

Evaluation of Secondary Chronic Suppurative Osteomyelitis of Jaw in 15 Cases: A Retrospective Analysis

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ABSTRACT

Introduction: Chronic osteomyelitis may become a refractory condition and is more difficult to treat. Therefore, for correct diagnosis and evaluation of chronic osteomyelitis, primary health care practitioners must have knowledge of signs and symptoms associated with osteomyelitis for effective management.

Aim: To evaluate secondary chronic suppurative osteomyelitis of jaw in 15 cases.

Materials and Methods: This was a retrospective study of all patients treated for maxillo-mandibular secondary chronic osteomyelitis over a period of six years (January 2013 to December 2018) in Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Nagpur, Maharashtra, India. This study was carried out in between November 2019 to November 2020. A total of fifteen cases were identified which were diagnosed as Secondary Chronic Suppurative Osteomyelitis (SCO) and treated for same. The cases were evaluated for demographic data, risk factors, aetiology, clinical presentation, radiological findings and the management. Data was collected through retrospective search of records and was arranged in descriptive tabular format without statistical analysis.

Results: Out of 15 cases 9 (60%) were female. The patients ranged in age from 21 to 56 years with a mean age of 36.6±9.0 years.

The mean age at first symptoms was 35.5 years (20-55), with a standard deviation of 9.12 years. The distribution of osteomyelitis in the jaws was dominated by the cases that occurred in the mandible i.e., 73.33% (11 cases) and the maxilla 26.66% (four cases) with most common involved site was body and angle region of mandible (eight cases) followed by premolar region two cases and anterior region one case. In this study, five cases (33.33%) had carious lesion and seven cases (46.67%) had infected extraction socket. Other causes of infection were osteoradionecrosis in one case and superimposed infection like mucormycosis in two cases. The most common causes of chronic osteomyelitis of the jaws were directly related to odontogenic infections like infected unhealed socket. Decortication and curettage was done in four cases. Decortication and sequestrectomy were performed in five cases and debridement of necrosed bone in three cases. Sinus opening, debridement of necrosed wall and packing were done in three cases of SCO involving maxilla. Duration of antibiotic therapy in all patients averaged five weeks.

Conclusion: The accurate diagnosis with the help of recent imaging techniques, adequate antibiotic therapy as well as surgical treatment was keys for the success of SCO management.

Keywords: Decortication, Microbial, Odontogenic infection, Sequestrectomy, Suppuration

INTRODUCTION

Osteomyelitis is an inflammation of bone [1] both cortical and cancellous [2]. It develops in the jaws after a chronic odontogenic infection or of other causative factors [3]. Osteomyelitis can be acute and chronic depending on the time of progress following onset of symptoms. An acute process occurs upto one month after the onset of symptoms and chronic process occurs for longer than one month [4,5]. In the majority of the cases of chronic osteomyelitis, aetiology is usually microbiologic and results from an odontogenic infection, post extraction complications, trauma, inadequate and inappropriate antibiotic therapy, diagnostic failure, infected fracture or irradiation to the mandible [6,7].

Incidence of disease has decreased significantly following the use of broad spectrum antibiotics, advances in restorative dentistry, increased awareness of oral hygiene and better dental health care [8]. Acute osteomyelitis may progress to chronic stage when antimicrobial agents prove ineffective. This chronic osteomyelitis may further becomes a refractory condition which is difficult to treat. Hence, correct diagnosis of osteomyelitis is decisive [9] and health care practitioners must have a thorough knowledge of the signs and symptoms for correct evaluation and effective management.

Correct diagnosis of chronic osteomyelitis can be done by various methods that include microbial culture, bone biopsy, conventional radiography, computerised tomography and magnetic resonance imaging, radioisotope bone scanning [10]. In chronic mandibular osteomyelitis clinical course is characterised by chronic pain,

abscess, purulent discharge with intraoral and extraoral fistula. Severe complications like pathologic fracture and neuropalsy are commonly reported [11]. The treatment of chronic mandibular osteomyelitis involves surgical intervention and prolonged antibiotics administration [12]. In the management of chronic osteomyelitis, Bamberger DM suggested administering atleast four weeks of antibiotic therapy after surgical intervention [13] whereas Kim SG and Jang HS suggested antibiotic therapy for eight weeks postsurgery for successful results [11].

The present study was conducted to retrospectively analyse all the cases of secondary chronic osteomyelitis treated in the Department of Oral and Maxillofacial Surgery over a period of six years for demographic factors, probable aetiological factors, clinical and radiographic findings, microbial sensitivity testing, treatment methods.

MATERIALS AND METHODS

In this retrospective study, the records were searched for all the patients treated for maxillo-mandibular secondary chronic osteomyelitis over a period of six years (January 2013 to December 2018) in Department of Oral and Maxillofacial Surgery, Government Dental College and Hospital, Nagpur, Maharashtra, India. This study was carried out in from November 2019 to November 2020.

Inclusion and Exclusion criteria: The inclusion criteria were all cases of SCO of jaws of all ages. Patients with history of malignant pathology were excluded. A total of 15 cases were included in the retrospective analysis.

Intervention was search of records for cases of SCO. The cases were evaluated for demographic data, probable aetiological factors, risk factors, clinical presentation, radiological findings, management and follow-up for two years. Data was collected for habits and any systemic diseases. The diagnostic criteria of SCO included were clinical presentation as well as imaging. The Orthopantomograph (OPG), conventional multislicing Computed Tomography (CT), Cone Beam Computed Tomography (CBCT) findings were recorded. Microbial culture and sensitivity test findings were also recorded.

STATISTICAL ANALYSIS

Data was collected through retrospective search of records and was arranged in descriptive tabular format without statistical analysis.

RESULTS

The patients ranged in age from 21 to 56 years with a mean age of 36.6 years, with a standard deviation of 9.0 years. The mean age at which first symptoms appeared was 35.5 years (20-55), with a standard deviation of 9.12 years. Age distribution of patients is shown in [Table/Fig-1]. Of the 15 patients, nine were female (60%) and six were male (40%).

Age (years)	Number of patients	Percentage (%)
21-30	4	26.6
31-40	7	46.6
41-50	2	13.3
51-60	2	13.3

[Table/Fig-1]: Age-wise distribution of patients.

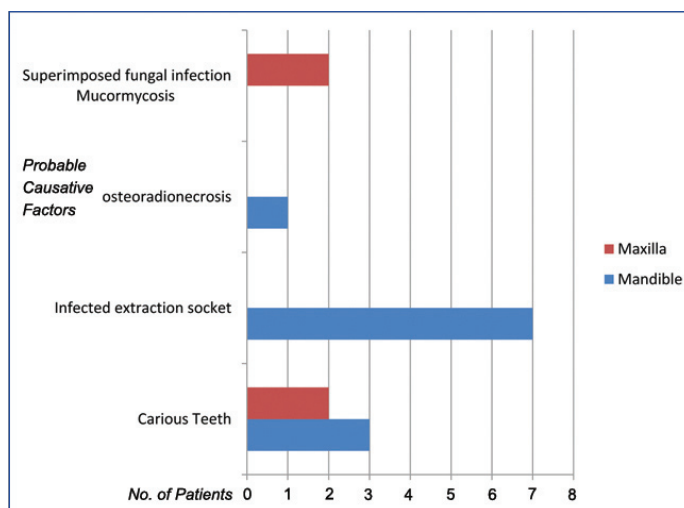
The distribution of osteomyelitis in the jaws was dominated by the cases that occurred in mandible i.e., 11 cases (73.33%) and maxilla four cases (26.67%). In mandible most common involved site was body and angle region (eight cases) followed by premolar region (two cases) and anterior region (one case). In maxilla, involved site was premolar region (two cases). Superimposed fungal infection (one case) was noted in maxilla involving bilateral maxilla and one case involving unilateral maxilla from anterior to posterior region. Percentage of region wise distribution of lesion in mandible and maxilla is shown in [Table/Fig-2].

Tooth involved	No. of patients	Percentage (%)
Mandibular molar	8	53.33
Mandibular premolar	2	13.33
Mandibular anterior	1	6.67
Maxillary premolar	2	13.33
Bilateral maxillary anterior to posterior region	1	6.67
Unilateral maxillary anterior to posterior region	1	6.67

[Table/Fig-2]: Involved sites in the lesion.

Four cases of maxilla had characteristic features of osteomyelitis, out of which two cases had odontogenic infection and two cases had superimposed fungal infection. Out of 15 patients, five patients had diabetes mellitus and one patient had habit of alcoholism and smoking. Probable cause of osteomyelitis in these patients was predominantly odontogenic in nature. In this study, five cases had carious lesion and seven cases had infected extraction socket. Other causes of infection were osteoradionecrosis in one case [Table/Fig-3].

The symptoms of all patients were recorded. In most cases primary complaints were swelling, pain and pus discharge associated with carious tooth or extraction socket. In some cases, extraoral discharging sinus and exposed necrosed bone were also noted [Table/Fig-4]. Orthopantomograph [Table/Fig-5a,b] of patient, authors can appreciate the extension of lesion in coronal sections of CBCT



[Table/Fig-3]: Probable Causative factors of SCO.

especially in cases of bucco-lingual extension and cortical changes. Total 12 cases (80%) of patient had clinical and radiological findings consistent with osteomyelitis. In six cases sequestra formation was seen on the radiograph.

Antibiotic drug therapy and surgical treatment were given. Ten cases were treated on outpatient basis and five cases required hospital admission for Intravenous (IV) antibiotic medication administration. The surgical procedure used in SCO were extraction of involved tooth, decortication and curettage, saucerisation and sequestrectomy. Surgical treatment in mandible was decortication and curettage was done in four cases, decortication and sequestrectomy were performed in five cases and debridement of necrosed bone in three cases and sinus opening, debridement of necrosed wall and packing were done in three cases of SCO involving maxilla [Table/Fig-4].

In all patients average duration of antibiotic therapy was five weeks. Treatment was started with intravenous antibiotics. Inj. ceftriaxone injection 1 g or amoxycylav 1.2 g IV 12 hourly. Inj. gentamycin 5 mg/kg every 24 hour (q24h), Inj. metronidazole IV 100 mL (eight hourly) for two weeks along with surgical debridement followed by oral medications which includes Tab. amoxycylav 625 mg eight hourly and Tab. metronidazole 500 mg orally tds (eight hourly) for three weeks [Table/Fig-4].

In this study, seven cases responded well to empirical antibiotic therapy, remaining eight cases were not responded to empirical therapy underwent for culture and sensitivity test for definitive antibiotic therapy. In two cases culture were reported fungal infection by mucormycosis and other two culture showed Klebsiella infection and four culture showed no microorganisms growth [Table/Fig-6].

Mucormycosis cases were treated with Inj. amphotericin B (given in dextrose 5% in water) intravenously at a dose of 1.0-1.5 mg/kg daily, Inj. cephotaxim 1 gm 12 hourly, Inj. metronidazole IV 100 mL 8 hourly [Table/Fig-4].

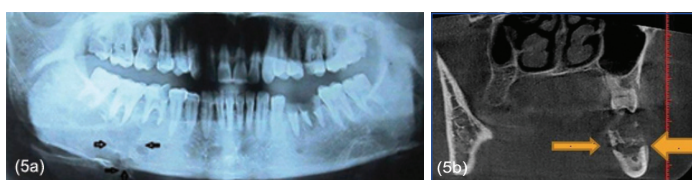
The patients were reviewed regularly during periodic follow-up visits in the Outpatient Department (OPD). Satisfactory healing was observed and there were no clinical signs or symptoms to indicate persistent infection, except in one case having habit of tobacco chewing and alcoholism reported with fracture mandible and recurrence of infection. Total three cases were reported with paresthesia in lower lip of affected region. Every patient was kept under long-term follow-up for over 24 months and remained symptom free. Uneventful healing without any recurrence showed in 10 cases. One case of Mucormycosis was transferred to Ear, Nose and Throat Department (ENT) for further management [Table/Fig-4].

Sr. No.	Age/Sex	Aetiology	Clinical presentation	Radiological findings OPG/CT	Differential diagnosis	Management	Follow-up for 24 months/ Prognosis
1	34/F	Carious lesion	Pain, abscess and pus discharge	Osteolytic and sclerotic bone with sequestrum	Pagets disease, hypercementosis, early stage malignant bone tumour	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 2 weeks along with tooth extraction, decortication and sequestrectomy followed by same medicament for 3 weeks	Uneventful healing without any recurrence
2	32/F	Carious lesion	Pain, abscess and pus discharge	Mixed lesion with cortical plate disruption with sequestrum	Pagets disease, hypercementosis, early stage malignant bone tumour	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally (8 hourly) for 2 weeks along with teeth extraction, decortication and sequestrectomy followed by same medicament for 3 weeks	Uneventful healing without any recurrence
3	28/F	Carious lesion	Pain, swelling, abscess and pus discharge	Osteolytic lesion with cortical plate disruption	Pagets disease, hypercementosis, early stage malignant bone tumour	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally (8 hourly) for 2 weeks along with Tooth extraction, debridement of necrosed bone followed by same medicament for 3 weeks	Uneventful healing without any recurrence
4	38/F	Carious lesion	Pain, swelling and extraoral discharging sinus	Osteolytic lesion with cortical plate disruption	Pagets disease, hypercementosis, early stage malignant bone tumour	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally (8 hourly) for 2 weeks. External sinus tract was removed intraorally and extraorally, infected teeth were extracted, debridement of necrosed bone performed. followed by oral medicament for 3 weeks	Uneventful healing without any recurrence
5	22/M	Carious lesion	Pain, swelling, abscess and pus discharge	Osteolytic lesion with cortical plate disruption	Pagets disease, hypercementosis	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally (8 hourly) for 2 weeks along with teeth extraction, debridement of necrosed bone followed by same oral medicament for 3 weeks	Uneventful healing without any recurrence
6	35/F	Infected extraction sockets	Extraoral discharging sinus and exposed necrosed bone	CT shows Mixed lesion with cortical plate disruption with sequestrum	Early stage malignant bone tumour, osteogenic sarcoma	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally, and decortication and sequestrectomy was done. Followed by same oral medicament for 3 weeks	Paresthesia in lower lip of affected region
7	36/M	Infected extraction sockets	Pain, swelling and extraoral discharging sinus	CT shows osteolytic lesion with cortical plate disruption with sequestrum	Early stage malignant bone tumour, osteogenic sarcoma	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally and decortication and sequestrectomy was done. Followed by same oral medicament for 3 weeks	Paresthesia in lower lip of affected region
8	35/F	Infected extraction sockets	Pain, swelling and extraoral discharging sinus	CT shows osteolytic lesion with cortical plate disruption	Early stage malignant bone tumour, osteogenic sarcoma	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally, and decortication and curettage was done. Followed by same oral medicament for 3 weeks	Uneventful healing without any recurrence
9	28/M	Infected extraction sockets	Pain, swelling and extraoral discharging sinus	CT shows mixed lesion with cortical plate disruption with sequestrum	Early stage malignant bone tumour, osteogenic sarcoma	Inj. Ceftriaxone injection-1 g or Amoxycyclav 1.2 g IV 12 hourly Inj. Gentamycine 5 mg/kg q24h Inj. Metronidazole IV 100 mL/500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally, decortication and sequestrectomy was done. Followed by oral medicament (Tab. Amoxycyclav 625 mg 8 hourly and Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	Mandible fracture and recurrence of infection as patient is tobacco chewer and habit of alcoholism
10	34/F	Infected extraction sockets	Pain, swelling and extraoral discharging sinus and exposed necrosed bone	CT shows Mixed lesion with cortical plate disruption	Early stage malignant bone tumour, osteogenic sarcoma	Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 5 weeks. The external sinus tract was removed intraorally and extraorally, and decortication and curettage was done. Followed by oral medicament (Tab. Amoxycyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	Uneventful healing without any recurrence

11	29/F	Infected extraction sockets	Extraoral discharging sinus and exposed necrosed bone	Osteolytic lesion with cortical plate disruption	Early stage malignant bone tumour, osteogenic sarcoma	Inj. Ceftriaxone injection-1 g IV 12 hourly Inj. Gentamycine 5 mg/kg q24h Inj Metronidazole IV 100 mL/500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally, and decortication and curettage was done. Followed by oral medicament Tab. Amoxyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	Paresthesia in lower lip of affected region
12	48/F	Infected extraction sockets	Pain, swelling and extraoral discharging sinus, exposed necrosed bone	Osteolytic lesion with cortical plate disruption	Early stage malignant bone tumour, osteogenic sarcoma	Inj. Amoxyclav 1.2 g IV 12 hourly Inj. Gentamycine 5 mg/kg q24h Inj. Metronidazole IV 100 mL/500 mg orally tds (8 hourly) for 2 weeks. The external sinus tract was removed intraorally and extraorally, decortication and curettage was done. Followed by oral medicaments (Tab. Amoxyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	Uneventful healing without any recurrence
13	56/M	Osteoradionecrosis	Exposed necrosed bone	Mixed lesion with sequestrum	Recurrence of malignant bone tumour, osteogenic sarcoma	Inj. Amoxyclav 1.2 g IV 12 hourly Inj. Gentamycine 5 mg/kg q24h Inj. Metronidazole IV 100 mL/500 mg orally tds (8 hourly) for 2 weeks along with Sinus opening, debridement of necrosed wall and packing. Followed by oral medicaments (Tab. Amoxyclav 625 mg 8 hourly Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	uneventful healing without any recurrence
14	52/M	Superimposed Infection (Mucormycosis)	Pain and exposed necrosed bone	CT scan shows opacification of sinuses with mixed areas of sclerosis and irregular osseous erosion	Malignant bone tumour, osteogenic sarcoma	Inj. Amphotericin B, (given in Dextrose 5% in water intravenously at a dose of 1.0-1.5 mg/kg daily), Inj.Cephotaxim 1gm 12 hourly, Inj. Metronidazole IV 100 mL 8 hourly for 2 weeks along with sinus opening, debridement of necrosed wall and packing. Followed by oral medicaments (Tab. Amoxyclav 625 mg 8 hourly and Tab. Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	uneventful healing without any recurrence
15	42/M	Superimposed Infection (Mucormycosis)	Pain and exposed necrosed bone	CT scan shows opacification of sinuses with mixed areas of sclerosis and irregular osseous erosion	Malignant bone tumour, osteogenic sarcoma	Inj. Amphotericin B, (given in Dextrose 5% in water intravenously at a dose of 1.0-1.5 mg/kg daily), Inj.Cephotaxim 1gm 12 hrly, Inj. Metronidazole IV 100 mL 8 hourly for 2 weeks along with sinus opening, debridement of necrosed wall and packing. Followed by oral medicaments (Tab. Amoxyclav 625 mg 8 hourly and Tab.Metronidazole 500 mg orally tds (8 hourly) for 3 weeks	Patient not responding to the treatment patient transferred to Ear, Nose and Throat Department for further management

[Table/Fig-4]: Patients data describing demographic details, risk factors, clinical presentation, differential diagnosis radiological findings and the management.

OPG: Orthopantomograph; CT: Computed tomography



[Table/Fig-5a]: OPG showing loss of the normal trabecular pattern with patchy radiolucencies and cortical perforation at inferior border of mandible.

[Table/Fig-5b]: Areas of bicortical perforation is well appreciated in coronal section of CT. (Images from left to right)

Infection	No. of patients
<i>Klebsiella</i>	2
<i>Mucormycosis</i>	2
No microorganism growth	4

[Table/Fig-6]: Bacterial growth on cultures and sensitivity tests. Patients who were not responding to empirical therapy underwent the blood growth culture test

DISCUSSION

The classification of osteomyelitis as acute, subacute or chronic is based on the time of onset and clinical presentation [14]. Typical

signs and symptoms of acute osteomyelitis of jaws are pain oedema fever and malaise which occurs in early phase of the disease. However, with the chronic condition, in the later phase of the disease, systemic signs and symptoms may be reduced, but there may still be swelling, purulence, drainage, open wounds, bone exposure, or sequestration [4,5,15]. According to Marx RE et al., chronic disease is seem to be of greater than one month duration and may represent either a lack of response to initial therapy or an overpowering of the host defences [16].

In this study, majority of the cases were referred to our institution by general dentist after the failure of initial care. The assessed cases in this study were of chronic suppurative osteomyelitis as described in the literature. In our study, 60% were female and 40% were male, which is comparable with survey by Andre CV which showed (55%) patients were females, 45% were males [17] and contrast to some surveys Koorbusch GF et al., showed men (74%) and women (26%) and in Malik S and Singh G survey the male patients (62%) outnumbered the female (38%) [8, 18].

The average age of this study population was almost 36 years. In the study of Kim SG and Jang HS it was shown that the percentage

of chronic osteomyelitis was highest in the age group of 50-59 years [11]. However, this study revealed that chronic osteomyelitis patients were relatively younger.

Primary site of infection was angle and body regions of the mandible which is consistent with other similar studies [8,11,18].

In case of odontogenic infections, the highest percentage (46.66%) (seven cases) had infected unhealed socket followed by pulpitis (40%) (five cases). The most common causes of chronic osteomyelitis of the jaws were directly related to odontogenic infections such as infected unhealed socket (46.66%), whereas Kim SG and Jang HS found that chronic osteomyelitis had odontogenic causes only 38% of the time [11]. Economically weaker sections, lack of awareness, illiteracy and mistreatments are the reasons for late reporting of the patient [18].

Chronic osteomyelitis is a slow and persistent inflammatory disease of bone that is characterised by necrosis of mineralised and marrow tissues, suppuration, resorption, sclerosis, and hyperplasia [11]. In acute stage, suppurative osteomyelitis of the mandible is usually treated by appropriate and adequate antibiotic therapy which may prevent progression of the inflammatory disease [19,20] whereas in chronic suppurative osteomyelitis, symptoms include deep pain, fever, and constitutional symptoms and pus exudes around the sulcus and then break the cutaneous barrier and form the fistula [19,20]. The primary goal of treatment in chronic osteomyelitis is to provide resolution of the infection by removing the source and includes aggressive surgical debridement along with accurate antimicrobial drug therapy [14]. Clinical presentations in the study included local pain, fever, swelling, purulent discharge, intraoral and skin fistula, infected unhealed socket in the oral cavity.

The significance of radiological evaluation is twofold: to differentiate osteomyelitis from other conditions that show similar signs and symptoms like early stage malignant bone tumour, osteogenic sarcoma, fibrous dysplasia and to check the progress of the disease and its response to treatment [21]. The orthopantomograph, conventional multislicing computed tomography, cone beam computed tomography are the major imaging tools used. The multiplanar slices and computer-generated 3D reconstructions are easier to interpret than conventional radiographs. Cone beam CT scans are capable of creating a three dimensional image of a focused area with a significantly lower radiation dose than conventional CT scans [19].

Yoshiura K et al., classified computed tomography patterns of osteomyelitis into lytic, mixed, sclerotic and sequestrum patterns [22]. Mixed pattern cases showed diffuse bone abnormalities, along with cortical plate perforation and periosteal reaction. In this study, for diagnosis of chronic suppurative osteomyelitis, radiological investigations like cone beam computed tomography, orthopantomograph were advised which showed osteolytic changes in six cases, mixed pattern seen in two cases whereas none of the case showed sclerotic pattern, in five cases sequestration formation seen. In cases of lesion extending in buccolingual direction, tomographic images in the axial, coronal and sagittal directions are easy to evaluate [19].

Management of SCO included a course of antimicrobial drug therapy in combination with surgical debridement. Management protocol is consistent with the published protocols of Koorbusch GF et al., Van Merkesteyn JP et al., Kim S and Jang H which showed 94.9% successful outcome when surgery was followed by two weeks of intravenous antibiotics (amoxicillin/clavulanic acid, cefazolin and an aminoglycoside) followed by six weeks of oral administration (amoxicillin/clavulanic and roxythromycin [8,9,11]. Clindamycin and metronidazole were used according to culturing and sensitivity tests).

The minimum duration of antibiotic therapy to treat chronic suppurative osteomyelitis should be at least two weeks [23] however, Bamberger DM suggested that a minimum of four weeks are needed [13]. In this study, the patients analysed were treated by antimicrobial drug therapy

and surgical treatment. Patients were prescribed a preoperative and postoperative course of antibiotics (for a maximum period of 60 days according to patient's compliance and clinical progress), which in combination with surgical debridement (tooth extraction, debridement, sequestrectomy, decortications, saucerisation) was successful and effective treatment of chronic suppurative osteomyelitis. Most common microorganisms involved in the pathogenesis of osteomyelitis of the jaws are streptococcus, actinomyces, bacteroides, lactobacillus and klebsiella species [8,11]. In immunocompromised patients, fungal organisms such as candida and aspergillus species have also been reported to cause osteomyelitis of jaws [24]. The management of chronic cases is always complex. SCO cases should be treated with surgical debridement followed by systemic antibiotic drug therapy for 4-6 weeks as followed in the present study [13].

Limitation(s)

Being a retrospective nature, the present study had limitations of bias in data collection with regards to detailed parameters of study and treatment outcome.

CONCLUSION(S)

Inappropriate and indiscriminate use of antibiotics may be one of the causes of non responding odontogenic infection. Selection of antibiotic should be based on culture and sensitivity tests, as a culture-directed antibiotic therapy for proper duration helps to avoid multidrug resistance, but also provide a more favourable treatment outcome. The computerised tomography remains an indispensable tool for diagnosis of SCO which can be missed on OPG. Culture directed antibiotic therapy along with aggressive surgical therapy is the key to the success of the SCO management.

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PLAGIARISM CHECKING METHODS: [\[Jain H et al.\]](#)

- Plagiarism X-checker: Oct 28, 2020
- Manual Googling: Apr 07, 2021
- iThenticate Software: Jul 07, 2021 (14%)

ETYMOLOGY: Author Origin**AUTHOR DECLARATION:**

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? No
- For any images presented appropriate consent has been obtained from the subjects. No

Date of Submission: **Oct 24, 2020**Date of Peer Review: **Dec 19, 2020**Date of Acceptance: **Apr 08, 2021**Date of Publishing: **Aug 01, 2021**