MATRIX OF THE KNOWLEDGE OF LIGHT AND KNIFE:
The Journey of a Maxillofacial Surgeon into Imaging

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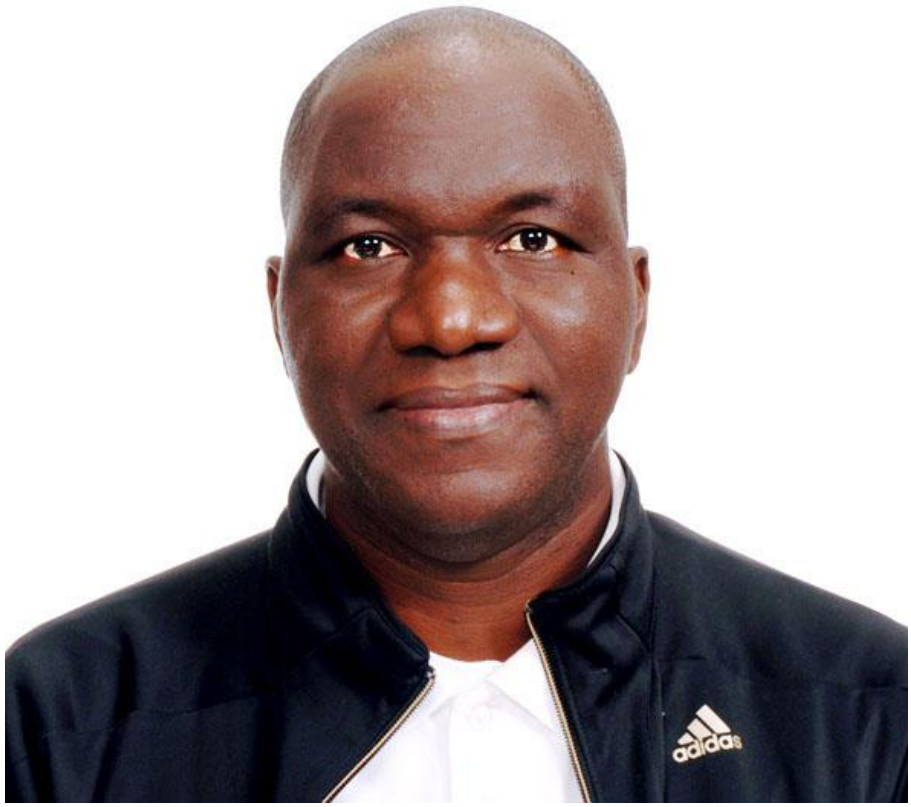

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SUMMARY OF PRESENTER'S BIODATA

Professor Babatunde Olamide Bamgbose was born in Lagos. He attended New State High School and King's College Lagos for his secondary and High School Certificates respectively. He was Head Boy at New State High School and appointed McKee Wrights House Prefect at King's College Lagos.

He obtained his Bachelor of Dental Surgery, (B.D.S.), degree in 1994 at the University of Lagos. After his one-year internship at the Lagos University Teaching Hospital Lagos and afterward, completed the compulsory National Youth Service programme in Bauchi State on 13th November 1996.

He then enrolled in the Oral and Maxillofacial Surgery Residency Training Programme at the Lagos University Teaching Hospital (LUTH) and completed it in 2004. While on the residency training programme, he was Secretary and later elected President of the Association of Resident Doctors (ARD). He has exemption from Part I of the Royal College of Surgeons of Edinburgh, United Kingdom.

Professor Babatunde Bamgbose moved to the United States of America and he completed a residency training programme in Oral and Maxillofacial Radiology and a Master of Science, Stomatology, at The University of Iowa in 2008. From there, he moved to the College of Dentistry of the University of Nebraska Medical Centre at Lincoln, Nebraska where he obtained his Doctor of Dental Surgery (D.D.S) degree in 2010. He obtained a Foundation M.D. degree from the National Postgraduate Medical College of Nigeria in 2021. He is a Research Fellow at the Graduate School of Medicine, Dentistry and Pharmaceutical Sciences, Okayama University, Okayama, Japan and currently enrolled in a PhD programme in Oral and Maxillofacial Radiology at the Graduate School of Dentistry, Kyushu University, Japan. He also has a Master of Business Administration degree from Edo State University.

His research, teaching interests and publications include Oral and Maxillofacial Surgery, Oral and Maxillofacial Radiology, Research Design, Practice Management and Mentorship and General Dental Practice.

Professor Bamgbose's teaching philosophy incorporates the concept of teaching that encourages competency, life-long learning, general transference of skills and critical

thinking. He teaches diagnostic sciences which is a body of knowledge that requires life-long learning and integration of facts bordering on signs, symptoms and imaging characteristics of pathologies and pathoses. Critical thinking is an essential learning tool. Professor Bamgbose's goal for his students is to ensure they appreciate the fundamentals of oral and maxillofacial radiology, including radiation physics, radiation protection, radiation biology, and diagnosis. His extensive background in multiple specialities has been an asset in his classroom. The outcome of his teaching is to ensure his students can assimilate the fundamentals of radiology through critical-thinking and problem-solving. He predominantly uses case studies and interactive lectures to achieve his goal.

Professor Babatunde Bamgbose is an Examiner with the National Postgraduate Medical College of Nigeria in Oral and Maxillofacial Surgery and an External Examiner at the University of Ghana School of Medicine and Dentistry, Korle-Bu, Ghana in Oral and Maxillofacial Radiology. He has conducted over 10 formative assessment of Fellowship Research Proposals in Oral and Maxillofacial Surgery and Oral Medicine and supervised five Fellowship Dissertations and four of his candidates are qualified Fellows and practising consultants in different institutions in Nigeria. He is currently supervising a Master's Thesis Research Work.

He is a member of Royal College of Radiologists, International Association of Dento-Maxillofacial Radiology, European Association of Dento-Maxillofacial Radiology, Asian Academy of Oral and Maxillofacial Radiology, American Dental Association, International Association of Oral and Maxillofacial Surgeons, British Association of Oral and Maxillofacial Surgeons, Nigerian Association of Oral and Maxillofacial Surgeons, Nigeria Medical Association, Nigeria Dental Association, Nigerian Institute of Management, International Association of Dental Research, Kano Medical Research Society, British Society of Dental and Maxillofacial Radiology and Association of Radiologists in Nigeria.

Professor Babatunde Bamgbose is a Board Member of Nigeria Journal of Basic and Clinical Science, Dental Hypothesis, Journal of Mouth and Teeth, Journal of Dentomaxillofacial Science. He is the current editor-in-chief of the Nigerian Journal of Oral and Maxillofacial Surgery. He serves as a reviewer to numerous peer-review journals. He has supervised thirty-one undergraduate research projects and mentored the research design of seven resident doctors.

Professor Babatunde Bamgbose is the first academic to become a Professor of Oral and Maxillofacial Radiology in Nigeria and West Africa. He has served as Head of Department since 2013. He has served on many Faculty, College and University Committees and Boards. He also serves as member of non-university committees and boards, including Faculty Board Member, Faculty of Dental Surgery of the National Postgraduate Medical College of Nigeria, Member, Board of Directors, Amazing Grace Residential Services Inc, Pikeville, Maryland, USA, Member, Board of Directors, Obuks Photographers, Lagos, Nigeria, Chairman/Chief Executive Officer, HeartWork Photography, Lincoln, Nebraska, US.

He has attended forty-four international and local scientific meetings and conferences, both as guest speaker and participant. He is a visiting professor of Oral and Maxillofacial Radiology at the University of Lagos and Lagos State University.

Professor Babatunde Bamgbose is blessed with four children: Ayomide Bamgbose, Olujuwon Bamgbose, Victor Bamgbose and Junior Bamgbose. He is married to Vivian Bamgbose.

His extra-curricular activities include photography, cycling, high-speed driving, travelling, boxing and family times.

MATRIX OF THE KNOWLEDGE OF LIGHT AND KNIFE: The Journey of a Maxillofacial Surgeon into Imaging

INTRODUCTION

It is my pleasure to welcome you all to the 49th Professorial Inaugural Lecture in Bayero University Kano and the first to be delivered by the Department of Oral Diagnostic Sciences of the Faculty of Dentistry. I stand before you this afternoon with a heart of gratitude to the Almighty God for bringing me to this stage in my career. I thank the University for giving me the platform and I am grateful to all of you who have decided to grace this occasion with your physical presence.

Prospective, Randomized, Open-Label, Study Comparing the Effects of Dexamethasone Co-Administered with Diclofenac Potassium or Acetaminophen and Diclofenac Potassium Monotherapy after Third- Molar Extraction

Surgical removal of impacted third molars is a common outpatient procedure in oral surgery. It has been documented that extraction of impacted teeth results in severe post-operative pain, swelling and trismus in most cases. Patients who experience pain, swelling and trismus after third molar extraction are reported to experience a 3-fold higher rate of adverse effects on quality of life compared with those who are asymptomatic after this surgery. Investigators have placed emphasis on the necessity for better control of this triad of sequelae. Steroids can reduce the risk for physiologic process of inflammation, thereby suppressing the development of inflammation (Bamgbose et al 2006).

The addition of dexamethasone, a synthetic adrenocortical steroid, to a regimen containing diclofenac K or acetaminophen might have additive anti-inflammatory effects, thereby reducing the inflammatory exudates, with resultant further reduction in oedema and pain, after third molar surgery (Bamgbose et al 2006). Our study assessed the effects of combination treatment with dexamethasone and diclofenac K or acetaminophen with those of diclofenac K alone on post-operative pain, swelling, and trismus after surgical removal of third molars (Bamgbose et al 2006).

Patients were randomized into 1 of 3 treatment groups: concomitant treatment with dexamethasone 8mg IM and diclofenac K 50mg per oral (PO) or acetaminophen 1000 mg PO, or monotherapy with diclofenac K 50mg PO. Overall analgesic efficacy of the drug combinations was assessed for 7 days post-operatively using a 4-point categorical pain-intensity rating scale (0 = no pain; 1 = mild pain; 2 = moderate pain; and 3 = severe pain). Facial swelling was measured in 1 dimension on days 1, 2, and

7 after surgery using a tape measure from the tip of the tragus, to gonion, to the tip of the contralateral tragus, and trismus was assessed using interincisal mouth-opening ability, measured using a vernier-calibrated calliper on post-operative days 1, 2, and 7. A total of 150 patients (50 per treatment group) were included in the analysis (76 women, 74 men; mean [SD] age, 26.8 [5.04] years [range, 18 – 45 years]; 100% Nigerian). [Table 1]. The proportion of patients reporting no pain on the pain-intensity rating scale was significantly higher in the group receiving dexamethasone and diclofenac K compared with that in the groups receiving dexamethasone and acetaminophen or diclofenac monotherapy (44% vs 22% and 24%, respectively, both, $P < 0.05$) [Table 2].

Facial swelling was significantly less with dexamethasone and diclofenac K or dexamethasone and acetaminophen compared with diclofenac K alone (day 1: $P = 0.013$ and $P = 0.011$, respectively; day 2: $P = 0.002$ and $P = 0.004$, respectively). However, trismus relief was statistically similar between the treatment groups on post-operative days 1 and 2. No adverse effects or complications were recorded [Table 2].

We concluded that concomitant treatment with dexamethasone and diclofenac K provided significant relief of post-surgical pain and swelling compared with dexamethasone and acetaminophen or monotherapy with diclofenac K after third-molar extraction (Bamgbose et al 2006).

Table 1: *Baseline Characteristics of Study Patients in the Prospective, Randomized Study*

Characteristic	Dexamethasone and Diclofenac K (n = 50)	Dexamethasone and Acetaminophen (n = 50)	Diclofenac K (n = 50)	All Patients (N = 150)
Age, y				
Mean (SD)	25.6 (4.8)	27.6 (5.3)	27.2 (5.1)	26.8 (5.04)
Range	17–46	16–47	19–44	18–45
Sex, no. (%)				
Male	25 (56)	28 (56)	24 (48)	74 (49)
Female	22 (44)	22 (44)	26 (52)	76 (51)
Nigerian race, no. (%)	50 (100)	50 (100)	50 (100)	150 (100)
Impaction type, no. (%)				
Mesioangular	28 (56)	25 (50)	26 (52)	79 (53)
Distoangular	12 (24)	10 (20)	8 (16)	30 (20)
Horizontal	6 (12)	7 (14)	10 (20)	23 (15)
Vertical	4 (8)	8 (16)	6 (12)	18 (12)
Duration of surgery, mean (SD), min				
Bone	20.78 (9.69)	13.08 (7.53)	17.44 (10.69)	17.10 (9.86)
Total	41.30 (12.65)	38.48 (13.44)	38.26 (14.71)	39.35 (13.61)

K = potassium.
*No significant between-group differences were found.
†Although some patients underwent extraction of >1 tooth, only 1 tooth per patient was included in the analysis.

Source: Bamgbose et al., 2006

Table 2: *Pain Intensity, Facial Swelling, and Mouth Opening Ability at postsurgical days 1 and 2.*

Parameter	Dexamethasone and Diclofenac K (n = 50)	Dexamethasone and Acetaminophen (n = 50)	Diclofenac K (n = 50)
Day-1 pain intensity, no. (%)			
None	22 (44)†	11 (22)	12 (24)
Mild	25 (50)	32 (64)	23 (46)
Moderate	3 (6)	7 (14)	11 (22)
Severe	0	0	4 (8)
Facial swelling, mean (SD), %			
Day 1	30.9 (1.6)‡	30.9 (1.5)§	31.7 (1.6)
Day 2	31.0 (1.6)‖	31.2 (1.5)¶	32.0 (1.5)
Mouth-opening, mean (SD), %			
Day 1	36.0 (11.2)	38.8 (12.6)	39.2 (11.3)
Day 2	38.1 (10.1)	38.1 (10.8)	36.0 (10.0)

K = potassium.
*P values were calculated using the 2-tailed t test.
†$P < 0.05$ versus dexamethasone and acetaminophen and diclofenac K.
‡$P = 0.013$ versus diclofenac K.
§$P = 0.011$ versus diclofenac K.
‖$P = 0.002$ versus diclofenac K.
¶$P = 0.004$ versus diclofenac K.

Source: Bamgbose et al., 2006

Assessment of Pain and Swelling Following Surgical Extraction of Impacted Mandibular Third Molar Using Complete and Partial Wound Closure

The surgical extraction of impacted mandibular third molar involves traumatic injury to adjacent soft and hard tissues with resultant post-operative complications, such as pain, swelling and trismus. The immediate post-operative pain and swelling is due to inflammatory response secondary to trauma. The intensity of this trauma-induced inflammatory response has been attributed to factors such as age of the patient, gender, degree of impaction and wound closure technique. Following third molar surgery, the wound can either be left unclosed (suture-less), closed partially or closed completely. Suture-less technique is not popular in our environment. Partial wound closure technique involves placement of one or two interrupted sutures across the wound, but the socket still communicating with the oral cavity. Partially closed socket allows free drainage of inflammatory exudate thereby reducing post-operative pain and swelling. The draw back with the technique is the accumulation of food debris in the socket (Owobu, Bamgbose, Abubakar, et al 2019).

In the Owobu, Bamgbose, Abubakar, et al., (2019) study, 120 consenting subjects were randomly allocated into two groups: Group 1 had complete wound closure while Group 2 had partial closure. The research subjects were evaluated for the degree of pain and swelling at 24 hours, 3rd and 5th post-operative days using verbal rating scale (VRS) for pain and visual analogue scale (VAS) for swelling. The Chi test was used to determine associations between categorical variables and a p-value of 0.05 or less was considered significant.

There were 51.7% males in the study, mesioangular impaction was the most common type of impaction, the mean age of participants was 31.7±5.7 and pericoronitis was the most common indication for extraction [Table 3]. The Chi-square test for independence in relation to the two techniques indicated that post-operative pain at day 1 was 2.95±0.22 and 2.88±0.32 respectively in Groups 1 and 2 while swelling was 4.87±0.34 in Group 1 and 4.83±0.38 in Group 2. [Table 4]. The difference between the groups was statistically significant for swelling (p=0.001) but not for pain (p=0.864) [Table 4].

Pain and swelling were maximal on the first post-operative day and this gradually reduced over time. Post hoc test using Bonferroni correction revealed that wound closure technique elicited a reduction in pain from Day 1, Day 3 and Day 5. There was a significant difference between the two techniques (p = 0.000). The partial

wound closure technique provides greater reduction in post-operative pain and swelling.

Table 3: *Social demographic and pre-operative characteristics of study participants*

Description of social demographic		Complete closure n(%)	Partial closure n(%)
Age	18-25	8 (13.30)	9 (15.0)
	26-35	36 (60.00)	36 (60.00)
	36 and above	16 (26.7)	15 (25.0)
Gender	Male	33 (55.0)	29 (48.0)
	Female	27 (45.0)	31 (52.0)
Occupation	Civil Servant	18 (30.0)	22 (36.7)
	House wives	8 (13.3)	22 (36.7)
	Students	25 (41.7)	21 (35.0)
	Business/Traders	9 (15.0)	7 (11.7)
Tribe	Ibo	6 (10.0)	5 (8.3)
	Yoruba	4 (6.7)	3 (5.0)
	Hausa	25 (41.7)	27 (45.0)
	Fulani	24 (40.0)	25 (41.7)
	Others	1 (1.6)	0 (0)
Educational Qualification	Quaranic	12 (20.0)	14 (23.3)
	Primary	2 (3.3)	3 (5.0)
	Secondary	4 (6.7)	6 (10.0)
	Polytechnic	5 (8.3)	3 (5.0)
	University	37 (61.7)	34 (56.7)
Description of preoperative characteristics		**Complete closure Mean ± (SD)**	**Partial closure Mean ± (SD)**
Quadrant Location of Tooth	Mandibular Right	35 (58.30)	32 (53.30)
	Mandibular Left	25 (41.70)	28 (46.70)
Type of Impaction	Mesioangular	41 (68.4)	39 (65.0)
	Distoangular	9 (15.0)	10 (16.7)
	Horizontal	5 (8.3)	6 (10.0)
	Vertical	5 (8.3)	5 (8.3)
Indication for extraction	Pericoronitis	35 (58.3)	32 (53.3)
	Dental caries	19 (31.7)	25 (41.7)
	Prophylaxis	6 (10.0)	3 (5.0)

Source: Owobu, Bamgbose, Abubakar, et al (2019)

Table 4: Chi-square test for independence of post-operative pain and swelling in relation to complete and partial wound close (Owobu, Bamgbose, Abubakar, et al, 2019).

		Complete closure χ2 (SD)	Partial closure χ2 (SD)	p-value
Pain	Day 1	2.95 (0.22)	2.88 (0.32)	0.048
	Day 3	1.20 (0.63)	1.18 (0.65)	0.864
	Day 5	0.38 (0.49)	0.65 (0.76)	0.564
Swelling	Day 1	4.87 (0.34)	4.83 (0.38)	0.453
	Day 3	2.47 (0.62)	1.90 (0.66)	0.001
	Day 5	0.75 (0.47)	0.18 (0.39)	0.001

Source: Owobu, Bamgbose, Abubakar, et al (2019)

Effects of Vasoconstrictor on Arterial Blood Pressure During Minor Oral Surgical Procedures

The currently used local anaesthetic agents consist of vasoconstrictor as part of the composition to improve the biological properties of the solution. Adrenaline is the most frequently used and its desirable properties include haemostasis, increased depth and duration of anaesthesia, decreased systemic absorption and reduced toxicity. The vasoconstrictors cause some hemodynamic changes which may be either direct action on the cardiac muscle or by stimulation of the autonomic innervations of the heart. These effects may cause an increased heart rate, increased force of cardiac contraction and increased blood pressure (Maria et al, 2008). The aim of our study Abubakar, Bamgbose, Owobu, et al (2018) was to assess the effect of vasoconstrictor contained in local anaesthetics on arterial blood pressure during minor oral surgical procedures.

A total of 100 subjects with mean age of 34.66±10.3 years participated in the study. The study group was treated using 2% lignocaine HCL with 1:80,000 epinephrine, while the control was treated using 2% plain lignocaine (without epinephrine). Normo-tensive or controlled hypertensive subjects age range, 18-55 years, were enrolled in the study. The mean age in the vasoconstrictor non-vasoconstrictor groups, respectively, was 33.72±9.8 and 35.60±10.9 years (Table 5). There were 20 males and 30 females in the vasoconstrictor group, while the non-vasoconstrictor group consisted of 19 males and 31 females. The major ethnic group amongst the study participants was Hausa (72%) [Table 6]. There was no statistically significant

difference in the history of hypertension between the two groups (p=0.817). The number of local anesthetic cartridges used, and injection techniques were not statistically significant between the two study groups. There was a level of anxiety in the control group (p=0.004) [Table 7].

There was no statistically significant difference in blood pressure and pulse rate between patients in the study and control groups. [Tables 8 and 9]. Our conclusion was that optimal use of adrenaline-containing local anaesthetic agents does not cause a statistically significant increase in blood pressure or pulse rate.

Table 5: *Mean Age of Participants in the study on Effects of vasoconstrictor on arterial blood pressure during minor oral surgical procedures.*

Group	Mean Age (years)	Number	Std. Deviation p-value
Study	33.72	50	9.76
Control	35.6	50	10.967 0.367
Total	34.66	100	10.372

Source: Abubakar, Bamgbose, Owobu, et al (2018)

Table 6: *Socio-demographic characteristics of participants in the study on effects of vasoconstrictor on arterial blood pressure during minor oral surgical procedures*

Socio-demographic Variable	Group		p-value
	Vasoconstrictor n (%)	No Vasoconstrictor n (%)	
Sex			
Male	20 (40.0)	19 (38.0)	
Female	30 (60.0)	31 (62.0)	0.838
Total	50 (100)	50 (100)	
Occupation			
Students	4 (8.0)	11 (22.0)	
Dependents	9 (18.0)	8 (16.0)	
Artisans	5 (10.0)	1 (2.0)	
Traders	10 (20.0)	11 (22.0)	
Motorcyclists/ Drivers	2 (4.0)	1 (2.0)	0.217
Civil servants	19 (38.0)	17 (34.0)	
Professionals	1 (2.0)	1 (2.0)	
Total	50 (100)	50 (100)	
Ethnicity			
Ibos	2 (4.0)	1 (2.0)	
Yorubas	7 (14.0)	3 (6.0)	
Hausas	36 (72.0)	40 (80.0)	0.157
Fulanis	1 (2.0)	5 (10.0)	
Others	4 (8.0)	1 (2.0)	
Total	50 (100)	50 (100)	
Nationality			
Nigerians	49 (98.0)	50 (100)	
Non-Nigerian	1 (2.0)	0 (0.0)	1.000
Total	50(100)	50(100)	
Highest educational level			
Uneducated	1 (2.0)	1 (2.0)	
Primary	6 (12.0)	3 (6.0)	
Secondary	9 (18.0)	9 (18.0)	0.891
Tertiary	31 (62.0)	34 (68.0)	
Islamic/Arabic	3 (6.0)	3 (6.0)	
Total	50 (100)	50 (100)	

Source: Abubakar, Bamgbose, Owobu, et al (2018)

Table 7: *Pre-anesthetic evaluation of participants in the study on effects of vasoconstrictor on arterial blood pressure during minor oral surgical procedures*

Variable	Group		p-value
	Vasoconstrictor n(%)	No Vasoconstrictor n (%)	
History of Hypertension			
Yes	12 (24.0)	13 (26.0)	
No	38 (76.0)	37 (74.0)	0.817
Total	50 (100)	50 (100)	
Anxiety level			
Very low/low	10 (20.0)	0 (0.0)	
Medium	16 (32.0)	21 (42.0)	0.004
Moderate	24 (48.0)	29 (58.0)	
Total	50 (100)	50 (100)	
Number of Cartridges			
1	33 (66.0)	26 (52.0)	
2	17 (34.0)	24 (48.0)	0.155
Total	50 (100)	50 (100)	
Injection technique			
Nerve block	28 (56.0)	33 (66.0)	
Infiltration	22 (44.0)	17 (34.0)	0.305
Total	50 (100)	50 (100)	

Source: *Abubakar, Bamgbose, Owobu, et al (2018)*

Table 8: *Blood pressure and pulse rate 5 minutes before local anaesthetic injection in participants in the study on effects of vasoconstrictor on arterial blood pressure during minor oral surgical procedures*

Parameter	Group	N	Mean	Std. Deviation	p-value
Systolic Blood Pressure	Vasoconstrictor	50	126.80	11.452	0.580
	No Vasoconstrictor	50	125.58	10.510	
Diastolic Blood Pressure	Vasoconstrictor	50	74.32	10.927	0.683
	No Vasoconstrictor	50	73.42	11.073	
Pulse Rate	Vasoconstrictor	50	89.86	17.757	0.293
	No Vasoconstrictor	50	86.36	15.275	

Source: *Abubakar, Bamgbose, Owobu, et al* (*2018*)

Table 9: *Blood pressure and pulse rate 5 minutes after local anaesthetic injection in participants in the study on effects of vasoconstrictor on arterial blood pressure during minor oral surgical procedures*

Parameter	Group	N	Mean	Std. Deviation	p-value
Systolic Blood Pressure	Vasoconstrictor	50	125.36	13.953	0.408
	No Vasoconstrictor	50	122.98	14.667	
Diastolic Blood Pressure	Vasoconstrictor	50	71.36	11.602	0.502
	No Vasoconstrictor	50	69.90	9.988	
Pulse Rate	Vasoconstrictor	50	92.44	18.495	0.248
	No Vasoconstrictor	50	88.52	15.096	

Source: *Abubakar,* ***Bamgbose****, Owobu, et al* (*2018*)

Drs Abubakar Mohammed Kaura and Thomas Owobu - two of my co-researchers at the Aminu Kano Teaching Hospital, Kano

LOBULAR CAPILLARY HEMANGIOMA OF THE GINGIVA

Lobular capillary hemangioma of the oral mucosa represents inflamed fibrovascular tissues and has been given a myriad of names including fibrous inflammatory hyperplasia, palatal papillary hyperplasia, giant cell granuloma, pregnancy epulis and pyogenic granuloma. It is a common entity that causes soft tissue enlargement in the oral cavity or skin and is considered to be non-neoplastic. Whereas the term "pyogenic granuloma" is suggestive of an infectious process, the lesion does not contain pus and it is, histologically, not granulomatous (Bamgbose et al 2016).

While the lesion is very common in the skin, it is extremely rare in the gastrointestinal tract except the oral cavity where it is commonly found on keratinized tissues. It mostly presents as a painless, pedunculated or sessile mass of gingival tissue. Lesions are more common on the maxillary gingiva than the mandibular gingiva, and anterior region of arches are more commonly affected than posterior regions. Pyogenic granuloma exists in two histological forms namely, lobular capillary hemangioma and non-lobular capillary hemangioma.

A Case at the Aminu Kano Teaching Hospital, Kano, Nigeria (Bamgbose *et al,* 2016)

A 22-year-old female patient presented to the Oral Diagnostic Sciences Clinics with a complaint of gingival swelling on the facial surface of the upper left quadrant of 4-months duration. The swelling initially was millet-sized and progressively increased in size. There was no history of trauma or toothache before the swelling, and the patient was not pregnant. There was intermittent pain and bleeding. There was no history of dysphagia or weight loss.

The patient was otherwise in good health and she presented no history of prior hospitalization, hypertension or diabetes mellitus. Intra-oral examination revealed firm, inflamed and pedunculated swelling between the maxillary left lateral incisor and canine, protruding out of the oral cavity and measuring about 3 cm by 5 cm in diameter with intact overlying mucosa. There was hyperemia of the adjacent attached gingiva. Mouth opening was adequate and oral hygiene was poor. Probing depth around the maxillary left lateral incisor and canine was >5.5 mm, with bleeding on probing and Grade III mobility of the maxillary left lateral incisor. The patient has full complement of teeth. A clinical impression of Pyogenic Granuloma was made with the differential diagnosis of peripheral giant cell granuloma and peripheral fibroma.

Source: *Bamgbose et al, 2016*

Figure 1: *Patient retracting upper lip to reveal a firm, pedunculated gingival mass in the region of the maxillary left lateral incisor and canine, measuring about 3 cm by 5 cm*

Anterior maxillary occlusal radiograph showed a gross horizontal bone loss in the region of the maxillary central incisors, maxillary left central incisor and canine. The crown-root ratio was grossly increased. There was also present, a radiopaque entity on the region of the maxillary left central incisor and canine. The appearance was suggestive of calculus.

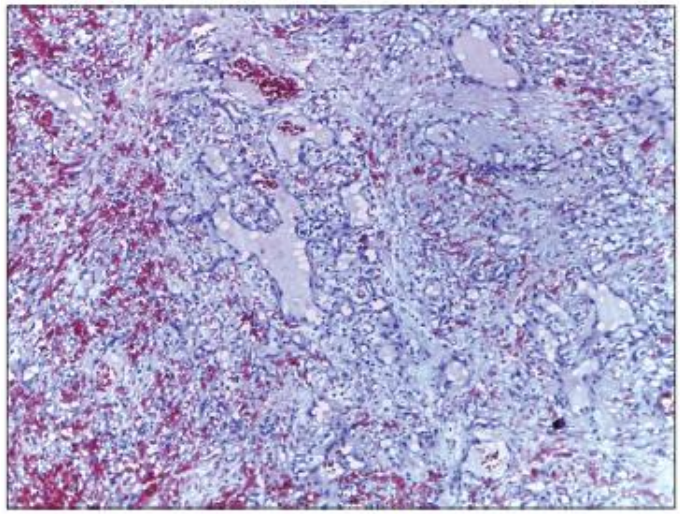
Source: *Bamgbose et al, 2016*

Figure 2: *Anterior maxillary occlusal radiograph showing a gross horizontal bone loss in the region of the maxillary central incisors, maxillary left lateral incisor and canine. The crown-root ratio is grossly increased. There is also present, a radiopaque entity in the region of the maxillary left lateral incisor and canine. The appearance is suggestive of calculus*

A surgical excision was done under local anaesthesia (2% lignocaine HCL 1:80,000 epinephrine). Extraction of maxillary left central incisor was done and the specimen of exuberant tissue was sent for histopathology. The histopathology report confirmed Pyogenic Granuloma and the lesion was reported as Lobular Capillary Hemangioma. The histological section showed keratinized squamous epithelium overlying a stroma composed of lobules of small sized capillary blood vessels containing red blood cells lined by plump endothelial cells. Immunohistochemistry staining revealed positivity for oestrogen receptor.

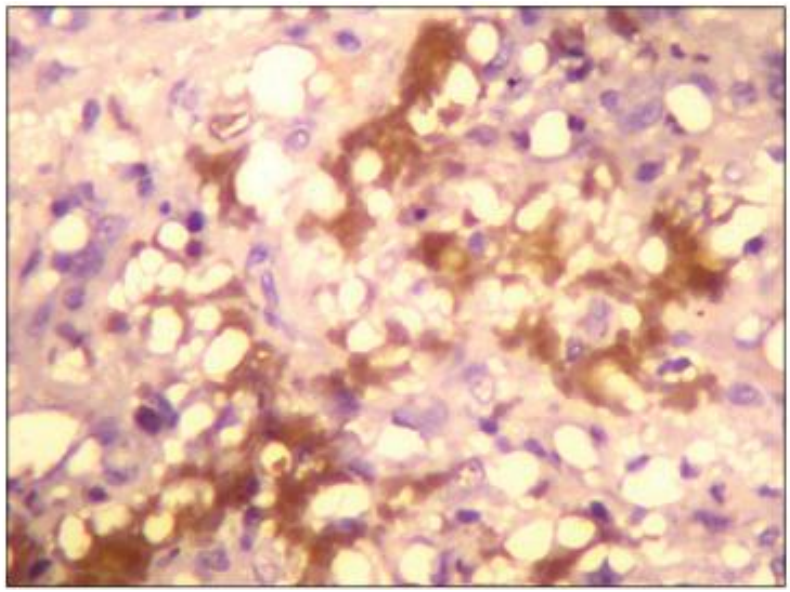
Source: (Bamgbose et al, 2016)

Figure 3: *Immediate post-operative photograph showing the extraction socket of the lateral incisor and the associated hyperemic gingiva*



Source: (Bamgbose et al, 2016)

Figure 5: *Low power photomicrograph of the lesion. Shows keratinized epithelium overlying stroma composed of lobules of small sized capillary vessels containing red blood cells and lined by plump endothelial cells. There is mild lymphocytic infiltrate in the interstitium*



Source: (Bamgbose et al, 2016)

Figure 6: *Immunohistochemistry stain ×400 shows nuclei of the spindle cells demonstrating positivity for oestrogen receptor*

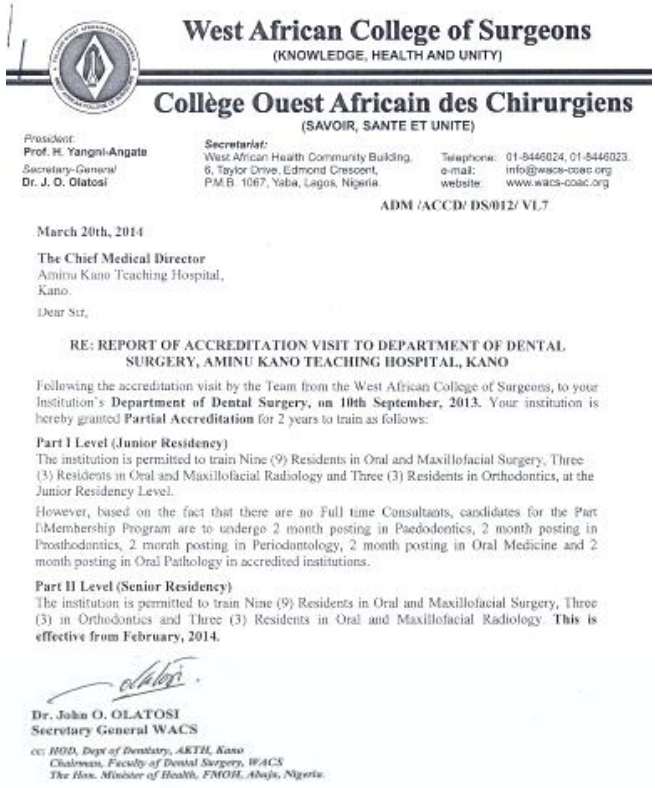
Pyogenic granuloma is seen predominantly in the second decade of life in females. This is thought to be due to the vascular effects of female hormones. Female hormonal changes have remained a focus of investigation in the etiology of pregnancy tumour, a type of pyogenic granuloma that occurs during pregnancy. Pregnancy tumour arises from the gingiva and shares a similar histologic characteristic with oral pyogenic granuloma. Pronounced vascularity of gingiva, hyperplastic gingivitis and pyogenic granuloma are some of the oral changes seen with use of oral contraceptives.

It is postulated that oestrogen and progesterone act directly on gingiva causing enlargement during pregnancy and atrophy during menopause. Such a role is due to the circulating hormones and exerts a great effect on the endothelium of pyogenic granuloma.

TRANSITION TO RADIOLOGY - Why Did I Move from Oral and Maxillofacial Surgery to Oral and Maxillofacial Radiology?

The West African College of Surgeons, on 10th of September 2013, came for speciality accreditation visit at Aminu Kano Teaching Hospital. In the Accreditation Report of March 20, 2014, the College recognized the speciality of Oral and Maxillofacial Radiology and granted us full accreditation to commence specialist training. By that singular act, the Oral and Maxillofacial Radiology became a recognized speciality in the entire West African Health Community, and yours truly became the Pioneer Oral and Maxillofacial Radiologist in Nigeria and West Africa.

By an act of fortune, Kano became the only centre for postgraduate training in Nigeria and West Africa.



West African College of Surgeons
(KNOWLEDGE, HEALTH AND UNITY)

Collège Ouest Africain des Chirurgiens
(SAVOIR, SANTE ET UNITE)

President:
Prof. H. Yangni-Angate
Secretary-General
Dr. J. O. Olatosi

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P.M.B. 1067, Yaba, Lagos, Nigeria.

Telephone: 01-8446024, 01-8446023.
e-mail: info@wacs-coac.org
website: www.wacs-coac.org

ADM /ACCD/ DS/012/ VL7

March 20th, 2014

The Chief Medical Director
Aminu Kano Teaching Hospital,
Kano.

Dear Sir,

RE: REPORT OF ACCREDITATION VISIT TO DEPARTMENT OF DENTAL SURGERY, AMINU KANO TEACHING HOSPITAL, KANO

Following the accreditation visit by the Team from the West African College of Surgeons, to your Institution's **Department of Dental Surgery, on 10th September, 2013.** Your institution is hereby granted **Partial Accreditation** for 2 years to train as follows:

Part I Level (Junior Residency)
The institution is permitted to train Nine (9) Residents in Oral and Maxillofacial Surgery, Three (3) Residents in Oral and Maxillofacial Radiology and Three (3) Residents in Orthodontics, at the Junior Residency Level.

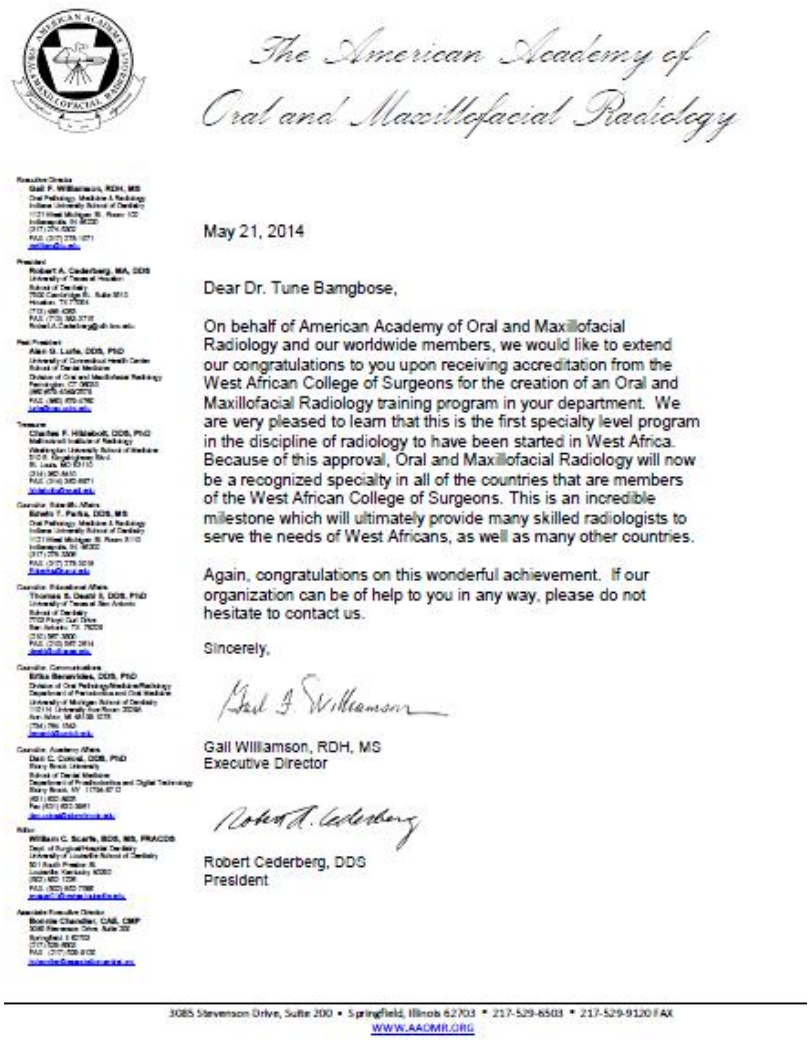
However, based on the fact that there are no Full time Consultants, candidates for the Part I Membership Program are to undergo 2 month posting in Paedodontics, 2 month posting in Prosthodontics, 2 month posting in Periodontology, 2 month posting in Oral Medicine and 2 month posting in Oral Pathology in accredited institutions.

Part II Level (Senior Residency)
The institution is permitted to train Nine (9) Residents in Oral and Maxillofacial Surgery, Three (3) in Orthodontics and Three (3) Residents in Oral and Maxillofacial Radiology. **This is effective from February, 2014.**

Dr. John O. OLATOSI
Secretary General WACS

cc: HOD, Dept of Dentistry, AKTH, Kano
Chairman, Faculty of Dental Surgery, WACS
The Hon. Minister of Health, FMOH, Abuja, Nigeria.

Figure 7: *The West African College of Surgeons Accreditation report that granted Kano the rights to train and develop manpower in the speciality of Oral and Maxillofacial Radiology.*



The American Academy of Oral and Maxillofacial Radiology

May 21, 2014

Dear Dr. Tune Bamgbose,

On behalf of American Academy of Oral and Maxillofacial Radiology and our worldwide members, we would like to extend our congratulations to you upon receiving accreditation from the West African College of Surgeons for the creation of an Oral and Maxillofacial Radiology training program in your department. We are very pleased to learn that this is the first specialty level program in the discipline of radiology to have been started in West Africa. Because of this approval, Oral and Maxillofacial Radiology will now be a recognized specialty in all of the countries that are members of the West African College of Surgeons. This is an incredible milestone which will ultimately provide many skilled radiologists to serve the needs of West Africans, as well as many other countries.

Again, congratulations on this wonderful achievement. If our organization can be of help to you in any way, please do not hesitate to contact us.

Sincerely,

Gail Williamson, RDH, MS
Executive Director

Robert Cederberg, DDS
President

3085 Stevenson Drive, Suite 200 • Springfield, Illinois 62703 • 217-529-6503 • 217-529-9120 FAX
WWW.AADMR.ORG

Figure 8: *Letter from the American Academy of Oral and Maxillofacial Radiology giving the Kano Training programme a full support.*

FOURTH MOLAR: A RETROSPECTIVE STUDY AND LITERATURE REVIEW OF A RARE CLINICAL ENTITY

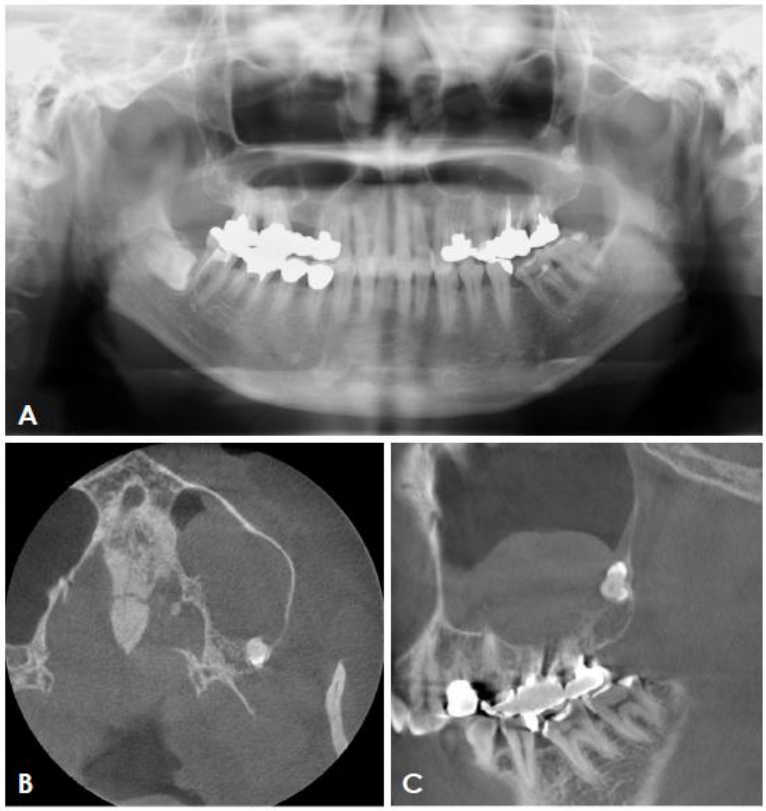
Dr. Zahrau Saleh

I like to start my story in Radiology by sharing this very important work. This work is significant because it involves one of my best students, Dr. Zahrau Saleh Abdu. Zahrau started as a student but she is now a colleague and true friend of mine. I remember vividly the day she came to my office with the periapical radiograph of her schoolmate, and she made an observation of a distomolar. She was so excited at what she was seeing! When I returned to my base at Okayama University in Japan, I mentioned the experience and it led to a huge study that was later published. Permit me to share the study with you.

Supernumerary teeth are extra teeth occurring in addition to the physiologic number of teeth, and they can be observed in both primary and permanent dentitions. They can be classified according to their location, and those that erupt distal to the third molar are referred to as distomolars or fourth molars (Bamgbose, Abdu, Asaumi et al, 2019). The prevalence of supernumerary teeth has been reported to be between 0.1% and 3.8% (Kaya et al). The aim of our study was to determine the prevalence, clinical significance, and associated pathologies of fourth molars.

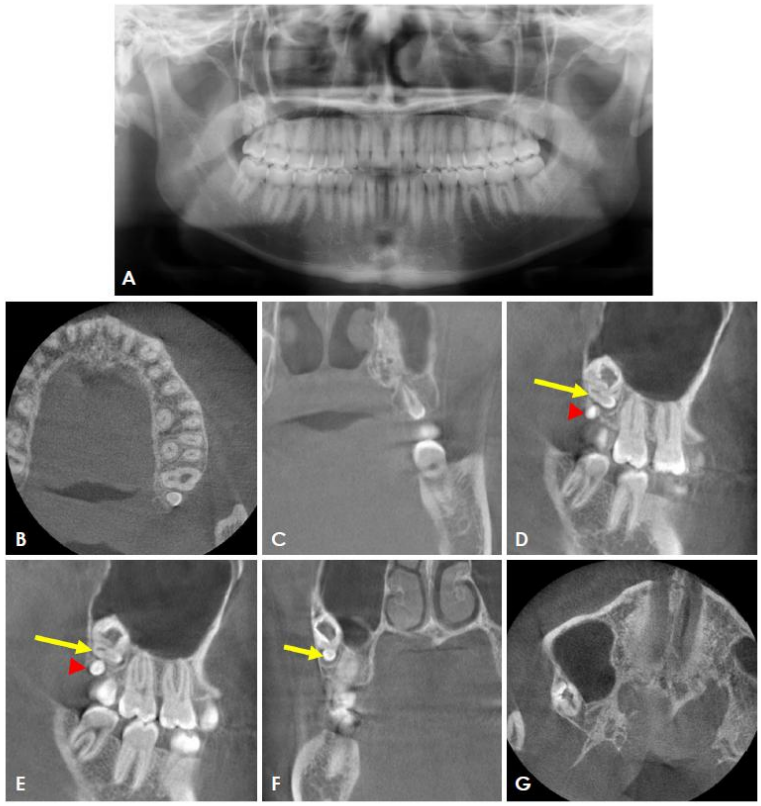
We designed a 5-year retrospective prevalence study that was conducted at the Department of Oral Diagnosis and Dentomaxillofacial Radiology Department of Okayama University Hospital, Okayama, Japan. The study involved extracting data from the digital records of patients from January 1, 2013 through December 31, 2017. The sampling frame included all patients who had panoramic radiographs, cone-beam computed tomography (CBCT), and multislice CT images during the period under review.

A total of 26,721 cases were reviewed and 87 fourth molars were identified. The prevalence of fourth molars in the 5-year study was calculated as 0.32%. The mean age of patients with fourth molar was 30.43 years, and the male-to-female ratio was 1:0.98. The vast majority of cases were in the maxilla (92%) and had normal shapes (89.7%); furthermore, 82.8% of cases were unerupted.



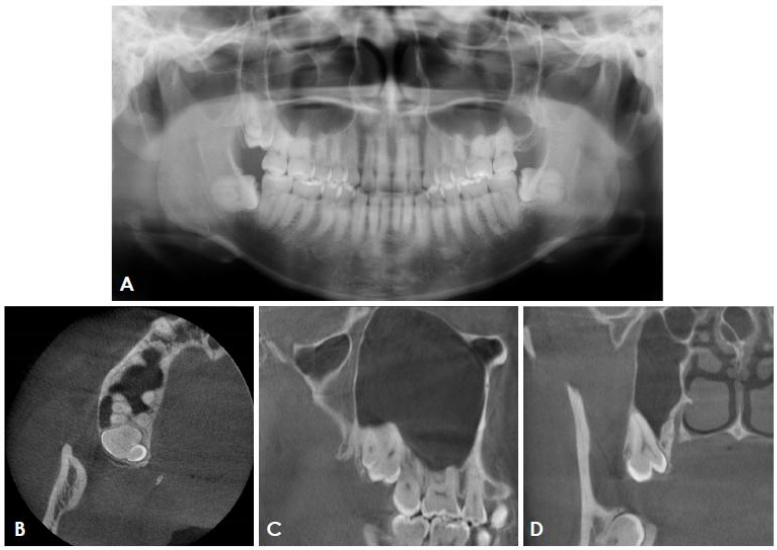
Source: *Bamgbose, Abdu, Asaumi et al, 2019*

Figure 9: ***A)****. Panoramic radiograph showing a borderline case classified as "cannot decide," portraying a tooth-like radiopacity in posterior maxillary left region that cannot be classified as a third or fourth molar because of the absence of both maxillary third molars.* ***B)*** *and C)****.*** *Cone beam computed tomographic images demonstrate an abnormally shaped tooth-like entity with 2 distinct crowns and fused roots with an associated mucus retention cyst in the posterior wall of the maxillary sinus*



Source: *Bamgbose, Abdu, Asaumi et al, 2019*

Figure 10. *A. Panoramic radiograph shows a fourth molar distal to the maxillary left third molar. There is also a fourth molar associated with a suspected odontoma in the region of the maxillary right third molar. Both fourth molars are in the maxillary tuberosity. B and C. Conebeam computed tomographic (CBCT) images demonstrate the maxillary left fourth molar as a normal-shaped microdont. D and E. Sagittal CBCT images show a complex odontoma superior to the maxillary right fourth molar (arrow head). D-G. The complex odontoma consists of a horizontally impacted microdont at its inferior segment (arrow), and the upper segment consists of various component tissues of the teeth*



Source: *Bamgbose, Abdu, Asaumi et al, 2019*

Figure 11: *A). Panoramic radiograph shows a fourth molar overlapping the maxillary right third molar. Cone-beam computed tomographic images demonstrate a fourth molar distopalatal to the maxillary right third molar B) and a fused tooth connecting with the third molar by the dental pulp (C and D).*

Source: *Bamgbose, Abdu, Asaumi et al, 2019*

Figure 12: *Fully-formed fourth molar associated with the distal surface of the maxillary right third molar in a patient with cleidocranial dysostosis*

Table 10: *Summary of abnormally shaped fourth molars.*

Age/Sex	Imaging modalities	Location	Shape	Type of eruption	Radiologic features
20/F	Pano + CBCT	Maxillary left quadrant	Abnormal crown morphology	Unerupted	A large tooth, representing the fourth molar, and 3 denticles located in the maxillary tuberosity in the proximity of the floor of the maxillary sinus.
32/M	Pano	Mandibular right quadrant	Abnormal crown morphology	Unerupted	Abnormal crown morphology. Roots not portrayed on the image. Impacted and distal to the adjacent third molar.
56/M	Pano + CT	Maxillary left quadrant	Toothlike structure	Unerupted	Distinct abnormal crown morphology, but the outline of roots was not distinct. Located in the maxillary tuberosity. Horizontally impacted against the root of the associated third molar, facing distally.
51/M	Pano + CT	Maxillary right quadrant	Toothlike structure	Unerupted	Located palatally in the maxillary tuberosity distal to the associated third molar.
66/F	Pano + CBCT	Mandibular left quadrant	Toothlike structure	Unerupted	Impacted third molar with associated unerupted, poorly formed fourth molar. The fourth molar was located distal and buccal to the impacted third molar. Root morphology not distinct.
46/M	Pano	Maxillary left quadrant	Toothlike structure	Unerupted	Located in the distal of apical third of the corresponding third molar. Crown morphology distinct.
50/F	Pano	Maxillary left quadrant	Toothlike structure	Unerupted	Two toothlike structures distal to the fully erupted maxillary left third molar. No CT available for close evaluation. The outline of the tooth was not clearly demonstrated on the panoramic radiograph. The appearance was suggestive of fourth and fifth molars.
19/M	Pano	Maxillary right quadrant	Toothlike structure	Unerupted	Fully formed tooth distal to the maxillary right thir molar. Located in the maxillary tuberosity.
45/F	Pano	Maxillary right quadrant	Small and not toothlike	Unerupted	Radiopaque entity with the appearance of enamel at the tip. Distal to the maxillary left third molar.

Pano: panoramic radiography, CBCT: cone-beam computed tomography, CT: computed tomography

Source: *Bamgbose, Abdu, Asaumi et al, 2019*

Table 11: *Summary of the location and shape of fourth molars*

Location	Number	Shape	
		Normal	Abnormal
Maxillary right quadrant	32	30	2
Maxillary left quadrant	48	44	4
Mandibular left quadrant	5	3	2
Mandibular right quadrant	2	1	1
Total	87	78	9

Source: *Bamgbose, Abdu, Asaumi et al, 2019*

LOBODONTIA

During the fourth molar study, I came across a rare case. This case brought pride to Bayero University Kano because I provided the correct diagnosis to an unusual case.

Source: *Okayama University (Unpublished)*

Figure 13: *Thirty-two-year-old female with an incidental finding of abnormal tooth morphology consistent with Lobodontia*

The term "lobodontia" was coined by *(Keene and Dahlberg, 1973)* to denote multiple dental anomalies including teeth crown of canines and premolars resembling those of carnivores or wolves. The cases of lobodontia described so far show certain variability in clinical presentations. All types of dental dysmorphology are not seen in all cases. The most constant clinical findings are single pyramidal molar roots and tritubercular crowns with pointed buccal cusps of maxillary canines and premolars. Tritubercular shape of canines and premolars resembles the dentition of *Canis lupus familiaris* or domestic dog. The shape of tricondont class is characteristic for early mammalian stage of teeth development and is common in dogs and other carnivores. Lobodontia is a very rare condition. Its prevalence is estimated to be less than 1:1,000,000. This case is being prepared for publication.

THE USEFULNESS OF READOUT-SEGMENTED ECHO-PLANAR IMAGING (RESOLVE)FOR BIO-PHANTOM IMAGING USING 3-TESLA CLINICAL MRI

Readout-segmented echo-planar imaging (RESOLVE) is a multi-shot echo planar imaging (EPI) modality with k-space segmented in the readout direction. We investigated whether RESOLVE decreases the distortion and artefact in the phase direction and increases the signal-to-noise ratio (SNR) in phantom images taken with 3-Tesla (3T) MRI versus conventional EPI (Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016). We used a physiological saline phantom and subtraction mapping and observed that RESOLVE's SNR was higher than EPI's [See Table 12 and Figure 14].

Using RESOLVE, the combination of special-purpose coil and a large-loop coil had a higher SNR compared to using only a head/neck coil. RESOLVE's image distortion was less than EPI's. Figure 14. We used a 120mM polyethylene glycol phantom to examine the phase direction artefact. Figure 15. The range where the artefact appeared in the apparent diffusion coefficient (ADC) image was shorter with RESOLVE compared to EPI[Figures 15 and 16]. We used RESOLVE to take images of a Jurkat cell bio-phantom: the cell-region ADC was 856 x $10^{-6}mm^{-2}$/sec, and the surrounding physiological saline region ADC was 2,951 x $10^{-6}mm^{2}$/sec [Figure 17].

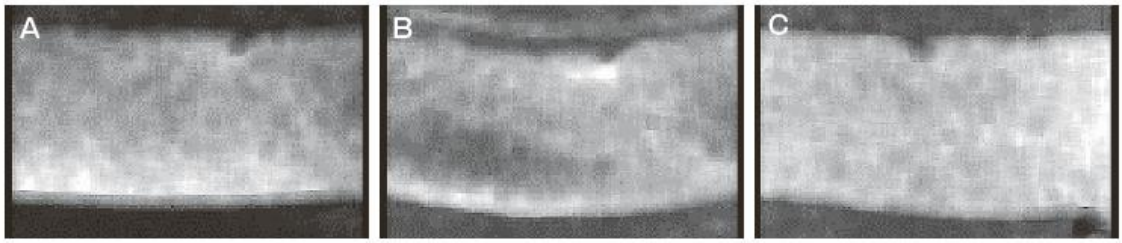
The combination of RESOLVE and the 3T clinical MRI device reduced image distortion and improved SNR and the identification of accurate ADC values due to the phase direction artefact reduction. This combination is useful for obtaining accurate ADC values of bio-phantoms (Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016).

Table 12: *RESOLVE and EPI MR imaging conditions, SNR, distortion, phase-direction artifact and bio-phantom*

Parameters	SNR and distortion		Phase direction artifact		Bio-phantom
	RESOLVE	EPI	RESOLVE	EPI	RESOLVE
TR (msec)	8000	8000	8000	8000	8000
TE (msec)	80	122	103	98	103
ES (msec)	0.6	1.57	0.6	1.44	0.6
FOV (mm)	120	120	120	120	120
Matrix	162 × 162	162 × 162	224 × 224	120 × 120	224 × 224
BW (Hz/pixel)	386	752	360	758	360
Average	2	2	2	2	2
Segment	7	–	7	–	7
Slice thickness (mm)	5	5	5	5	5
Slice number	1	1	1	1	1
Phase direction	AP	AP	AP	AP	AP
b-value (sec/mm^2)	1000	1000	0, 200, 400, 600, 800, 1000, 1100, 1200, 1300	0, 200, 400, 600, 800, 1000, 1100, 1200, 1300	0, 200, 400, 600, 800, 1000, 1100, 1200, 1300, 1400, 1500, 1700, 2000
Imaging time (h : min : sec)	7 : 06	1 : 14	1 : 43 : 30	12 : 42	1 : 43 : 30

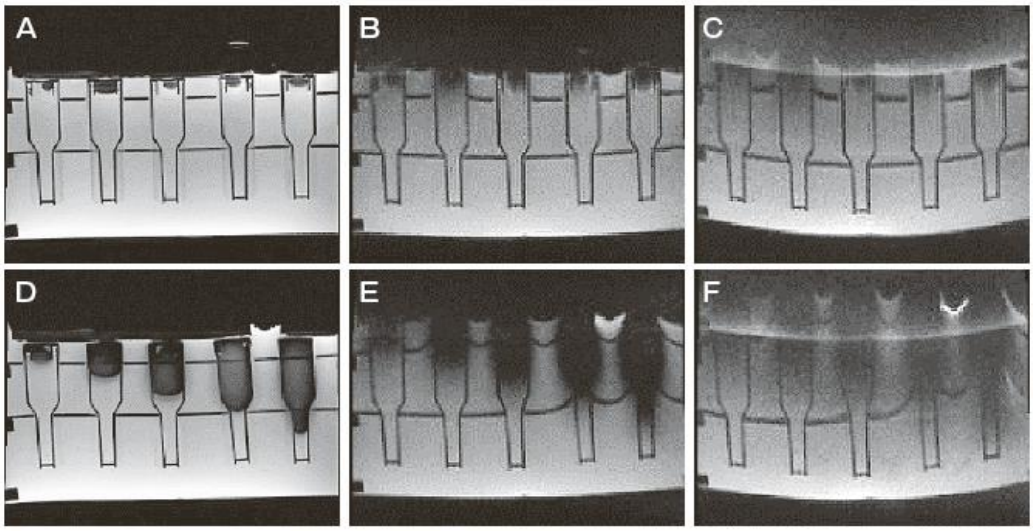
TR, repetition time; TE, echo time; ES, echo space; FOV, field of view; BW, band width; AP, antero-posterior.

Source: *Yoshimura, Kuroda, and Asaumi, et al, 2016*



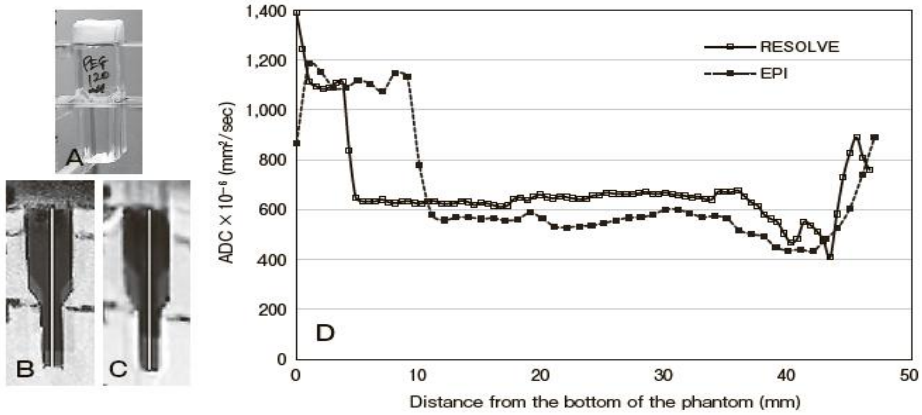
Source: *Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016*

Figure 14: *The SNR map based on the differences in sequences and in the selection of coils. A, RESOLVE with the combination of the special-purpose coil and large-loop coil. SNR: 46.2; B, EPI with the combination of the special-purpose coil and large-loop coil. The SNR was 21.7; C, RESOLVE with the head/neck coil. SNR: 23.5 (Yoshimura, Kuroda,* ***Bamgbose****, Asaumi, et al, 2016).*



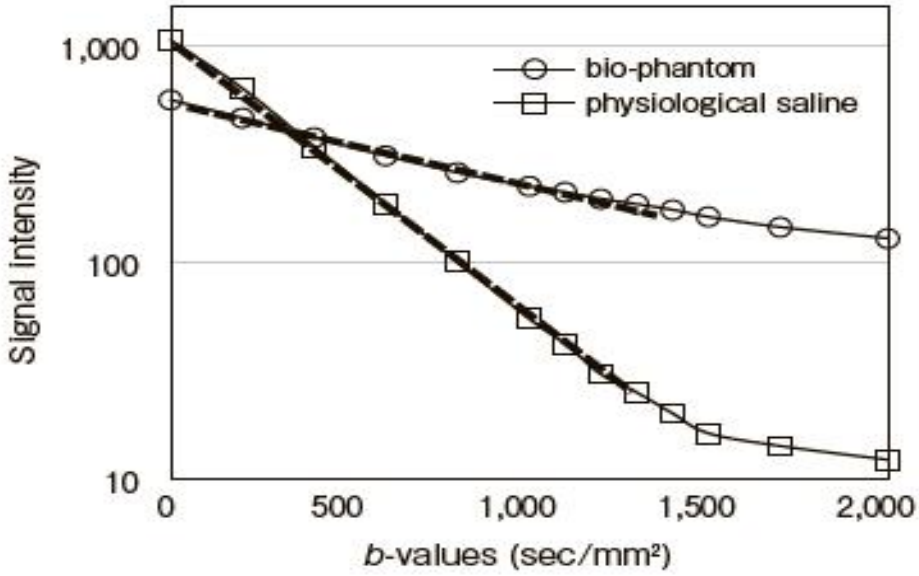
Source: *Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016*

Figure 15: *The distortion of images based on the different sequences and the volume of air in the phantom. A, D, T2-weighted images as the control images without distortion; B, E, RESOLVE; C, F, EPI. A-C, No air in the phantom; D-F, Different volumes of air in the phantom*



Source: *Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016*

Figure 16: *The phase-direction artifact. A, The phantom containing 120 mM PEG; B, RESOLVE; C, EPI. The longitudinal axis of the phantom represents the phase direction; this is shown as the midline on panels B and C; D, The ADC values calculated along the midline of the longitudinal axis, from the bottom to the top of the phantom. Open square with full line, RESOLVE; Closed square with dotted line, EPI*



Source: *Yoshimura, Kuroda, Bamgbose, Asaumi, et al, 2016*

Figure 17: *Calculation of the ADC values of the bio-phantom. The signal intensity of the ROIs on the RESOLVE images was plotted as the function of the b-values. Open circles and squares represent the signal intensity of the ROIs in the bio-phantom and physiological saline, respectively. The straight lines represent regression lines calculated with the least square method for the b-values between 0 and 1,300 sec/mm2.*

ASSESSMENT OF AMELOBLASTOMA USING MRI AND DYNAMIC CONTRAST-ENHANCED MRI

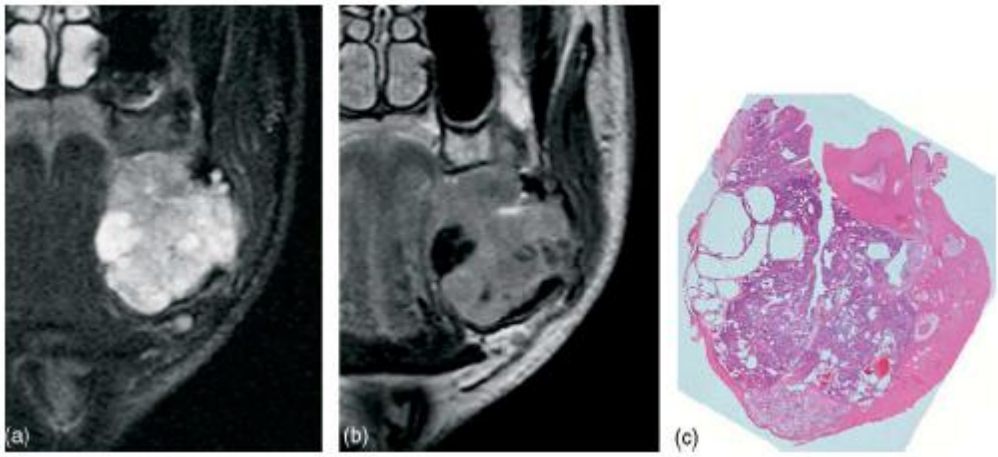
Ameloblastoma is a benign but locally invasive polymorphic neoplasm consisting of proliferating odontogenic epithelium, which usually has a follicular or plexiform pattern lying in a fibrous stroma. It is the most common odontogenic tumour, and accounts for 1% of tumours and cysts of the jaw and 10% of odontogenic tumours.

The radiographs of ameloblastoma may show considerable variation reflecting their polymorphic features. The typical plain radiographic picture is of a multilocular destruction of bone, but unilocular ameloblastoma also occur. In conventional radiography, differential diagnosis may include odontogenic keratocyst, odontogenic myxoma, dentigerous cyst, ameloblastic fibroma, giant cell granuloma, aneurysmal bone cyst, and other lesions.

With its superior soft-tissue contrast and multiplanar facilities, magnetic resonance imaging (MRI) is the most useful modality for analyzing the internal structure of lesions. Dynamic contrast-enhanced MRI (DCE-MRI) reflects intratumoral angiogenesis and is useful in the differential diagnosis and has been used to identify differences between benign and malignant tumours.

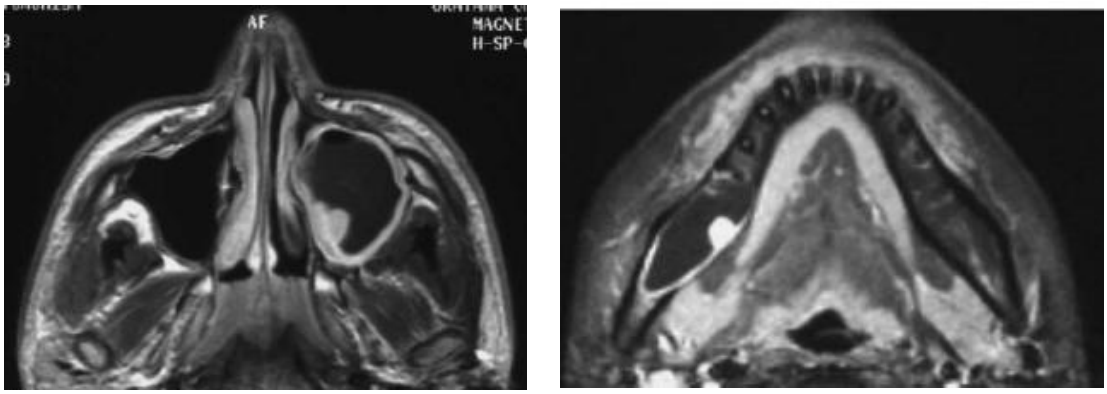
A retrospective study by my mentor in Okayama, Professor Jun-Ichi Asaumi, evaluated the MR features and DCE-MRI of ameloblastoma to assess whether MRI and DCE-MRI can provide additional information.

The contents of ameloblastoma were divided into two portions of either solid or cystic components on the basis of MR signal intensities [Figures 18 and 19]. The signal intensity with the solid or cystic potions was classified as homogeneous or heterogeneous. For the DCE-MRI, region of interest (ROI) was drawn to include the maximal region of solid portion excluding the cystic portion. The mean signal intensity (SI) pre- and post-contrast was evaluated on the ROI of each lesion and the results used to determine the contrast index (CI). The CI was plotted on a time course to obtain the CI curves (Asaumi et al, 2005; Fujita et al, 2013).



Source: *Asaumi et al, 2005*

Figure 18: *27-year-old male (a) Axial T2-weighted MR image shows a well-defined focal mass of heterogeneous high signal intensity with an extremely high signal spot at the left mandible (TR/TE = 4000/90). (b) On Gd-T1W, there is well enhancement in the lesion. However, the area corresponding to the intermediate signal spot on T1WI and the extremely high signal spot on T2WI shows no enhancement on Gd-T1WI (TR/TE= 700/12). (c) Gross features of the resected tumour correspond to the coronal section of the MRI*



Source: *Asaumi et al, 2019*

Figure 19. On Gd-T1WI, only the surrounding area including the mural nodule and the thick wall shows well-enhancement in the lesion, while the area corresponding to the central portion shows no enhancement.

MR features of ameloblastoma reflect the histopathological findings. Contents of ameloblastoma could be divided into solid and cystic portions on the basis of MRI findings. MRI, especially Gd-enhanced T1WI, could easily detect the mural nodule and thick wall, which is difficult to detect on the basis of CT. In the ameloblastomas, the solid portions show various signal intensities from intermediate to slightly high on T1WI and from intermediate to high on T2WI, and the cystic portions show homogeneous low-to-slightly high signal intensities on T2WI. There is no difference in the signal intensities among primary and recurrent ameloblastoma. On Gd-T1WI, the solid portion shows enhancement, but the cystic portion does not. The cystic ameloblastoma shows rim enhancement [Figures 13 and 14]. The MR features of ameloblastoma show various signal intensities reflecting its polymorphic histopathologic pattern [Figure 14].

Current Status of Oral and Maxillofacial Radiology in West Africa

This study was done in collaboration with my colleague in Medical Radiology, Professor Muhammad Suwaid, my mentee, Dr. Abubakar Kaura, and my research team in Okayama. There was networking with my colleagues in North America, Canada, Europe and Australia in the course of this study (Bamgbose et al, 2017).

Postgraduate dental education in West Africa is coordinated and regulated by the West African College of Surgeons, which awards a Fellowship after 5-6 years of postgraduate training. This body ensures uniformity of training at the various training centres, concentrated in Nigeria and Ghana, by drawing up training curriculum and administering examinations. The West African College of Surgeons is also the organization that grants speciality recognition to programmes for postgraduate training. It is not uncommon for oral surgeons to develop an interest in and teach radiology. Until 2014, Oral and Maxillofacial Radiology was not a recognized training speciality in West Africa (Bamgbose et al, 2017).

The main findings of our study were that Oral and Maxillofacial Radiology became the ninth dental speciality recognized by the American Dental Association (ADA) in October 13, 1999. On March 20, 2014, the West African College of Surgeons recognized this speciality and granted accreditation for postgraduate training. In the U.K, Japan and Australia, the postgraduate education in Oral and Maxillofacial Radiology has two patterns, namely professional training and academic training [Table 13].

Table 13: *Oral and Maxillofacial Radiology programmes in different countries*

Countries	Number of specialists	Year of recognition	Duration of program (years)	Population (millions)	Gross domestic product (GDP)
United Kingdom [14, 20]	27	–	4	65	USD 2.849 trillion
Japan[a,b]	300	2007		127	USD 5.96 trillion
Nigeria	3	2014	6	186	USD 481.07 billion
United States of America[c]	100	1999	2–3	324	USD 18.56 trillion
Australia[d]	10	1989[d]	3	23.13	USD 1.56 trillion

[a] The Japanese Society of Oral and Maxillofacial Radiology is composed of 1500 members, including honorary and life members. This includes 300 members with full specialist recognition

[b] There are about five different levels in the specialty system in Japan

[c] The American Board of Oral and Maxillofacial Radiology (ABOMR) has 160 Board-Certified Oral and Maxillofacial Radiologists, about 20 of whom are outside the USA. The estimated number of practicing oral and maxillofacial radiologists is 100, and 30–40 of these are at Dental Schools

[d] The first and only training program is located at the University of Queensland and started in 1989. It is not clear whether 1989 was the year when the specialty was recognized

Source: *Bamgbose et al, 2017*

For speciality training in Oral and Maxillofacial Radiology in West Africa, there is need to work closely with the Medical Radiology Department. This department is the custodian of advanced imaging facilities, such as computed tomography, magnetic resonance imaging, ultrasound, and interventional imaging suites. It is imperative to have a harmonious relationship with medical radiologists for the training of oral and maxillofacial radiologists (Bamgbose et al, 2017). This type of working relationship enhances the sharing of facilities across departments, because it is difficult to have these installed in the dental schools in a resource-limited economy such as West Africa. In Japan, advanced imaging facilities, including MRI, MDCT, USS and CBCT are domiciled in the dental school and readily available for oral and maxillofacial diagnostic purposes.

The goal of the programme in West Africa is to train Oral and Maxillofacial Radiologists to be able to work in any of three different capacities, namely stand-alone private oral and maxillofacial imaging practice, university practice (faculty practice), and hospital practice (Bamgbose et al, 2017).

It is a privilege and honour to be the first Professor of Oral and Maxillofacial Radiology in the entire West African Health Community.

THE FACULTY OF DENTISTRY

What is Dentistry?

Dentistry is the evaluation, diagnosis, prevention and/or treatment (non-surgical, surgical or related procedures) of diseases, disorders and/or condition of the oral cavity, maxillofacial area and/or the adjacent and associated structures and their impact on human body. Dental services are provided by dentists within the scope of their education, training and experience, in accordance with the ethics of the profession and applicable laws. Dentistry is both a science and an art and it is an evolving profession. The evolving nature of dentistry increases the complexity and scope of procedures dentists perform. Dental services are provided more effectively and efficiently through advances in research, education and training.

The dental team is comprised of the dentist, dental therapist, dental assistant, dental laboratory technologist, dental technician, speech therapist, and dental nurse. The dentist has a leadership role in the team. Depending on the type of practice, the dentist sets the objectives and scope of practice for the team. The leadership role of the dentist is not limited to the clinical component of the practice, but it includes the business of dentistry, human resource management, financial management and patient communication. Patient communication is key to practice success.

Dental Specialities

The undergraduate training programme is moderated by the National Universities Commission and the Medical and Dental Council of Nigeria, while the speciality programmes are controlled by the National Postgraduate Medical College of Nigeria and the West African College of Surgeons.

Upon completion of the Bachelor of Dental Surgery programme of the Faculty of Dentistry, Bayero University, Kano, a graduate can enrol in the Primary Fellowship Examination of either the National Postgraduate Medical College of Nigeria or the West African College of Surgeons. At this stage of the speciality programme, there is reciprocity. Success in the Primary Fellowship Examination is a prerequisite for enrolment in the speciality programme in Dentistry.

A speciality is an area of dentistry that has been formally recognized by the National Postgraduate Medical College of Nigeria or the West African College of Surgeons. The following are the current recognized specialities in Dentistry in Nigeria: Dental Public Health, Endodontics, Oral and Maxillofacial Pathology, Oral and Maxillofacial

Medicine, Oral and Maxillofacial Radiology, Oral and Maxillofacial Surgery, Orthodontics and Dentofacial Orthopedics, Paediatric Dentistry, Periodontics, Prosthodontics, Conservative Dentistry and Family Dentistry.

Fig. 19: Prof. *Tunde Bamgbose with Dr Efunkoya*

Fig. 20: Prof. *Tunde Bamgbose in the operating room with Dr Lawal*

SERVICE TO THE UNIVERSITY COMMUNITY

When I joined the Faculty of Dentistry, I immediately understood we needed to bring the Faculty to the consciousness of the community. One individual that gave me a head-start was Dr. Joshua Adeoye. He gave me an insight into the mindset of the individuals in the Faculty and it became my responsibility to design ways of navigating their idiosyncracies. I can say that we succeeded in most of the programmes we initiated. Through my photography outfit, HeartWork Photos, I became the photographer to the Faculty and was very eager to record the history of the emerging Dental Project. I also became a graphic design expert and founded a newsletter, KANDAHA, for the Faculty. I initiated and coordinated the Faculty Lecture Series for the Faculty. The programme created a platform for individuals outside the Faculty to share their knowledge. My photography outfit covered all the events.

A particularly interesting development was the setting up of **BREAKFAST TABLE** for our weekly seminars. I used this platform to teach and motivate the Resident Doctors. Unknown to them, I was showing them leadership through service. I was personally in charge of the breakfast procurement, set up and clean up. I enjoyed every bit of that moment in time.

Since I joined the Bayero University, Kano, I have served as Head of Department except for a moment when I was out of the country and certain individuals acted on my behalf.

I was the coordinator of the Faculty Research activities and I ran a full research methodology course for the Faculty in conjunction with my mentors at the University of Iowa. That course was the beginning of academic growth of the Faculty and has produced two Professors, two Associate Professors and ten resident doctors who have successfully completed their programmes and now employed with the Bayero University Kano or Federal Medical Centres in Nigeria. I have served on several Faculty and College Committees.

THE PEOPLE WHO GAVE ME GUIDANCE

I have mentioned many of the special individuals in the course of this lecture. I wish to place them in categories.

Professors Yahuza Bello and Jun-Ichi Asaumi

This lecture is delivered in honour of Professor Muhammad Yahuza Bello, the immediate past Vice Chancellor of Bayero University Kano. He has been a true friend and has greatly supported the founding of the speciality by allowing me ample time to travel round the world establishing collaborations with international institutions. We met fortuitously during the period I was promoting the Kano Dental Project. We have been friends ever since.

The honour also goes to my professional mentor and friend, Professor Jun-Ichi Asaumi, Immediate Past Dean of the Okayama University Dental School and Professor of Oral and Maxillofacial Radiology. Since our paths crossed, Prof. Asaumi has been so concerned about my growth. I am very grateful for the relationship and his mentorship. I also wish to extend my appreciation to members of my Research Team at Okayama University. I appreciate the love and affection they have for me. Okayama has become my second home and family. I should mention my senseis, including Kuroda sensei, Hisatomi sensei, Okada sensei, Matsubara sensei, Takeshita sensei and others.

Prof Lanre Adeyemo

A special friend deserves special mention. Prof Adeyemo is not just my best friend, he is my brother. I am grateful to him for his loyalty and sincere guidance. We met during our period as oral and maxillofacial surgery residents at the Lagos University Teaching Hospital and we have remained very close. Adeyemo and I have traversed every region of Nigeria for political undertakings. I might be right to say Adeyemo initiated me into politics. He is the initiator of the phrase “RESPONSIBLE LEADERSHIP.” We have equally traversed the globe in pursuit of knowledge. As the Chief Medical Director of Lagos University Teaching Hospital once said, “when the sun shines, you should move close so that some light can shine on you too.” Lanre Adeyemo is a shinning light in our generation and we are proud of him. Thank you my brother. You will always remain special to me.

Lagos University Teaching Hospital

I am a Lagosian. I was born, raised and educated in Lagos. I wish to show appreciation to my Medical School classmates who supported me through my formative years. Special mention goes to my friend, Obuks Mafuru, my darling sister, Ify Ndukuba (Now Adegbulugbe), Bimbo Giwa, Omotayo Oremosu, Bimpe Adegbite, Adewale Chris, Tunde Bakare, Collins Esiwe, Wale Badejo, Dewunmi Oyesakin, Austin Edomwonyi, Oluleke Jeboda, Kunle Aluko, Kenneth Nwachukwu, Lawal Oyeneyin, mni and the entire Class of 93^{+1}.

My teachers and trainers were good people. I want to thank Prof. Jelili Akinwande, Dr. Bola Obisesan, Prof. G. T. Arotiba, Prof. A. L. Ladeinde and Prof Ogunlewe for teaching me the art of the healing knife. I also appreciate my colleague in the Oral and Maxillofacial Surgery Department at LUTH, Prof. Gbotolorun and the other individuals whom I trained with. I am grateful to Prof. Oredugba, Prof. O. O. Sofola (the immediate past Dean of University of Lagos Faculty of Dental Sciences), Dr O. F. Ajayi and all my teachers at the School of Dental Sciences of the University of Lagos.

Special Friends at Bayero University Kano

In the course of my stay in Kano, I have cultivated some friendship and will like to appreciate them for making me feel at home. One individual who has been of great support to me is the Acting Registrar, Jamilu Salim. I appreciate your wise counsel. Another great friend is Maxwell Fwa, the Personal Secretary to the Vice Chancellor.

At the College of Health Sciences, three individuals have been my most trusted friends. Coincidentally, they are related. Prof. Hadiza Galadanci was someone I met while she was the CMAC of Aminu KanoTeaching Hospital, Prof. Zubaru Iliyasu and I met during the period I was promoting the Kano Dental Project. I met Prof. Aisha Gwarzo within the premises of the hospital and it has been a mutually enriching friendship. In addition, the immediate past CMD of Aminu Kano Teaching Hospital, Prof. Aminu Zakari has become a friend and a brother. I appreciate you all.

Mallam Mahbub Sani Alhassan (BANYO)

While not a staff of the Bayero University Kano, Mallam Mahbub Sani Alhassan (BANYO) is a special friend. I call him Professor Mahbub. His family has been good to me. Dr Princess Babar Hajiya Umitta is the last born and quite loving.

I may not have mentioned all the individuals I have worked with, either in Lagos or Kano. Please note that I appreciate you all and I share with you the joy of this day.

MY STUDENTS WHO BECAME MY FRIENDS

Beyond the first set of Dental students that we graduated, I have enjoyed very good working relationships with all the sets we have trained and some individuals stood out. I will mention Dr. Taofeek Galadanci. Galadanci gave us the gift of his oratory prowess when he read a portion of the citation of the former Vice Chancellor of BUK, Professor Adamu Rasheed, during the farewell reception organized by the Faculty of Dentistry. He was and is always a reliable friend. He shared some of his academic aspirations with me and we are trusting God to help fulfil his dreams. Next to him is Dr. Maryam Al-Amin. Maryam was in the same set as Galadanci and, because she was the only female in that class, she controlled the class without even being in leadership. I admired the manner her classmates gave her so much regard and courtesy. We created a project around her through a piece she contributed to the Faculty Newsletter, KANDAHA. It was titled: "I AM MARYAM." We wanted to use the project to educate the girl-child, using Maryam as an example of success. There was also my very good friend and son, Dr. Shamsu Danlami Muhammad. Shamsu and I became really close because I saw so much potentials in him and he made me a promise to fulfil his potentials. It may have started slowly but he is a proud doctor today! I personally linked Shamsu with the three musketeers in the class, namely Drs. Hajara Bala Magaji, Amina Sani Baffa and Isma'il Khadijah Adballah. I am grateful to these ladies for welcoming Shamsu into their fold and changing the tide of his academic progression. These ladies were very hardworking and eager to learn. They were high flyers.

In another set, I met a young lady who showed tremendous interest in my class. She was always the first to get to class and ever so attentive. I took interest in her progress. It was much later I realized, through the Vice-Chancellor, that her father was a professor at the BUK. Dr. Zahra'u Saleh Abdu is a good friend. I am proud of how well she has started her career and I pray she continues on that path. Her very close friend, Dr. Fatima Ahmad Maigari, is also a friend of mine. Fatima is so quiet and very unassuming. She would execute every instruction to the letter. She graduated top of her class.

In the current senior class, I have two special friends. One is Khaleed Umar. Khaleed has an inner vision that is yet to blossom, but he has a clear thought on the direction he is heading. He comes across as a gentleman, but his will is made of steel. His classmate, Mariya Muhammad Kadir is also a very good friend of mine. Her classmates were surprised to see me at the mosque during her wedding. I remember

telling her husband to please allow her pursue her career aspirations. Mariya's wedding remains the only wedding I have attended in Kano so far.

While it may not be possible to mention the names of all my students, I am grateful to everyone for giving me a good time in Kano. Thank you, Katagun. Thank you, Sahadatu. Thank you, Yellow Man. Thank you, Hauwa Idris. Thank you, Babatunde Victor. Thank you, Akinola Taofeek and thank you, Dr Azeezat Rabiu.

FUTURE RESEARCH DIRECTION

Prinicples of Receiver Operating Characteristics Analysis as Applicable to Cluster Signal-to-Noise Ratio Analysis

The receiver operating characteristic (ROC) curve, which is defined as a plot of test sensitivity as the y coordinate versus its 1-specificity or false positive rate (FPR) as the x coordinate, is an effective method of evaluating the quality or performance of diagnostic tests and is widely used in radiology to evaluate the performance of many radiological tests.

Sensitivity and specificity, which are defined as the number of true positive decisions/the number of actually positive cases and the number of true negative decisions/the number of actually negative cases, respectively, constitute the basic measures of performance of diagnostic tests.

	True Condition Status		
Test Result	Positive	Negative	Total
Positive	TP	FP	T+
Negative	FN	TN	T−
Total	D+	D−	

Source: *Weerawanich et al, 2018*

The table represents the Decision Matrix, where sensitivity is defined as TP/D+ [test is positive, given that disease is present] and specificity is defined as TN/D- [test is negative given that disease is absent].

TP = True Positive, FP = False Positive, FN = False Negative and TN = True Negative

When the results of a test fall into one of two obviously defined categories, such as either the presence or absence of a disease, then, the test has only one pair of sensitivity and specificity values.

However, in many diagnostic situations, making a decision in a binary mode is both difficult and impractical. Image findings may not be obvious or clean-cut. There may be considerate variation in the diagnostic confidence levels between radiologists who

interpret the findings. As a result, a single pair of sensitivity and specificity values is insufficient to describe the full range of diagnostic performance tests.

My current research work is summarized as follows:

Relationship between diagnostic image quality using cluster signal-to-noise analysis, visual quality of several anatomical landmarks and diagnostic accuracy of mandibular canal in CBCT images

Purpose:

To clarify the mutual relation between diagnostic image quality using cluster signal-to-noise analysis, visual quality of several anatomical landmarks and diagnostic accuracy of mandibular canal in CBCT images, and to establish the quantitative method to determine the optimum exposure parameter for clinical use of CBCT.

Observer Performance Test (Visual Image Quality):

Images with Morita CBCT will be used (32 image data sets from 4 dry mandibles).

90 kVp and 1, 2, 3, 4, 5, 6, 8, 10 mA with the pixel size of 0.08 mm.

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LIST OF PROFESSORIAL INAUGURAL LECTURE TO DATE

S/N	NAME	DEPT	DATE	TOPIC
1st	Emmanuel Ajayi Olofin	Geography	4th March, 1992	The Gains and Pains of Putting a Water Lock on the Face of the Drylands of Nigeria
2nd	Garba Dahuwa Azare	Education	24th June, 2000	BASIC CONCERNS: Revitalizing Nigeria's Primary Education in the New Millennium
3rd	Dajuma Abubakar Maiwada	Education	29th July, 2000	Improving Teaching and Learning in University Education with Particular Reference to Bayero University, Kano
4th	Majekodunmi Oladeji Fatope	Chemistry	7th July, 2001	NATURAL PRODUCTS SCIENCE: Looking Back and Looking Forward
5th	Muazu Alhaji Zaria Sani	Nigerian Languages	13th October, 2001	A focus on Some Segmental and Suprasegmental Features in Hausa Phonology
6th	Isa Hashim	Political Sciences	20th March, 2004	Planning and Budget Implementation in the Health Sector
7th	Abdulla Uba Adamu	Education	24th April, 2004	SUNSET AT DAWN, DARKNESS AT NOON: Reconstructing the Mechanisms of Literacy in indigenous Communities
8th	Auwalu Hamisu Yadudu	Private and Commercial Law	5th June, 2004	LAW AS INTERPRETATION: An Exploratory inquiry from Islamic Law Jurisprudence

9th	Mohammed Sanni Abdulkadir	History	31st July, 2004	STRUCTURING, STRUGGLING AND SURVIVING ECONOMIC DEPRESSION IN NORTHERN NIGERIA: The 1930s As Preview of the present
10th	Muhammad Sani Sule	Bio-chemistry	23rd March, 2013	Enzymology and Radiation Biology in the Understanding of Biochemistry
11th	Essiet Unanaowo Essiet	Agriculture	22nd May, 2013	AGRICULTURE SUSTAINABILITY IN THE DRYLAND OF NIGERIA: Realities and Prospects
12th	Aliyu Kamal	English Studies	5th March, 2014	The Islamic Novel Style and Structure
13th	Abdu Ahmed Manga	Agriculture	9th April, 2014	Horticulture as a Panacea for Food Insecurity and Unemployment
14th	Sa'idu Muhammad Gusau	Nigerian Languages	26th May, 2014	Wakar Baka Bahaushiya (The Hausa Oral Songs)
15th	Abdallah Uba Adamu	Mass Comm-unication	9th July, 2014	IMPERIALISM FROM BELOW: Media Contra-Flows and Emergence of Metro-Sexual Hausa Visual Culture

16th	Ghaji Abubakar Badawi	Library and Information Sciences	29th July, 2015	THE ROLE OF PUBLIC LIBRARIES AS CENTERS OF INFORMATION TO DISADVANTAGED GROUPS: A 2004 - 2014 Study of the Information Needs of Gada Prostitutes in Dawakin Kudu Local Government Area of Kano State, Nigeria.
17th	Mohammed Kabir	Community Medicine	16th September, 2015	Public Health Concern for Chronic Non-Communicable Diseases Surpasses Anxiety Over Most Infections
18th	T.I. Oyeyi	Biological Sciences	30th March 2017	Linking Schistosomiasis and Water Resources Development in Kano State Nigeria: Public Health Impact and Mitigation
19th	Abdulrazaq G. Habib	Medicine	27th April, 2017	Medicine, Science and Society – The Global Health Imperative
20th	S. Y. Mudi	Chemistry	6th July, 2017	Natural Products: Plants as Potential Sources of Drugs
21st	Sani Ibrahim	Biological Sciences	27th July, 2017	BETWEEN LIFE AND DEATH: Water Quality and Resource Evaluation - The Place of Hydrobiologists
22nd	J. Afolabi Falola	Geography	26th October, 2017	The Poor We Have With Us Always

23rd	Umar G. Danbatta	Electrical Engineering	2nd November, 2017	GETTING OUT OF THE WOODS: Diversifying Nigeria's Economy Through the Telecommunications Sector
24th	Adelani W. Tijani	Nursing	23rd November, 2017	Wholesome Alimentation: Path to Radiant Health
25th	Juwayriya Badamasiuy	Private and Commercial Law	21st December, 2017	Uncovering Patriarchy in the Law: Feminist Movement for Re-Interpretation of Islamic Law in Focus.
26 th	Isa Mukhtar	Nigerian Language	25th January, 2018	STYLISTIC THEORIES AND THE LINGUISTICS OF HAUSA PROSE TEXTS: the (SFL) approach.
27th	Ganiyu Sokunbi	Physiotherapy	29th March, 2018	TODAY IT HURTS, TOMORROW IT WORKS: Complimentary and Alternative Therapy for Failed Back Syndrome
28th	Aminu K. Kurfi	Business Admin. and Entrepreneurship	19th April, 2018	Micro-finance as an Elixir for Poverty Alleviation and Wealth Creation in Nigeria
29th	Muhammad S. Khamisu	Arabic	17th May, 2018	Substitution in Arabic Languages Rules and Types
30th	Habu Nuhu Aliyu	Pure and Industrial Chemistry	21st June, 2018	SCHIFF BASES AND THEIR TRANSITION METAL COMPLEXES: The Drug for the Next Generation
31st	Hashim M. Alhassan	Civil Engineering	19th July, 2018	EASING THE BURDEN OF TRAVEL: Can Roadway Capacity Modeling Help?
32nd	Habu Mohammed	Political Science	13th September, 2018	TUG OF WAR OR ECHO IN THE DARK? Civil Society Organizations (CSOs) and the Fight Against Corruption in the Era of Change Mantra in Nigeria

33rd	Bello Idrith Tijjani	Physics	20th September, 2018	NAVIGATING THE DATA LABYRINTH: Application of Some Advanced Statistical Analysis in Atmospheric Physics
34th	Mohammed Ajiya	Electrical Engineering	18th October, 2018	SEAMLESS GLOBAL CONNECTIVITY AT THE SPEED OF LIGHT: Converting Intrinsic Phenomena in Optical Fibers to Capacity Increase.
35th	Abdulrahman Abdul Audu	Pure and Industrial Chemistry	25th October, 2018	MY ACADEMIC VOYAGE IN WATER INTO THE WORLD OF HEAVY METALS
36th	Ibrahim Rakson Muhammad	Animal Science	21st February, 2019	FORAGE AND FODDER PRODUCTION IN NIGERIA: Its Sensitivity in Sustainable Ranching.
37th	Muhammad Bashir Ibrahim	Department of Pure and Industrial Chemistry	14th March, 2019	WATER POLLUTION AND THE QUEST FOR ITS REMEDIATION: The Natural Resource Option
38th	Oyerinde O. Oyesegun	Department of Physical and Health Education,	4th April, 2019	MAN DOES NOT DIE BUT KILLS HIMSELF: The Dilemma of the Health Educator and the Moderating Influence of Health Education
39th	Danladi Ibrahim Musa	Department of Physical and Health Education	25th April, 2019	WAGING WAR ON THE DEADLY QUARTET AND ITS CO-MORBIDITIES: A Physical Activity Panacea
40th	Kabiru Isa Dandago	Department of Accounting	2nd May, 2019	THE ACCOUNTING IN HUMANITY KNOWS NO BOUNDS
41st	Mustapha Hassan Bichi	Department of Civil Engineering	20th June, 2019	MAN, ENVIRONMENT AND WATER - The *Moringa oleifera (Zogale)* Intervention

42nd	Mustapha Muktar	*Department of Economics*	27th June, 2019	PEOPLE, PLANET AND PROFIT: Peaceful Bed Fellows at the Best of Times But Strange Roommates at Present - The Economist's Approach to a Peaceful and Sustainable Co-Existence
43rd	Mohammed Atiku Kano	*Department of Biochemistry*	25th July, 2019	Serum Lipids and Lipoproteins - A Curse or a Blessing?
44th	Rabi'u Mohammed	*Department of Physical and Health Education*	8th July, 2019	EXERCISE AND SPORTS FOR THE ATYPICAL PERSONS: A Multidimensional Analysis
45th	Yahaya, D.B.	Department of Mechanical Engineering	12th December 2019	GETTING OUT OF THE DARKNESS: The Solar Energy Solution
46th	Shehu Alhaji Musa	*Department of Agricultural Economics & Extension*	22nd April 2021	CROSSING THE CHASMS OF AGRICULTURAL DEVELOPMENT IN NIGERIA: Consumer Preference Studies: Market Integration Syntheses and Value Chain Diagnoses to the Rescue
47th	Shehu U.R. Aliyu	*Department of Economics*	24th June, 2021	What Have We Learnt From Modelling Stock Returns In Nigeria: Higgledy-Piggledy?
48th	Kamilu Sani Fage	*Department of Political Science*	8th July, 2021	FROM DIVIDEND'S OPTIMISM TO DASHED HOPES: The Imperatives of Leadership Re-Engineering in Nigeria