

## ANTIMICROBIAL TREATMENT OPTIONS IN THE MANAGEMENT OF ODONTOGENIC INFECTIONS

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### ABSTRACT:

Most acute oro-facial infections are of odontogenic origin. Usually in normal host they do not occur without some type of predisposing conditions. Anti-microbial therapy as an essential role in the management of these infections. It is initiated before surgery as it shortens the period of infection and minimizes associated risks. The etiology of odontogenic infections is usually attributed to the endogenous flora of the mouth and not to the introduction of non resident bacteria.

### KEYWORDS :

Antibiotics ,microbial drug resistance ,odontogenic infections.

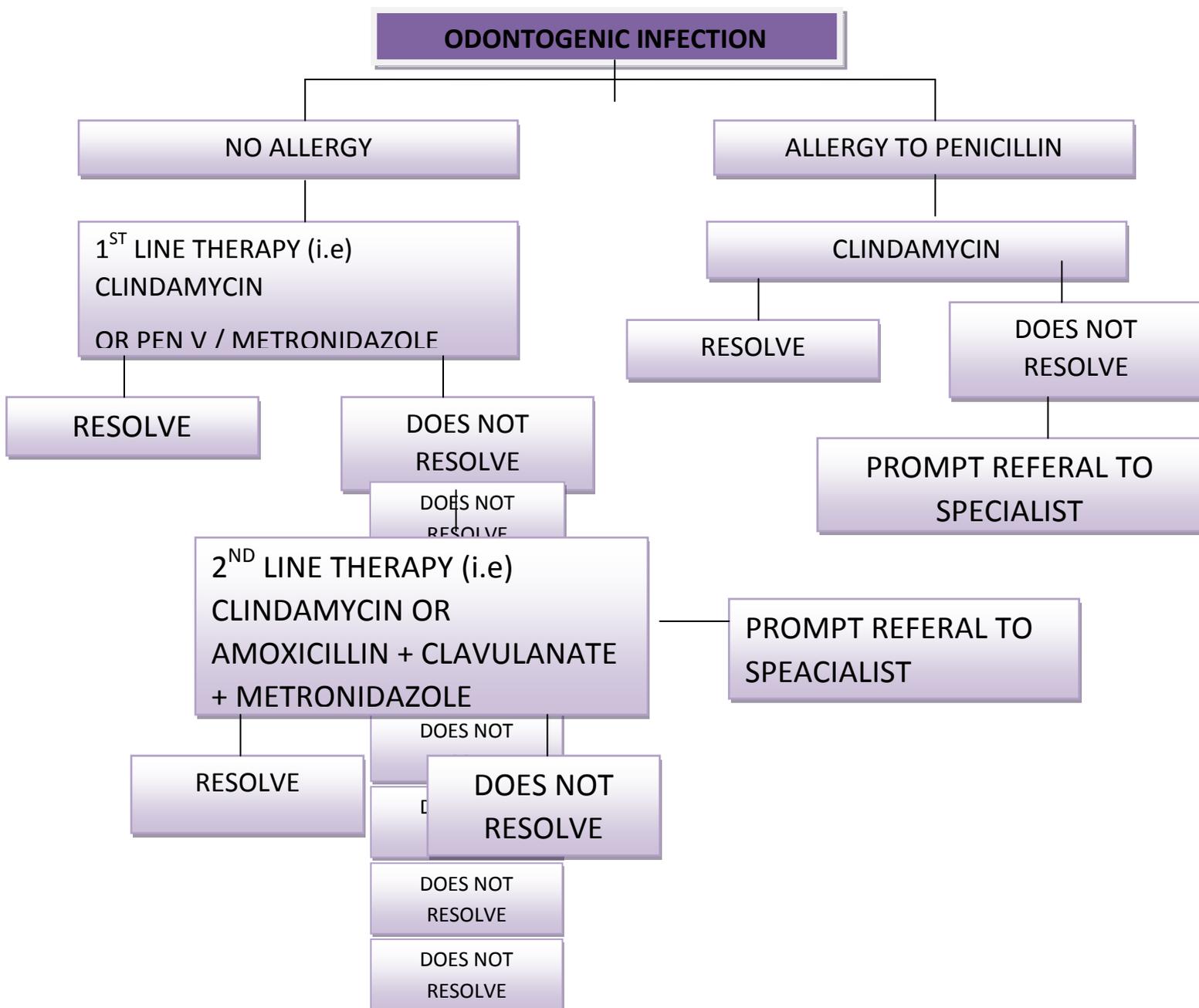
### INTRODUCTION:

The majority of odontogenic infections are self limiting , and may drain spontaneously .<sup>[1]</sup> Odontogenic infections are among the most common infections of the oral cavity .<sup>[2]</sup> Early recognition and management of acute orofacial infections are critical because of rapid systemic involvement.<sup>[2,3]</sup> However, these infections may drain into the anatomical spaces adjacent to the oral cavity and spread along the contiguous facial planes, leading to more severe infection. Due to the proximity of the central nervous system and critical respiratory passages, timely efforts are required to

establish a patent airway, mechanical debridement and drainage, and appropriate antimicrobial therapy.<sup>[1,4]</sup>

**ODONTOGENIC INFECTIONS:**

The most common infections of the oral cavity are odontogenic infections.<sup>[5]</sup> They can be caused by dental caries, deep restorations that approximate the pulp chamber, pulpitis, periapical abscess, periodontitis, periodontal abscess, and pericoronitis.<sup>[4,5]</sup>



**MICROBIOLOGY:**

A complex population of microorganisms are present in the microbial flora of the oral cavity.<sup>[6]</sup> The oral cavity is unique in that it cannot be regarded as a single uniform environment, and resident microorganisms can be cultured from most areas of the mouth.<sup>[7,8]</sup> Overall, the *Streptococcus*, *Peptostreptococcus*, *Veillonella*, *Lactobacillus*, *Corynebacterium* and *Actinomyces* general represent more than 80% of all cultivable flora.<sup>[8]</sup> In the aetiology of periodontal disease, a whole series of species such as *Actinobacillus*, *actinomycetemcomitans*, *Porphyromonas gingivalis*, *Prevotella intermedia* and *Tannerella forsythensis* can be especially highlighted due to their frequency and the importance of the complications that may arise from them.<sup>[9]</sup> Facultative gram-negative bacilli are uncommon in healthy adults and are seen almost exclusively in elderly, hospitalised patients with serious medical diseases.<sup>[9]</sup>

**BACTERIAL PATHOGENS ASSOCIATED WITH ODONTOGENIC INFECTIONS**

		AEROBES	ANAEROBES
GRAM POSITIVE	cocci	Streptococcus sp. Staphylococcus	Peptostreptococcus Peptococcus streptococcus
	Bacilli	Lactobacillus corynebacterium	Lactobacillus Actinomycosis Eubacterium Leptotrichia clostridium
	cocci	Moraxella	veillonella

<b>GRAM NEGATIVE</b>	Bacilli	Enterobacteriaceae	Bacteroides
		Eikenella	Porphyromonas
			Prevotella
			Fusobacterium

**ANTIMICROBIAL THERAPY**

Although bacteria play a major role in odontogenic infections, antimicrobials are not always warranted.<sup>[10]</sup> The aim of antimicrobial treatment of odontogenic infection is to prevent local spread to neighbouring areas, to decrease the bacterial inoculum in the infectious focus and to prevent complications derived from dissemination via the circulatory system.<sup>[11,12]</sup> Antimicrobials must never be used as a replacement for appropriate surgical drainage and / or debridement and should only be used as adjunctive therapy.<sup>[10,11]</sup> However antimicrobial therapy initiated soon after diagnosis and before surgery can shorten the period of infection and minimize associated risk such as bacteraemia.<sup>[10]</sup>

ANTIMICROBIAL	ADULT DOSE	PEDIATRIC DOSE
Penicillin v	600 mg qid	>12 yrs: 30-50 mg/kg/day in 4 divided doses
Pivampicillin	500 mg bid	1-3yrs: 175mg (5ml) bid 4-6yrs: 262.5mg (7.5ml) bid 7-10yrs: 350mg (10ml) bid
Amoxicillin	500mg tid	< 20kg: 20-50mg/kg/day in divided doses every 8 hours
Amoxicillin + Clavulanate	500/125 mg tid	40/10 mg/kg/day in divided doses every 8 hours
Metronidazole	500 mg tid	15-30 mg/kg/day in 3-4 divided dose
Clindamycin	150 – 300 mg qid	10-30 mg/kg/day in 3-4 divided dose

### **PENICILLIN:**

Historically, the penicillin have been used as the first line agents in the treatment of odontogenic infections. Penicillin are bactericidal. The spectrum of activity is narrow relatively, it is appropriate for the treatment of odontogenic infections.<sup>[13]</sup> Penicillin, ampicillin and amoxicillin are bactericides that are useful in treat in acute phase of odontogenic infection, in addition to preventing associated complication.<sup>[14]</sup> Due to their effectiveness against facultative aerobic and anaerobic pathogens, they are considered to be the antibiotic of choice in the treatment of infections of mixed etiology in the oral cavity.<sup>[15]</sup> Amoxicillin and ampicillin increase penicillin spectrum to cover the enteric gram negative bacilli.<sup>[16,17]</sup> Amoxicillin is better then ampicillin because of its superior enteric absorption.<sup>[16,17]</sup>

### **CEPHALOSPORINS:**

Cephalosporin are broad spectrum antibiotic but they do not offer any advantage over amoxicillin in treating odontogenic infections.<sup>[18]</sup> The mechanism of action is that of similar to the penicillin. There are four generation of cephalosporin; their spectrum of antibacterial coverage, especially gram negative bacteria, generally increase from the first to fourth generation.<sup>[18]</sup> Cephalosporins are not used as a first line treatment in the management of odontogenic infections. Cephalexin is more commonly used for sinus communications and for antibiotic prophylaxis in patient with prosthetic joints.<sup>[18,19]</sup>

### **TETRACYCLINE:**

Classically, tetracycline has been used as a standard antibiotic in treating odontogenic infections, although at present, they exert limited activity as a result of increased resistance.<sup>[20]</sup> Use of tetracycline in pregnant women and growing children can cause enamel defects in children.<sup>[21]</sup>

### **CLINDAMYCIN:**

Clindamycin is a broad spectrum of action its efficacy in treating odontogenic infection comparable to penicillin .Clindamycin inhibits bacterial protein synthesis and is bactericidal and its higher dosages.<sup>[19]</sup> In recent years its use has increased due to increasing concern over penicillin

resistances.<sup>[19]</sup> Clindamycin as excellent coverage of gram positive cocci and anaerobic bacteria clindamycin is considered as the antibiotic of choice for penicillin-allergic patient .<sup>[22]</sup>

### **FLUOROQUINOLONES:**

Fluoroquinolones are bactericidal and exert their antibacterial effect by inhibiting DNA gyrase and topoisomerase IV .<sup>[23]</sup> The broad spectrum antibiotic moxifloxacin as excellent bacterial coverage in the setting of odontogenic infections due to the spectrum of organisms associated with the odontogenic infections, the fluoroquinolones in the treatment of acute odontogenic infections should not be considered.<sup>[23,24]</sup>

### **ORAL VERSUS INTRAVENOUS ANTIBIOTIC :**

Most infections when treated in a timely matter, can be adequately managed using oral therapy. Patients with no airway swelling, eyelid swelling, or neck involvement, who have normal intake and systemically feel well, are good candidate for oral therapy. When swelling of the airway, swelling of the eyelid, or neck involvement present or, patient's level of activity and oral intake is decreased intravenous antibiotics and hospital admission should be strongly considered. In case of presence of airway or eyelid swelling and neck involvement also warrants a diagnostic CT scans to avoid potentially disastrous complications.<sup>[25]</sup>

### **CONCLUSION**

Odontogenic infection are polymicrobial in nature. Antibiotics are essential for control of odontogenic infections are even though mechanical debridement of pulp tissue is necessary.<sup>[13]</sup> Amoxicillin continues the drug of choice. Clindamycin also provides excellent coverage and should be used for the penicillin allergic patient or in setting in penicillin failure.<sup>[9]</sup>

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