

Management of odontogenic infections:

-**Odontogenic infection:**Infection originated from teeth and other related structures.

-**Bacterial species found in odontogenic infections:**

8 species but out of these 8 we can identify 3 species that are commonly found in such odontogenic infections:

1. **Aerobic gram +ve cocci**
2. **Anaerobic gram +ve cocci**
3. **Anaerobic gram -ve rods**

-The previous 3 count 2/3 of the bacterial infections,others are very rare and act as opportunistic infection.

-Odontogenic infections are "**Polymicrobial**";at least 5 species contribute to any odontogenic infection,not only one type.

That's why we have to think about Broad spectrum antibiotics.

-60% of odontogenic infections are polymicrobial and mixed "Aerobic and anaerobic".

-These infectious species are commensal normal flora,don't cause any infection **except** in the following 2 cases:

1. **Suppressed immune system**
2. **Increased virulence of these microorganisms**

-For example: Diabetic patient or a patient with metabolic disorders or under chemotherapy can't withstand these species.

-Aerobic bacteria can initiate the process of infection "In the presence or even in absence of oxygen",Active microorganisms start the secretion of their destructive enzymes "hyaluronidase",spreads to tissues,edema occurs,and this is called "**Inoculation stage**" or "**Edematous stage**";small soft swelling .

-After destruction and necrosis of these tissues, ph decreases and all this necrotic environment will create a good environment for the activity of anaerobes due to consumption of oxygen.Anaerobes start their activity by secreting their enzymes "Collagenases" ,**Cellulites** occurs and this is the most dangerous stage of infection,"**Hot stage of infection**" , very dangerous for the patient and it limits your treatment, usually it's a mixed stage.

Large,hard,tender swelling .

Unstable vital signs for the patient (Abnormal pulse, high temperature but notice that blood pressure is a late feature)

-Then(After 5 days of infection) the **Abscess stage** starts. Fluctuant swelling and pus formation.

-Remember that what have been mentioned above "Inoculation, Cellulites and abscess stages" are **ACUTE** infection. (Since there's no spontaneous drainage or a drainage induced by the operator its acute)

-**Resolution stage or Chronic infection:** Drainage occurs "Spontaneously or induced".

-Acute stage is very critical especially in case of cellulites.

-**Clinical scenario:** If a patient came to you in the inoculation stage " Mildly tender, not indurated,2-3 days for the infection", Antibiotics are enough ,no need for an incision or drainage or even removal of the etiology .

-Odontogenic infections need: Antibiotics, Incision and drainage, Removal of etiology if we could.

BUT not in all stages, some stages we accept only one of the above.

-**Cellulites stage:** Incision and drainage lead to spread of the infection and you should give antibiotics.

Others say that you should do incision and drainage as soon as you can **CORRECTLY** to decrease the bacterial load,so in case of following this say you need to do it properly by giving IV antibiotic prophylaxis in case of surgery failure to prevent the spread of infection, otherwise the infection will spread and you'll deal with severe illness "septic shock could occur as a result for the spread of infection"

"One of the principles of antibiotic prophylaxis is the high bacterial concentration. "

-Therapeutic use of antibiotics: Amoxicillin 3 times daily for example.

-Prophylactic use: 2 grams before half an hour of your procedure. "Double the dose before half an hour of the procedure"

-Once the infection occurs it spreads in all directions equally **BUT it prefers the least resistant areas** which is determined by thickness of bone and muscular attachment.

-Buccal plate in Maxilla is thinner than platal plate in all locations except for the palatal root of upper first molars and laterals since they're palatally inclined so they're buccally thicker than

palatally, in case of odontogenic infections they appear usually in the buccal areas unless you're dealing with the palatal root of an upper 6 or 2 palatally inclined, in case of buccally inclined lateral you'll notice the swelling buccally.

-Usually any patient we see with anterior palatal swelling the source most probably is the lateral incisor.

-The thickness of mandibular buccal plate (with external oblique ridge) increases when we move posteriorly that's why the infection anteriorly is expected to be in the buccal direction but lingually in the posterior area.

-But if this spread of infection is below the muscular attachment "Buccinator, elevators, depressors.." then the result will be vestibular space involvement and this is the most common place for infection spread. "But in case of the canine usually it's above due to its length"

-Below: Vestibular space infection.

-Above: Buccal space infection.

-Management: The right management starts by taking a proper history, examination and investigations.

-I need to notice the vital signs; those with abnormal vital signs are suffering from a life-threatening condition. **So the aim is to determine the severity of the infection whether simple or complex odontogenic infection.**

-Simple odontogenic infection: Any infection contained in the vestibular space not beyond it for the first time in an immunocompetent patient, other than that it's a complex infection needs hospitalization.

-Having a proper history is so important, for example:

if the infection started 2 days ago then we're in the inoculation stage and we only have aerobes so only amoclan is enough. But more than 3-4 days we have mixed so metronidazole is given.

As a routine some dentists give amoclan, metronidazole and ibuprofen for any odontogenic infection which is wrong since there'll be destruction for non-active organisms and this increases the risk of infection if prescribed in early stages of infection.

-Signs and symptoms of airway compromised patients are important, trismus: limited mouth opening so masticatory spaces are involved, dysphagia and dyspnea are also parts of airway compression.

-Also you need to know how the patient feels, those with toxicity have toxic appearance "looking ill and feeling not well" with malaise and fatigue then its a sign of spread of the infection.

-High temperature, increasing of pulse more than 100 and the respiratory rate more than 20 means that we're dealing with a toxic case .

-Hypotension with any grade of fever means that the patient enters the **toxic shock/septic shock stage**.

-General appearance is important also to identify any signs of systemic spread of the infection.

-Infection=elevated white blood cells count."In case of bacterial infection we'll have a **shift to the left**: increase in the neutrophils band cells "Acute stage; cellulites and serious odontogenic infection "

But **shift to the right** means :higher lymphocytes and monocytes.

WBCs>25X10⁹ means that we're dealing with **leukemoid reaction**.

So CBC should be taken to notice the active high infectious process in this patient ,also an opg is needed to determine the site of the infection also ct scan could give you an exact determination especially in case of complex infection .

-The infection could spread via a vein to the brain to cause **cavernous sinus thrombosis**.

-**Limited mouth opening**=moderate to severe odontogenic infection and this indicates spread of infection to masticatory spaces. "Medial,lateral.p masseter and temporalis muscles are involved with their spaces in the infection"

-**Ludwig's Angina**:bilateral involvement of submental and and submandibular spaces infection. "Very large,localized,indurated,shiny areas means that discharging is almost there"

-Incision and drainage are allowed in cellulites stage in life threatening conditions but with a prophylactic cover.

-Those with odontogenic infections usually with CBC they have high platelets that called "**reactionary platelets**" "Usually infections and surgeries elevate platelets and this should be an alert"

-Ct with contrast is a must for any complex odontogenic infection.

-A white border around the pus on the ct scan called **peripheral enhancement** indicates that the patient has an abscess. "The contrast couldn't enter the cystic lesion due to the presence of fibrosis; the best treatment in this case is incision and drainage."

-Incision and drainage for the submasseteric space done intraorally. "Along the anterior border of the ramus and let the mosquito inside the submasseteric and open it to let the pus comes out". Could be done extraorally but you have to elevate the masseter muscle as a one unit and this prevents the patient from opening his mouth.

-We need to decide whether we're dealing with **simple**"located in the vestibular space not beyond it **AND** in an immune-competent patient **AND** for the first time" no need for hospitalization

OR **complex** odontogenic infection "Beyond the vestibular space **OR** presented more than once **OR** in an immune-compromised patient".

For example: vestibular space infection in a diabetic patient is complex due to the immune-compression status .

-Limited mouth opening <20 mm indicates involvement of masticator spaces which are:

1. Submasseteric space
2. Pterygomandibular space
3. Deep temporal space (infra-temporal space)
4. Superficial temporal space

-Breathing difficulty, swallowing difficulty, dehydrated patient, severe trismus, swelling beyond the vestibular spaces **indicate complex odontogenic infection.**

-Definitive treatment:

1. Incision and drainage "Has to be done with a sharp blade at the most dependent location"
2. Removal of etiology "Like extractions and RCTs"
3. Antibiotics .

-You can refer to chapter 17,figures (17-3) ,(17-7) and (17-9) for the clinical cases.

