

# Protocol of Maxillofacial Abscess Treatment and the Role of Socio-Economic Status in the Outcome

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## **ABSTRACT**

**Objective:** The aim of this study was to analyze the treatment outcome of patients with maxillofacial abscess and its relationship with socioeconomic status in a major public hospital offering secondary health care.

**Methods:** A total of 105 patients presented at the Dental Centre, Central Hospital Benin, Edo State with maxillofacial abscess all of which were of odontogenic origin were seen over a 4-year period. Age, gender, educational level, occupation, treatment, medication and outcome taken into data of interest considered in this paper.

**Results:** The predominant age groups were 11-20- and 21-30-years age group, accounting for 24.8% each. Females outnumbered the males at 52.4%. Length of hospital stay ranged from 5 to 10 days. A wide range of antibiotics were prescribed and some patients required dental extractions. Maxillofacial abscess is a public and personal health issue with potential life-threatening complications.

**Conclusion:** This study identified effect of socio-economic status on the outcome of treatment of maxillofacial abscess.

**Keywords:** Maxillofacial abscess, Treatment, Socio-economic status, Outcome

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## **INTRODUCTION**

The protocol for the treatment of maxillofacial infections as a standard of care has been known for centuries: extract the tooth and drain the pus. This was described by Hippocrates<sup>1</sup> and was reinforced in the modern surgical but pre-antibiotic era.<sup>2</sup>

In the antibiotic era, the use of antibiotic, intravenous fluids to rehydrate the patient and appropriate pain management have been well described.<sup>3-7</sup> The main objectives of this treatment protocol are: elimination of focus of infection and drainage of abscess, pain relief, recovery of function, preservation of vital structure, prevention of relapses and the limitation of the period of incapacitation.<sup>8-9</sup> The antibiotic medication of choice must follow four criteria. First, the antibiotic must be effective against all the microorganisms that are usually responsible for facial infections. Second, the medication should have a limited spectrum when possible, in order not

to interfere with the normal microbiota of the patient. Third, the antibiotic must be as less toxic as possible and fourth, the drug must be bactericidal because the patient affected by facial infection could be defenseless and the bacteriostatic antibiotics could lead to a slow recovery.<sup>8-9</sup>

Severe maxillofacial infection is a relatively common entity in developing countries. Although, there has been dramatic improvements in the treatment of such infections,<sup>10</sup> socioeconomic factors particularly ignorance, illiteracy and poverty may play an important role for such infections.<sup>11</sup>

Payment for healthcare (user fees) at the point of service or out of pocket has remained the dominant mode of financing healthcare in developing countries;<sup>12</sup> in Nigeria, this accounts for 70% of healthcare payments.<sup>13</sup>

This study was undertaken to improve knowledge on the protocol of treatment of maxillofacial infections

with emphasis on how socioeconomic factors affect outcome.

## MATERIALS AND METHODS

A prospective study was done over four years. There were 105 patients seen within the study period. Inclusion criteria were patients with localized dental abscesses and all odontogenic infections that had spread beyond the confines of the jaw. Data collected were gender, age, therapeutics, surgical intervention and outcome. The occupation and level of education were also obtained for all patients including the parents of children less than 16 years old. The socioeconomic status was determined using a modification of Oyediji's<sup>14</sup> social classification system. Socio-economic scores were awarded based on the occupation and educational attainment. For the purpose of this study, children of primary and secondary school (that is 16 years and below), the socio-economic scores used were those of their parents or guardians.

For occupation, class I was allocated to professionals, class II to retired because they still receive a fraction of their salaries. Class III to housewives and students because they receive some income and a majority of the housewives were educated but had no jobs. Class IV was allotted to artisans, drivers, and security guards. Class V was to the unemployed.

For the educational scale, class I was all given university graduates and HND (Higher National Diploma); class II to OND (Ordinary National Diploma) and other equivalent diplomas. Class III was allocated to SSC holders (senior school leaving certificate); class IV was to those that did not complete secondary school and primary school holders. Those without formal education were allotted class V.

The patients were either admitted or managed as outpatients. The criteria for hospital admission included patients with impending threat to the airway or vital structures, need to monitor for drug compliance and control of a concomitant systemic disease.

Some of the patients had incision and drainage done; with drains put in place. The causative teeth were either extracted or had root canal treatment done. Pus or serosanguinous discharge drained was sent for culture only when discharge persisted. Empirical treatment with antibiotics was given. When there was no penicillin sensitivity, Amoxicillin/Clavulanate was used in combination with Metronidazole, and/or

Gentamicin. Antibiotics were modified when it was necessary, depending on the microscopy, culture and sensitivity result. Antibiotics were continued for a minimum of 7 days, and the patients were followed up until complete resolution of infection.

## RESULTS

A total of 105 patients presented at the Central Hospital with maxillofacial abscesses for a period of four years. The males n=50 were (47.6%) while females were n=55 (52.4%), (Table 1). The predominant age group were the 11-20 and 21-30 years age group, each accounting for 24.8% each while the 71-80 years age group accounted for 3.8% of the total number of patients (Table 1). Patients with secondary school education but did not finish and therefore did not obtain a certificate accounted for 41.9% while artisans and traders which were the predominant group accounted also for 41.9% of orofacial and space infections (Table 1).

### Treatment modalities

Treatment modalities are shown in Table 2. All patients were managed under local anaesthesia without any needing intubation for airway management. About 11.4% were admitted.

It was noted however, that some of these patients were using hot water compress to massage their jaws as well. 11.4% patients were observed to use hot compress and shea butter and/or menthol balm to massage their faces pre and/or post extraction. 2.9% of the total patients has had their teeth extracted in other clinics/hospitals but came to the hospital because they observed that they had facial swelling that was increasing in size. These patients were observed to be taking their medication correctly and advised to continue but to stop hot water compress and local balm massage (Table 2).

11.4% patients had diffuse facial swelling, were placed on antibiotics, on the 3<sup>rd</sup> day, swelling was observed to have reduced considerably and extraction of the offending tooth/teeth was done. 7.6% of these patients had trismus but no sign of toxicity, were given medications- capsule amoxicillin 500mg (250mg for children), tablet metronidazole 200mg (100mg for children) and tablet paracetamol 1000mg (500mg for children) 8-hourly for initial 3 days, then completed full dosage after extraction of teeth. Amoxicillin is completed in 5 to 7 days and metronidazole's full dose is 4 days all depending on the patient's response. Paracetamol is stopped on

the third day and taken when needed (PRN)- and had extraction of tooth on the 3<sup>rd</sup> day. 23.8% had trismus

and other signs of toxicity had Incision and Drainage (I&D) and subsequent extraction.

Table 1: Demographic data

Variable	n (%)
Age Range (years)	
0-10	11(10.5)
11-20	26 (24.8)
21-30	26 (24.8)
31-40	15 (14.3)
41-50	7 (6.7)
51-60	8 (7.6)
61-70	8 (7.6)
71-80	4 (3.8)
Total	105 (100)
Gender	
Male	50 (47.6)
Female	55 (52.4)
Total	105 (100)
Educational level	
No formal education	6 (5.7)
Primary school	8 (7.6)
Secondary school (no certificate)	44 (41.9)
Secondary school certificate	18 (17.1)
OND/Diploma	15 (14.3)
HND/University degree	14 (13.3)
Total	105 (100)
Occupation	
Artisan/traders	44 (41.9)
Drivers/security guards	3 (2.9)
Students	29 (27.6)
Unemployed	7 (6.7)
Housewives	8 (7.6)
Retired	3(2.9)
Professionals/senior civil servants	11 (10.5)
Total	105 (100)

The antibiotics used are detailed in Table 3. The combination of Amoxicillin and Metronidazole was the most commonly used therapy.

#### Patients admitted

1.9% of the cases were admitted by the medical team and eventually discharged by them. 11.4% were admitted for various reasons. 1.9% of these was for

concomitant medical condition; 1.9% was for monitoring of their medication; and the remaining 7.8% were admitted for signs of toxicity. These signs included elevated tongue, neck swelling, difficulty in breathing and restless. All these patients were admitted by the maxillofacial team for a maximum of 5 days. For those with neck swelling and concomitant medical condition, the general surgeons kept them for 7-10 days.

Table 2: Treatment modalities

Treatment given	n (%)
Medication and follow-up (had undergone extraction in another centers)	3 (2.9)
Root Canal Therapy (RCT) and Medication	1 (1.0)
I&D and medication (did not come back for extraction)	2 (1.9)
Medication, I&D then subsequent extraction	25 (23.8)
I&D, RCT and medication	4 (3.8)
Extraction, medication and I&D	1 (1.0)
Extraction and medication	49 (46.7)
Medication, 2 days later extraction (trismus)	8 (7.6)
Medication, 2 days later extraction (massaging with warm moist compress)	12 (11.4)

Table3: Medication

Medication	n (%)
1. Oral Amoxicillin/Metronidazole/Paracetamol (had taken ampiclox)	76(72.4)
2. Oral Amoxicillin & Clavulanate/Metronidazole/Paracetamol (after MCS)	2 (1.9) (was part of no. 1)
3. Oral Amoxicillin/Metronidazole/Antifungal	4(3.8) (part of no. 1)
4. IV Amoxicillin/Metronidazole/Gentamicin (admitted)	12(11.4)
5. IV Amoxicillin/metronidazole/Gentamicin/oral clindamycin	3(2.9) (part of no. 4)
1. IV Amoxicillin/Metronidazole/Gentamicin stat (then back to 1)	4(3.8) (part of no. 1)
6. Oral Amoxicillin & Metronidazole/IM Gentamicin (could not be admitted)	17 (16.2)

**Socioeconomic factors**

Table 4 summarizes the occupation and educational attainment of the patients.

When educational attainment and occupation was classed side by side, it was observed that class IV (47.1%), a low class by the standard used came in at

the highest number. These are patients without much education who are semi-skilled or not skilled. The higher classes – I to III- accounted for a smaller number of patients at 46.8% than class IV alone.

Table 4: Classification of Socioeconomic status according to occupational and educational scales

Class	Occupation	Frequency	Education	Frequency	Grand total	%age of grand total
I	Professionals/senior civil servants	11	HND/University degree	14	25	11.9
II	Retired	3	OND/Diplomas	15	18	8.6
III	Housewives & Students	37	SSCE	18	55	26.2
IV	Artisans/Drivers & Security guards	47	No school certificate/Primary school certificate	52	99	47.1
V	Unemployed	7	No formal education	6	13	6.2
	Total	105	Total	105	210	100



Figure 1: Post extraction

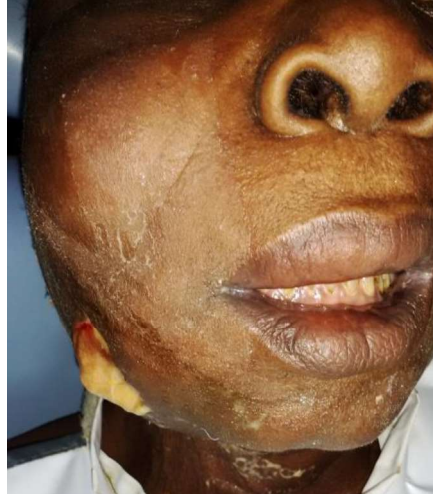


Figure 2: Sloughed skin

### Outcome

The outcome was satisfactory with complete resolution, without any residual problem, in 29.5% of cases with fascial space infections. Patients without fascial space infections did very well except for 4.8% who used warm water compress and local balm for massage. 1.0% of them needed Incision and Drainage after extraction for decompression (Figure 1). while another had soft tissue dressing because the facial tissue had sloughed off (figure 2). The remaining 2.9% patients who had extraction in other clinics/hospitals were counseled and their medication continued. For those with fascial space

infection, resolution with some morbidity in the form of persistent limitation of mouth opening lasting 2-8 weeks was observed in 2.9% patients (figure 3), orocutaneous fistula was found in 2.9% patients (figure 4), while unsatisfactory resolution in the form of persistent drainage lasting more than 7 days was found in 6.7%. Persistent loss of sight was observed in 1.0% patient, even though he was visiting the Ophthalmologist.

The outcome was found to be significantly affected by age- 6.7%, underlying systemic condition 1.9%, and socioeconomic factors 14.3%.

There was no mortality recorded

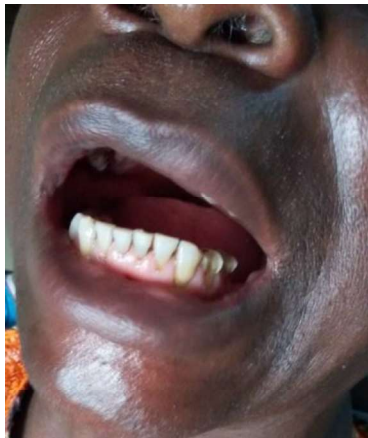


Figure 3: Limited opening



Figure 4: Oro-cutaneous fistula



## DISCUSSION

The treatment of fascial space infections includes elimination of the source/foci of infection (elimination of source of infection which can be by incision and drainage, extraction of offending tooth/teeth or RCT),<sup>15</sup> aggressive intravenous high dose antibiotics (usually penicillin or cephalosporins and metronidazole), use of analgesics and fluid therapy.

In this study, some patients with fascial space infections had aggressive intravenous antibiotics. A few of these patients had a stat dose as outpatients and continued oral medication as outpatients.

Most of the patients with facial space infection were treated without admission partly because there was no bed space or some of the patients could not afford the hospital fees. The patients had no ill-effects after the procedures. Other authors have observed that fascial space infections of odontogenic origins are routinely treated as an out-patient procedure.<sup>16</sup>

Patients with infection-related trismus should be carefully evaluated for signs of upper airway embarrassment, tongue elevation, stridor, difficulty with swallowing saliva and decreased air intake and should be immediately sent to hospital. These are medical emergencies. A few patients in the study, who fell into this category, were admitted.

In this study, two of the admitted patients was strictly to ensure drug compliance. One of the cases was a nine-year-old male patient whose guardian dispensed the drugs to him every morning before she left the house. There was no resolution of swelling and the pain did not abate. Patient was admitted and placed on intravenous Amoxicillin/Clavulanate and Metronidazole-300mg and 250mg 8-hourly respectively for three days because he was previously on oral Amoxicillin with Metronidazole. Paracetamol was added for pain relief.

The second case was a 78-year-old woman living with her nine-year-old relation. It was observed that there was no compliance with medication and warm salt mouth baths. She was placed on admission for strict monitoring and compliance.

Patients with acute orofacial infections had extraction of offending tooth/teeth and were immediately given antibiotics. A clinician can rely on the knowledge of likely microorganism that can cause infection in a particular site of the body and the nature of antibiotic susceptibility pattern in the local environment of his practice as a guide to the rational choice of antibiotic therapy.<sup>17</sup>

In one case, incision and drainage was carried out days after extraction of offending tooth. This was a 56-year-old woman who used hot water compress and shea butter massage on her face. A pointing abscess was noticed on her face when she came for review two days later.

In this study, four patients had antifungal drugs- Fluconazole tablets 200mg daily for 7 days added to their medication. They were day cases who required weekend dressings. They did not come for weekend dressing and resorted to self- help. One of them, a 56-year-old woman used strips of cut cloth from her wrapper as dressing while the other 26-year-old male used toilet roll as dressing. The third patient, a female used unsterile gauze for her dressing, while the fourth dabbed with dirty handkerchief. When pus discharge was observed to be persistent and fould smelling in these cases, fluconazole 150mg daily for 3 days was added to their medication and the pus discharge slowed and stopped within 3 to 5 days. Some authors have suggested that, for infections with special difficulty to treat, fungal contamination should be investigated.<sup>18</sup>

The three cases that had Clindamycin were all on admission already. Persistent pus discharge necessitated addition of Clindamycin 600mg 8 hourly for 5 to 10 days. Discharge was observed to slow from the next day and to stop 3 to 5 days later in these patients.

Several authors have reported that facial infections can be promptly treated by proper antibiotic therapy and surgical management; without the results of culture and sensitivity with success in all facial infections treated<sup>19</sup>. In this study, two patients were sent for MCS of their pus discharge because of persistent drainage that was not responding to surgical management and antibiotic therapy. Amoxycillin/Clavulanate was found to be sensitive. This compares favourably with the study carried out by Odai et al.,<sup>20</sup> which clearly showed *staphylococcus aureus*-the predominant organism- in swab specimens analyzed by them was sensitive to Augmentin (Amoxycillin/Clavulanate).

Planning the treatment protocol of maxillofacial space infections should take into consideration the socioeconomic status of the patients concerned. This is because of the recognized effect of this on the health-seeking behavior of patients. Socioeconomically, as observed in table 4, patients in classes IV and V were of lower socioeconomic class and thus by implication, they may be less likely to pay attention to their health.<sup>24</sup> It was noted that the main

reasons for higher incidence of the diseases studied by Oyediji<sup>14</sup> included poverty, lack of good formal education as well as of social amenities. This can also apply to this study.

As shown in this study, a large proportion of patients with orofacial and space infections were artisans and traders. While those with complications, were old and retired patients. The scope of user fees, which is variable and can include any combination of drug costs, medical material costs, entrance fees, and consultation fees,<sup>20,21</sup> will pose a challenge to this category of patients. Low socioeconomic status, has been described as an important contributory factor towards the high incidence of severe odontogenic infections.<sup>11</sup> When drugs are prescribed for patients who have to pay out of pocket, there is no guarantee that the patients will buy the drugs or can afford the complete dosage. This author suggests that for all recall visits, the patients should be asked to bring their drugs, so that compliance with purchase and administration should be monitored closely. This is because patients may not be aware of predisposing factors or potential harmful complications of odontogenic infections.<sup>11</sup>

## CONCLUSION

Patient characteristics particularly socio-economic status is very important in the management and outcome of treatment of facial space infections particularly in developing countries. Cognizance should be taken of the socioeconomic status of patients because it affects the outcome of treatment of the disease process. Understanding the patients' socioeconomic situation will improve the outcome of the management

## REFERENCES

1. Wilwerding T. History of Dentistry. <http://www.cudental.creighton.edu/htm/history2001.pdf>. Accessed November 2005
2. Thomas TT. Ludwig's angina. *Ann Surg* 1908; 47: 161-163
3. Huang TT, Liu TC, Chen PR, Tseng FY, Yeh TH, Chen YS. Deep neck infection: analysis of 185 cases. *Head Neck* 2004; 26: 854-860.
4. Bridgeman A, Wiesenfeld D, Hellyar A, Sheldon W. Major maxillofacial infections. An evaluation of 107 cases. *Aust Dent J* 1995; 40:281-288.
5. Bross-Soriano D, Arrieta-Gomez JR, Prado-Calleros H, Schimelmiz-Idi J, Jorba-Basave S. Management of Ludwig's angina with small neck incisions: 18 years' experience. *Otolaryngol Head Neck Surg* 2004; 130: 712-717.
6. Juang YC, Cheng DL, Wang LS, Liu CY, Duh RW, Chang CS. Ludwig's angina: an analysis of 14 cases. *Scand J Infect Dis* 1989; 21:121-125.
7. Laskin DM. Anatomic considerations in diagnosis and treatment odontogenic infections. *J Am Dent Assoc* 1964; 69:308-316.
8. Peterson LJ, Ellis III E, Hupp JR, Tucker MR. *Contemporary Oral and Maxillofacial Surgery*. Saint Louis: Mosby; 2002:343-379.
9. Miloro M, Ghali GE, Larsen P, Waite P. *Peterson's principles of oral and maxillofacial surgery*. Shelton: PMPH-USA; 2011. p. 841-861.
10. Storoe W, Haug RH, Lillich TT. The changing face of odontogenic infections. *J Oral Maxillofac Surg* 2001; 59:739-748.
11. Tozoglu S. Role of socioeconomic factors in maxillofacial abscess of odontogenic origin. *J Ataturk Univ Faculty Dent* 2009; 19:26-30
12. O'Donnell O, van Doorslaer E, Rannan-Eliya RP, Somanathan A, Adhikari SR, Akkazieva B, *et al*. Who pays for health care in Asia? *J Health Econ* 2008; 27:460-475.
13. Uzochukwu B, Ughasoro M D, Etiaba E, Okwuosa C, Enzuladu E, Onwujekwe O E. Health care financing in Nigeria: Implications for achieving universal health coverage. *Niger J Clin Pract* 2015; 18:437-444.
14. Oyediji GA. Socioeconomic and cultural background of hospitalized children in Ilesha. *Niger J Paediatr* 1985; 12:111-117.
15. Osunde OD, Akhiwu BI, Efunkoya AA, Adebola AR, Iyogun CA, Arotiba JT. Management of fascial space infections in a Nigerian teaching hospital: A 4-year review. *Niger Med J* 2012; 53(1): 12-15.
16. Rega AJ, Aziz SR, Ziccardi VB. Microbiology and antibiotic sensitivities of head and neck space infections of odontogenic origin. *J Oral Maxillofac Surg*. 2006; 64:1377-1380.
17. Uluibau IC, Jaunay T, Goss AN. Severe odontogenic infections Australian Dental Journal Medications Supplement 2005; 50:4
18. Almeida OP, Scully C. Fungal infections of the mouth. *Braz J Oral Sci*. 2002; 1:19-26
19. Veronez B, Pando de Matos F, Monnazzi MS, Sverzut AT, Sverzut CE, Trivellato AE. Maxillofacial infection. A retrospective evaluation of eight years *Braz J Oral Sci* 2014; 13(2):98-103.

20. Odai ED, Isitua CC, Obuekwe ON. Bacteriology, pathology and antibiotic sensitivity of periapical infections seen in a tertiary health facility. *Afr J Oral and Maxillofac Path Med* 2016;2(1):21-29
21. Lagarde M, Palmer N. Evidence from Systematic Reviews to Inform Decision-Making Regarding Financing Mechanisms That Improve Access to

Health Services for Poor People: A Policy Brief Prepared for the International Dialogue on Evidence-Informed Action to Achieve Health Goals in Developing Countries (IDEAHealth) in Khon Kaen; Thailand. 13-16 December 2006. Geneva: Alliance for Health Policy and systems Research; 2006.)