

# ASSESSING THE EFFECTIVENESS OF PREOPERATIVE INTRAVENOUS CLINDAMYCIN VERSUS INTRAVENOUS METRONIDAZOLE IN PREVENTION OF DRY SOCKET IN SURGICAL EXTRACTION OF IMPACTED MANDIBULAR THIRD MOLAR: A PROSPECTIVE COMPARATIVE STUDY

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## Abstract

**Aim:** To assess the efficacy of preoperative antibiotic administration of metronidazole and Clindamycin in surgical extraction of mandibular third molar extraction.

**Methods and Material:** 50 patients visiting the Oral and Maxillofacial surgery department for the surgical extraction of mandibular third molar were selected and assigned into two groups after consent and approval was taken explaining them in detail the procedure. Group 1 was administered 400mg of metronidazole IV one hour prior to the surgery and group 2 was administered 300mg of Clindamycin IV one hour prior to the surgery. Both groups were instructed to take analgesics twice a day for 5 days, and to report back after 7 days for review or to report back immediately in case of severe pain.

**Result:** The incidence of Dry socket in both the groups were not statistically significant and were similar to previous reports of literature.

**Conclusion:** In this study, it was found that administering a single dose of Clindamycin intravenously before surgery did not decrease the occurrence of dry socket. However, it was found to be just as effective as a single preoperative intravenous dose of metronidazole. This suggests that Clindamycin is a dependable and efficient option for patients who are allergic to the nitroimidazole group.

**Keywords:** metronidazole IV, Clindamycin IV, Mandibular Third Molar,

## Introduction:

Alveolar osteitis or fibrinolytic osteitis is commonly referred as dry socket, is a condition that is a possible complication of extraction and surgical disimpaction.

Dry socket is when the extraction socket is exposed and the clot that is to be covering it post extraction has been dislodged.

The etiology of dry socket is multifold and has many contributing factors like infection, inflammation, or the nature of the extraction.

Dry sockets are commonly associated with severe pain characterised by pain more severe than the initial complaint and debilitating enough to hinder sleep.

A commonly accepted cause of dry socket is anaerobic bacterial infection of the extraction socket leading to the dislodgement of the formed clot. Prophylactic antibiotics in patients undergoing surgical extraction of third molar is a commonly followed procedure in reducing the incidence of dry socket among the general population.

## Materials and methods:

50 patients who visited the department of oral and maxillofacial surgery for the surgical extraction of the mandibular third molar were allocated into 2 groups. Group 1 was assigned with 400mg Metronidazole IV preoperatively while the second group was

administered 300mg Clindamycin IV preoperatively. Patients undergoing surgical extraction of mandibular third molar were asked to take post operative analgesics twice a day for 5 days. All patients were explained the procedure and were given the same post operative instruction, to seek Immediate Medical attention if there was severe pain or any other major concerns not limited to difficulty in breathing, Rashes or Bleeding from the socket.

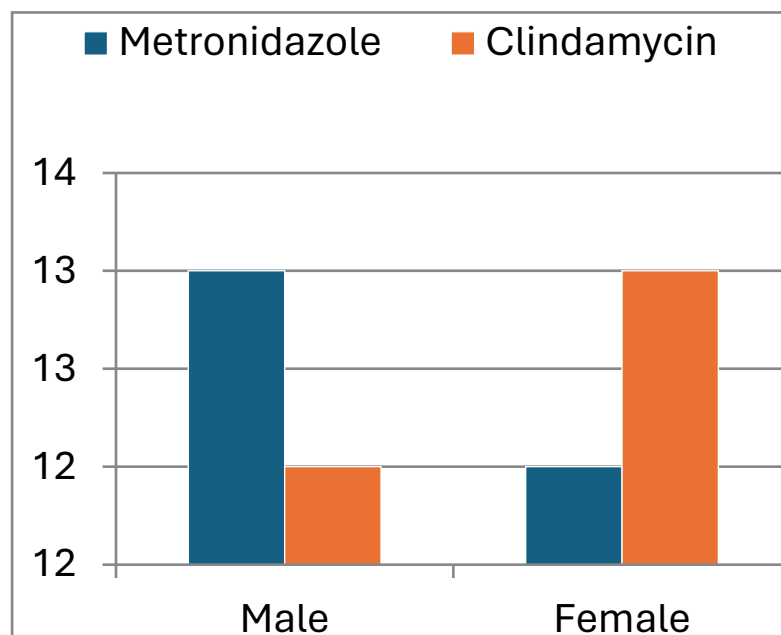
The inclusion criteria of the study was made to include patients over the age of 18 years and below the age of 65, Pregnant women and patients with any underlying systemic diseases or patients who were on aspirin and anti platelet drugs were excluded from the study.

The Criteria for accepting the diagnosis of dry socket was severe non reducing pain 24 hours after extraction. Once a diagnosis of dry socket was made the clinician addressed the complication using their treatment of choice and documented any further complication associated with it.

### Results:

The result of the studies of the 50 patients that volunteered showed that among the 25 patient who were on Intravenous Metronidazole, 5 patients experienced “dry socket” making the incidence rate to be 5% in the Group 1, In the Intravenous Clindamycin group of 25 patients only 3 patients were diagnosed with dry socket making the incidence rate to be 4.5%. The Chi square test analysis between the two groups did not show any significant difference in the incidence of dry socket. Several factors were identified in the study that may be responsible for the occurrence of dry socket post extraction. In the study it was found that incidence of dry socket was more in the female population as compared to the male population, A total of 5 females experienced dry socket as against 4 in the male population, Though this is not a statistically significant difference.

Patients in the age group of 40-44 had the highest incidence of dry socket in both the clindamycin and metronidazole group.



Any and all adverse reaction to medication were noted and documented for future use.

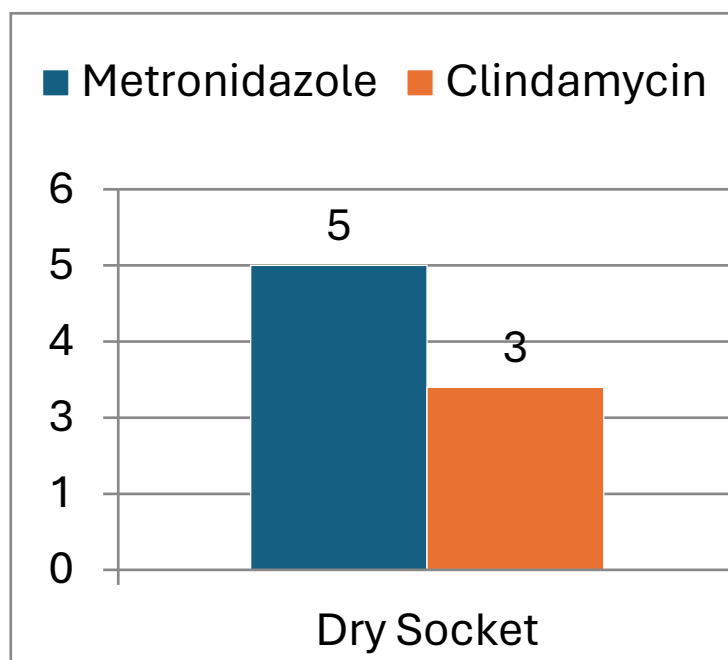
| Preoperative Drug         |        | Frequency | Percent |
|---------------------------|--------|-----------|---------|
| Metronidazole<br>400mg IV | Female | 12        | 48.0    |
|                           | Male   | 13        | 52.0    |
|                           | Total  | 25        | 100.0   |
| Clindamycin<br>300mg IV   | Female | 12        | 48.0    |
|                           | Male   | 13        | 52.0    |
|                           | Total  | 25        | 100.0   |

### DISCUSSION

Metronidazole belonging the Nitroimidazole group or more specifically. (2-methyl-5-Nitroimidazole-l-ethanol) especially effective against anaerobic bacteria, protozoans and

microaerophilic bacterial species, It is also extremely cytotoxic to facultative anaerobic bacterial species.

Metronidazole exhibits fast bactericidal activity against anaerobic bacteria, with the rate of bacterial elimination being directly proportional to the concentration of the antibiotic



The mechanism of action of metronidazole is as follows, Metronidazole permeates into the bacterial cell and hampers the process of protein synthesis by interacting with DNA, leading to a disruption of the helical structure of DNA and the subsequent destruction of the helical strands which Consequently induces cellular demise in vulnerable species.

The action of metronidazole in preventing bacterial infection occurs through 4 crucial steps. The first step involves the permeation of the metronidazole compound into the cells of anaerobic and aerobic pathogens through diffusion across cell membranes.

Though the diffusion process occurs in both aerobic and anaerobic organism, the mechanism of action only takes place in anaerobic organism and is ineffective in aerobic bacterial species.

Followed by which there is there is reduction of the metronidazole drug which create a concentration gradient in the cell thereby creating a more favourable environment for increased uptake of metronidazole drug there by creating more free radicals in the cell which is inherently cytotoxic.

The third step in this process is the interaction of the free radical particles with the bacterial DNA causing DNA strand Breakdown and subsequent destruction of the DNA helical structure, the last and final fourth step is the breakdown of the cytotoxic products.

Metronidazole like most antibiotics can be administered in multiple routes including oral, topical and Intravenous. Intravenous routes bypass the first pass metabolism and provide a 100% bioavailability of the drug in the system and has a quicker onset of action as compared to both oral and topical application of the drug,

When administering metronidazole in IV form, care has to be taken while preparing and maintaining the dose at 5mg/100ml and should be infused over a duration of 30-60mins.

Alveolar osteitis or fibrinolytic osteitis is commonly referred as dry socket, is a condition that is a possible complication of extraction and surgical disimpaction.

Dry socket is when the extraction socket is exposed and the clot that is to be covering it post extraction has been dislodged.

The ethology of dry socket is multifold and has many contributing factors like infection, inflammation, or the nature of the extraction.

Dry sockets are commonly associated with severe pain characterised by pain more severe than the initial complaint and debilitating enough to hinder sleep.

There have been several studies that have been done to evaluate the effectiveness of various antibiotics and their ability to prevent dry socket by prevention of infection of the extraction socket. A consensus has been arrived at by administering post operative antibiotic post surgical disimpaction in prevention of alveolar osteitis which has drastically and significantly reduced the incidence of dry socket among the general population.

The studies found that a combination of both anaerobic and aerobic organisms were commonly present in the mouth of patients preoperatively in patient who developed dry socket, it was also noted that anaerobic microorganisms were present in a significantly higher concentration in those patient who developed dry socket.

Metronidazole has proved to be effective in reducing the incidence of 'dry socket' and this raises the possibility that anaerobic organisms may have a major role in its production.

Clindamycin exerts its main action by binding to the 50s ribosomal subunit of bacteria. This compound inhibits protein synthesis by disrupting the transpeptidation stage, hence restricting the first elongation of the protein chain. Clindamycin has the ability to improve the process of opsonisation and phagocytosis of bacteria, even at concentrations below the level that inhibits bacterial growth. Clindamycin interferes with the process of bacterial protein production, causing changes in the structure of the cell wall's surface. This diminishes the capacity of bacteria to adhere to host cells and amplifies the process of eliminating the organisms within the cells. The drug exhibits a prolonged post-antibiotic action on specific bacterial strains,

which can be attributed to its persistence at the ribosomal binding site.

Clindamycin has also shown to be extremely effective in treating infection caused by anaerobic microorganism and facultative anaerobic bacteria, it is a commonly used drug that is used to treat septicaemia, Lower GI infection and skin infection.

Clindamycin is also used as an antibiotic prophylactic cover against bacterial endocarditis prior to dental extraction and treatment in patients with any valve replacement.

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