

Role of Metronidazole In Treatment of Pericoronitis: Systematic Review.

Ala Ali Maudhah¹, Ahmed Mamdouh¹, Abdullah Hemadi², Asmaa Alzalab³,
Mao Jing^{1*}

¹Department of Stomatology, Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan. China.

²Department of Pediatric Dentistry, West China Hospital of Stomatology, Sichuan University, Chengdu, China.

³Biomedical Materials & Tissue Engineering Department, Materials Science College, Wuhan University of Technology, Wuhan. China.

***Correspondence author:** *Professor: Mao Jing

Head of Department of Stomatology, Tongji Hospital. Tongji Medical College, Huazhong University of Science and Technology, China

Main author: Alaa Ali Maudhah

Key words: metronidazole, infections, pericoronitis, third molar.

ABSTRACT

Objectives: The purpose of this study was to evaluate the predominant flora associated with pericoronitis in third molars and to investigate the role of metronidazole in controlling the situation.

Subject and methods: The search was carried out by two individuals using various electronic databases: MEDLINE (PubMed), ScienceDirect, and ResearchGate. In the English literature, clinical studies reporting the role of metronidazole in management of pericoronitis. The search terms were used, alone or in combination were "pericoronitis", "molar impaction", "oral infection" metronidazole".

Results: Initial of titles leads to 97 abstracts. 69 abstracts were excluded, so 28 full texts were obtained complete papers were evaluated for inclusion/exclusion criteria in the first phase. Of these 28 studies, 16 studies were excluded and 12 studies went through the first review stage. During the second review stage, 5 studies were excluded and studies were deemed to have met the inclusion criteria. After studies of the same cohorts were excluded, 7 studies were finally selected.

Conclusion: These results highlight (1) the diversity of the microflora associated with pericoronitis and the importance of the anaerobic flora (2) metronidazole plays and important role in pericoronitis management.

Keywords: metronidazole, infections, pericoronitis, third molar.

I. INTRODUCTION

Diseases are located in the head and neck, which usually emerge from odontogenic tissues, ought to be taken care of with each feeling of desperation; generally, inside a brief timeframe, they will bring about intense crises. This is a result of the many associated spaces, upgrading a quick spread of irritation in the area (1-7). Impacted third molars are related with dangers of many issue and confusions, (8) including pericoronitis, caries, resorption and periodontal problems (9). Pericoronitis is characterized as irritation in the delicate tissues encompassing the crown of a mostly ejected tooth. It by and large does not emerge in teeth that eject regularly; more often than not, it is found in teeth that emit gradually or wind up noticeably affected, and it most usually influences the lower third molar. Once the follicle of the tooth speaks with the oral hole, it is felt that bacterial entrance into the follicular space starts the contamination (10). Prevalent bacterial types of pericoronitis of ejecting mandibular third molars are Streptococcus, Actinomyces and Propionibacterium species, and also betalactamase-delivering microbes, for example, Prevotella, Bacteroides, Fusobacterium, Capnocytophaga, and Staphylococcus sp. (11, 12). The recognizable proof of these verdure and an information of the fact that they are so helpless to anti-infection agents are important to adjust the treatment. The verdure have been portrayed by photon microscopy as like those of intense necrotizing ulcerative gingivitis. Three treatment strategies depend on the seriousness: torment and disease administration,

minor surgery to expel the covering gum tissue (operculectomy), and evacuation of the tooth. Operculectomy, which comprises of expulsion of operculum, is shown when the tooth is as yet valuable. This enables better access to clean the zone and keep the aggregation of microscopic organisms and nourishment trash(15).The aim of this review is systematically efficiency of metronidazole in managing of periocornitis.

II. MATERIALS AND METHODS

A review tradition was composed on the preface of the principles proposed by the PRISMA clarificationand the Cochrane Collaboration (16) The survey address, targets of the review, qualification criteria, inquiry and information examination system were unmistakably expressed ahead of time and joined in the convention's substance. The qualification criteria, characterizing the incorporation and prohibition criteria of the efficient survey, incorporated the accompanying parts:

Samples

Individuals with pericoronal tissue infections impacted lower third molars. Individuals with no systematic disease

Outcomes

Bacterial responses against metronidazole antibiotics

Types of articles

Randomized controlled clinical trial (RCT), cohort and crossover studies. master supposition papers were taken to avoid bias (17) In vitro and animal studies, systematic reviews, and clinical reviews that allude to techniques for biting capacity assessment, which were incorporated. Dialect: papers written in English.

Production status: full articles include in study had been downloaded

2.1. Search strategy

The search was carried out by two individuals using various electronic databases: MEDLINE (PubMed), ScienceDirect, and ResearchGate. In the English-literature, clinical studies role of metronidazole of treatment of pericoronitis. The search terms were used, alone or in combination were "metronidazole", "pericoronitis", "impaction" systematic review", "The search covered a time span from January 1996 to October 2016.

2.2. Study selection

The review method carried out in two stages: in the first stage, abstracts and/or full texts were screened by the two reviewers. Initially, titles were searched for relevance, and the abstracts of the relevant articles were obtained. The papers obtained were investigated using the exclusion and inclusion principles. Articles that were technical articles, or were in language other than English or had no English-language abstract were excluded. The included full papers were further screened separately by the two researchers in the second phase of review using the inclusion criteria:

1. Studies conducted on the management of pericoronitis.
2. Studies included lower molar impaction
3. Studies published in English.

Exclusion criteria

- 1- Non- human study.
- 2- Studies utilize non antibiotics treatment strategies.

2.3. Assessment of bias in individual studies

All of the included surveys was requested by the Oxford Center for Evidence-based Medicine levels of affirmation. Each was assessed for potential inside methodological inclination.

2.4. Data extraction

Information with respect to study outline, the quantity of members, duration of clinical findings, kind of lesions and it is seriousness and kind of instruments utilized were chosen from the included studies. This review article conveyed a fundamental illustrative abstract and illumination of the qualities and disclosures of the chosen articles (18). Information were organized in tabular form to encourage the introduction and evaluation of the current proof.

III. RESULTS

1. Search strategy followed

Figure 1 shows the method used to determine the studies finally included from the initial yield of 550 titles. Initial f of titles leads to 97 abstracts. 69 abstracts were excluded, so 28 full texts were obtained complete papers were evaluated for inclusion/exclusion criteria in the first phase. Of these 28 studies, 16 studies were excluded and 12 studies went through the first review stage .During the second review stage, 5 studies were excluded and studies were deemed to have met the inclusion criteria. After studies of the same cohorts were excluded, 7 studies were finally selected.

2. Analysis of the characteristics of the included studies

Properties and the principal results of the 7 included papers used are defined in two tables Current study concerned the Effective Metronidazole activity against bacterial culture isolated from pericorinitis in table 1 while table 2 content most effective Metronidazole with other antibiotic activity against bacterial culture isolated from pericorinitis

IV. DISCUSSION

Pericoronitis is an irritation of the gingival tissue encompassing molar teeth, for example, an affected shrewdness tooth, or somewhat ejected tooth. Pericoronitis can create when somewhat emitting tooth get through gingival tissue, enabling microbes to enter through the opening. Nourishment or plaque might be caught underneath a fold of gingiva around the tooth, chafe the gingiva and prompt pericoronitis(19)With the approach of anti-infection agents and enhanced financial gauges, the spread of odontogenic contaminations is declining not just in Europe and America (7)

In the investigation worry with deciding the most pervilantbactreia sort found in pericornal tissue around fractional erupted uncovered that Viridans, Actinomyces and Prevotella(12).

Rajasuo et al found that Aggregatibacteractinomycetemcomitans is one of the most common types of bacteria found in pericoronitis this run with the findings showed by (12)Sixou et al although (12)Sixou et al used nonselective media and (20)Rajasuo et al used Eppendorff tube media their results are similar .on the other hand, (21)Microbiology of mandibular third molar pericoronitis: Incidenceof -lactamase-producing bacteria)find that Obligate anaerobes were present in 21 of the 26 samples. The bacteria most commonly detected were -hemolytic streptococci (26/26).the result was slightly different results can be explained by the use of different type of bacterial culturing media(Brucella agar containing 5% sheep blood enriched with vitamin K1 (1 mg/L) and hemin (10 mg/L).in another study using sheep blood agar plates as culture media, Of the grampositive cocci, Streptococcus was the microorganism most frequently colonizing(22)

On the clinical studies that investigating the effect of different antibiotic regimen on pericoronal bacteria, (23)find using metronidazole, 500 mg, every 8 hours) within 5 daysto 1 week. Can control the infection (infection had not spread to the neck and chest wall).this run in agree with a retrospective study developed by (24)Mahmoodiet al which revealed Metronidazole is effective in treatment of pericorinitis.another interesting study concerning the effectiveness of metronidazole as prophylaxis against dry socket ,(25)find that using Metronidazole 1600 mg(four 400-mg tablets) The patients were given the tablets by mouth 45 min before operation decrease the probability of developing dry socket after teeth extraction. Theexplanation of this that metronidazole is effective against an aerobic bacteria which in the main bacteria in dry socket.

V. CONCLUSION

These results highlight (1) the diversity of the microflora associated with pericoronitis and the importance of the anaerobic flora (2) metranidzole plays and important role in pericoronitis management.

REFERENCES

- [1]. Siegert R. Ultrasonography of inflammatory soft tissue swellings of the head and neck. Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons. 1987;45(10):842-6.
- [2]. Jones KC, Silver J, Millar WS, Mandel L. Chronic submasseteric abscess: anatomic, radiologic, and pathologic features. AJNR American journal of neuroradiology. 2003;24(6):1159-63.

- [3]. Furuichi H, Oka M, Takenoshita Y, Kubo K, Shinohara M, Beppu K. A marked mandibular deviation caused by abscess of the pterygomandibular space. *Fukuoka igaku zasshi = Fukuoka acta medica*. 1986;77(7):373-7.
- [4]. Srirompotong S, Srirompotong S. Surgical emphysema following intraoral drainage of buccal space abscess. *Journal of the Medical Association of Thailand = Chotmaihet thangphaet*. 2002;85(12):1314-6.
- [5]. Baqain ZH, Newman L, Hyde N. How serious are oral infections? *The Journal of laryngology and otology*. 2004;118(7):561-5.
- [6]. Miller EJ, Jr., Dodson TB. The risk of serious odontogenic infections in HIV-positive patients: a pilot study. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*. 1998;86(4):406-9.
- [7]. Killey H, Kay L. Management of orofacial soft tissue space infections. *An Outline of Oral Surgery Part*. 1989;2:310-30.
- [8]. Adeyemo WL. Do pathologies associated with impacted lower third molars justify prophylactic removal? A critical review of the literature. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*. 2006;102(4):448-52.
- [9]. Kunkel M, Kleis W, Morbach T, Wagner W. Severe third molar complications including death-lessons from 100 cases requiring hospitalization. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*. 2007;65(9):1700-6.
- [10]. Moloney J, Stassen LF. Pericoronitis: treatment and a clinical dilemma. *Journal of the Irish Dental Association*. 2009;55(4):190-2.
- [11]. Gutierrez-Perez J. Third molar infections. *Medicina oral, patologia oral y cirugia bucal*. 2004;9:122-5; 0-2.
- [12]. Sixou JL, Magaud C, Jolivet-Gougeon A, Cormier M, Bonnaure-Mallet M. Evaluation of the mandibular third molar pericoronitis flora and its susceptibility to different antibiotics prescribed in france. *Journal of clinical microbiology*. 2003;41(12):5794-7.
- [13]. Nitzan DW, Tal O, Sela MN, Shteyer A. Pericoronitis: a reappraisal of its clinical and microbiologic aspects. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*. 1985;43(7):510-6.
- [14]. Weinberg A, Nitzan DW, Shteyer A, Sela MN. Inflammatory cells and bacteria in pericoronal exudates from acute pericoronitis. *International journal of oral and maxillofacial surgery*. 1986;15(5):606-13.
- [15]. DS. B. Pericoronitis.: <http://www.medicinenet.com/pericoronitis/article.htm>; 2015 [1.10.2017].
- [16]. D. O'Connor SG, J.P.T. Higgins,. Defining the review question and developing criteria for including studies, in: J.P.T. Higgins, S. Green (Eds.), . *Cochrane Handbook for Systematic Reviews of Intervention*, Wiley-Blackwell, Chicester 2008: pp. 83–94.
- [17]. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Journal of clinical epidemiology*. 2009;62(10):1006-12.
- [18]. J.P.T. Higgins SG. *Cochrane handbook for systematic reviews of interventions* (version 5.1.0, updated March 2011). . The Cochrane Collaboration; 2011.
- [19]. Pericoronitis. HR. <http://www.webmd.boots.com/oral-health/guide/pericoronitis>.: WebMD [Internet]. 2014 [1.10.2017].
- [20]. Rajasuo A, Laine V, Kari K, Pyh  j  rvi A, Meurman JH. Periodontal bacteria in different sampling sites of pericoronitis patients. *Open Journal of Stomatology*. 2012;2(02):98.
- [21]. Sixou JL, Magaud C, Jolivet-Gougeon A, Cormier M, Bonnaure-Mallet M. Microbiology of mandibular third molar pericoronitis: incidence of beta-lactamase-producing bacteria. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*. 2003;95(6):655-9.
- [22]. Bresco-Salinas M, Costa-Riu N, Berini-Aytes L, Gay-Escoda C. Antibiotic susceptibility of the bacteria causing odontogenic infections. *Med Oral Patol Oral Cir Bucal*. 2006;11(1):E70-5.
- [23]. Akinbami BO, Akadiri O, Gbujie DC. Spread of odontogenic infections in Port Harcourt, Nigeria. *Journal of oral and maxillofacial surgery : official journal of the American Association of Oral and Maxillofacial Surgeons*. 2010;68(10):2472-7.
- [24]. Mahmoodi B, Weusmann J, Azaripour A, Braun B, Walter C, Willershausen B. Odontogenic Infections: A 1-year Retrospective Study. *The journal of contemporary dental practice*. 2015;16(4):253-8.
- [25]. Bergdahl M, Hedstrom L. Metronidazole for the prevention of dry socket after removal of partially impacted mandibular third molar: a randomised controlled trial. *The British journal of oral & maxillofacial surgery*. 2004;42(6):555-8.

Role of Metronidazole In Treatment of Pericoronitis: Systematic Review.

Table 1 : Effective Metronidazole activity against bacterial culture isolated from pericoronitis

N	Title	Study design	Number	Antibiotics	Clinical finding
1	Spread of Odontogenic Infections in Port Harcourt, Nigeria (23)	A prospective study of patients who presented with periodontitis around lower third molar	22	(Metronidazole, 500 mg, every 8 hours) within 5 days to 1 week.	Antibiotics control the infection (infection had not spread to the neck and chest wall)
2	Metronidazole for the prevention of dry socket after removal of partially impacted mandibular third molar: a randomised controlled trial(25)	Double blind, randomized, placebo controlled, single-center trial. Patient divided to two groups. study group (59 patients) and control (60 patients)	119	Metronidazole 1600 mg (four 400-mg tablets) The patients were given the tablets by mouth 45 min before operation	Patients of the study group developed dry socket after extraction of third molar is 10 which is significantly lower than number of patients developed dry socket from control group (13 patients)
3	Odontogenic infection: A 1-year retrospective(24)	Retrospective, descriptive study was conducted including all patients with pericoronitis. The data were obtained from the electronic records.	119	Metronidazole	Metronidazole is effective in treatment of pericoronitis.

Table 2: Effective Metronidazole with other antibiotic activity against bacterial culture isolated from pericoronitis

N	Title	Study design	Number	Types of bacteria	Culture media	Antibiotics	Results
1	Periodontal bacteria in different sampling sites of pericoronitis patients(20)	Bacterial samples were taken aseptically from six sites of each patient. Complain from pericoronitis	3	Aggregatibacter actinomycetemcomitans (A.a.), Porphyromonas gingivalis (P.g.), Tannerella forsythia (T.f.), and Treponema denticola (T.d.)	All samples were placed immediately into an Eppendorf tube and kept deep-frozen (-70°C) until sent for analyses in carbon dioxide ice.	Metronidazole combined with Roxithromycin or fenoxymethylpenicillin	-Periodontal bacteria T.f. and T.d. were the most common species detected in all the sample sites and in saliva samples. A.a. and P.g. were most commonly detected in saliva and tongue samples
2	Microbiology of mandibular third molar pericoronitis : Incidence of lactamase-producing bacteria(21)	The third molars in patient were evaluated by cultures with nonselective media and with selective media containing antibiotics	26	Obligate anaerobes were present in 21 of the 26 samples. The bacteria most commonly detected were - hemolytic streptococci (26/26) and the genera Prevotella (15/26), Veillonella (15/26), Bacteroides (9/26), and Capnocytophaga (9/26).	Brucella agar containing 5% sheep blood enriched with vitamin K1 (1 mg/L) and hemin (10 mg/L)	Spiramycin metronidazole (1 mg/L 4 mg/L) metronidazole (4 mg/L)	The means of the ratios (count on selective medium/ total anaerobe count) were respectively for metronidazole 0.566 and 0.347 for spiramycin metronidazole.

N	Title	Study design	Number	Types of bacteria	Culture media	Antibiotics	Results
3	Evaluation of the Mandibular Third Molar Pericoronitis Flora and Its Susceptibility to Different Antibiotics Prescribed in France(12)	Clinical examination of subject suffering from pericoronitis sampling, microbiological processing with nonselective media, microbial identification.	35	Viridans, Actinomyces and Prevotella.	Nonselective media	Spiramycin and metronidazole (MS1, 1 and 4 mg/liter; MS2, 4 and 4 mg/liter) - metronidazole (M, 4 mg/liter)	Metronidazole alone or combined with spiramycin was the most effective drug against obligate anaerobes.

4	Antibiotic susceptibility of the bacteria causing odontogenic infections(22)	The samples were collected after lesion distal to the third molar exposure using sterile paper tips	43	Fermentative cocci (Enterococcus faecalis and Streptococcus mutans and oralis). Of the grampositive cocci, Streptococcus was the microorganism most frequently colonizing	Sheep blood agar plates	Metronidazole	For Gram+ cocci (33.6%) Resistant 66.4% Sensitive - For Gram-bacilli 85.5% Resistant 14.5% Sensitive - for Gram + bacilli 100 % Resistant
---	--	---	----	---	-------------------------	---------------	---

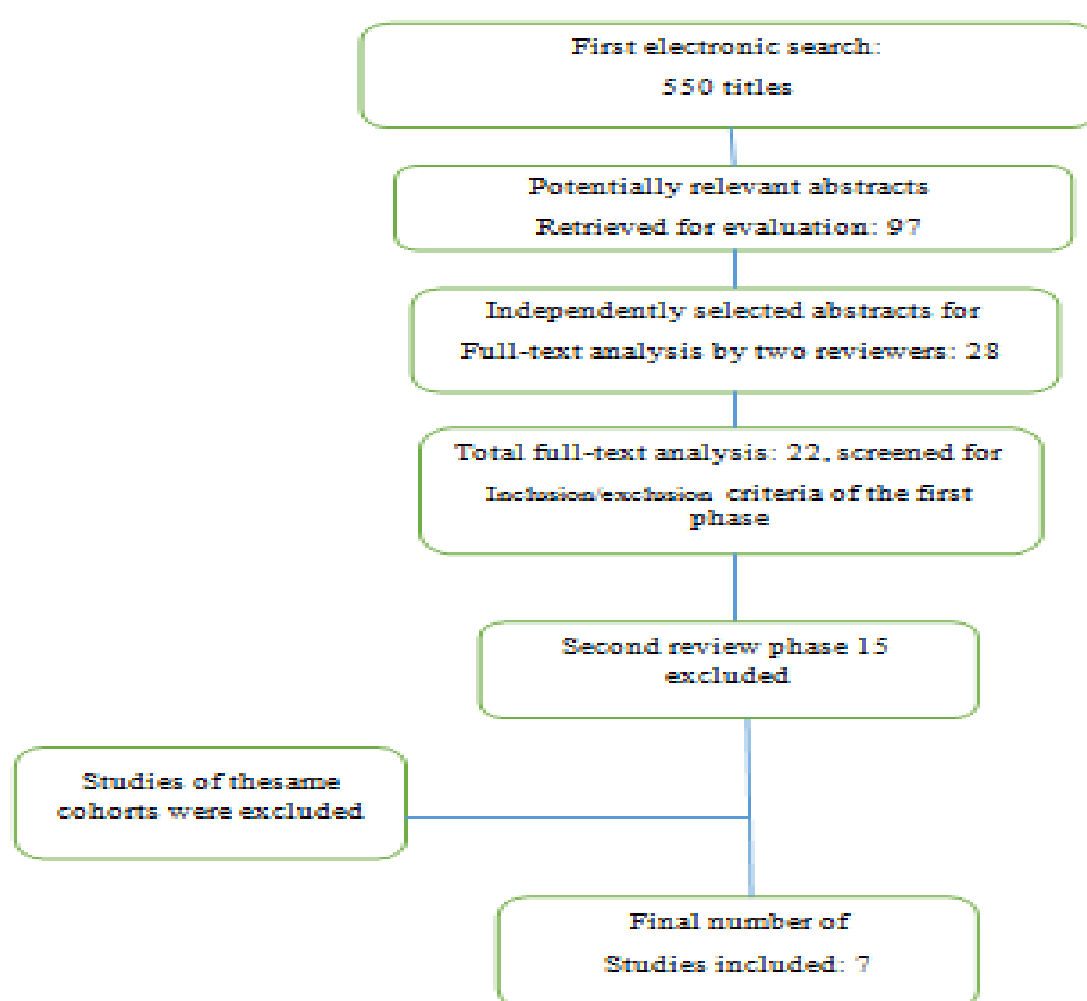


Fig 1 search strategy

***Correspondence author: *Professor: Mao Jing**
Head of Department of Stomatology, Tongji Hospital. Tongji Medical College, Huazhong University of Science and Technology, China