ISSN: 2643-4091

Okechi and Sohal. Clin Arch Bone Joint Dis 2025, 8:020
DOI: 10.23937/2643-4091/1710020
Volume 8 | Issue 1
Open Access

Clinical Archives of Bone and Joint Diseases

ORIGINAL RESEARCH

A Clinical Evaluation of Diseases and Conditions Affecting the Temporal Mandibular Joint among Patients Managed in Enugu, Nigeria

Uchenna Okechi, BDS, FWACS[1] and Karpal Singh Sohal, DDS, MD[2]*

[1]*Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, College of Medicine, University of Nigeria, Nigeria*

[2]*Department of Oral Health Services, Muhimbili National Hospital, Dar es Salaam, Tanzania*

***Corresponding author:** *Sohal, Karpal Singh, Department of Oral Health Services, Muhimbili National Hospital, P.O. Box 65001, Dar es Salaam, Tanzania, Tel: +255-712-723-917*

Abstract

Background: Various conditions affect the temporomandibular joint (TMJ), including degenerative changes, inflammatory processes, infections, tumors, and trauma. Each condition may present an array of patterns with some overlapping symptoms.

Objectives: To determine the demographic information and the pattern of presentation of various diseases/conditions affecting the TMJ among patients managed in Enugu, Nigeria.

Methods: This study of the clinical profile of 68 patients with TMJ diseases was carried out for 5 years. The information gathered included the age and sex of the patient, the patient's symptoms, the duration of the symptoms, and the management offered. Data analysis was done using the SPSS 29 computer program. Chi-square, ANOVA, and Fisher's test were used and p-value < 0.05 was set.

Results: There were slightly more female patients (52.9%), the patients' ages ranged between 4 and 81 years with a mean age of 36.96 ± 21.04 years. The most frequently reported symptoms were limited/ difficult mouth opening (n = 52, 76.5%). TMJ pain dysfunction (22.1%) and TMJ dislocation (20.6%) were frequently encountered conditions. Most (29.4%) of the cases were conservatively managed.

Conclusion: A multitude of disease conditions affect the TMJ. All age groups can be affected, with slight female predominance, except for traumatic conditions which are more common in males. The TMJ diseases compromise function and are often painful. Their management varies depending on the diagnosis.

Keywords

Temporomandibular joint, Dislocation, Pain dysfunction, Ankylosis, Nigeria

Introduction

The temporomandibular joint (TMJ) is an ellipsoid variety of the right and left synovial joints lined by fibrous cartilage, forming a bicondylar articulation [1]. It comprises extracapsular components (the capsule, ligaments, nerves, and vessels) and intracapsular components (skeletal and soft tissue components) [2]. The skeletal components are the mandibular condyle, the glenoid (mandibular) fossa, and the articular eminence, while the soft tissue components are the TMJ disc and the disc attachments [2]. Various conditions can affect the TMJ, including joint dysfunction, degenerative changes, inflammatory processes, infections, tumors, and trauma [3].

Different conditions affecting the TMJ present an array of patterns. A meta-analysis assessing the global distribution of TMJ disorder found that the prevalence was significantly higher in South America (47%), followed by Asia (33%) and Europe (29%), with a higher incidence of Temporomandibular Joint Disorders (TMDs) in females compared to males [4]. An Ethiopian study [5] on TMJ ankylosis reported that the condition was more predominant among females and 20-29 year-old patients. A study from Poland [6] recorded that the condyles are fractured predominantly in males and young patients. A report from Switzerland [7] indicates that the mean age of patients with TMJ dislocation is 42.06 years with no gender predomination. The

Citation: Okechi U, Sohal KS (2025) A Clinical Evaluation of Diseases and Conditions Affecting the Temporal Mandibular Joint among Patients Managed in Enugu, Nigeria. Clin Arch Bone Joint Dis 8:020. doi.org/10.23937/2643-4091/1710020

Accepted: January 21, 2025: **Published:** January 23, 2025

majority of the conditions affecting TMJ may have common symptoms but the treatment varies [4-7].

Despite having an amplitude of literature on single conditions affecting the TMJ worldwide, to the best of our knowledge there have been very few if any publications that look into all the TMJ conditions in a given population together. Similarly, Zieliński, et al. and colleagues recommended more research from African and Australian populations [4]. Therefore, there is a knowledge gap in understanding the common conditions that generally affect the TMJ. Taking into consideration the importance of having documented baseline information regarding general conditions affecting the TMJ, this survey aimed to determine the demographic information and the pattern of presentation of various diseases/conditions affecting the temporomandibular joint among patients managed in Enugu, Nigeria.

Methods

Study design, setting, and population

This descriptive study was conducted at the Oral and Maxillofacial Surgery Department of the University of Nigeria Teaching Hospital (UNTH) Ituku/Ozalla, Enugu, Nigeria from June 2019 to July 2024. Patients were conveniently enrolled in this study. The study included all patients diagnosed and treated with diseases or conditions involving the temporomandibular joint (TMJ). Patients who had presented with features of TMJ disease but did not complete investigations to confirm the diagnosis and those who did not show up for eventual treatment of their ailment were excluded from the study.

Questionnaire and data collection

A questionnaire was used to gather patients' data and clinical history. Thorough clinical and physical examination were conducted and findings were recorded in a proforma. The information collected included the patient's age and sex, the complaint and symptoms, the duration of their complaint, the diagnosis, and the treatment offered.

Radiological investigations were ordered according to the hospital protocols and they included orthopantomography (OPG), computed tomography scan (CT-scan) of the head and neck (Figure 1), and Magnetic Resonance Imaging (MRI) of the TMJ. In cases of tumors involving the TMJ, an incisional biopsy was taken to confirm its nature. Patients were managed according to the protocols set by the UNTH Department of Oral and Maxillofacial Surgery.

Statistical analysis

Data entry and analysis were done using a computer program, Statistical Package for Social Sciences (SPSS) software (version 29.0, Armonk, New York: IBM Corp). For descriptive analysis, mean, standard error of mean, median, and proportions were used wherever applicable. The age of the participants was grouped as pediatric (< 18 years), young adults (18-39 years), middle-aged adults (40-59 years), and elderly (60+ years). The age was dichotomized into < 40 and ≥ 40 years for regression analysis. The duration of disease or condition was dichotomized as acute (≤ 1 month) and chronic (> 1 month). Data were presented in the form of frequency distribution tables and mean.

Chi-square, ANOVA, and Fisher's test were used and p-value < 0.05 was set. The Cohen D was used to determine the effect size. Binary regression analysis was applied to establish the independent predictors (age and sex) for various aspects of diseases or conditions (chronicity, trauma, and tumors).

Figure 1: A 3D view of the skull CT scan showing a multi-locular lesion affecting the left side of the mandible from the parasymphyseal region to the left condylar region. The lesion was histologically diagnosed as an odontogenic myxoma.

Table 1: Distribution of patients by sex, mean age, and age groups.

Age groups and mean age	Sex		Total
	Male N = 32	Female N = 36	
Pediatric	6 (18.8%)	6 (16.7%)	12 (17.6%)
Young adults	12 (37.5%)	17 (47.2%)	29 (42.6%)
Middle-aged adults	8 (25.0%)	5 (13.9%)	13 (19.1%)
Elderly	6 (18.8%)	8 (22.2%)	14 (20.6%)
p-value	0.657		
Mean age	37.75 ± 20.46	36.25 ± 21.80	36.96 ± 21.04
p-value	0.772		

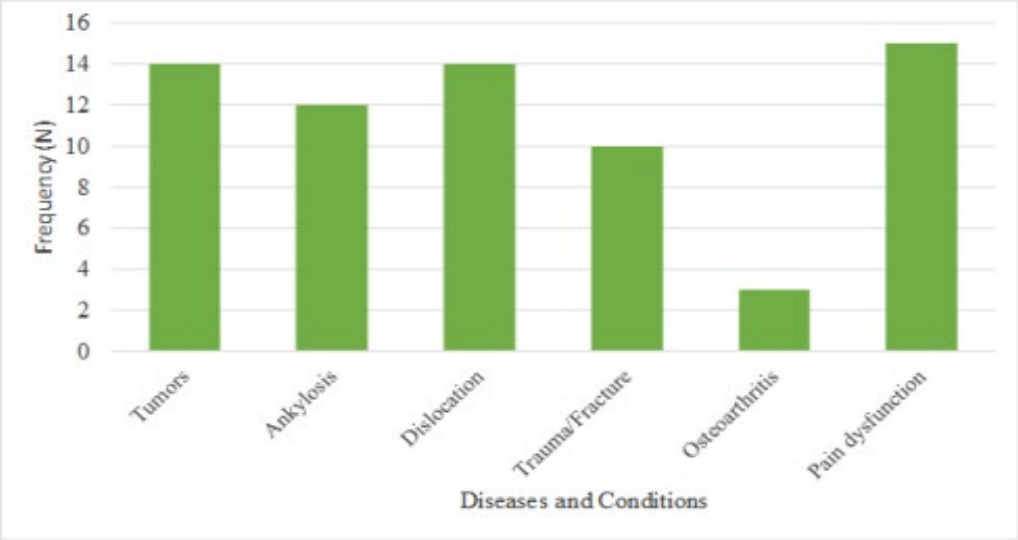

Figure 2: Frequency distribution of various diagnoses of the patients with TMJ-related ailments.

Ethical consideration

Ethical clearance was obtained from the Health Research Ethics Committee of the University of Nigeria Teaching Hospital, Enugu, Nigeria. Participation was voluntary and refusal to participate or withdraw from the study did not compromise the management of the patient. Each participant provided a signed informed consent form before the data collection process. The study fulfills the STROCSS criteria for cross-sectional studies [8].

Results

General characteristics of the study population

Table 1 shows the general characteristics of 68 patients with various temporal mandibular joint (TMJ) diseases and conditions enrolled in this study. There was no statistically significant association between the sex of the patients and their age groups and mean ages.

Duration, clinical symptoms and diagnosis

Figure 2 shows the frequency distribution of various diagnoses of the patients with TMJ-related ailments. Of the 14 cases of tumors/cysts involving the TMJ, ameloblastoma was the most frequent (n = 6, 42.8%). Others included odontogenic keratocyst and odontogenic myxoma each with a frequency of two (14.3%) cases. There was one case each of ameloblastic carcinoma, multiple myeloma, angiosarcoma, and mucoepidermoid carcinoma.

Table 2 shows the clinical parameters of various diseases/conditions affecting the TMJ.

The most frequent diseases or conditions to affect the pediatric age group were tumors/cysts and ankylosis. The young adults often were diagnosed with traumatic conditions (condylar fracture) and tumors/cysts, whereas individuals above 40 years often suffered from TMJ dislocation and TMJ pain dysfunction. The clinical symptoms of each disease/condition are presented in Table 2.

According to the time of presentation, all cases of tumors/cysts affecting TMJ, ankylosis, and osteoarthritis were grouped as chronic conditions. Ninety percent of traumatic TMJ conditions, 86.7% of TMJ pain dysfunction, and 64.3% of dislocation cases were grouped as acute conditions. The smallest means of duration of disease/conditions was of TMJ trauma, while the largest mean

Table 2: Percentage distribution of patients according to their diagnosis and clinical parameters.

Duration group, mean of duration, and clinical symptoms	Diagnosis of the disease or condition affecting the TMJ					
	Tumor/Cyst n = 14	Ankylosis n = 12	Dislocation n = 14	Trauma n = 10	Osteoarthritis n = 3	Pain dysfunction n = 15
Age Groups						
Pediatric	5 (35.7%)	4 (33.3%)	-	1 (10.0%)	-	2 (13.3%)
Young adults	8 (57.1%)	6 (50.0%)	4 (28.6%)	7 (70.0%)	-	4 (26.7%)
Middle-aged adults	1 (7.1%)	2 (16.7%)	4 (28.6%)	1 (10.0%)	1 (33.3%)	4 (26.7%)
Elderly	-	-	6 (42.9%)	1 (10.0%)	2 (66.7%)	5 (33.3%)
Sex						
Male	4 (28.6%)	3 (25.0%)	6 (42.9%)	9 (90.0%)	1 (33.3%)	9 (60.0%)
Female	10 (71.4%)	9 (75.0%)	8 (57.1)	1 (10.0%)	2 (66.7%)	6 (40.0%)
Duration Groups						
Acute	-	-	9 (64.3%)	9 (90.0%)	-	13 (86.7%)
Chronic	14 (100%)	12 (100%)	5 (35.7%)	1 (10.0%)	3 (100%)	2 (13.3%)
Mean duration in months (std dev)	39.00 (30.76)	67.33 (57.79)	1.59 (1.78)	0.59 (1.22)	5.33 (1.15)	0.61 (0.80)
Symptoms						
Swelling	13 (92.9%)	-	-	8 (80.0%)	-	-
Pain	3 (21.4%)	-	9 (64.3%)	9 (90.0%)	3 (100%)	15 (100%)
Limited mouth opening	14 (100%)	12 (100%)	-	8 (80.0%)	3 (100%)	15 (100%)
Difficult mouth closing	11 (78.6%)	-	14 (100%)	10 (100%)	-	1 (6.7%)

Table 3: Percentage distribution of patients according to their diagnosis against treatment offered.

Management of the disease or condition	Diagnosis of the disease or condition affecting the TMJ					
	Tumor/Cyst	Ankylosis	Dislocation	Trauma	Osteoarthritis	Pain dysfunction
Tumor resection	12 (85.7%)	-	-	-	-	-
Gap arthroplasty	-	8 (66.6%)	-	-	-	-
Interpositional arthroplasty	-	2 (16.7%)	-	-	-	-
Closed reduction	-	-	11 (78.6%)	-	-	-
Maxillomandibular fixation	-	-	2 (14.3%)	5 (50.0%)	-	-
Open reduction			1 (7.1%)	-	-	-
Open Reduction and Internal fixation	-	-	-	4 (40.0%)	-	-
Conservative	-	2 (16.7%)	-	1 (10.0%)	2 (66.7%)	15 (100%)
Referred	2 (14.3%)	-	-	-	1 (33.3%)	-

of duration was of TMJ ankylosis (Table 2).

Treatment

The treatment offered depended on the diagnosis of the disease or condition, as displayed in Table 3. Generally, the most common (n = 20, 29.4%) treatment modality was conservative management, which included medication, soft diet, and/or jaw exercises.

The relationship between age, sex, and diagnosis

The sex of the patient and the patient's age group had a statistically significant association with the duration of the ailment ($p < 0.05$, Cohen D = 0.468). The males were almost 5.5 times more likely to have acute conditions than females [AOR 5.51, 95% CI 1.79, 16.95, p = 0.003]. The chances of patients above 40 years to be diagnosed with acute conditions were 79% less than those below 40 years [AOR 0.21, 95% CI 0.07, 0.65, p = 0.007].

There was no significant association ($p > 0.05$) between sex and any of the specific groups of diagnosis except for trauma/ fracture to the condyle. The chances for males to be diagnosed with trauma to the TMJ were nearly 14 times more than females [COR 13.70, 95% CI 1.62, 115.47 p = 0.016].

Only tumors and dislocation had a statistically

significant relation with the dichotomized age group. The odds of individuals below 40 years being diagnosed with tumors were 12 times higher than those of 40+ years [COR 12.07, 95% CI 1.49, 98.86 p = 0.02]. The 40+ year-olds were 5 times more likely to present with TMJ dislocation than those under 40-year-olds [COR 5.44, 95% CI 1.49, 19.84 p = 0.01].

Discussion

In the current survey, six different groups of diseases of the TMJ were observed, this can be explained by the fact that the TMJ is composed of several structures both the extracapsular components and intracapsular components (skeletal and soft tissue components) [2] and all these components are susceptible to many diseases including joint dysfunction syndrome, degenerative changes, inflammatory processes, infections, tumors, and trauma [3].

Temporomandibular joint pain dysfunction syndrome was the most frequently diagnosed condition in this study which is in line with reports in the literature [9,10]. Pain in the TMJ region may arise from problems in the articular region, adjacent structures, or other factors [11]. The findings of the current study indicate that TMJ pain dysfunction syndrome is common in patients aged above 40 years concurrent to reports from India [11] and Nigeria [10] however, contrary to another study from other studies from Nigeria [9] and India [12] which reported a preponderance of younger individuals. Males were more affected in this study contrary to previous studies from Nigeria [9,10] which reported no sex preference. We found no significant relationship between TMJ pain dysfunction syndrome occurrence and patient sex and age. Differences between studies may be due to methodological and social-cultural differences. Similar to the findings of other studies [9,10], pain around the ear was the most frequent symptom the patient presented with, which is further supported by the findings of the present survey, which show the condition is acute. Patients with TMJ pain dysfunction syndrome were managed conservatively with analgesics, muscle relaxants, a soft diet, and TMJ physiotherapy. This treatment modality has been used by other centers as well with considerable good results [10].

The source of tumors of the TMJ may be primarily from the tissues of the TMJ, extension from the body of the mandible, extension from adjacent issues (parotid gland or muscles), or distant metastasis of a tumor from elsewhere (especially malignancy) [13]. In most cases, the TMJ was affected after the extension of the tumor arising from other parts of the mandible. Results from this study pointed out that the odds of diagnosing tumors to the mandible subsequently TMJ at a younger age were more than 12 folds higher than in older adults, findings which were concurrent to the report from elsewhere [14,15]. Swelling and limited mouth opening were the frequent symptoms of the patient. Tumors in the jaw tend to cause expansion of the cortical plates and when the cortical plates of the condylar part of the mandible (forming TMJ) are affected, its anatomy is distorted with respect to the articulating surface of the temporal bone, and therefore, there will be a limited function of the joint presenting as difficulty in mouth opening. The treatment option for the management of most tumors affecting the TMJ was surgical resection, which is the standard of care in most centers [16,17].

Dislocation of the TMJ is a common condition presenting with complete separation of the joint with fixation of the condyle in an abnormal position [18]. The TMJ dislocation can be acute (most common), habitual, recurrent, or chronic [1]. There is no standardized duration that differentiates acute and chronic TMJ dislocation, however, a common agreement is that if the situation persists beyond a month, it is a chronic dislocation [19]. In this study majority of patients with TMJ dislocation were female, similar to reports from elsewhere [1,19]. Shaban and colleagues [1] speculated that the factors for TMJ dislocation in females may be similar to those explaining the preponderance of other TMJ disorders in them, i.e., behavioral, psychosocial, hormonal, and constitutional factors. We found that the odds of TMJ dislocation were higher in individuals above 40 years, this may be due to wear and tear due to aging and laxity of joints [20]. Acute TMJ dislocation requires immediate effective reduction, which can usually be accomplished with a manual closed technique by applying bimanual intraoral force on the mandibular molars of the patient in an inferior and posterior direction (Hippocratic maneuver) [19], which is what was done in our cases. In this survey, most chronic cases were reduced with a manual closed technique under general anesthesia, except in one case where maxillomandibular fixation using rubber traction was carried out as described by Harsh, et al. [21].

Among the conditions frequently affecting the TMJ in the current study was traumatic injury to the TMJ presenting as a fracture of the mandibular condyle. According to the literature, the condyle is affected by 20% to 40% of all mandibular fractures [22-24]. The results of this study concur with the reports in various scientific literature that typically the affected patients are males and young adults [22,24]. There are controversies regarding management of condylar fracture, especially in selecting between closed and open reduction, depending on displacement severity and fracture site [22,25]. In this study, half of the cases were managed by closed reduction using maxillomandibular fixation (MMF). The indications for Open Reduction and Internal Fixation in this study were lateral overlap, displacements in extracapsular fractures, fractures associated with dislocations of the condylar head, bilateral condylar

fracture with displacement, and failure to achieve satisfactory occlusion following closed reduction [23].

Among the common disorders of TMJ in this study was TMJ ankylosis. In the present study, TMJ ankylosis was predominant in females, our finding is in agreement with other reports from elsewhere [5,26,27], but contrary to other reports that showed male predominance [28,29]. Similar to the findings of other researchers [5,26-29], in this study, children and young adults were more affected than the elderly. Several surgical approaches have been used to manage this condition including gap arthroplasty, interpositional arthroplasty, and total joint reconstruction [30]. In this study, similar to reports from Ethiopia [5], gap arthroplasty was most frequently carried out. Management by mouth-opening exercise was done in two cases with fibrous ankylosis of the TMJ.

The present study had some limitations, firstly it was a single-center study, thus patients who did not get managed in the study were not included which may have introduced selection bias. Secondly, we did not record the outcome of the management rendered to the patients. Another limitation was the sample size was small for the generalization of the data to the whole Nigerian population. Lastly, we did not adopt a gold standard questionnaire for TMDs, thus some clinical features were not presented. However, the study gives important information regarding the TMJ diseases in our locality and provides baseline information for further studies that will focus on separate TMJ diseases in multiple centres in Africa.

Conclusion

The results of this study point out that the TMJ can be affected by a multitude of conditions including trauma, neoplasms, and inflammatory diseases. The diseases of TMJ can affect all age groups but mostly in those under 40 years and are more common in females, except for traumatic conditions which are more common in males. The TMJ diseases are distressing because they compromise function and are often painful. The management of TMJ conditions varies depending on the diagnosis, while conservative therapy was reserved for TMJ pain dysfunction syndrome, surgery was often the choice in tumors, ankylosis and traumatic conditions.

Funding

None.

Conflict of Interest

None.

Authors Contribution

Uchenna Okechi: Conceived the idea, guided the whole process of data collection, data analysis, writing, and editing of the first draft, and approved the final draft.

Karpal Singh Sohal: Broadened the conceived idea, data analysis, writing, and editing of the first draft, and approved the final draft.

References

1. Shaban SD, Sohal KS, Moshy JR (2017) A novel technique for surgical reduction of long-standing temporomandibular joint dislocation. Int J Head Neck Surg 8: 107-111.
2. Tamimi D, Kocasarac HD, Mardini S (2019) Imaging of the temporomandibular joint. Semin Roentgenol 54: 282-301.
3. de Oliveira LRLB, dos S. Alves I, Vieira APF, Passos UL, da C. Leite C, et al. (2023) Temporomandibular joint: From anatomy to internal derangement. Radiol Bras 56: 102-109.
4. Zieliński G, Pająk-Zielińska B, Ginszt M (2024) A meta-analysis of the global prevalence of temporomandibular disorders. J Clin Med 13: 1365.
5. Mekonnen D, Gizaw A, Kebede B (2021) Temporomandibular joint ankylosis among patients at Saint Paul's Hospital Millennium Medical College, Ethiopia: A 9-year retrospective study. Int J Dent 2021: 6695664.
6. Kozakiewicz M, Walczyk A (2023) Current frequency of mandibular condylar process fractures. J Clin Med 12: 1394.
7. Papoutsis G, Papoutsi S, Klukowska-Rötzler J, Schaller B, Exadaktylos AK (2018) Temporomandibular joint dislocation: A retrospective study from a swiss urban emergency department. Open Access Emergency Medicine 10: 171-176.
8. Mathew G, Agha R, Albrecht J, Goel P, Mukherjee I, et al. (2021) STROCSS 2021: Strengthening the reporting of cohort, cross-sectional and case-control studies in surgery. Int J Surg 96: 106165.
9. Eweka O, Ogundana O, Agbelusi G (2016) Temporomandibular pain dysfunction syndrome in patients attending Lagos University Teaching Hospital, Lagos, Nigeria. J West Afr Coll Surg 6: 70-87.
10. Omoregie OF, Okoh M (2014) Pattern of temporomandibular pain dysfunction syndrome in a Nigerian population. Journal of Medical Investigations and Practice 9: 116-119.
11. Ramachandran S, Ravichandran K (2023) Prevalence of temporomandibular joint pain among patients who reported to dental OPD at a tertiary hospital in Pondicherry, India: A cross-sectional study. Journal of Clinical and Diagnostic Research 17: ZC40-ZC44.
12. Chaurasia A, Ishrat S, Katheriya G, Chaudhary PK, Dhingra K, et al. (2020) Temporomandibular disorders in north indian population visiting a tertiary care dental hospital. Natl J Maxillofac Surg 11: 106-109.
13. Yibulayin F, Yu CX, Feng L, Wang M, Lu MM, et al. (2020) Malignant tumours of temporomandibular joint. BMC Cancer 20: 967.
14. Sohal KS, Moshy JR, Kalyanyama BM, Shubi FM, Sylivester E (2024) Retrospective analysis of histopathological reports of intraosseous mandibular lesions among patients attended at a tertiary health facility in Tanzania. J Oral Maxillofac Surg Med Pathol 36: 235-240.
15. Okechi UC, Akpeh JO, Chukwuneke FN, Saheeb BD, Okwuosa CU, et al. (2023) Ameloblastoma of the jaws in children: An evaluation of cases seen in a tertiary hospital in South-Eastern Nigeria. Ghana Med J 54: 36-41.
16. Ibikunle AA, Taiwo AO, Braimah RO (2018) A 5-year audit

of major maxillofacial surgeries at Usmanu Danfodiyo university teaching hospital, Nigeria. BMC Health Serv Res 18: 416.

17. Moshy JR, Sohal KS, Shaban SD, Owibingire SS, Shubi FM, et al. (2019) The spectrum of oral and maxillofacial surgical procedures at the National Referral Hospital in Tanzania from 2013 to 2017. Ann Res Hosp 3: 3-3.

18. Ugboko VI, Oginni FO, Ajike SO, Olasoji HO, Adebayo ET (2005) A survey of temporomandibular joint dislocation: Aetiology, demographics, risk factors and management in 96 Nigerian cases. Int J Oral Maxillofac Surg 34: 499-502.

19. Marqués-Mateo M, Puche-Torres M, Iglesias-Gimilio ME (2016) Temporomandibular chronic dislocation: The long-standing condition. Med Oral Patol Oral Cir Bucal 21: 776-783.

20. Okoje V, Aladelusi T, Abimbola T (2017) Managing temporomandibular joint dislocation in Ibadan: Review of 11 cases. Ann Ib Postgrad Med 15: 96-102.

21. Harsh A, Gupta DK, Purohit P, Sharma A (2013) Management of long standing TMJ dislocation by mechanical method: A case report. International Journal of Oral Care and Research 1: 59-62.

22. Mahgoub MA, El-Sabbagh AH, El-Latif EAA, Elhadidy MR (2018) Condylar fractures: Review of 40 cases. Ann Maxillofac Surg 8: 19-27.

23. Akinbami BO, Akadiri OA (2013) Classification and management of mandibular condyle fractures in a tertiary health center. Surg Sci 4: 339-344.

24. Moshy JR, Msemakweli BS, Owibingire SS, Sohal KS (2020) Pattern of mandibular fractures and helmet use among motorcycle crash victims in Tanzania. Afr Health Sci 20: 789-797.

25. Choi K, Yang J, Chung H, Cho B (2012) Current concepts in the mandibular condyle fracture management part II : Open reduction versus closed reduction. Arch Plast Surg 39: 301-308.

26. Mishra N, Sharma NK, Dhiman NK, Jaiswara C, Tiwariet P, et al. (2021) Temporomandibular joint ankylosis: A tertiary center-based epidemiological study. Natl J Maxillofac Surg 12: 392-396.

27. Gupta V, Mehrotra D, Malhotra S, Kumar S, Agarwal G, et al. (2012) An epidemiological study of temporomandibular joint ankylosis. Natl J Maxillofac Surg 3: 25-30.

28. Bello SA, Aluko Olokun B, Olaitan AA, Ajike SO (2012) Aetiology and presentation of ankylosis of the temporomandibular joint: Report of 23 cases from Abuja, Nigeria. Br J Oral Maxillofac Surg 50: 80-84.

29. Vasconcelos BCDE, Porto GG, Bessa-Nogueira RV (2008) Temporo mandibular joint ankylosis. Braz J Otorhinolaryngol 74: 34-38.

30. He CH (2024) Management of traumatic temporomandibular joint ankylosis: A case report. Oral Maxillofac Surg Cases 10: 100344.