafemi Awolowo University Teaching Hospital, Ile-ife, Osun State

Correspondence:

Dr. Otaren N. J.

Department of Preventive Dentistry, University of Benin Teaching Hospital

Benin City, Nigeria

E-mail: nosakhare.otaren@uniben.edu

ORIGINAL ARTICLE

Introduction

Orofacial clefts constitute the most common anomalies in the orofacial region.[1,2,3] Previous Nigerian studies reported an incidence of 1 in 2,703 (0.4 in 1000).[4]

It occurs due to a failure of fusion of a number of facial processes during embryonic development.[5] Cleft lip and palate (CL/P) may be unilateral, bilateral, complete and incomplete. According to Veau CL/P is classified into four main groups; cleft of the soft palate, cleft on hard palate, cleft of lip and alveolus, cleft of palate (CP), bilateral cleft of lip, alveolus and palate.[6,7,8]

The gender ratio among individuals with CL/P in the general population is inconclusive, with males being affected 1.5 to 2.0 times more frequently than females.[2,9,10]

Previous studies have proved that environment and genetics are the core causes of CL/P. However, other factors, such as deficiency of vitamin B, folic acid, maternal age, mothers who smoke or consume alcohol and some viral infections are also related to CL/P development.[11,12,13]

Though cleft CL/P is not life-threatening, it has various problems associated with it, such as speech problems, hearing problems, dental problems, feeding and nutritional problems, aesthetics, psychological, and mental problems.[1,5] CL/P can be treated and requires appropriate corrective treatment

to improve aesthetical functions. This corrective treatment also requires multiple stages of intervention during the various developmental stages and can largely help to return to normal and satisfactory living.[6,14,15,16,17]

Knowledge about the various treatment procedures involved and the timing of the procedures among dental students is vital for them to refer the patient at the correct stage to the appropriate specialist, who will provide the best patient care. Therefore, the purpose of this study was to assess the knowledge and awareness of CL/P among undergraduate dental students of the University of Benin, Benin City, Nigeria.

Materials and Methods

This cross-sectional study was carried out between January 2023 and April 2023. The study was carried out among undergraduate dental students of the University of Benin, Benin City, Nigeria. The age range was 20 to 35 years, mean age was 24.61±2.796 years. The study instrument was a close-ended, 12-item, self-administered questionnaire and each participant gave their informed consent.. The research was approved by the Research Ethics Committee of the University of Benin Teaching Hospital. The questionnaire was pre-tested in a pilot study carried out on 10 (ten) clinical dental students two weeks before the commencement of the study. Inclusion criteria included only 400-level, 500-level, and 600-level dental students of the University of Benin, Benin City, Nigeria, who indicated consent and willingness to participate in the study. Exclusion criteria included non-clinical dental students of the same University and dental students from other institutions, and lack of consent. There was a 100% response from the students in completing the questionnaires. The study population consisted of 24 final year students (600 level), 30 five hundred level students (500 level) and 30 four hundred level students (400 level), giving a total population of 84 (eighty-four) dental students. A self-administered questionnaire was given to each participant. The questionnaire included a section on demographic information and a section on knowledge and awareness of cleft lip and palate. Data was computed and analyzed using SPSS version 21.0 software. The data generated was subjected to statistical analysis to determine the variables (frequency, percentages, and means). Differences between variables were evaluated with the Chi-square test. P values at <0.05 were set as significant.

Results

This was a cross-sectional study carried out among undergraduate dental students of the Faculty of Dentistry, University of Benin, Benin City, Nigeria. There were 46 (54.8 %) males and 38 (45.2 %) females, giving a total population of 84 (eighty-four) participants. The minimum age of the study population was 20 years, the maximum age was 35 years, and the mean age was 24.61±2.796 years.

Table 1. Distribution of the study population according to level of education

Level of Education	Frequency	Percentage
600 Level	24	28.6
500 Level	30	35.7
400 Level	30	35.7
Total	84	100.0

Table 1 shows the distribution of the study population according to their level of education. The 600-level students were 24 (28.6 %), 500-level students were 30 (35.7 %), while 400-level students were 30 (35.7 %)

Table 2. Knowledge and awareness about cleft lip and palate among the study population

Knowledge and Awareness about Cleft Lip and Palate	Frequency	Percentage
Yes	70	83.9
No	14	16.1
Total	84	100.0

Table 2 shows the knowledge and awareness about cleft lip and palate among the study population. A total of 70 (83.9 %) had the knowledge and awareness of cleft lip and palate, while 14 (16.1 %) had no knowledge and awareness about cleft lip and palate.

Table 3. Relationship between level of education and knowledge about cleft lip and palate

	Can Cleft Lip and Palate be treated?		
Level of Education	Yes	No	Total
600 Level	24	0	24 (28.6 %)
500 Level	30	0	30 (35.7 %)
400 Level	30	0	30 (35.7 %)
Total	84	0	84 (100.0 %)

Table 3 shows the relationship between the level of education and knowledge about cleft lip and palate. All the respondents 84 (100 %) had the knowledge and awareness that cleft lip and palate can be managed, therefore there was no significant relationship between the level of education and knowledge and awareness that cleft lip and palate can be managed.

Seventy-nine (93.5 %) of the study population agreed that children with cleft lip and palate would become normal after surgery, while 5 (6.5 %) did not agree that children with cleft lip and palate would become normal after surgery. 20 (24.2 %) of the study population agree that cleft lip is always associated with cleft palate, while 64 (75.8 %) did not agree that cleft lip is always associated with cleft palate.

Forty-seven (56.5 %) of the study population knew that vitamin B and folate deficiency cause cleft lip and palate in the newborn, while 37 (43.5 %) did not know that vitamin B and folate deficiency caused cleft lip and palate. Up to 15 (17.7 %) of the study population believed that the most common manifestation of cleft lip and palate is unilateral on the right side, 43 (51.6 %) believed that unilateral on the left side is the most common, while 26 (30.6 %) believed that bilateral clefts are the most common.

The majority of the study population, 73 (87.1 %) agreed that children with cleft lip and palate have problems with feeding, speech, and development of teeth, 4 (4.8 %) believed that children with cleft lip and palate have only speech problems, while 7 (8.1 %) believed that children with cleft lip and palate only have problems with the development of teeth. Forty-one (48.4 %) of the study population believed that cleft lip and palate is caused by the non-union of the maxillary process with the medial nasal process,

28 (33.9 %) believed that cleft lip and palate is caused by the non-union of the medial nasal process and lateral nasal process, and 15 (17.7 %) believed that cleft lip and palate is caused by the non-union of the medial nasal process and medial nasal process.

Fort-eight (56.4 %) of the study population believed that the diagnosis of cleft lip and palate is carried out by ultrasound during pregnancy, 28 (33.9 %) of the study population believed that the diagnosis of cleft lip and palate is carried out only after the baby is born, while 8 (9.7 %) believed that cleft lip and palate cannot be diagnosed until late in life. Twenty-four (29.0 %) of the study population believed that the initial surgery for cleft lip is carried out when the baby is 2 months old, 29 (33.9 %) believed that it should be carried out when the baby is 3 months old, while 31 (37.1 %) believed that the initial surgery be carried out when the baby is 6 months old. The relationship between the level of education and knowledge of the aetiology of cleft lip and palate showed that the majority of the 600 level students knew that cleft lip and palate is caused by the non-union of the maxillary process with the medial nasal process when compared to the 500-level and 400-level students, but the relationship was not statistically significant (Chi-square- 5.382; P value- 0.250).

Discussion

Orofacial clefts constitute the most common anomalies in the orofacial region.[1,2]

In this study, the respondents were selected based on their level of education (400, 500, and 600 levels). This was a similar finding in previous studies[11,18], where the study participants were classified according to their levels in the undergraduate dental programme. The majority of the population had the knowledge and awareness about cleft lip and palate, this was a similar finding in a previous study[11], but in another study, there was considerably low knowledge and awareness about cleft lip and palate among undergraduate dental students.[18]

This study showed that there was no statistically significant difference between the various levels of undergraduate dental students and their knowledge of the management of cleft lip and palate. There was a similar finding in a previous study[18], but the previous study[11] showed that the most senior students had more knowledge about cleft lip and palate management.

In this study, the majority of the study population knew that speech, feeding, and the development of teeth are all affected by cleft lip and palate. Similar findings were made in previous studies.[11,19] The current study also showed that the majority of the study population were aware that ultrasound diagnosis during pregnancy is a method adopted to diagnose cleft lip and palate. In a previous study, only the senior students were aware that ultrasound diagnosis is a useful method for diagnosis of cleft lip and palate during pregnancy.[11] The use of ultrasound in the diagnosis of cleft lip and palate during pregnancy was also stated in another study.[20]

This study has also shown that all the study participants believed that children with cleft lip and palate can be treated successfully through surgical intervention. There was a similar finding in a previous study[18] which showed that only the senior students were aware that children with cleft and palate can be successfully managed surgically .[11]

Conclusion

In this study, the knowledge and awareness of cleft lip and palate was assessed among undergraduate dental students in Benin City, Nigeria. The majority of the students had the knowledge and awareness of cleft lip and palate, including their diagnosis and management. Therefore, it is important to educate undergraduate dental students with the necessary knowledge about cleft lip and palate including its prevention, diagnosis, and treatment.

Contribution to authorship : All authors contributed equally to the manuscript.

Funding : Funded by the authors

Conflicts of interest: There are no conflicts of interest to be declared

References

1. Chung KY Sorouri K, Wang L, Suryavanshi T, Fisher D. The impact of social stigma for children with cleft lip and/or palate in low-resource areas: A systematic review. Plastic Reconstr Surg Glog Open 2019;7(10):e2487.
2. Umweni AA, Ojo MA. Orofacial clefts: Team approach to management, 2006, Benin City, Graphix Palace Ltd, Chap 1, About the book, pg 4.
3. Sharma G. Orthodontic management of cleft lip and palate patients. Current treatment of cleft lip and palate 2020, E-Book ISBN Pg 1-100.
4. Iregbulem LM. The incidence of cleft lip and palate in Nigeria. Cleft Palate J 1982;19:201-205.
5. Al-Namankany A, Alhubaishi A. Effects of cleft lip and palate on children's psychological health: A systematic review. J Taibah Univ Med Sci 2018;13(4):311-318.
6. Chouairi F, Mets EJ, Gabrick KS, Alperovich M. Veau III and Veau IV cleft palate: Do perioperative complications differ? J Craniofac Surg 2019;30(8):2372-2374.
7. Kharbanda OP, Khazanchi R, Mathur N, Sagar S, Singhal M, et al. Clinical profile and treatment status of subjects with cleft lip and palate anomaly in India: Preliminary report of a three-centre study. J Cleft Lip Palate Craniofac Anomalies 2014;1:26.
8. Takemura H, Yasumoto K, Toi T, Hosoyamada A. Correlation of cleft type with incidence of perioperative respiratory complications in infants with cleft lip and palate.Pediatric Anesthesia 2002;12:585-588.
9. Mcdonald RE, Avery DR, Dean JA. Dentistry for the Child and Adolescent, 2004, Mosby, Chap 28, Multidisciplinary Team approach to cleft lip and palate management, pg 691.
10. English JD, Peltomaki T, Pharm-Litsche K. Mosby's Orthodontic Review: 2009, Mosby Inc, Chap 21, Orthodontics and Craniofacial deformities, pg 244.
11. Revathy E, Abiram A. Knowledge and awareness about cleft lip among undergraduate dental college students in Chennai – A Questionnaire study. Drug and Cell Therapies in Haematol 2021;10(2):451-462.
12. Munger RG, Kuppuswamy R, Murthy J, Balakrishnan K, Thangavel G, Sambandam S et al. Maternal vitamin B status and risk of cleft lip and palate birth defects in Tamil Nadu State, India. Cleft Palate Craniofac J 2021;58(5):567-576.
13. Nahai FR, Williams JK, Burstein FD, Martin J, Thomas J. The management of cleft lip and palate: Pathways for treatment and longitudinal assessment. Seminars in Plastic Surg 2005;19: 275-285.
14. Owotade FJ, Ogundipe OK, Ugboko VI, Okojie VN, Olasoji HO, Makinde ON, et al. Awareness, knowledge and attitude on cleft lip and palate among antenatal clinic attendees of tertiary hospitals in Nigeria. Nig Clin Practice 2014;17(1):6-9.
15. Vyas T, Gupta P, Kumar S, Gupta R, Gupta T, Singh HP. Cleft lip and palate: A review. J Fam Med Prim Care 2020;9(6):2621-2625.
16. Sinko K, Cede J, Jagsch R, Strohmayr AL, McKay A, Mosgoeller W, et al. Facial aesthetics in young adults after cleft lip and palate treatment over five decades. Sci Rep 2017;(1):15864.
17. Niu SQ Chen J, Hou F, Zang Y, Qianqian Z. Effect of early orthodontic treatment on alveolar bone in patients with cleft lip and palate. J Oral Sci Res 2019;35(11):1040-1043.
18. Sruthi S, Swakumar A, Pandian SK, Navaneethan R. Knowledge, awareness, and attitude on cleft lip and palate management among dental students. Drug Invention Today 2018;10(1):2008-2013.
19. Rani MS, Nithya CS. Classification of cleft lip and palate – A review. Annals and Essence Dent 2011;3:82-94.
20. Christ JE, Meininger MG. Ultrasound diagnosis of cleft lip and palate before birth. Plastic and Recons Surg 1981;68:854-859.

APPENDIX

QUESTIONNAIRE

KNOWLEDGE AND AWARENESS ABOUT CLEFT LIP AND PALATE AMONG UNDERGRADUATE DENTAL STUDENTS

1. Level of education……400 LEVEL ☐ 500 LEVEL ☐ 600 LEVEL ☐
2. Gender…… Female ☐ Male ☐
3. Have you ever seen cleft lip and palate cases? Yes☐ No☐
4. Can cleft lip and palate be treated? Yes ☐ No ☐
5. If surgically treated can the children with cleft lip and palate achieve normal appearance? Yes ☐ No ☐
6. Is cleft lip always associated with cleft palate? Yes☐ No ☐
7. Does vitamin B and Folate deficiency cause cleft lip and palate in the newborn? Yes☐ No ☐
8. Which is the most common type of cleft deformity in our environment?
   Unilateral on the right side ☐ Unilateral on the left side ☐ Bilateral location. ☐
9. What are the other problems associated with cleft lip and palate?
   Feeding ☐ Speech ☐ Development of teeth ☐ All of the above. ☐
10. Cleft lip is due to the non-union of?
    maxillary process with medial nasal process ☐
    medial nasal process and lateral nasal process ☐
    medial nasal process and medial nasal process. ☐
11. How is cleft lip and palate diagnosed?
    By ultrasound during pregnancy ☐
    Only after the baby is born ☐
    Cannot be diagnosed until later in life. ☐
12. When is the initial surgery performed for the cleft lip?
    When the baby is 2 months old ☐
    3 months old ☐
    6 months old ☐

Psychological Impact of Malocclusions on Adult Orthodontic Patients at The Lagos State University Teaching Hospital - A Pilot Study

Esan TB[a], Odunsi OY[a], Yemitan TA[a,b], Oyewo OO[a]

Abstract

Background: There is an increased demand for adult orthodontics because adults are becoming more aware and concerned about dental aesthetics. The way most people perceive themselves is greatly linked to their facial attractiveness, and this affects their social and professional relationships. The aim of this study was therefore to assess the impact of dental aesthetics on oral health- related quality of life (OHRQoL) using the psychological impact of dental aesthetic questionnaire (PIDAQ).

Methods: This was a descriptive cross-sectional study of adults, aged 18 years and above who presented at the orthodontic clinic of Lagos State University Teaching Hospital for diagnosis. A total of 60 adults were recruited and surveyed using the PIDAQ and analyzed to check for internal consistency, A bivariate analysis was performed using the ANOVA test and Pearson's correlation coefficient. Multiple linear regression analysis was used to test the influence of socio-demographic factors on the PIDAQ scale and subscales.

Results: A total of 60 adult patients participated in the study with a 100% response rate. Sex distribution was 70% (n = 42) female and 30% (n = 18) male. Subjects were of 3 age groups: between 18 to 25 years (40%, n = 24), 26 to 40 years (46.7%, n = 28), and >40 years (13.3%, n = 8). The overall mean score for PIDAQ was 75.4 (SD = 20.5) with the social impact domain having the highest rating of 23.5 (SD = 7.7). Comparing age groups, significant differences were found in the psychological impact (p=0.003), social impact (p=0.010), aesthetic concern (p=0.044) and total PIDAQ scores (p=0.027). Those with tertiary education had the highest impact in dental self-confidence, aesthetic concern and total PIDAQ ($p<0.05$). Single status and absence of previous dental treatment had the highest impact in the psychological domain ($p<0.05$).

Conclusion: Perceived dental aesthetics had effects on the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly contributed to self-perceived aesthetics and psychosocial well-being.

Keywords: Orthodontics, Adult, Dental aesthetics, OHRQoL, LASUTH

ORIGINAL ARTICLE

Authors' affiliations
[a]Department of Child Dental Health. Lagos State University Teaching Hospital, Ikeja, Lagos
[b]Department of Child Dental Health, Lagos State University College of Medicine, Ikeja, Lagos

Correspondence:
Esan T. B.
Department of Child Dental Health, Lagos State University College of Medicine, Ikeja, Lagos
E-mail: tolulope_esan@yahoo.com
Phone: +234 80562770372

Introduction

According to the definition provided by the World Health Organization, Oral health quality of life (QoL) is defined as one's perception of their situation in life in terms of culture, value system, goals, expectations, standards, and priorities.[1] QoL is a subjective concept not visible to others and is based on individuals' perceptions of the different aspects of their lives. Nonetheless, many authors believe that QoL domains should be measurable both subjectively and objectively.[2,3] Several studies have reported the negative effect of impaired dental esthetics on daily life.[4,5] Oral Health-Related Quality of Life (OHRQoL) aims to evaluate the aetiology of oral diseases, interventions to prevent oral conditions, distribution of oral diseases in different populations, the treatment need and effect of oral conditions on daily activities.[5,6] This index can also help in the allocation of oral health care services.[7]

The Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ) is a multiple-item

questionnaire developed in the German language, and then published in the English language; designed as a self-assessment tool for evaluating the effect of dental esthetics on the psychosocial status of young adults.[8] This questionnaire can discriminate between different degrees of dental esthetics determined by the IOTN-aesthetic component (IOTNAC) and the perception of occlusion (POS) index.[8] PIDAQ has been translated to several languages so far and its validity and reliability have been previously confirmed.[4,9–14]

The aim of this study was therefore to assess the impact of dental aesthetics on the oral health-related quality of life (OHRQoL) using the psychological impact of dental aesthetic questionnaire (PIDAQ).

Materials and methods

This was a cross-sectional descriptive study carried out at the orthodontic clinic of the Lagos State University Teaching Hospital (LASUTH), Ikeja Lagos state, a Tertiary Health Facility in Southwest Nigeria for a duration of 3 months. Adult patients (60) who presented on account of malocclusion were recruited before commencing orthodontic treatment using convenient sampling technique to determine the psychological impact of dental aesthetics on oral health-related quality of life using the psychological impact of dental aesthetics questionnaire (PIDAQ). The sample size was calculated by using a statistical formula for comparative research study by Isiekwe *et al*[15]

Inclusion criteria included adults aged 18 years and above who are of Nigerian descent, patients who have not undergone any orthodontic treatment in the past and who gave consent to participate in the study. Those who have facial asymmetry or deformities such as visual/hearing impairment, physical deformities, autism, and those with a history of trauma to their anterior teeth, visible carious lesions, dental hypoplasia or fluorotic lesions were excluded from the study.

All selected adult patients completed the PIDAQ prior to the start of orthodontic treatment. The version that was used in this study contained five items on sociodemographic information regarding age, gender, education, marital status, and religion. History of past dental treatment and the reasons for seeking orthodontic treatment were also obtained.

The PIDAQ is a 23-item tool that measures important aspects of the oral health-related quality of life, Dental Self-confidence (DSC), Social Impact (SI), psychological impact (PI), and Aesthetic Concerns (AC). It is made up of four subscales which represent 4 domains: aesthetic concern (AC; 3 items), psychological impact (PI; 6 items), social impact (SI; 8 items) and dental self-confidence (DSC; 6 items).

A five-point Likert scale was used ranging from 1 (no impact of dental aesthetics on quality of life) to 5 (maximum impact of dental aesthetics) for each item. The response options are as follows: 1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree.

To ensure the same direction of scoring for all questionnaire items and to produce a consistent measure of impacts, the items in dental self-confidence DSC were scored in a reverse mode. The DSC, SI, PI, and AC scores were calculated by summing the participants' responses from the corresponding question items of each domain in the questionnaire. Additionally, the total PIDAQ score was calculated from the sum scores of the subdivisions AC, PI, SI, and the reversed scores of the positive domain DSC.

Data was analyzed with the IBM Statistical Package for Social Sciences (SPSS) for Windows Version 23.0. (IBM Corp., Armonk, NY, USA). The internal consistency of the instrument was calculated using Cronbach's alpha (α). Descriptive statistics of scores were obtained. Bivariate analysis was performed using the ANOVA test.

Results

A total of 60 individuals participated in this study with a 100% response rate with no missing data. Sex distribution was 70% (n = 42) female and 30% (n = 18) male. Participants were of 3 age groups: between 18 to 25 years (40%, n = 24), between 26 to 40 years (46.7%, n = 28), and >40 years (13.3%, n = 8). Of all participants, 13.3% (n = 8) had previous dental treatment while 16.7% (n = 10) sought orthodontic

treatment because they were referred by a dentist (Table 1).

The Cronbach's alpha coefficient of internal consistency was calculated to be 0.835 for the total PIDAQ score indicating a good internal consistency. The Cronbach's alpha coefficient was 0.868 for the aesthetic concern, 0.780 for social impact, 0.796 for Psychological impact, and 0.802 for dental self-confidence. The measurement reliability correlation coefficient was 0.977, 0.964, 0.929, and 0.955 for dental self-confidence, social impact, psychological impact, and aesthetic concern, respectively (Table 2).

Overall, the total mean score (SD) for the Psychosocial Impact of Dental Esthetic Questionnaire (PIDAQ) in the current study was 75.4 (SD = 20.5) with the highest rating given to the social impact domain (23.5, SD = 7.7) followed by the dental self-confidence (22.1, SD = 5.9), psychological (20.3, SD = 5.5), and aesthetic concern (9.5, SD = 3.6) domains respectively (Table 3).

There was a negative correlation between the total PIDAQ score (Pearson = 0.361, p <0.01) and age groups of the sample as shown in Table 4, indicating an inverse relationship. A negative correlation was also found between age and the dimensions of social impact, psychological impact and aesthetic concern.

The correlation of psychological impact with age (Pearson = -0.402, p <0.01) and marital status (Pearson = -0.321, p <0.05) was found to be negative while the relationship between psychological impact and history of past dental treatment was positive ((Pearson = 0.299, p <0.05).

The influence of the different sociodemographic characteristics on the results of the PIDAQ and its subscales scores is shown in Table 5. When age groups were compared, significant differences were detected for psychological impact (p = 0.003), social impact (p = 0.010) aesthetic concern (p = 0.047) and total PIDAQ score (p = 0.017). The results did not reveal any significant differences in the participants' ratings across all domains when compared based on gender, ethnicity, religion, and reason for seeking orthodontic treatment (p >0.05).

However, significant differences were detected with respect to educational background in dental self-confidence (p = 0.018), aesthetic concern (p = 0.044) and total scores (p = 0.027). Those who had tertiary education had the highest impact on OHRQoL compared to the rest of the participants.

The younger adults, unmarried, and those with no previous dental treatment displayed the highest impact in the psychological domain of PIDAQ (p < 0.05).

Table 1. Frequency and percentage of sociodemographic variables

Variables	Sub-categories	n (%)
Age	18-25 years	24 (40.0)
	26-40 years	28 (46.7)
	>40 years	8 (13.3)
Gender	Male	18 (30.0)
	Female	42 (70.0)
Ethnicity	Yoruba	42 (70.0)
	Igbo	8 (13.3)
	Hausa	3 (5.0)
	Others	7 (11.7)

Marital Status	Single	45 (75.0)
	Married	15 (25.0)
	Divorced	-
Educational background	Primary	-
	Secondary	4 (6.7)
	Postgraduate	40 (66.7)
	No formal education	16 (26.7)
Religion	Christianity	48 (80.0)
	Muslim	12 (20.0)
	Others	
History of past aesthetic dental treatment	Yes	8 (13.3)
	No	52 (86.7)
Reason for seeking orthodontics	Crooked teeth	18 (30.0)
	Spaced teeth	20 (33.3)
	Protruding jaw	12 (20.0)
	Referred by a dentist	10 (16.7)

Table 2. Reliability of measurements

Variables	R	P values
DSC	0.977	0.000***
SI	0.964	0.000***
PI	0.929	0.000***
AC	0.955	0.000***

Table 3. Mean and SD for PIDAQ subscale and total score

Domain	Mean	SD	Range
Dental self-confidence total score	22.1	5.9	8-30
Social impact total score	23.5	7.7	9-40
Psychological impact total score	20.3	5.5	6-29
Aesthetic attitude total score	9.5	3.6	3-15
PIDAQ total score	75.4	20.5	28 -114

Table 4. Correlation (Pearson correlation coefficient) between PIDAQ/ subscales and sociodemographic variables

Domain	Age groups	Gender	Ethnicity	Marital status	Educational background	Religion	History of dental treatment	Reason for ortho treatment
Dental self-confidence	-0.189	0.074	0.045	-0.084	-0.176	0.067	0.154	-0.18
Social impact	-0.384**	0.002	0.177	-0.202	-0.067	0.106	0.101	-0.167
Psychological impact	-0.402**	0.077	0.053	-0.321*	-0.133	0.039	0.299*	-0.102
Aesthetic concern	-0.310*	0.013	0.143	-0.117	-0.097	0.092	0.154	-0.184
PIDAQ total	-0.361**	0.045	0.118	-0.207	-0.129	0.086	0.19	-0.174

Table 5. Comparison of mean PIDAQ subscale and total scores among different sociodemographic variables

Variable	Sub-categories	DSC mean (SD)	P value	PI mean (SD)	P value	SI mean (SD)	P value	AC mean (SD)	P value	Total PIDAQ	P value
Age	18-25	23.1(6.2)		22.3(5.1)		26.7(8.0)		10.5(3.8)		82.6(21.2)	
	26-40	21.9(5.4)	0.322	20.2(4.5)	0.003**	22.2(6.2)	0.010*	9.4(2.7)	0.047*	73.6(16.1)	0.017*
	>40	19.5(6.7)		14.9(7.0)		18.3(8.5)		7.0(4.4)		59.6(24.6)	
Gender	Male	21.4(5.4)	0.575	19.7(5.8)	0.556	23.4(7.4)	0.988	9.4(3.3)	0.919	73.9(20.2)	0.732
	Female	22.3(6.2)		20.5(5.5)		23.5(7.9)		9.6(3.7)		76.0(20.9)	
	Yoruba	22.1(5.8)		20.3(5.2)		22.8(7.9)		9.3(3.6)		74.4(20.2)	
Ethnicity	Igbo	21.1(5.1)	0.73	20.1(5.3)	0.356	24.6(5.1)	0.267	10.0(2.4)	0.327	75.9(16.4)	0.363
	Hausa	19.7(8.7)		15.7(8.4)		19.3(8.3)		7.3(3.8)		62.0(29.1)	
	Others	23.9(7.1)		22.6(6.7)		28.1(8.0)		11.4(4.0)		86.0(23.4)	
Marital status	Single	22.3(5.7)	0.525	21.3(4.8)	0.012*	24.4(7.0)	0.122	9.8(4.4)	0.374	77.8(18.5)	0.113
	Married	21.2(6.6)		17.3(6.6)		20.8(9.3)		8.8(4.2)		68.1(25.0)	
Educati-onal back-ground	Secondary	18.8(7.4)		17.3(8.6)		18.5(8.4)		7.0(4.7)		61.7(27.0)	
	Tertiary	23.6(5.5)	0.018*	21.5(5.0)	0.053	24.9(7.4)	0.109	10.3(3.4)	0.044*	80.3(19.2)	0.027*
	Post graduate	19.1(5.5)		18.1(5.4)		21.2(7.6)		8.2(3.1)		66.6(19.0)	
Religion	Christianity	21.9(5.7)		20.2(5.5)		23.1(7.5)		9.4(3.6)		74.5(19.9)	
	Muslim	22.8(6.8)	0.612	20.8(6.0)	0.765	25.1(8.7)	0.42	10.2(3.6)	0.485	78.8(23.5)	0.516
History of past dental treatment	Yes	19.8(8.3)		16.1(7.5)		21.5(10.3)		8.1(4.7)		65.5(29.1)	
	No	22.4(5.5)	0.241	21.0(5.0)	0.020*	23.8(7.3)	0.442	9.7(3.4)	0.239	76.9(18.8)	0.146
Reason for seeking orthodontic treatment	Crooked teeth	22.7(6.5)		19.7(5.4)		23.2(6.6)		9.7(3.6)		75.3(19.8)	
	Spaced teeth	23.0(5.0)	0.463	22.0(5.2)	0.281	26.4(8.1)	0.148	10.5(3.4)	0.317	81.8(20.2)	0.222
	Protruding jaw	21.7(6.0)		20.5(5.2)		21.8(7.7)		8.9(3.7)		72.8(19.6)	
	Dentist referral	19.5(6.4)		17.9(6.5)		20.2(7.7)		8.0(3.6)		65.6(22.0)	

Discussion

This study aimed to assess the impact of dental aesthetics on the oral health-related quality of life (OHRQoL) of adults that sought orthodontic treatment using the psychological impact of dental aesthetic questionnaire (PIDAQ). The results showed that perceived dental aesthetics affected the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly affected self-perceived aesthetics and psychosocial well-being.

The first subscale, Dental Self-Confidence (DSC), examined the impact of dental aesthetics on the subject's emotional state. A recent study suggested that HRQoL instruments in dentistry should not only include a certain degree of detrimental effects of the oral condition but also deal with the subjective perception of well-being.[16] It has been suggested that positive and negative well-being correlate differently to psychosocial conditions.[17] It is important to measure the positive impacts of dental aesthetics on the affective state of a person. [18]

Social impact aims to give insight into the potential problems a person may encounter in a social situation due to the unfavourable dental appearance.[19] Past studies have shown that individuals perceived to be attractive are more likely to have a high-quality of dental aesthetics.[8,20,21] They are more prone to experience positive social interactions and positive evaluations by their peers. A greater social appearance concern in individuals with poor dental aesthetics may also be present, to the extent of being a social handicap. Onyeaso *et al*.[16] reported a high percentage of respondents who felt less confident as a result of their malocclusion.

The psychological impact of dental aesthetics is composed of items regarding a feeling of inferiority and despondency when the individual with unfavourable dental aesthetic compares himself or herself with others who have superior dental aesthetics.[3] Comparison plays an important role in psychological well-being and such upward comparison might result in depressing moods.[17]

The fourth subscale, Aesthetic concern, comprises statements referring to the dissatisfaction of a person's dental appearance when confronted with a mirror, photographic and/or video images. This finding correlated with inner insecurities and seemed to be related to the fact that the enhancement of dental aesthetics is a major motivation for people to seek orthodontic treatment.[22]

In this study, the scores varied across the subscales, with the Social impact having the highest score and the Aesthetic concerns the lowest. This is in contrast with the findings of Kolawole *et al*.[23] who reported Dental self-confidence as the highest subscale. This difference could be related to the difference in population sample because their study sample was from the university undergraduate student population. Research shows that correlated PIDAQ and DAI reported higher Aesthetic concern scores in participants with higher perceived orthodontic treatment needs based on DAI scores.[23,24]

The present research suggests an inverse relationship between age and the impact of perceived dental aesthetics on OHRQoL in adults. The younger age group had a greater impact on OHRQoL.[18,25,26] This may be due to the influence of social media on the definition and perception of beauty and aesthetics.[25]

However, another previous study found no correlation between the perception of dental aesthetics and the severity of malocclusions.[27]

The present study found that participants with a tertiary level of education had the highest impact of dental aesthetics on OHRQoL compared to other levels of education. In this study, those with tertiary education had reduced Dental self-confidence and increased aesthetic concerns. This result is similar to the research done by Kolawole *et al*.[23] where study participants were university undergraduate students.

Past dental treatment may contribute to a better OHRQoL because those who are satisfied with their appearance may be more self-confident and have higher self-esteem than those who are dissatisfied.[28,29] This may explain the significantly lower psychological impact of dental aesthetics on OHRQoL in participants with a history of past dental

treatment. Marital status was found to influence the impact of dental aesthetics on OHRQoL. This was in contrast to the research by Alhajj *et al*.[30] where single subjects rated their dental aesthetics better than their married counterparts. This may be related to other priorities and responsibilities that prevented focus on dental aesthetics. A limitation of this study is the fact that the study population was comprised of only patients seeking treatment at the orthodontic clinic, thus the findings may not entirely reflect that of the general population.

The findings from this study show that public health practices should be guided by considering the patients' perceptions of their dental appearance as an important aspect of patient management, in order to achieve higher levels of patient satisfaction, minimizing the risks of overtreatment and reducing costs by identifying those with a greater likelihood of benefiting from treatment.

Conclusion

Perceived dental aesthetics was found to affect the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly affected self-perceived aesthetics and psychosocial well-being. Patients' perceptions of psychosocial impact related to dental esthetics are multifactorial and are influenced by the subjective perceptions of the patient, thus care should be taken when planning dental and orthodontic services.

Contribution to authorship : All authors contributed equally to the manuscript.

Funding : Funded by the authors

Conflicts of interest: There are no conflicts of interest to be declared

References

1. Group WQ. What is quality of life? World Health Organization. 1996;17:352–356.
2. Bourzgui F, Serhier Z, Sebbar M, Diouny S, Bennani Othmani M NP. Adaptation and validation of the Moroccan Arabic version of the Psychosocial Impact of Dental Aesthetics Questionnaire (PIDAQ). Saudi Dent journal. 2013;27:180–186.
3. Bretz YPM, Sousa GLN, Serra-Negra JMC, Paiva SM AL. Association between malocclusion severity and psychosocial issues among adolescents. J Oral Res. 2019;8:42–9.
4. Bucci R, Rongo R, Zito E, Galeotti A, Valletta R D V. Cross-cultural adaptation and validation of the Italian psychosocial impact of dental aesthetics questionnaire (PIDAQ). Quality of life research: an Int J Qual Life Asp Treat Care Rehabil. 2015;24:747–752.
5. RA. C. Moving from the quality of life concept to a theory. J Intellect Disabil Res. 2005;49:699–706.
6. Hagerty MR, Cummins RA, Ferriss AL et al. Quality of life indexes for national policy: review and agenda for research. Soc Indic Res. 2001;55:1–7.
7. Tsichlaki A, Chin SY, Pandis N, Fleming PS. How long does treatment with fixed orthodontic appliances last? A systematic review. Am J Orthod Dentofac Orthop. 2016;149:308–18.
8. Klages U, Claus N, Wehrbein H ZA. Development of a questionnaire for assessment of the psychosocial impact of dental aesthetics in young adults. Eur J Orthod. 2006;28:103-111.
9. Lin H, Quan C, Guo C, Zhou C, Wang Y BB. Translation and validation of the Chinese version of the psychosocial impact of dental aesthetics questionnaire. Eur J Orthod. 2013;35:354–360.
10. Aglarci C, Baysal A, Demirci K, Dikmen F AA. Translation and validation of the Turkish version of the psychosocial impact of dental aesthetics questionnaire. Korean J Orthod. 2016;46:220–227.
11. Bourzgui F, Elmoutawakil A, Diouny S, Elquars F. The impact of malocclusion on oral health-related quality of life in orthodontic patients. Malocclusion: Causes, Complications and Treatment. 2018. 309–330 p.
12. Santos PM, Gonçalves AR MT. Validity of the psychosocial impact of dental aesthetics questionnaire for use on Brazilian adolescents. Dent Press J Orthod . 2016;21:67–72.

13. Singh VP SR. Translation and validation of a Nepalese version of the psychosocial impact of dental aesthetic questionnaire (PIDAQ). J Orthod. 2014;41:6–12.
14. Sardenberg F, Oliveira AC, Paiva SM, Auad SM VM. Validity and reliability of the Brazilian version of the psychosocial impact of dental aesthetics questionnaire. Eur J Orthod. 2011;33:270–275.
15. Isiekwe GI, Onigbogi OO, Olatosi OO SO. Oral Health Quality Of Life In A Nigerian University Undergraduate Population. J West Afr Coll Surg. 2014;4:54–74.
16. Onyeaso CO, Utomi IL IT. Emotional effects of malocclusion in Nigerian orthodontic patients. J Contemp Dent Pr. 2005;6:64-73.
17. Arora P, Haynie JM LG. Counterfactual thinking and entrepreneurial self-efficacy: The moderating role of self-esteem and dispositional effect Pr Entrep Theory. 2013;37:359-385.
18. Militi A, Sicari F, Portelli M, Merlo EM, Terranova A, Frisone F, et al. Psychological and social effects of oral health and dental aesthetic in adolescence and early adulthood: An observational study. Int J Environ Res Public Health. 2021;18:2–9.
19. Moeller J, Singhal S, Al-Dajani M, Gomaa N, Quiñonez C. Assessing the relationship between dental appearance and the potential for discrimination in Ontario, Canada. SSM - Popul Heal. 2015;1:26–31.
20. Lopez, Y., Rouzic, J., Bertaud, V., Pérard, M., Clerc, J. and Vulcain J. Influence of teeth on the smile and physical attractiveness. A new internet-based assessing method. Open J Stomatol. 2013;3:52–7.
21. Robin S. Baker, Henry W. Fields, F. Michael Beck, Allen R. Firestone SFR. Objective assessment of the contribution of dental esthetics and facial attractiveness in men via eye tracking. Am J Orthod Dentofac Orthop. 2018;153:523–33.
22. Parrini S, Rossini G, Castroflorio T, Fortini A, Deregibus A DC. Laypeople's perceptions of frontal smile esthetics: A systematic review. Am J Orthod Dentofac Orthop. 2016;150:740-750.
23. Kikelomo Adebanke Kolawole, Olusegun Oluseun Ayeni VIO. Psychosocial impact of dental aesthetics among university undergraduates, International Orthodontics. Int Orthod Sci direct. 2012;10:96–109.
24. Iranzo-Cortés JE, Montiel-Company JM, Bellot-Arcis C, Almerich-Torres T, Acevedo-Atala C, Ortolá-Siscar JC, et al. Factors related to the psychological impact of malocclusion in adolescents. Sci Rep. 2020;10:1–8.
25. Mavis Henriques & Debasis Patnaik, Social Media and Its Effects on Beauty. . 10.5772/intechopen 93322 .2020. 5211 p.
26. Alvarez-Azaustre MP, Greco R LC. Oral Health-Related Quality of Life in Adolescents as Measured with the Child-OIDP Questionnaire: A Systematic Review. Int J Env Res Public Heal. 2021;18:1–16.
27. Albino JE, Tedesco LA KH. Esthetic issues in behavioural dentistry. Ann Behav Med. 1990;12:148–155.
28. Phillips C BKNE. Self-concept and the perception of facial appearance in children and adolescents seeking orthodontic treatment. Orthod, Angle. 2009;79:12–16.
29. Aitao Lu, Xiuxiu Hong, Yanping Yu, Hong Ling, Haiping Tian, Zuwei Yu LC. Perceived physical appearance and life satisfaction: A moderated mediation model of self-esteem and life experience of deaf and hearing adolescents. J Adolesc. 2015;39:1–9.
30. Alhajj MN, Ariffin Z, Celebić A, Alkheraif AA, Amran AG II. Perception of orofacial appearance among laypersons with diverse social anaphic status. PLoS One. 2020;15:1–11

Management of Class II Division 1 Malocclusion with Bimaxillary Proclination of the Incisors - A Case Report

Ayenakin O, Utomi IL

Abstract

Background: This case reports the orthodontic management of a 23-year-old female who presented at the Lagos University Teaching Hospital with Angle's class II division 1 malocclusion on skeletal pattern II. This was complicated by increased overjet of 8.5mm, increased upper and lower incisal angles, mild upper anterior crowding of 2mm, constricted lower anterior arch, Ellis class I fracture of the upper right incisors, rotated teeth 21, 22, and 16, and the upper midline shift to the right by 1mm.

Methods: Interdisciplinary management was done with Oral/Maxillofacial Surgery and restorative units where a 2-unit extraction of the maxillary first premolars and composite restoration of tooth 21 were done respectively. Comprehensive upper and lower fixed orthodontic appliance, preadjusted edgewise was used using Roth 0.022 prescription brackets.

Results: The treatment was completed in 26 months and the outlined objectives were achieved.

Conclusion: The objectives for the treatment were achieved and the patient had significant improvement in appearance. Fixed lingual of both arches and Hawley's were used for retention.

Key words: Class II division I, Malocclusion, Interdisciplinary management, Orthodontics

Authors' Affiliation

Department of Child Dental Health, Lagos University Teaching Hospital, Idi Araba, Lagos.

Correspondence

Ayenakin O.

Department of Child Dental Health, Lagos University Teaching Hospital, Idi Araba, Lagos.

ORIGINAL ARTICLE

Introduction

Malocclusion is the term used to describe any deviation of the teeth from the norm. Edward. H. Angle, classified malocclusion into I, II, and III, based on the relationship of the mesiobuccal cusp of the maxillary first molar to the buccal groove of the mandibular first molar[1]. Class II malocclusion is characterized by the mesiobuccal cusp of the maxillary first permanent molar occluding anteriorly to the buccal groove of the mandibular first molar. This type of malocclusion is the most common reason patients seek orthodontic treatment,[2] due to noticeable clinical features, particularly in Class II division 1 cases which is associated with proclination of the upper incisors. In Africa, Angles Class II malocclusion is the second most prevalent type accounting for 9.7%, while Class I and III malocclusions constitute 76.7% and 4% respectively.[3] Specifically, about 9.9% of Nigerians present with Angles Class II division 1 malocclusion[4] Bimaxillary proclination, characterized by proclined upper and lower incisors, further compromises the aesthetics when present in class II malocclusion. The management of Class II malocclusion depends on factors such as the patient's age, and the presence or absence of skeletal discrepancies[5].

The use of fixed appliances, with or without extractions in the management of Class II division 1 in adults has been documented in literature. Although 2-unit extraction of the upper first premolar is often recommended, management of Class II division 1 becomes more complex in the presence of equally proclined lower incisors.

Clinical Case

Patient AO, a 21 years old female presented at the Orthodontic Unit of the Lagos University Teaching

Hospital, with a presenting complaint being "my upper teeth are forward". There was no significant medical history of note. On examination, there was no facial asymmetry, and her lips appeared competent, with a Jackson score of 3/1. The facial profile appeared slightly convex, a presentation that is common in skeletal Pattern II (Figure 1).

FRONTAL PROFILE VIEW FRONTAL SMILING

Figure 1. Pretreatment extraoral photographs

On intraoral examination, all the permanent teeth were present except tooth 38. There were no decayed, missing, or filled teeth. Mild upper anterior crowding of 2.5 mm was measured, and no crowding or spacing was seen in the lower arch. The upper and lower arches were slightly constricted, and the upper and lower incisors were proclined. The overjet was 8mm on the left and 6.5mm on the right, while the overbite was reduced and complete. There was a shift in the upper midline to the left by 1.5mm, mesiolabial rotation of 16, distolabial rotation of 21, 22, and Ellis class I fracture of 12. The anteroposterior molar relationships bilaterally were Angle Class II.

Upper arch Lower arch

Right buccal segment Left buccal segment

Figure 2. Pretreatment intraoral photographs

Panoramic radiograph (Figure 3) showed mesioangular impaction of 38 and 48, as well as otherwise healthy periodontium of all other teeth present (Figure 3). The pretreatment cephalometric analysis (figure 4) showed a reduced SNB of 78^0 (relative to normal Nigerian values), ANB of 7.5^0, and reduced interincisal angle of 83^0. The Frankfort mandibular plane angle was increased (22^0) as well as the percentage lower facial height (62.5%), and the upper and lower incisal angles were significantly increased at 131^0, and 125^0 respectively. All the cephalometric soft tissue analysis parameters were within normal range.

Figure 3. Pretreatment panoramic radiograph.

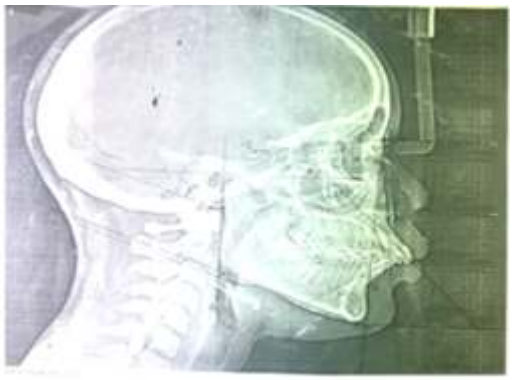

Figure 4. Pretreatment Cephalometric radiograph.

Figure 5. Pretreatment study models.

Treatment Objectives.

The objectives of the orthodontics treatment in this patient were to achieve normal overjet, full unit class II molar relationships bilaterally, to achieve Class I canine relationship, unravel the crowding, round up the arches, to derotate teeth, and achieve coincident midlines.

Treatment Plan.

The treatment plan was to set up a comprehensive fixed orthodontic appliance therapy, preadjusted edgewise, with 2-unit extractions of 14 and 24, to band up to the 7s, and interproximal reduction in the lower arch to create space to upright the lower incisors, and to consider the extraction of the

impacted lower 8s. Hawley's retainer and fixed lingual retainers would be provided after orthodontic treatment.

Treatment Progress.

Two unit extraction of the upper 14 and 24, as well as the composite build-up of 12, was done prior to orthodontic treatment. This was followed by a complete upper and lower arch set-up, using the Roth 0.022 prescription, preadjusted edgewise bracket system. The arch wire sequence used was '0.012 Nickel Titanium wires (Niti) in the upper and lower arches, followed by 0.014 Niti, and 0.016 Niti. Elastic separators were placed around all 7s to create space for banding of the 7s, after which the wire sequence continued as 0.018 Niti, and 0.020 Niti. Minimal interproximal reduction was done repeatedly in the lower arch intermittently and the wire sequence proceeded up to rectangular 0.019' x 0.025' stainless steel wires (SSW). Crimpable hooks were placed in the upper arch of this rectangular wire, for the application of active tie-back for space closure and class II elastics. Figure of 8 wiring was applied from upper 13 to 23 to retract the upper anterior segment and close the extraction spaces, using the active tie-back (ATB) bilaterally in the upper arch. Upper midline correction was done using 2 elastic modules ATB on the upper right quadrant, and single module ATB on the left quadrant. Medium Class II elastics were given to encourage further retraction of the upper segment and correct the Class 1 canine relationship. A passive tie-back on the upper left quadrant was placed to stabilize the arch after space closure on the left side, while an active tie-back continued on the right. Elastic chain was applied from 17 to 27 to close the residual spaces. Figure of 8 wiring with soft stainless-steel wire was then applied to all the teeth in the upper arch, while posterior box elastics were given for posterior detailing. The patient was debonded after 26 months. The composite build-up of 12 was repeated after debonding, while upper Hawley and lower fixed retainers were given.

Figure 6. Intraoperative photographs.

Figure 7. Intraoperative photographs showing before and after space closure.

Frontal 1 **Frontal 2** **3/4 view** **Profile**

Figure 8. Post-treatment extraoral photographs.

Figure 9. Post-treatment intraoral photographs and retainers.

Figure 10. Post-treatment Cephalometric radiograph.

Figure 11. Before and after treatment.

Figure 12. Post-treatment study models.

Table 1. Comparison of pre- and p0st- treatment cephalometric values

	Pre-treatment values	Post-treatment values	Difference
• SNA	85.5^0	85.5^0	0
• SNB	78^0	78^0	0
• ANB	7.5^0	7.5^0	0
• U1 to FP	131^0	118^0	13^0
• LI to MP	125^0	110^0	15^0
• IIA	83^0	107.5^0	24.5^0
• FMA	22^0	20^0	2^0
• LFH	62.5%	60%	2.5%

Treatment results.

Normal overjet of 2mm was achieved, upright upper incisors, significantly improved proclined lower incisors, rounder arches, restoration of 12, coincident midlines, and the smile and profile remain balanced.

Discussion

The patient in this case was managed following Roth's philosophy of extracting two maxillary first premolars in class II cases where there is no crowding or skeletal deficiency[6,7]. Although the mandible was slightly deficient and the SNA angle was at the upper limit of normal, orthognathic surgery was not an option based on the patient's preference, hence a definitive management with dental camouflage was prescribed. Post-treatment satisfaction with orthodontic camouflage without surgery is similar to satisfaction following orthognathic surgery[8].

Space management was of utmost importance due to the significantly increased upper and lower incisal angles, hence anchorage was controlled by ensuring all the second molars were banded to provide better reinforcement when retracting the proclined upper and lower incisors. Most of the post-treatment cephalometric parameters improved significantly. Although the lower incisors to mandibular plane angle was still increased, the post-treatment occlusal features were very acceptable considering the severity of the bimaxillary proclination and the fact that no teeth were extracted in the lower arch.

Conclusion

Angle's class II division 1 malocclusion can be successfully managed with extractions and the use of elastics. In managing patients with bimaxillary proclination, good stability after treatment can be ensured by normalizing the interincisal angle, achieving lip competence, and having good buccal intercuspation.

References.

1. Rea Ghodasra MBrizuela. Orthodontics, Malocclusion. StatPearls Publishing LLC.; 2023. 1 p.
2. Ayaz M, Kharbanda OP. Successful treatment of Class II malocclusion with bidental protrusion using standard edgewise prescription. Contemp Clin Dent. 2016 Jan 1;7(1):75–8.
3. Yemitan TA, Oyapero AO, Scientia M. Prevalence of malocclusion in Africa: A systematic review and meta-analysis. 2022; Available from: https://doi.org/10.30574/msarr.2022.5.1.0041
4. Ajayi E, Ize-Iyamu I. Malocclusion and occlusal traits among orthodontic patients seen at the University of Benin Teaching Hospital, Nigeria. Niger Dent J. 2011 Mar 30;18(1).
5. Ramamurthy Suresh a KP. Orthodontic camouflage treatment of skeletal class II malocclusion with severe maxillary dentoalveolar protrusion. Journal of Pierre Fauchard Academy. 2013;27(4):118–23.
6. S E Bishara DMCJRJARZ. Dentofacial and soft tissue changes in Class II, division 1 cases treated with and without extractions. Am J Orthod Dentofacial Orthop. 1995;107(1):28–37.
7. Esquivel Alvirde A, Aguilar Acevedo J, Aranda González RM. Tratamiento de una maloclusión clase II división 1 en un paciente adulto. Reporte de un caso. Revista Mexicana de Ortodoncia. 2015 Jan;3(1):39–46.
8. Mihalik CA PWPC. Long-term follow up of Class II adults treated with orthodontic camouflage: A comparison with orthognathic surgery outcomes. Am J Orthod. 2003;123:266-278.

Abstract Presentation at NAO 2023 Annual Scientific Conference held in Lagos at the Marriott hotel Ikeja, from September 17-19, 2023.

ORAL PRESENTATIONS

ABSTRACT ONE

Unlocking the Secrets to Naturally Looking Designed Smiles

Shumbusho A*

Abstract

In the field of dentistry, the pursuit of achieving aesthetically pleasing smiles has been an ongoing endeavor. This has led to the development of various techniques and treatments to enhance the appearance of smiles.

However, one challenge that practitioners face is maintaining a balance between a designed smile and a natural-looking result.

I will be sharing a comprehensive approach that combines Artistry, Technology, and Patient-centered care.

ABSTRACT TWO

Limited Orthodontic Treatment for Severely Rotated Incisors in an Adult Female Patient with Cleft: A Case Presentation

Nkwocha FG[1], Aladelusi TO[2], Afieharo IM[3], Olusanya AA[2], Oromakinde AE[1*].

[1]Department of Child Oral Health, University College Hospital, Ibadan, [2] Department of Oral and Maxillofacial Surgery, University College Hospital, Ibadan, [3]Department of Aesthetic, Plastic and Reconstructive Surgeon, University College Hospital, Ibadan

Background and Aim: Cleft lip and palate present craniofacial and occlusal anomalies that are known to impact negatively on an individual's self-esteem and overall well-being which require comprehensive multidisciplinary management.

This case presentation focuses on a young, adult female patient from a resource-poor background, with a previously repaired cleft lip, who presented for correction of a severely rotated upper right central incisor and missing upper right lateral incisor.

The aim was to achieve functional and aesthetic improvement of the incisor position while minimising treatment complexity, cost, and duration as well as preservation of the integrity of the dental arch for a future comprehensive orthodontic and implant therapy for the missing upper right lateral incisor.

Materials and Methods: A secondary alveolar bone graft was performed before orthodontic treatment. Derotation of the upper right central incisor was carried out using Temporary Anchorage Devices, elastic chains, and a segmental straight wire fixed appliance. Retention was provided following active orthodontics with upper Hawley's retainer to maintain the achieved results.

Results: Correction of the severely rotated central incisor was achieved with pleasing aesthetics.

The arch width was maintained for future rehabilitation therapy, with the patient being highly satisfied.

Conclusions: This presentation showcases the multi-disciplinary management of orofacial cleft and the integration of orthodontics within the broader context of cleft care. Limited orthodontic treatment was successfully performed on the patient laying a foundation for a more comprehensive treatment and tooth implant when the patient becomes financially capable.

ABSTRACT THREE

Orthodontists' Clinical Appearance and the Perception of Patients

Etim SS[1*], Ndubuisi N[2], Mba MC[3], Eminue JO[1]

[1]Department of Child Dental Health, Faculty of Dentistry, College of Health Sciences, University of Port Harcourt. Rivers State, [2]Department of Child Dental Health, University of Port Harcourt Teaching Hospital. Rivers State, [3]Department of Oral Pathology and Biology, University of Port Harcourt Teaching Hospital. Rivers State.

Background and Aim: Orthodontists' dressing and appearance can make a non-verbal communication to the patients. This study aimed to assess patients' perception of their Orthodontists' appearance.

Materials and Methods: A 26-item interviewer-based questionnaire was used as a data collecting tool. Socio-demographic information of patients and their parents, their preferences for orthodontist's dress colour and style, and other elements of appearance were elicited. Pictures were included to demonstrate the questions for better understanding. SPSS version 25 was used for data analysis.

Results: The study involved 131 patients (82 (62.6%) females and 49 (37.4%) males); with mean age 19.20+/- 9.43 years; age range, 7-58 years. Of these, 121 (92.4%) had treatment appointment while 7(5.3%) were for routine checkup. Seventy four (56.5%) participants had no preferred gender for their orthodontists. Majority (116, 88.5%) were interested and liked their orthodontist dressing while a few (10,12.2%) female, 3 (6.1%) male were indifferent. Seventy three (55.7%) patients preferred white to coloured clothings, (98, 74.8%) preferred pinned/parked hair while only 20 (15.3%) preferred flowing hair on female orthodontists; the difference between genders was not statistically significant. In respect of male Orthodontists, (86, 65.6%) and (59, 45.0%) participants respectively would not want them to wear dreadlocks or afro style haircut. Majority (108, 82.4%), (113,86.3%) said Orthodontist dressing does not affect their cooperation and review
appointments, respectively.

Conclusions: Orthodontic patients have preference for the appearance of their Orthodontists,
though the clothings of their Orthodontists do not affect their cooperation and review appointments.

ABSTRACT FOUR

The Effects of Malocclusion among Priests: A Study of an Anglican Church in Enugu, Nigeria

Okeke A[*], Folaranmi N, Obi I
Department of Child Dental Health, University of Nigeria Teaching Hospital, Enugu, Nigeria

Background and Aim: Malocclusion influences many aspects of life including academic performance, employment, choice of friends and spouse. Priests are among the class of people that mostly have social contact and interaction with other persons. Since the priests are usually either preaching or counselling, they are common targets of facial assessment. However, since their duty is thought to be mostly spiritual, priests and the congregants may often overlook issues pertaining to their facial appearance with the possible consequences of malocclusion. The purpose of this study was therefore to evaluate the effects of malocclusion and facial appearance of priests as perceived by congregants. The influence of malocclusion on some aspects of priests' ministry (counselling and sermon) was assessed among church members.

Materials and Methods: This was an electronic questionnaire-based cross-sectional study in which google form survey administrative software was used to collect responses from 100 registered adult members of the chapel of His Resurrection, Parklane, G.R.A Enugu, aged between 18 and 70 years old. The collected data was analysed using the Statistical Product for Service Solution (SPSS) version 25.0. Descriptive statistics and Chi-square test were used for data analysis and significance was at 0.05.

Results: One hundred subjects participated in the study. 44 (39.3%) were between 31-44 years with a mean age of 43.6 ± 8.8 years. Slightly more than half (52%) were females. Most were medical practitioners 22 (19.6%). Most 73(65.2%) have heard of the term, "Malocclusion". (60%) believed that the issue of facial appearance was important for a priest while about half (47%) believed that unattractive facial appearance will impact negatively on the acceptance of the priests gospel message. Most (25%) believed that the teeth were the facial components most implicated in unattractive facial looks. However, most (54%) subjects said unattractive teeth

arrangement will not impact negatively on the acceptance of the priests gospel message. Only 24.1% said that facial appearance will influence their choice of priest to go to for counselling. Test of association between the sociodemographics and congregants perception as it concerns sermons or attendance to counselling was not significant.

Conclusions: Members of the church congregation are not only interested in the spirituality of their spiritual leaders but also on their physical appearance. Members of the clergy who have malocclusion (no matter how spiritual they may be), should avail themselves of orthodontic treatment to enhance the efficiency and effectiveness of their pastoral/priestly duties.

ABSTRACT FIVE

Assessing the Effect of Parental Factors on Gender Bias towards Orthodontic Treatment for Children

Azubuike O [*], Ndukwe A , Onyejaka N
Department of Child Dental Health, University of Nigeria Teaching Hospital, Enugu, Nigeria

Background and Aim: Cultural, socioeconomic and family backgrounds form factors that influence commencement of orthodontic treatment. In Africa, so much value is placed on the gender of a child and in some families more than one child may have malocclusion that requires orthodontic treatment. The study sought to determine if a child's gender is one of the factors that influences parent's choice in bringing their children for orthodontic treatment.

Materials and Methods: The study was a questionnaire-based descriptive cross-sectional study in which 85 sequential parents/guardians who brought their children to the orthodontic clinic of the University of Nigeria Teaching Hospital, Enugu were recruited into the study. Independent variables were gender, age, occupation, level of education and marital status while the dependent variable was the effect of gender on the choice of child brought to the clinic for orthodontic treatment. Descriptive statistics and Chi-square test were used for data analysis and significance was at 0.05.

Results: Eighty-five (85%) subjects participated in the study. 43 (50.6%) of the study subjects were between 40-49 years with a mean age of 43.18 ± 9.23 years. More than half of the study subjects (60%) were females. Most were civil servants (41.2%). 73(85.9%) believed that orthodontic treatment was necessary in both gender and being a single parent significantly (p-value 0.043) showed the necessity of treatment in both genders. However, 75(88.2%) of subjects said they will attend to their female child first if their finances at a particular time would be sufficient to attend to only one child. The need to "look fine" topped 52(61.2%) the reason for their decision. More female children 51(60%) were brought to the clinic than the males 34(40.0%).

Conclusions: Many subjects showed preference for the female children having orthodontic treatment than the males if their finance was sufficient to attend to only one child. With the call for equity and justice in the 21st century societies, attention therefore, should be drawn to this tendency to discriminate against the male child. Greater awareness is thus essential and governments the world over should be ready to alleviate the financial burden of healthcare so as to enable parents to show equal care to their children without the bias of gender.

ABSTRACT SIX

Knowledge and Practice about Oral Habits in Children by Medical Practitioners in Lagos State University Teaching Hospital

Bamgbose AL[1*], Yemitan TA[1,2], Odunsi OY[1]
[1]Department of Child Dental Health. Lagos State University Teaching Hospital,
[2]Department of Child Dental Health. Lagos State University College of Medicine.

Background and Aim: Oral habits have been identified as one of the major aetiological factors of malocclusion, which negatively impacts on the psychosocial well-being of a child. Medical practitioners of different specialties may be the first point of care for a growing child, therefore, the ability for them to identify these habits and refer them to the orthodontist early cannot be overemphasised. The purpose of this study was to evaluate the knowledge and perception of oral habits in children by medical practitioners in Lagos State University Teaching Hospital (LASUTH).

Materials and Methods: This was a descriptive cross-sectional study among 180 resident doctors in LASUTH. Self-administered online questionnaires were used for data collection. The data was analysed using Statistical Package for Social Sciences (IBM 23).
Results: More than half of the respondents (57.8%) were unaware that malocclusions are more likely to develop in children with oral habits. However, 58.3% (n =105) of them agreed that a high prevalence of oral habits is observed in children. In addition, 95.6% (n = 172) perceived that parental counselling combined with oral health education might be used as a preventive technique to reduce the occurrence of dental habits. Majority (93.3%) agreed that patients with oral habits should be referred to paediatric dentists.
Conclusions: The knowledge about oral habits as risk factors for malocclusion was inadequate among medical practitioners, although the majority of them had a positive perception concerning oral habits.

ABSTRACT SEVEN

Psychological Impact of Malocclusions of Adult Orthodontic Patients at Lagos State University Teaching Hospital - A Pilot Study.

Esan TB[1*], Odunsi OY[1], Yemitan T.A[1,2], Oyewo OO[1]
[1]Department of Child Dental Health. Lagos State University Teaching Hospital, [2]Department of Child Dental Health. Lagos State University College of Medicine.

Background and Aim: There is an increased demand for adult orthodontics because adults are becoming more aware and concerned about dental aesthetics. The way most people perceive themselves is greatly linked to their facial attractiveness, and this affects their social and professional relationships. Satisfactory aesthetic appearance influences the improvement of selfesteem and the way the body image is perceived by self. The aim of this study is therefore to assess the impact of dental aesthetics on the oral health related quality of life using the psychological impact of dental aesthetic questionnaire (PIDAQ).
Materials and Methods: This was a descriptive cross-sectional study of adults, age 18 years and above who presented at the orthodontic clinic of Lagos State University Teaching Hospital for diagnosis. A total of 60 adults were recruited and surveyed using the PIDAQ. Data analysis was done using SPSS. To check for internal consistency, Cronbach's alpha (α) was calculated for the scale as a whole and for each individual domain Bivariate analysis was performed using ANOVA test and Pearson's correlation coefficient. Multiple linear regression analysis was used to test the influence of socio-demographic factors on the PIDAQ scale and subscales.
Results: There was 100% response rate. Sex distribution was 70% (n = 42) female and 30% (n = 18) male. Subjects were of 3 age groups: between 18 to 25 years (40%, n = 24), 26 to 40 years
(46.7%, n = 28), and >40 years (13.3%, n = 8). The internal consistency was good (Chronbach's alpha=0.835). The overall mean score for PIDAQ was 75.4 (SD=20.5) with social impact domain having the highest rating of 23.5 (SD=7.7). There were significant negative correlations indicating inverse relationships between total PIDAQ score and age group (Pearson =0.361), psychological impact with age (Pearson = -0.402) and marital status (Pearson = -0.321). However, a positive relationship was found between psychological impact and past dental treatment (Pearson =0.299, $p<0.05$). Comparing age groups, significant differences were found in the psychological impact ($p=0.003$), social impact ($p=0.010$), aesthetic concern ($p=0.044$) and total PIDAQ score ($p=0.027$). Those with tertiary education had the highest impact in the dental self-confidence, aesthetic concern and total PIDAQ ($p<0.05$). The younger adult, unmarried, and subjects with no previous dental treatment had highest impact in the psychological domain ($p<0.05$).
Conclusions: Perceived dental aesthetics affect the psychological well-being of the subjects. Age, marital status, level of education, and history of past dental treatment were all factors that significantly affected self-perceived aesthetics and psychosocial well-being. The perception of patients on dental aesthetics should be put into consideration when planning dental and orthodontic services in order to achieve a higher level of satisfaction.

ABSTRACT EIGHT

Transmigration of Right Mandibular Canine – A Case Report

Odunsi OY[1*], Oyewo OO[1], Yemitan TA[1,2], Adegbite KO[1]
[1]Department of Child Dental Health. Lagos State University Teaching Hospital,
[2]Department of Child Dental Health. Lagos State University College of Medicine.

Introduction: Transmigration is a rare and special phenomenon of movement of an unerupted tooth in the bone across the midline to the opposite side of the dental arch.
This unusual developmental dental anomaly, which occurs only in the permanent dentition could involves the mandibular lateral incisor, the canine, and the second premolar. The left canine has been reported to undergo transmigration more commonly than the right. These teeth usually remain impacted and asymptomatic, often diagnosed by chance during a routine radiographic examination.
The most common clinical signs announcing the presence of this anomaly are over-retention of the deciduous canine and the absence of permanent canine from the dental arch after its physiological period of eruption.
Case Description: This report presents a clinical case of an eleven-year-old female patient who presented at the orthodontic clinic of Lagos State University Teaching Hospital with transmigrated right mandibular canine whereas transmigration has been reported to be more frequent on the left side.
On intraoral examination, right mandibular deciduous canine was seen to be retained. Panoramic radiograph revealed a mesioangularly impacted right mandibular permanent canine migrated across the midline and located below the apices of the incisors.
Conclusion/ Clinical Significance: The presence of retained mandibular deciduous canine, and absence of permanent teeth which cannot be accounted for should always be investigated radiographically. Failure to detect such teeth, however, could lead to damage to adjacent teeth and surrounding bone.

ABSTRACT NINE

Assessment of Impact of Orthodontic Treatment On Oral Health Related Quality of Life In A Nigerian Adult Population.

Umeh OD[1], Adeloye AY[2*], Utomi IL[1], Saliu ZA[2], Isiekwe IG[1], daCosta OO[1], Sanu OO[1].
[1]Department of Child Dental Health, Faculty of Dental Sciences, CMUL/Lagos University Teaching Hospital, [2]Department of Child Dental Health, Faculty of Dental Sciences, Lagos University Teaching Hospital

Background and Aim: There is an increasing number of adult patients seeking orthodontic treatment. Adults generally present with different experiences such as buccal pathologies, and psychological limitations. Understanding their difficulties during treatment enables clinicians deliver more efficient treatment experiences, thus improving their oral health related quality of life. This study aims at assessing the impact of orthodontic treatment on the oral health related quality of life of adults.
Materials and Methods: A descriptive cross-sectional study. Self-administered OHIP-14 questionnaire through Google forms on WhatsApp data collection platform was used after obtaining consent and ethical approval. Questionnaires assessed levels of pain, discomfort, and oral functional problems using a Likert scale and OHIP.
Statistical analysis was carried out using the Statistical package for social sciences, SPSS version 23.0 with 0.05 level significance.
Results: A total of 83 participants responded to the survey with a mean age of 24yrs and a male to female ratio of 1;3. Physical discomfort was reported by 84.3% of respondents, experiencing occasional mouth pain, eating discomfort (60.2%) and speech affection (47%). Approximately 68.7% and 60.2% reported self-consciousness and treatment-related anxiety respectively. Only 7.4% felt embarrassed about wearing braces.
Conclusions: Orthodontic treatment affects oral health related quality of life in adults.

ABSTRACT TEN

Geospatial Mapping of Orofacial Clefts in Northwest Nigeria.

Aborisade A O [1*], Oguchi C O[2], Adeoye J B[3], Badamosi M [4], Ibrahim A N [4], Adebola R A[5]

[1]Department of Oral Diagnostic Sciences, Aminu Kano Teaching Hospital Complexes/ Bayero University, Kano, [2]Department of Child Dental Health, Aminu Kano Teaching Hospital Complexes/ Bayero University, Kano, [3]Adjuvant Capital Management Team, New York, United States, [4]Center for Dry Land and Agriculture, Bayero University, Kano, [5]Faculty of Dentistry, Federal University of Health Sciences, Azare, Bauchi State

Background and Aim: Geographic information systems, GIS aids in disease mapping, pattern identification, and spatial data linkage. Grassroot Smile Initiative (GSI), a Smile Train partner in Kano since 2008, treated 2000+ cleft lip-palate (CL/P) patients. This study aims to analyze CL/P's geospatial distribution and incidence patterns in Kano, Northwestern Nigeria, as a pilot.

Materials and Methods: The data utilized was for in-patient CL/P cases treated at GSI. Basic information from the hospital's patients' records was retrieved. Statistics utilized included: means, percentages and frequencies. GIS analysis was done using ArcMap 10.3. A first step involved geocoding street addresses into a map coordinate system before aggregation to wards for subsequent spatial distribution analyses.

Results: A total of 928 cases were mapped. The analysis found that 54.4% (n=505 patients) of these cases were residents of the Kano Metropolis, a high-density area, confirming that cleft incidence patterns align with population density in Kano. Furthermore, the highest prevalence of cleft cases was observed in the Metropolis in 2008, with slight increases in the northern and southern regions by 2013. When considering age, the Metropolis had the highest cleft prevalence for children under 1 month and those over 5 years old, while the south-western part had the highest prevalence for patients over 20 years.

Conclusions: The GIS analysis revealed that most of the patients with CL/P who got treatment from GSI Hospital lived relatively nearby with greatest incidence of cleft in the Metropolis. The cost of travelling may explain why those further afield do not come in for treatment.

ABSTRACT ELEVEN

Cleidocranial Dysplasia in an Orthodontic Patient: A Case Report

Ben-Okoye AL[1*], Ayenakin OO[2], Utomi II[3]

[1]Lecturer Department of child dental health, Faculty of Dentistry, University of Calabar, [2]Department of Child Dental Health, Lagos University Teaching Hospital, [3]Professor of Orthodontics, Department of Child Dental Health, Lagos University Teaching Hospital

Cleidocranial dysplasia (CCD) is a rare autosomal dominant condition that affects ossification. Global prevalence is one in one million births. Mutations of the runt-related transcription factor 2 gene (*RUNX2*), located on chromosome 6p21, have been identified as the cause of CCD. *RUNX2* controls the differentiation of precursor cells into osteoblasts and is essential for intramembranous bone formation, which is associated with delayed ossification of skull, spine, legs, feet, clavicles, maxilla, and teeth. In some cases, the clavicles are absent.

Dentofacial anomalies observed in patients with cleidocranial dysplasia (CCD) include: brachycephalic skull and bossing of the parietal and frontal bones, hypoplasia of the mid-face, apparent mandibular prognathism. The skeletal relationship of the jaws tends to be in a Class III position due to the presence of a hypoplastic maxilla. Vertical facial growth is decreased due to poor development of the alveolar bone. Other oral manifestations include delayed exfoliation of deciduous teeth, delayed eruption of permanent dentition, multiple supernumerary teeth and predilection for cyst formation involving the unerupted teeth**.**

The dental abnormalities associated with CCD may present an obstacle to orthodontic treatment planning. Treatment for CCD will often require coordination between oral and maxillofacial surgeons**,** orthodontists, and prosthodontists. The earlier the condition is recognized and properly treated, the better the chances are for a patient's favorable outcome.

In this case we report a typical case of CCD in a 20-year-old female who presented with classical diagnostic features of this condition. Patient presented at the Orthodontic unit of the Lagos University Teaching Hospital.

ABSTRACT TWELVE

A Comparative Cephalometric Evaluation of Children Aged 8-12 Years with Repaired Unilateral Cleft Lip and Palate in Kano State, Nigeria

Jibril M[1*], Isiekwe IG [2], Oguchi C[1]
[1]Department of Child Dental Health, Aminu Kano Teaching Hospital, Kano, [2]Department of Child Dental Health, Faculty of Dental Sciences, College of Medicine, University of Lagos.

Background and Aim: Cleft lip and/or cleft palate is the most common craniofacial anomaly. These patients often present with skeletal maxillary retrusion. The aim of this study was to compare the maxillomandibular cephalometric values of 8 – 12-year-old children with repaired unilateral cleft lip and palate and children without clefts.
Materials and Methods: This was a cross-sectional study of 30 patients with repaired unilateral clefts and 30 non-cleft controls. The patients aged 8-12 years. The radiographs were manually traced and analysed to produce values for SNA, SNB, ANB and Nasolabial angles, The WITS appraisal was also assessed.
Results: The mean age of the cleft group was 9.6 ± 1.55 years, while that of the control was 10.1 ± 1.47. The mean SNA, SNB, and ANB for the study group were 77.5± 4, 75.4 ± 4, and 2.1 ± 2 degrees respectively while for the control group were 82.3 ± 2.77, 79.3 ± 2.91, 2.96 ± 3.89 degrees respectively.
Values for SNA, SNB, and ANB, were all significantly greater in the control group than in the cleft group. Wits appraisal was significantly lower in the cleft group.
Conclusions: The findings from this study showed that the children with repaired clefts had significantly lower SNA, SNB, ANB angles and Wits appraisal when compared with children without clefts.

ABSTRACT THIRTEEN

Factors Influencing Dental Career Progression among Dental Students and Recent Graduates in Nigeria.

Umeh OD[1], Sanu OO[1], Ayenakin O[2*].
[1]College of Medicine, University of Lagos/Lagos University Teaching Hospital, [2] Department of Child Dental Health, Lagos University Teaching Hospital.

Background and Aim: Similarities exist in the dental surgery curriculum and the basic requirements for professional qualifications all over the world. Most studies investigating the core interests of medical and dental students focused on correspondents interested in pursuing residency after graduation. This is not enough to understand what path in dentistry is most desired or if young dentists will consider clinical practice at all. Therefore, the aim of this study was to identify the future career path(s) of dental students and recent dental graduates, and to determine the factors responsible for their decision.
Materials and Methods: All fifth, sixth-year dental students, and recently graduated dentists in the past two years at the college of Medicine, University of Lagos were recruited. Ethical approval was obtained from the research ethics committee. A self-administered 32-item online survey was designed to identify what career path in dentistry the participants find more appealing and why they are preferred. Data analysis was done using SPSS version 27.
Results: A total of 58 respondents, 20 males and 38 females, with a mean age of 27 3.02 were recruited for this study. Approximately 76% of the participants intend to practice clinical dentistry, 15.52% uncertain, and 8.62% unwilling. The preferred career paths are residency in a preferred specialty (62%), postgraduate masters (41%), non-dental related businesses (36%), and private dental practice (34%). Some of the strongest reasons for their desired path were pay renumeration (63.8%), flexible work schedule (55%), predictable work hours (41%), they found it more impactful (41.4%), and the potential for job opportunities abroad (36%).
***Conclusions*:** This study shows that most dental students prefer clinical practice while pursuing other personal non-dental businesses over non-clinical pathways and research.

ABSTRACT FOURTEEN

Bilateral Maxillary Canine Agenesis in a Nigerian Family: A Case Report.

Koledoye OA[1*], Isiekwe IG[1], Utomi IL[1].

[1]Department of Child Dental Health, Lagos University Teaching Hospital

Background and Aim: Tooth agenesis is one of the most commonly known dental anomalies characterized by the developmental absence of one or more teeth. Agenesis of both maxillary canines is an extremely rare condition and few cases have been reported in the literature. The prevalence of the maxillary canine agenesis varies between 0.07 and 0.13%. The aim of this study is to report a case of non-syndromic bilateral agenesis of permanent maxillary canine in three healthy members of a Nigerian family who presented to the Orthodontic clinic of the Lagos University Teaching Hospital for orthodontic treatment.

Materials and Methods: Intraoral clinical examination was done and radiological investigations were carried out using orthopantomograph.

Results: The maxillary deciduous canines were found to be present bilaterally in one of the members of the family while the others had neither the deciduous nor permanent canines present. The orthopantomograph also confirmed the absence of the permanent canines in the three members of the family.

Conclusions: A familial case of bilateral agenesis of permanent maxillary canine was reported in a Nigerian family. A genetic study will be carried out at a later time to detect the gene associated with tooth agenesis in this family.

ABSTRACT FIFTEEN

Occlusal Features and Orthodontic Treatment Needs in Cerebral Palsy Patients

Ben-Okoye AL[1*], Utomi IL[2].

[1]Lecturer Department of child dental health, Faculty of Dentistry, University of Calabar, [2]Professor of Orthodontics, Department of Child Dental Health, Lagos University Teaching Hospital

Background and Aim: Cerebral palsy (CP) refers to a heterogeneous group of conditions involving permanent non-progressive central motor dysfunction that affects muscle tone, posture, and movement. The aetiology is multifactorial, risk factors include maternal infections, neonatal jaundice, convulsions and infections, birth asphyxia and prematurity. The prevalence of CP is approximately 1.8–2.3/1000 children in Africa. Cerebral palsy gives rise to many functional problems, including impaired swallowing, chewing and speech.

The aim of this study was to assess the occlusal features and orthodontic treatment needs in patients with cerebral palsy.

Materials and Methods: A cross sectional study of patients with CP in the department of Pediatrics, Lagos University Teaching Hospital. Participants whose caregivers gave consent were recruited.. Oral examinations carried out on the participants. Treatment need was assessed using Dental Aesthetic Index (DAI).

Results: A total of 42 CP patients aged 1.7 to 18 years with a mean age 6.51±2.1years. There were 25(59.5%) males and 17 (40.5%) females. The Majority 39(92.6%) of the participants had Angles class I molar relationship. Eighteen (42.9%) participants had lip incompetence, 4(9.55%) had crowding, 8(19.1%) had anterior open bite, 16(38.1%) had one form of oral habit, 23(54.7%) had saliva drooling. Orthodontic treatment was not indicated in 25(59.5%) of the participants, elective in 7(16.7%) and was highly desirable in 10(23.8%) of the participants.

Conclusions: Lip incompetence, parafunctional habits, anterior open bite, and drooling were the most prevalent findings. Orthodontic treatment was indicated in significant proportion of the population

POSTER ONE

The Practice of Medical Practitioners at Lagos State University Teaching Hospital about Oral Habits in Children

Bamgbose AL[1*], Yemitan TA[1,2], Odunsi OY[1]

[1]Department of Child Dental Health. Lagos State University Teaching Hospital, [2]Department of Child Dental Health. Lagos State University College of Medicine.

Background and Aim: Oral habits existing beyond the age of 4 years are classified as anomalies and need to be intercepted at an early stage before they impact dentofacial growth. This will save patients from emotional distress and reduce financial burden while lessening treatment time and complexities. Majority of these patients present first to a physician, which makes their ability to detect these habits crucial.
The purpose of this study was to assess the practice of medical practitioners in Lagos State University Teaching Hospital (LASUTH) concerning oral habits in children.
Materials and Methods: A survey was conducted among medical resident doctors in LASUTH. Questionnaires were distributed through an online data collection platform. Data was collected on demographic characteristics and practices about oral habits in children. The data was analysed using SPSS IBM 2023.
Results: A larger proportion of the medical practitioners (66.7%, n = 120) refer their patients with oral habits to a paediatric dentist, while 30.6% (n =55) of them do not refer. Only 51.7% of respondents followed up on referrals for management of oral habits.
Conclusions: These results show the need for sensitization and enlightenment of medical practitioners concerning oral habits and their effects on occlusion.

POSTER TWO

Clinical Presentation of Malocclusions of Adult Orthodontic Patients at Lagos State University Teaching Hospital: A Retrospective Study.

Esan TB[1], Yemitan TA[1,2], Oyewo OO[1]

[1]Department of Child Dental Health. Lagos State University Teaching Hospital, [2]Department of Child Dental Health. Lagos State University College of Medicine.

Background and Aim: There has been an increase in the demand for orthodontic treatment by adults over the years. The main reasons for this demand include: the increasing awareness, desire to improve facial aesthetics, and need for prosthetic replacement.
To determine the pattern of malocclusions and oral hygiene status among adult orthodontic patient.
Materials and Methods: A retrospective review of the hospital records of adult patients who presented at the Orthodontic unit of the Department of Child Dental Health LASUTH, Lagos State, Nigeria, from January 2020 to December 2022. The demographic and clinical data: The patient's age, gender, molar relationships, tooth-bone ratio, transverse occlusal variables, and oral hygiene status (OHS) were retrieved from the patient's records.
Results: Out of 208 patients who attended orthodontic clinic during the period of study, 100 were adults. The mean age of subjects was 28.46±8.4 and prevalence was 48%. The M:F= 35:65. Angles Class I (n=74), Angles Class II (n=18) and Angles Class III (n=8). Spacing was significant among 18-25years age group (p=0.027). Male had 22.9% good OHS, 71.4% fair OHS and 5.7% poor OHS while females had 22.9% good OHS, 71.4% fair OHS and 5.7% poor OHS.
Conclusions: Younger adults have higher demand for treatment with Angles Class I being the commonest type of malocclusion and Class III the least. Spacing was significant. Fair OHS was predominant in both genders.

CASE ONE: ANNE ISIEKWE

Orthodontic-Surgical Management of Severe Skeletal Class III Malocclusion.

Ben-Okoye AL[1], Utomi IL[2]

[1] Lecturer Department of child dental health, Faculty of Dentistry, University of Calabar
[2] Professor of Orthodontics, Department of Child Dental Health, Lagos University Teaching Hospital

Introduction: Orthognathic surgery in conjunction with fixed orthodontics is a common indication for interdisciplinary management of severe skeletal Class III malocclusion. A thorough analysis of pretreatment investigations and development of a surgical visual treatment objective is essential to plan the type of surgical technique required. Bimaxillary orthognathic surgery is the most common type of surgical procedure for severe skeletal discrepancies. The present case report is a combined ortho-surgical team management of a skeletally Class III patient.

Case Description: A 24-year-old patient attended the Orthodontics Clinic Lagos University Teaching Hospital, chief complaint was an unattractive facial appearance due to a forward position of the mandible and inability to bite with the front teeth. Upon facial examination, the lower facial height was increased. The lateral and oblique view showed a greater projection of the chin, a concave profile. Intraorally, the molar relationship was class III; a negative overjet of -5mm. The patient presented a mild discrepancy of the dental midline as well. Orthodontic treatment was carried out in three phases: presurgical, surgical and postsurgical. In the presurgical phase dental decompensation was performed and the patient was prepared for surgery. In the surgical phase a le fort osteotomy was performed to advance the maxilla by 4mm. A mandibular setback via bilateral sagittal osteotomy was also performed to push back the mandible by 6mm. In the postsurgical phase good occlusal relationships were achieved in terms of canine class, molar class, overjet, overbite, as well as a more harmonious profile.

CASE TWO

Management of Class II Division 1 Malocclusion with Bimaxillary Proclination of the Incisors and Fractured Incisors.

Dr O. Ayenakin, Prof IL Utomi

Orthodontics Unit, Lagos University Teaching Hospital.

Background and Aim: This case reports the orthodontic management of a 23-year-old female who presented at the Lagos University Teaching Hospital with Angle' Class II division I malocclusion on skeletal pattern II. This was complicated by increased overjet of 8.5mm, increased upper and lower incisal angles, mild upper anterior crowding of 2mm, constricted lower anterior arch, Ellis class I fracture of the upper right incisors, rotated teeth 21, 22, and 16, and upper midline shift to the right by 1mm.
To achieve full unit class II molar relationships bilaterally, level and align the upper and lower arches in order to achieve normal overjet and overbite, upright upper and lower incisors, unravel the crowding, round up the lower arch, restore the fractured tooth, derotate the rotated teeth, and achieve coincident midlines.

Materials and Methods: Interdisciplinary management was done with Oral/Maxillofacial Surgery and restorative units where 2-units extraction of the maxillary first premolars and composite restoration of tooth 21 was done respectively. Comprehensive upper and lower fixed orthodontic appliance, preadjusted edgewise was used using Roth 0.022 prescription brackets.

Results: The treatment was completed in 18 months and outlined objectives were achieved.

Conclusions: The objectives for the treatment were achieved and the patient had significant improvement in appearance. Fixed lingual of both arches and Hawley's were used for retention.

Pictures from the Conference


NON-MALEFICENCE – D


SmileTrain
LOTUS


Nigerian Association of Orthodontists
SmileTrain


SPORTGEN


NAO23

Instructions for Authors

West African Journal of Orthodontics is a peer-reviewed journal published by affiliated Orthodontic Groups and Associations in the West African Sub region. The journal gives priority to reports of outstanding clinical and experimental and epidemiological works on malocclusion, dento-facial defects as well as important contributions related to common orthodontic problems in children, adolescents and adults worldwide.

Submission

Manuscripts and registered letters should be sent to: the Editor, West African Journal of Orthodontics, Department of Child Dental Health, Faculty of Dentistry, College of Health Sciences Obafemi Awolowo University, Ile-Ife, Osun State. Nigeria.

Manuscripts in MS word attachments may also be submitted via Email to wajoeditorinchief@yahoo.com, in addition to hard copies. Tables, figures and text should be included in the same file if possible. Authors may submit their research works by email only; such manuscripts need not be simultaneously sent by post. However, photographs and/or figures need to be sent separately as hard copy (under figures and illustrations).

Acceptance

Manuscripts should meet the following criteria: original material, clear writing, appropriate study methods, valid data, and reasonable conclusions supported by the data, in short, they should contain important information on topic of general orthodontic interest.

Peer-review Process

All the manuscripts that adhere to its style and Instructions for Authors are referred to peer-review. Some of them are rejected immediately after an inhouse review. The rejection at this stage is due to insufficient originality, serious scientific flaws or absence of message. The remaining articles are sent to at least two reviewers who are. experts in the subject. Manuscripts are reviewed with due respect for authors' confidentiality, and the identity of peer reviewers is also kept confidential. A decision is made from 6 to 12 weeks according to the response from reviewers, revision by the author(s) and reappraisal on the revision.

The accepted manuscripts are subjected to editorial revision to comply with the requirements on language and style of the journal. The rejected manuscript is not returned to authors but its copies are kept for 3 months to answer any queries. The copyright of the accepted and published articles is held by the journal and all the published materials cannot be reproduced or published elsewhere, in whole or part, without the written permission from the editor.

Duplicate Submission

Manuscripts are considered with the understanding that they have not been published previously and are not under consideration by another publication. The author should alert the editor if the work includes subjects about which a previous report has been published. A research paper submitted to this journal should not overlap by more than 10% with the previously published material or work submitted elsewhere, which would be considered as duplicate publication. If in doubt, authors may forward copies of the published work or material submitted elsewhere to this journal for decision making.

Proofs and Reprints

The corresponding author of the accepted article shall be supplied with the proof. Corrections on the proof should be restricted to errors only and no substantial additions/deletions should be made. No addition or deletion in the names of the authors is permissible at this stage. A copy of the issue carrying the article is supplied free of charge to the authors.
Reprints may be ordered on payment in advance.

Categories of Articles

Articles can be sent as editorials, original articles, review articles, special communications, brief reports, case reports, letters to editor, commentaries, or for images section.

They are mostly included under Events of Interest free of cost. This journal reserves the right to be selective in publishing these announcements.

Preparing Manuscripts

Manuscripts should be prepared in accordance with the Uniform Requirements for Manuscripts submitted to Biomedical Journals. 2 A summary of technical requirements for preparing the manuscript is provided below:

- Three copies of the manuscript should be submitted.
- Use 1 side of standard size 21.6x27.9 cm A4, white bond paper, with margins of at least 2.5 cm on each side.
- Double-space throughout including title page, abstract, text, acknowledgements, references, tables and figure legends. Start each of these sections (in same order) on a new page, numbered consecutively in the upper right hand corner, beginning with the title page.
- Use at least 12 point font size (Times New Roman or Arial).
- Submit photographs and transparencies in a separate heavy paper envelope (enclosed in cardboard, to prevent bending during mail handling).
- Conventional units are preferred with SI units in parenthesis, if available. The metric system is preferred for the expression of length, area, mass and volume.
- Use nonproprietary names of material rugs, devices and other products.
- All manuscripts should be accompanied by a signed statement by all authors regarding authorship, responsibility, financial disclosure and
- acknowledgements, as per standard format (Appendix J)[23 1 Those sending their manuscript through email are also required to submit this form by post with original signatures.

Manuscripts not fulfilling the technical requirements shall be returned to the authors without initiating the peer-review process.

Title Page

The page should contain (i) the title of the article: which should be concise but informative (simpler the title the better; preferably it should contain all the key words to help electronic retrieval reliably); (ii) a short running title of less than 40 characters placed at the foot end of the title page; (iii) initials and surname of each author with the highest academic degree(s) and designation at the time when the work was done; (iv) details of the contribution of each author; (v) name of department(s) and institution(s) to which the work should be attributed; (vi) disclaimers, if any; (vii) name, address, telephone, fax, email address of the corresponding author, (viii) source(s) of support in the form of grants, equipment, drugs or all of these; and (ix) declaration on competing interests.

Authorship

All persons designated as authors should qualify for the authorship. Authorship credit should be based on substantial contributions to (i) concept and design, or acquisition of data, or analysis and interpretation of data; (ii) drafting the article or revising it critically for important intellectual content; and (iii) final approval of the version to be published. Conditions 1, 2 and 3 must all be met. Participation solely in the acquisition of funding or the collection of data does not justify authorship. All such people who contributed to the work but do not satisfy all the conditions should be listed in the acknowledgements.

Authors are responsible for obtaining written permissions from everyone acknowledged by name. One of the authors shall act as guarantor of the paper and he/she should take the responsibility for the integrity of the work as a whole, from its inception to published article.

Authors should provide a description of what each author contributed on the title page. Subsequently, no names can be added or deleted without written permission of the editor. Written consent of authors whose names are being deleted should be obtained.

This journal reserves the right to satisfy itself regarding the specific role of each listed author to justify authorship. All authors must give signed consent to publication (Appendix 1).

Competing Interest

Competing interest for a given manuscript exists when the author has ties to activities that could inappropriately influence his or her judgment, whether or not judgment is in fact affected. Financial relationships with industry for example, through employment, consultancies, stock ownership, honoraria, expert testimony, either directly or through immediate family, are usually considered to be the most important competing interests. However, conflicts can

Original Article

Original articles should report original research relevant to basic and clinical orthodontics including randomized trials, intervention studies, studies of screening and diagnostic tests, cohort studies, cost effectiveness analyses and case control studies. While reporting randomized controlled trials (RCT), authors must attempt to be in conformity with the consolidated standards of reporting trial.

(CONSORT) statements

Each manuscript should be accompanied with a structured abstract (divided into background, methods, results and conclusions) in no more than 250 words. Four to five key words to facilitate indexing should be provided in alphabetical order along with the abstract. The text should be divided in sections on introduction, methods, results, discussion and conclusion.

Acknowledgment section may be included where necessary. Number of tables and figures should be limited to the very relevant ones and may be compressed if necessary. The typical text length for such contributions is 2500-3 500 words (excluding title page, abstract, tables, figures, acknowledgments and references).

Brief Report

Short accounts of original studies are published as brief reports. The text should be divided into sections, i.e., abstract, introduction, methods, results and discussion.

Abstract should be of 100-150 words highlighting the aims, methods and main results along with 3-4 key words.

The text should contain no more than 1500 words, 3 illustrations or tables and up to 20 references, preferably recent publications.

Review Article

State-of-the-art review articles or systematic, critical assessments of literature are also published. Normally a review article on a subject already published in the West African Journal of Orthodontics is not accepted for a period of 3 years.

The typical length for review articles is 2000-3000 words, excluding tables, figures, and references.

Authors submitting review manuscripts should include a structured abstract of around 200 words describing the need and purpose of review, methods used for selection, extraction and synthesis of data, and main conclusions.

Clinical cases highlighting uncommon malocclusion condition, orthodontic treatment techniques are published as case reports. Single case reports are usually not accepted, unless some new or unusual aspect regarding aetiopathogenesis, diagnosis or management is brought out that adds to the existing body of knowledge. The text should not exceed 1000 words and is divided into sections, i.e., abstract, introduction, case report and discussion. The number of tables/figures should be limited to 2. Ten recent references are acceptable. A maximum of 3 or 1 author is permitted from the principle and each of the associated departments respectively. Thus, case reports from only one investigative department can have a maximum of 3 authors.

Letter to Editor(s)

Letters commenting upon a recent article in the West African Journal of Orthodontics are welcome.

Such letters should be received within 6 months of the article's publication. At the editorial board's discretion, a letter may be sent to authors! experts for comments and both letter and reply may be published together. Letters may also relate to other topics of interest to orthodontists and others, and/or useful clinical observations. Letters should not be more than 400 words. The number of authors should not exceed 2, including the authors' reply in response to a letter commenting upon an article published in this journal.

Images Section

A short text of about 150 words depicting the condition with color photographs (vide infra) is needed.

Normally only clinical photographs are accepted but accompanying skiagrams or pathological images could also be considered for publication.

Photographs should be of high quality, clearly identify the condition and preferably add to the existing knowledge.

Personal Viewpoint

Such articles are published on topical orthodontic issues including social aspects. It is expected that the authors have sufficient credible experience on the subject for giving viewpoints. These should not exceed 1500 words.

Notes, News and Events of Interest

Announcements for conferences, symposia, meetings or courses may be sent for publication in advance. The announcements should provide title, date(s) and place of the event and contact address, telephone, and email

occur for other reasons, such as personal relationships, academic competition and intellectual passion. If any of the authors have accepted reimbursement for attending symposium, a fee for speaking, fee for organizing educational reach, funds for a member of the staff of consultation fees from an organization that may in: way gain or lose financially from the result of the study, review, editorial or letter, a competing interest would be deemed to exist. If any of the authors had been employed by an organization that may in any way gain or lose financially from the publication, or if any of them hold stocks or shares in such an organization, competing interest would be deemed to exist. If competing interest exists, the author(s) must disclose them while submitting the manuscript.

Abstract and Key Words

The second page should carry an abstract in case of original article (250 words), review article (200 words), brief report (100-150 words), and case report (50 words), respectively. For original article and reviews, the abstract should be structured as detailed earlier. For brief reports, the abstract should state the purpose of the study, basic methodology, main findings (giving specific data and statistical significance) and key conclusion(s). Below the abstract, authors should provide 3-5 key words for indexing; terms from the Medical Subject Headings (MESH) list of Index Medicus should be used. The basic structure of a paper follows the well known acronym IMRAD, which stands for Introduction (what questions was asked), Methods (how was it studied), Results (what was found) and Discussion[4].

Introduction

The introduction must clearly state the question that the author(s) tried to answer in the study. It may be necessary to briefly review the relevant literature.

Only cite those references that are essential to justify the proposed study.

Materials and Methods

The methods section should describe, in a logical sequence, how the study was designed (e.g., how randomization was done), carried out (e.g., how subjects were chosen or excluded, ethical considerations, accurate details of materials used, exact drug dosage and form of treatment, etc.) and data were analyzed (e.g., an estimate of the power of the study, exact test used for statistical analysis, etc.).

For standard methods, appropriate references are sufficient, but if standard methods are modified these should be clearly brought out.

Authors should provide complete details of any new methods or apparatus used (manufacturer's name and address in parentheses).

Ethics

When reporting experiments on human subjects, authors should indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1964, as revised in 2000.

They should indicate whether the study was approved by the Institutions' Ethical Committee, and whether informed consent was obtained from the study participants. They should not use patients' names, initials, or hospital numbers, especially in illustrative material. This journal reserves the right to reject a manuscript on ethical grounds, on the basis of recommendations of its "Ethical Committee", even if the research has been cleared by the institutional ethical committee. Moreover, when reporting experiments on animals, authors should indicate whether the institutional and national guide for the care and use of laboratory animals was followed.

Statistics

Authors should describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. When possible, they meet to quantify findings and present them with appropriate indicators of measurement error or uncertainty (such as confidence intervals). Actual P values are provided rather than stating as just <0.05 or >0.05 etc. References for the design of the study and statistical methods should be to standard works when possible (with pages stated) rather than to papers in which the designs or methods were originally reported. Any general-use computer programs used should be specified and statistical terms, abbreviations, and most symbols be defined.

Results

This section should include only relevant, representative data and not all information collected during the study. Major findings should be presented clearly and concisely. Text, tables, and illustrations should be used sensibly while avoiding repeating in the text all the data depicted in the tables or illustrations and emphasizing or summarizing only important observations. Tables and figures should be restricted to those needed to explain the argument of the paper and to assess its support. It is necessary to cite the tables in the text and type them on separate sheets. It may also be useful to mention what the study did not find.

Discussion

Discussion ordinarily should not be more than one third of the total length of the manuscript. This section should include a summary of the major findings, their relationship to other similar studies, limitations of methods and implications of these findings in future research. Conclusions should be linked to the goals of the study. Unqualified statements and conclusions which are not completely supported by the data should be avoided. Authors should also refrain from making statements on economic benefits and costs unless their manuscript includes economic data and analyses.

Acknowledgements

In acknowledgements section, it is suitable to list all contributors who do not meet the criteria for authorship, such as a person who provided purely technical help, writing assistance, or a department head who provided only general support. Financial and material support should also be acknowledged.

Groups of persons who have contributed materially to the paper but whose contributions do not justify authorship may be listed under a heading such as "clinical investigators" or "participating investigators", and their function or contribution should be described, for example, "served as scientific advisers", "critically reviewed the study proposal", "collected data", or "provided and cared for study patients". A written consent is required from all the persons acknowledged, indicating their acceptance for the same.

Contributions to joint-authorship

In the case of multiple author-ship, authors are expected to state clearly their contributions to the paper being considered for publication in terms of study initiation, design including methodology, data collection, analysis and final write-up. The editorial board reserves the right to remove any author's name if the contribution is insignificant.

References

References should be numbered consecutively in the order in which they are first mentioned in the text.

References are identified in text, tables, and legends by Arabic numerals in parentheses. References cited only in tables or in legends to figures should be numbered in accordance with the sequence established by the first identification in the text of the particular table or figure.

The titles of journals should be abbreviated according to the style used in Index Medicus. Authors are required not to use abstracts, unpublished observations and personal communications as references. References to papers accepted but not yet published should be designated as "in press"; authors should obtain written permission to cite such papers as well as verification that they have been accepted for publication.

The references must be verified by the author against the original documents. The Uniform Requirements style (the Vancouver style) is based largely on an American National Standards Institute (ANSI) standard style adapted by the NLM for its databases.

Journal Article

List all authors when 6 or less. When 7 or more, list only first six and add et al. Ngan P, Yiu C, Hu A, Hagg U, Ei SHY, Gunel E. Cephalometric and occlusal changes following maxillary expansion and protraction. Eur J Orthod 1998; 20: 237-254.

Organization as Author

Australian Dental Association Inc. An Australian Schedule of Dental Services and Glossary. 7th edn. Sydney: Australian Dental Association Inc., 1996.

Complete Book

Department of Health. Shifting the balance of power within the NHS: securing delivery. London: Doll, 2001.

Clayton D, Hills M. Statistical models in epidemiology. Oxford: Oxford University Press, 1993.

Farkas LG. Anthropometry of the Head and Face, 2nd Edn, New York; Raven Press; 1994

Book Chapter Lekholm U, Zarb GA. Patient selection and preparation. In: Branemark P1, Zarb GA, Albrektsson T, editors.

Tissue integrated Prostheses: Osseointegration in Clinical Dentistry, Chicago: Quintessence; 1988,199-209

Thesis and Dissertation

Yong SJ. Bone mineral density of normal Korean adults. Ph.D. Thesis. Seoul, Korea; 1989 Anozike, AN. Orthodontic treatment needs and its impact on oral health related quality of life in Lagos school children aged 12-16 years. FMCDS. Dissertation. Lagos, Nigeria; 2006

Conference Proceedings

Marshall SJ, Rixon RC, Whiteford DN, Cumming JT. The OrthoForm 3-Dimensional Clinical Facial Imaging System. Proceedings of the 15th IFHE Congress 1998; 15:83-87.

Dictionary and Similar References

Stedman's medical dictionary. 26th ed. Baltimore: Williams & Wilkins; 1995. Apraxia; p.11 9-120. Unpublished accepted material Leshner Al. Molecular mechanism of cocaine addiction. N Eng J Med. In Press 1996.

Material from Internet

World Health Organization, 2002.
www .who.intlmental-health!prevention/suicide
(accessed August 1, 2004).

Tables

Each table should be typed in double-space on a separate sheet of paper. Tables not submitted as photographs must be numbered consecutively (Arabic numerals) in the order of their first citation in the text, with a brief but self explanatory title for each.
Each column should have a short or abbreviated heading.
Explanatory matters are placed in footnotes, not in the heading. In footnotes all nonstandard abbreviations that are used in each table should be explained adequately.
Statistical measures of variations should be identified such as standard deviation and standard error of the mean.
Be sure that each table is cited in the text. If data are used from another published or unpublished source, it is necessary to obtain permission and acknowledge them fully.

Figures and Instructions

Figures should be professionally drawn and photographed; freehand or typewritten lettering is unacceptable. Instead of original drawings, X-ray films, and other material, sharp, glossy, black-andwhite photographic prints of high quality are necessary, usually 127x 173 mm (5x7 in) but no larger than 203x254 mm (8x10 in) For color illustrations negatives or positive transparencies are provided, along with color prints. It is preferable to have the photograph in portrait form rather than in landscape form to fit easily into one column.
Letters, numbers and symbols in photographs should be clearly legible.
Each figure should have a label pasted on its back indicating the number of the figure, author's name, and an arrow to mark the top and left side of the figure.
It is unacceptable to write on the back of figures or scratch or mark them by using paper clips, and to bend figures or mount them on cardboard. If photographs of individual/people are used, either the subjects must not be identifiable or their pictures must be accompanied by written permission to use the photograph. It is advisable to cover the eyes unless specifically need to be shown. If a figure has been published, the original source should be acknowledged and written permission from the copyright holder be obtained to reproduce the material. Figures should be numbered consecutively (Arabic numerals) according to the order in which they have been first cited in the text.

Legends for Illustrations

Legends for illustrations should be typed or printed out in double-space, starting on a separate page, with Arabic numerals corresponding to the illustrations.
When symbols, arrows, numbers, or letters are used to identify parts of the illustrations, each of them must be identified and explained in the legend. The internal scale should be explained and the method of staining in photomicrographs be identified.

Units of Measurement

Measurements of length, height, weight, and volume should be reported in metric units, i.e., meter(m), gram(g), or liter(l) or their decimal multiples.
Milliliter or deciliter should be expressed as ml or dl.
Red and white blood cell counts are to be expressed as 63 x10 /mc l and x10/ mc respectively. Temperatures should be given in degrees Celsius and blood pressures in millimeters of mercury (mmHg). All hematological and clinical chemistry measurements should be reported in the conventional system or in terms of the International System of Units (SI).

Abbreviations and symbols

Only standard abbreviations are used in the text while avoiding abbreviations in the title and abstract.
The full term for which an abbreviation stands should precede its first use in the text unless it is a standard unit of measurement. Year, month, day, hour, minute and second should be abbreviated as yr, mon, d, h, mm, and s in tables respectively.

References

1. Mother M, Schulz KF, Altman DG, for the CONSORT Group. The CONSORT statement Revised recommendations for improving the quality of reports of parallel group randomize Trials. Lancet 2001; 357: 1191-1194. (Also available from: URL: http ://www.consort-statement.orgl). Accessed June 28, 2002.
2. International Committee of Medical Journal Editors. Uniform Requirements for Manuscripts Submitted to Biomedical Journals. Ann Intern Med 1997;126:36-47. (Updated October 2001 version Available from: URL: http: //www.icmje.org/). Accessed June 28,2002.
3. JAMA Instructions for Authors. Available from URL: http :// jama.ama-assn.org/. Accessed June 28, 2002.
4. HaIl GM. Structure of a scientific paper. In: Hall GM, ds. How to write a paper. London:BMJ Books, 2000.
5. 52nd WMA General Assembly. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Available from: URL: http://www.wma.netl. Accessed June 28,2002.

Appendix 1:

Declaration of Originality and Transfer of Copyright

(Please download from Nigerian Association of Orthodontists (NAO) website https://www.nao-ng.org/)

This form is to be submitted with the initial copies of the manuscript to: West African Journal of Orthodontics, Department of Child Dental Health, Obafemi Awolowo University Ile-Ife, Osun State. Nigeria Manuscript No. (If known):

The author(s) hereby affirms that the submitted manuscript entitled:

I/We certify that the manuscript represents valid work and that neither this manuscript nor one with substantially similar content under my/our authorship has been published or is being considered for publication elsewhere. For papers with more than I author, we agree to allow the corresponding author to serve as the primary correspondent with the editorial office, to review the edited typescript and proof.

I/We have seen and approved the submitted manuscript. All of us have participated sufficiently in the work to take public responsibility for the contents. All the authors have made substantial contributions to the intellectual content of the paper and fulfill at least 1 condition for each of the 3 categories of contributions: i.e., Category 1 (conception and design, acquisition of data, analysis and interpretation of data), Category 2 (drafting of the manuscript, critical revision of the manuscript for important intellectual content) and Category 3 (final approval of the version to be published).

I/We also certify that all my/our affiliations with or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript are completely disclosed on the title page of the manuscript. My/our right to examine, analyze, and publish the data is not infringed upon by any contractual agreement.

I/We certify that all persons who have made substantial contributions to the work reported in this manuscript (e.g., data collection, writing or editing assistance) but who do not fulfill the authorship criteria are named along with their specific contributions in an acknowledgment section in the manuscript. If an acknowledgment section is not included, no other persons have made substantial contributions to this manuscript.

I/We also certify that all persons named in the acknowledgment section have provided written permission to be named.

The author(s) undersigned hereby transfer(s), assign(s), or otherwise convey(s) all copyright ownership, including any and all rights incidental thereto, exclusively to the West African Journal of Orthodontics, in the event that such work is published in the West African Journal of Orthodontics.

Authors name(s) in order of appearance in the manuscript; signatures (date):