**ORO-FACIAL FASCIAL SPACE INFECTION IN A PAEDIATRIC GAMBIAN POPULATION: A REVIEW OF 93 CASES**

**Okoje VN1, Omeje KU2\*, Okafor E3, Adeyemo YI4, Abubaccar J5, Roberts CAP5, Samateh AL5**

1Department of Oral and Maxillofacial Surgery, University College Hospital, Ibadan, Oyo State, Nigeria and Sabbatical consultant to Edward Francis Small Teaching Hospital Banjul, Gambia

2Department of Oral and Maxillofacial Surgery, Aminu Kano Teaching Hospital, Kano, Nigeria and Bayero University, Kano, Nigeria.

3Dental Clinic, Edward Francis Small Teaching Hospital Banjul, Gambia

4Department of Child Dental Health, Aminu Kano Teaching Hospital, Kano, Nigeria

5Department of Surgery, University of The Gambia, Edward Francis Small Teaching Hospital Banjul, Gambia

**\*Corresponding author:** Dr Kelvin U. Omeje **Email:** [uchennakelvinomeje@yahoo.com](mailto:uchennakelvinomeje@yahoo.com)

**Conflict of interest:** None

**Funding:** None

**ABSTRACT**

**Background:** Oro-facial fascial space infection is known to be a clinical presentation of neglected dental care. The proportion of children with dental sepsis has also been known to increase markedly with caries experience. Such fascial space infection in the paediatric age group is known to progress rapidly within a short period and is thus potentially more fatal than in the adult population.

**Aims:** This study aimed to document and evaluate the pattern of oro-facial fascial space infection amongst paediatric Gambian population.

**Patients and Methods:** The study was a 4-year descriptive retrospective survey of all patients with oro-facial fascial space infection seen and managed at the dental unit of the polyclinic attached to the Edward Francis Small Teaching Hospital in Banjul, The Gambia from May 2015 to April 2019. The information collated were patients’ sociodemographic data as well as clinical features related to their medical and dental condition. The extracted data were analyzed using Statistical Package for Social Sciences (SPSS) version 15.0 (SPSS Inc, Chicago, IL). Absolute numbers and simple percentages were used to describe categorical variables. Quantitative variables were described using mean (with standard deviation), median and range. Categorical variables were compared using chi square test and numeric variables compared using student t-test. Differences were considered significant if p<0.05.

**Results:** A total of 322 patients with oro-facial fascial space infection were managed within the period of the study out of whom 93 patients that met the inclusion criteria were studied. Their ages ranged from 3 months to 16 years, with a mean age of 8.5(SD2.1) years. There were 54 males and 39 females with a gender (M: F) ratio of 1.4: 1. All the patients presented with painful facial swelling and fever. Eighty-one (87.1%) had a history of toothache. The median number of fascial space involvement was 1 space; the submandibular space was involved unilaterally in 43 (46.2%) and bilaterally in 8 patients (8.6%). Eighty-one (87.1%) were odontogenic in origin and 12 (12.9%) were non-odontogenic. Seventy-two (88.89%) of odontogenic cases involved posterior teeth and 45 (62.5%) of these were the first permanent molars. Incision and decompression and teeth extraction were done for all the odontogenic cases. Staphylococci and/or streptococci were cultured from six patients.

All the patients had inpatient treatment with a combination of intravenous amoxicillin, metronidazole and gentamicin treatment. Mortality rate was 5.4% (5 out of 93) and the mean age of patients who died, 3.0 (SD0.3) years, was significantly lower than that of those who survived, 8.3 (SD1.4) years, (p<0.0001).

**Conclusion:** The commonest symptoms of oro-facial fascial space infection in the Gambian paediatric population were fever, facial swelling and toothache. Most of the infections were odontogenic and affected most commonly the submandibular space. Posterior teeth were more commonly involved than the anterior, with the first permanent molar being the most commonly affected tooth. Incision and decompression were performed in all odontogenic cases, with extraction of all culprit teeth. All patients had in-patient treatment with intravenous amoxicillin, metronidazole and gentamicin. The mortality rate was 5.4%. The burden of dental caries with its complications is huge in the paediatric population of the Gambia. Training of dental surgeons and specialists and their auxiliaries with advocacy on the need for regular dental checkup for children, as well as prompt attention to dental diseases will help to reduce this scourge.

**Keywords:** Oro-facial, fascial space, infections, odontogenic, paediatric, Gambia

**Introduction**

Oro-facial fascial space infection is relatively uncommon in the paediatric age group.1 It has even become more uncommon in this era of advances in antibiotic therapy. When it occurs, it is usually of odontogenic origin2 and sometimes may be a reflection of the quality of dental care in a population. It has been said to be one of the clinical presentations of neglected dental care.3 Previous studies have pointed to the fact that the proportion of children with dental sepsis increases markedly with caries occurence.4,5 The other causes of oro-facial fascial space infection may be infection of the salivary glands, tonsils, adenoids, infected fractures as well as infections of other peri-oral structures. Fascial space infection often arises as a sequel to pulp necrosis caused by caries, trauma or periodontitis. It could then progress beyond the alveolar bone to involve the fascial spaces around the face and oral cavity.6 These infections tend to spread along planes of least resistance from the supporting structures of the affected tooth.7 In the maxilla and mandible, it tends to start from the buccal and lingual sides respectively. These areas represent the region of the jaws where the alveolar bone is weakest; the infection then spreads posteriorly affecting the molar teeth, and could extend more anteriorly to involve the incisors and canine teeth.7 It is known that when fascial space infection is of odontogenic origin, location of the affected tooth predicts the route of spread and which oro-facial spaces ultimately become infected.

These infections usually present in the form of cellulitis or abscess and may become fatal if prompt care is not instituted.8 They commonly start from the primary fascial spaces, and may then spread to involve the secondary spaces and even extra-facial regions.

Ludwig’s angina is a severe form of these infections; its diagnosis is made mainly on clinical grounds when there is simultaneous and bilateral involvement of the submandibular and sublingual spaces as well as the submental space, which is often by lymphatic communication.

Oro-facial fascial space infection is known to be uncommon in the paediatric age group and it may progress rapidly, becoming severe disease within a short period of time. It is thus potentially more fatal than in the adult population.8 Unlike in the adult population where these infections are often of odontogenic origin, there may not be any culprit tooth in the paediatric age group. When these infections occur in the very young, there may be the need to rule out immune system compromise. Manal and Maha1 noted that paediatric odontogenic infections and their management continue to be a challenge for clinicians because they are uncommon. Hence, individual clinicians usually do not see enough cases to develop a systematic treatment plan.

The principles of management of these infections entail securing the airway when compromise is imminent; Ehrenfeld9 and Chunduri et al10 noted that airway maintenance during abscess drainage is a condition sine qua non. Others include incision and decompression, antibiotic therapy as well as extraction of the implicated tooth if cause is odontogenic.11

The aim of this study was to evaluate the pattern of oro-facial fascial space infection amongst a known paediatric Gambian population, determining clinical presentation, management and outcomes.

**Patients and Methods**

The study was a 4-year descriptive retrospective survey of all patients aged 0-16 years with oro-facial space infection seen and managed in the dental unit of the polyclinic attached to the Edward Francis Small Teaching Hospital in Banjul, The Gambia from May 2015 to April 2019. Inclusion criteria were patients’ whose oro-facial swellings were preceded by fever, with or without tooth ache, and recent onset swelling within the preceding 7 days. Patients with co-existing neoplastic lesions were excluded. Information was obtained from the clinic registers as well as the records at the accident and emergency department. Data extracted included age, gender, area of residence, previous history of dental clinic visit, presenting clinical features, number of fascial spaces involved and diagnosis. Others included duration of admission, treatment given and the outcome.The extracted data were analyzed using Statistical Package for Social Sciences (SPSS) version 15.0 (SPSS Inc, Chicago, IL). Absolute numbers and simple percentages were used to describe categorical variables. Numeric variables were described using mean (with standard deviation), median and range. Categorical variables were compared using chi square tests and numeric variables compared using student t-test. Differences were considered significant if p<0.05.

**Results**

A total of 322 patients with oro-facial fascial space infections were seen and managed during the study period. Their ages ranged from 3 months to 65 years, and 93 (28.9%) patients fell within 16 years of age which was consistent with our hospital definition of paediatric age group. There were 54 males and 39 females giving a male: female ratio of 1.4: 1.The mean age of the 93 patients was 8.5(SD2.1) years. There was no statistically significant difference in the mean ages of the male and female patients (males 8.6[SD1.0], females 8.40[SD0.1], p= 0.217 The age distribution of the patients is shown in Table 1.

All the patients presented with complaints of painful facial swelling and pre-existing fever. Eighty-one (87.1%) had a history of toothache; other symptoms included trismus, halitosis and dysphagia. They all had tender facial swellings; those who complained of toothache had carious teeth as well as collection of pus. The median number of fascial spaces involved was 1 space. The submandibular fascial space was the commonest involved: 43 (46.2%) had single space involvement while 8 (8.6%) had bilateral involvement without involvement of sublingual spaces. Ludwig’s angina was recorded in 5 (5.4%) patients. Other patients presented with isolated submental space infection and a combination of primary with involvement of adjoining secondary spaces. The least involved single space was the temporal space in 6 patients. The distribution of the orofacial fascial space infection is shown in Table 2.

Eighty-one (87.1%) of the cases were odontogenic in origin and 12 (12.9%) were of non-odontogenic origin. Of the odontogenic infections 72 (88.9%) had posterior teeth and 9 (11.1%) had anterior teeth being the origin of the infections. Children aged 10 years and above formed a higher proportion of the involved teeth (46, 57.5%) than those aged less than 10 years (34, 42.5%). There was no significant difference, between children aged less than 10 and those 10 years or older, in the proportions of anterior and posterior teeth involved (<10 years: 3 anterior, 31 posterior versus ≥10 years: 6 anterior, 41 posterior, p=0.726) (Table 4). The commonest involved posterior teeth were the first permanent molars, followed by the second deciduous molars (Table 5).

Of the 12 non-odontogenic cases 3 presented with submental space infection and 9 with unilateral submandibular space infection. Sialadenitis of minor salivary glands was the commonest origin of infection in non-odontogenic fascial space infection, 5 out of 12 (47.7%); Table 6 lists the origins of infection in non-odontotenic cases.

The areas of residence of the patients showed that Banjul and Mariama Kunda had the highest numbers followed by Brikama and Tabokodo. The distribution of the patients according to their place of residence is shown in Table 3.

All the patients were noted to be visiting a dental clinic for the first time at presentationand were all admitted into the paediatric ward. Investigations carried out included peri-apical/extra-oral radiographs, full blood count, **h**aemoglobin genotype and serum urea, electrolytes and creatinine. Microscopy, culture and sensitivity of pus was also done where necessary.

Eighty-one patients with obvious pus collection had incision and decompression of the affected spaces under local anaesthesia. Extraction of culprit tooth was carried out in all these same patients as soon as the degree of mouth opening permitted. Most of the cultures of the pus yielded no growth. The positive cultures yielded staphylococcal and streptococcal organisms in 2 and 5 cases respectively while both staphylococcal and streptococcal organisms were cultured in one case. The antibiotic sensitivities encompassed the drugs which were already being administered.

The drug treatment instituted in all cases was a combination of 3 antibiotics (Amoxicillin, metronidazole and gentamicin). Amoxicillin and metronidazole were given by intravenous route at a dose of 150mg/kg/day and 7.5mg/kg/day respectively in 3 divided doses at 8-hourly intervals; gentamycin was given intravenously at a dose of 5mg/kg/day in 2 divided doses at 12hourly intervals for children 10 years or older and 5mg/kg once daily for infants or children less than 10 years. The duration of antibiotic treatment was guided by patients’ response; however an average of a 5-day course was given. Patients with history of penicillin allergy were given oral erythromycin at a dose of 10mg per kilogram body weight per dose every 6 hours for an average of 5 days. Patients were also given appropriate dosage of non-opioid analgesic, usually paracetamol, and intravenous fluid (paediatric saline-0.43%) until resolution of the acute phase of the infection when alimentation improved.

All the patients without obvious pus collection who did not have incision and decompression were also managed as inpatients, and were on admission for between 3 to 8 days with a mean of 4.1(SD1.2) days. This was significantly shorter than the mean of 8.0(SD3.2) days for patients with pus collection who had incision and decompression (<0.0001).

Five patients died, giving a mortality rate of 5.4%. These included 2 males and 3 females and their ages ranged between 6 months and 4.5 years with a mean of 3.0 (SD0.3) years. The mean age of the mortalities was significantly lower than that for those who survived, 8.3(SD1.4) years, (p<0.0001). The patients that died had 2 or more oro-facial fascial spaces involved. The mean duration of admission before death was 2.1(SD0.8) days. The cause of death was over-whelming sepsis in all the cases.

**Discussion**

Complications of simple dental infection are more often found in patients with poor dental health or patients with impaired immunity.3 Fascial space infections when of odontogenic origin are often thought to result from neglected treatment of dental caries.3,5 The oral cavity serves as the host for over 500 species of bacteria which are normally innocuous to the oral environment.12 These microorganisms are noted to play a role in the pathogenesis of dental caries, periodontal infections and osteomyelitis.13 Fascial space infections are polymicrobial in nature with the involvement of both anaerobic and mixed aerobic bacteria.6 In paediatric patients these infections are known to progress rapidly and may lead to overwhelming infection with airway compromise being the most dreaded complication.

Management of children with oro-facial fascial space infection is essentially done by the different specialties in dentistry with need for paediatrician consultations at different times in the management when the need arises.

The constitutional symptoms that accompany these infections may lead to mis-diagnosis or missed diagnosis. Prompt diagnosis is important especially in the very young where the child may not be able to adequately communicate their symptoms; failure to make accurate diagnosis may lead to mismanagement of these children. It is essential that prompt diagnosis is made and treatment instituted almost immediately to prevent or limit the degree of morbidity associated with these infections.

Although painful facial swelling and fever were the symptoms common to all in our cohort, other clinical features which could have been found in these patients include carious or periodontally involved teeth, pointing abscesses on the skin, limitation of mouth opening, lethargy and loss of appetite. Aqunila and Lynham14 corroborated these symptoms in their study but noted that dysphagia, difficulty with or pain on moving the tongue, stridor, trismus, elevation of the tongue, and fever represent danger signs in these patients and should indicate urgent need for hospital referral. Involvement of multiple fascial spaces has been noted to correlate with increased degree of morbidity recorded in the management of fascial space infection. Brotherton et al15 noted that involvement of multiple oro-facial spaces as seen in Ludwig’s angina rapidly leads to airway compromise necessitating an artificial airway in the form of endotracheal intubation or emergency tracheostomy. The finding of submandibular space as the commonest involved fascial space in orofacial infections in our study was similar to that of a study from Nigeria which reported submandibular space involvement to be the most frequent, occurring in 43.9% of cases with single space involvement. That study however involved both children and adults16. In a study reported from India which involved children aged 3-14 years the submandibular space was the most frequently involved occurring in 56%. There was no involvement of multiple spaces observed in that study17.

The pattern of antibiotic prescription in the present study is similar to what has been documented from other studies. Brotherton et al15 in a review of management of oro-facial infections in 32 children below the age of 16 years noted that 62.5% (20/32) of the patients were treated with more than one antibiotic, with penicillin or penicillin derivative and anerobic cover with metronidazole predominating in 87.5% (28/32) of cases. The difference between our protocol and theirs was the addition in our cases of gentamycin for gram negative coverage; they also used systemic steroids in 20% of their cases. The addition of gentamycin in our cases was to complement Amoxicillin which has little or no gram negative coverage. The use of systemic steroids in management of facial space infection is controversial. Advocates of systemic steroids believe that they cause membrane stabilization leading to reduced mast cell degranulation18, thereby halting overwhelming systemic inflammatory response; the anti-inflammatory function of steroids may also lead to reduced airway oedema and limit associated respiratory insufficiency.18

Most of our cultures not yielding any organisms was probably because most of the patients had been commenced on antibiotics before incision and decompression. The initial use of empirical antibiotic therapy based on the clear knowledge of micro-organisms involved in fascial space infections which thereafter is modified accordingly following availability of culture and sensitivity results is the standard of care.

It must be emphasized that antibiotic therapy does not replace effective incision and decompression.1 Incision and drainage has been discouraged in the absence of pus aspiration, however proponents of incision and drainage even in cellulitis argue that some of the organisms involved in this process are gas producing and thus incision and drainage with insertion of drains may help to open up channels for the exit of these gases. They therefore refer to the procedure as incision and decompression rather than incision and drainage.

Treatment of fascial space infections in our study involved a combination of admission, prompt institution of empirical antibiotics as well as incision and decompression with elimination of the etiologic agent. Elimination of etiologic agent in our study referred to the extraction of culprit teeth in cases from odontogenic sources so as to provide path for drainage.7 The finding of posterior molars (deciduous and permanent) as the commonest implicated teeth in our study was similar to the findings of other researchers on the same subject matter.1,19-21 However while the permanent molars had a higher frequency compared to the deciduous molars in our study, the reverse was the finding in a study from Saudi Arabia. That study involved patients aged 2-14 years, with most of them 9 years old or younger1.

The finding of more males being affected than females in the present study may have to do with a lower pain threshold in relation to dental causes in female children when compared with males.22 Female children are thus more likely to present earlier to the clinic for medical attention before complications ensue.

Most of the cases in our series were of odontogenic origin requiring extraction of the offending tooth as a means of eliminating the aetiologic agent. Although odontogenic causes are documented to predominate in 90% of oro-facial infections in adults,23 Brotherton et al15 in contrast to our study found a dental risk in only one-third of the 35 children they reviewed. The non-odontogenic causes in their study included mouth trauma, mandibular fracture and complication of frenuloplasty. Other non-odontogenic causes of orofacial space infection like tonsillar infection, sialadenitis of the peri-oral minor salivary glands and gingival infections may not require tooth extraction as was seen in the 3 cases of submental space and 9 cases of isolated unilateral submandibular space infections in the present study.

Tooth extraction as a means of removal of aetiologic agent is one of the most important adjuncts to treatment of fascial space infection.7 This is mainly related to the ability of the extraction tooth socket to serve as the most important drainage site for the abscess since the involved tooth forms the largest concentration pool for the exudate collection. The admission of the patients in our study was to the paediatric ward giving the paediatricians the opportunity to review and participate in the management of these cases. Paediatrician involvement is necessary so as to promptly pick up associated systemic complications. The average duration of admission in the present study was consistent with the finding of other studies in similar age group with fascial space infection.1,24-25

The observation that all the children were visiting the dental clinic for the first time clearly justifies the saying that neglected dental care probably constitutes one of the greatest determinants of morbidity and mortality in oro-facial fascial space infections. Children are supposed to be introduced to the dental clinic after the eruption of their first teeth and a routine dental visit schedule and follow up plan charted for them. This will help prompt detection and treatment of dental diseases and prevention of their complications. The ratio of the population of Gambians to a dentist is over 200,000 meaning that majority of the Gambian population may never get to see a dentist in their life time. Oro-facial fascial space infection is preventable when adequate attention is given to oral health.

The mortalities that occurred in our series were within the first few days of admission and they occurred in those below the age of 5 years.The short duration of admission before death may suggest both delay in presentation as well as advanced stage of disease at presentation. These mortalities underscore the need for public health education on the causes and outcomes associated with of oro-facial fascial space infections in the paediatric population. Regular dental visits should be encouraged. More importantly, efforts should be made to train more dental surgeons, dental specialists and dental auxiliaries to be able to meet the need for oral health care in the country.

**Conclusion**

The commonest symptoms of oro-facial fascial space infection in the Gambian paediatric population were fever, facial swelling and toothache. Most of the infections were odontogenic and affected most commonly the submandibular space. Posterior teeth were more commonly involved than the anterior, with the first permanent molar being the most commonly affected tooth. Incision and decompression were performed in all odontogenic cases, with extraction of all culprit teeth. All patients had in-patient treatment with intravenous amoxicillin, metronidazole and gentamicin. The mortality rate was 5.4%. The burden of dental caries and its complication is huge in the paediatric population of the Gambia. Training of dental specialists and their auxiliaries with advocacy on the need for regular dental checkup for children, as well as prompt attention to dental diseases will help to reduce this scourge.

**References**

1. Al-Malik M, Al-Sarheed M. Pattern of management of oro-facial infection in children: A retrospective. Saudi J Biol Sci 2017;24:1375-1379.
2. Heimdahl A, Von Konow L, Satoh T, Nord C.E. Clinical appearance of orofacial infections of odontogenic origin in relation to microbiological findings. J. Clin. Microbiol. 1985;22:299-302.
3. Foster H, Fitzgerald J. Dental disease in children with chronic illness. Arch. Dis. Child. 2005;90:703-708.
4. Evans D. Untreated decayed teeth and dental sepsis. Br. Dent. J. 2006;200:45-47.
5. Pine CM, Harris RV, Burnside G, Merrett MC. An investigation of the relationship between untreated decayed teeth and dental sepsis in 5-year-old children. Br. Dent. J. 2006;200:45-47.
6. Sandor GK, Low DE, Judd PL, Davidson RJ. Antimicrobial treatment options in the management of odontogenic infections. J. Can. Dent. Assoc. 1998;64:508-514.
7. Nawaz KK. Management of Facial Space Infection in a 9-Year-Old Child - A Case Report. Int. J. of Clin. Oral. Maxillofac. Surg. 2016;2:1-4.
8. Chow AW, Roser SM, Brady FA. Orofacial odontogenic infections. Ann. Intern. Med. 1978;88:392-402.
9. Ehrenfeld M. Clindamycin in the treatment of dental infections. In: Zambrano D, editor. Clindamycin in the Treatment of Human Infections. Upjohn Company; Kalamazoo, Michigan: 1992.
10. Chunduri NS, Krishnaveni M, Venkateswara RG, Tanveer K, Haranadha R. Evaluation of bacterial spectrum of orofacial infections and their antibiotic susceptibility. Ann. Maxillofac. Surg. 2012;2:46-50.
11. Omeje KU, Amole IO, Efunkoya A A, Agbara R, Adesina O A, Jameel I. A revisit of oral and maxillofacial mortality from orofacial infections in a resource limited setting: is there a need for a change in management protocol?  East African Medical Journal 2017;94:499-502.
12. Gendron R, Grenier D, Maheu-Robert L. The oral cavity as a reservoir of bacterial pathogens for focal infections. Microbes Infect. 2000;2:897-906.
13. Li X, Kolltveit KM, Tronstad L, Olsen I. Systemic diseases caused by oral infection. Clin. Microbiol. Rev. 2000;13:547-558.
14. Aqunila PJ, Lynham A. Serious sequalae of maxillofacial infections. Med J Aust 2003;179:551-552.
15. Brotherton H, Templeton K, Rowney DA, Montague ML. Ludwig’s agina: Case report and literature review. Intern Med 2014;4:1-5.
16. Osunde OD, Akhiwu I, Efunkoya AA, Adebola AR, Iyogun CA, Arotiba JT. Management of facial space infection in a Nigerian teaching hospital: A 4 year review. Niger Med J 2012;53:12-15.
17. Nagaveni NB, Umashankara KV Microflora of Orofacial Space Infections of Odontogenic Origin in Children – A Bacteriological Study. J Interdiscipl Med Dent Sci 2014;2:118. doi:10.4172/2376-032X.1000118
18. Wynn SR. Mast cell stabilizers, anticholinergics, corticosteroids and troleandomycin. J Allergy Clin Immunol. 1989;84:1100-1103.
19. Kudiyirickal MG, Hollinshead F. Clinical profile of orofacial infections: an experience from two primary care dental practices. Med. Oral Patol. Oral Cir. Bucal 2012;17:533-537
20. Veronez B, Pando de Matos F, Monnazzi MS, Sverzut AT, Sverzut CE, Trivellato AE. Maxillofacial infection; A retrospective evaluation of eight years. Brazil. J. Oral Sci. 2014;3:98 -103
21. Gonclaves L, Lauriti L, Yamamoto MK, Luz GJ. Characteristics and management of patients requiring hospitalization for treatment of odontogenic infections. Craniofac Surg 2013;24:458-462.
22. Stewart BL, Sabbah WA, Owusu-Agyakwa GB. Dental pain experience and impact on children in Tabul, Saudi Arabia. Saudi Dent J 2002;14:82-88.
23. Moreland LW, Corey J, McKenzie R. Ludwig’s angina; Report of a case and review of the literature. Arch Intern Med 148:461-466.
24. Lin YT, Lu PW. Retrospective study of paediatric facial cellulitis of odontogenic origin. Pediatr. Infect. Dis. J. 2006;25:339-342.
25. Thikkurissy S, Rawlins JT, Kumar A, Evans E, Casamassimo PS. Rapid treatment reduces hospitalization for paediatric patients with odontogenic-based cellulitis. Am. J. Emerg. Med. 2010;28:668-672.

**Table 1: Age distribution of patients studied**

|  |  |  |
| --- | --- | --- |
| **AGE GROUP (Years)** | **FREQUENCY** | **PERCENTAGE** |
| <1 year | 2 | 2.2 |
| 1-3 | 10 | 10.8 |
| 4-6 | 17 | 18.3 |
| 7-9 | 18 | 19.4 |
| 10-12  >12  **TOTAL** | 27  19  **93** | 29.0  20.4  **100** |

**Table 2: Distribution of affected oro-facial fascial spaces**

|  |  |  |
| --- | --- | --- |
| **FACIAL SPACE** | **FREQUENCY** | **PERCENTAGE** |
| Isolated submandibular space (unilateral) | 43 | 46.2 |
| Isolated submandibular space (bilateral) | 8 | 8.6 |
| Isolated submental space | 7 | 7.5 |
| Classical Ludwig’s | 5 | 5.4 |
| Buccal/Canine space  Temporal spaces | 8  6 | 8.6  6.4 |
| Primary spaces with other adjoining secondary spaces  **TOTAL** | 16  **93** | 17.2  **100** |

* The adjoining secondary spaces are the secondary spaces in close proximity to the primary spaces.

**Table 3: Patients’ place of residence**

|  |  |
| --- | --- |
| **PLACE OF RESIDENCE** | **NUMBER (%)** |
| Banjul | 16 (17.2) |
| Mariama Kunda | 16 (17.2) |
| Brikama | 11 (11.8) |
| Tabokodo  Serrekunda  Bundung  Bansang  Latrikunda  Lamin  Bakau  Others | 10 (10.8)  9 (9.7)  8 (8.6)  7 (7.5)  6 (6.5)  4 (4.3)  3 (3.2)  3 (3.2) |

**Table 4: Distribution of extracted teeth in patients studied**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age group** | **Anterior teeth** | **Posterior teeth** | **Total carious teeth** |
| <1 year | - | 2 | 2 |
| 1-3 years | - | 4 | 4 |
| 4-6 years | 1 | 3 | 4 |
| 7-9 years | 2 | 22 | 24 |
| 10-12 years | 4 | 25 | 29 |
| >12 years | 2 | 16 | 18 |
| **Total** | **9** | **72** | **81** |

**Key**

\*Posterior teeth: Deciduous posterior teeth (DE) and Permanent Posterior teeth (Premolars, first and second molars).

\*Anterior teeth: Deciduous and permanent central/lateral incisors and canines

**Table 5: Extracted teeth (n=81)**

|  |  |
| --- | --- |
| **Extracted teeth** | **Number(%)** |
| **Anterior teeth** |  |
| Deciduous central incisor-A | 2 (2.47) |
| Deciduous lateral incisor- B | - |
| Deciduous canine- C | - |
| Permanent central incisor-1 | 4 (4.94) |
| Permanent lateral incisor 2 | 3 (3.70) |
| Permanent canine-3 | - |
| **Total teeth extracted (Anterior)** | **9 (11.11)** |
| **Posterior teeth** |  |
| First deciduous molar= D | 3 (3.70) |
| Second deciduous molar -E | 18 (22.22) |
| First premolar -4 | 1 (1.23) |
| Second premolar -5 | 1 (1.23) |
| First permanent molar-6 | 45 (55.56) |
| Second permanent molar -7 | 4 (4.94) |
| **Total teeth extracted (Posterior)** | **72 (88.89)** |

**Table 6: Distribution of origins of non-odontogenic infection**

|  |  |  |  |
| --- | --- | --- | --- |
| **Age group** | **Origin of Infection** | **Number** | **Involved fascial space** |
| <1 year | Ulcer on the crest of the mandibular  alveolar ridge | 1 | Submental |
| 1-3 years | Sialadenitis of the  Minor salivary gland | 5 | Submandibular |
| 4-6 years | Ulcer in the floor of the mouth  (around the lingual frenum) | 1 | Submental |
| 7-9 years | Fish bone impaction | 2 | Submandibular |
| 10-12 years | Infected tongue injury | 1 | Submental |
| >12 years | Periodontitis | 2 | Submandibular |
| **Total** |  | **12** |  |