

BONE INFECTIONS

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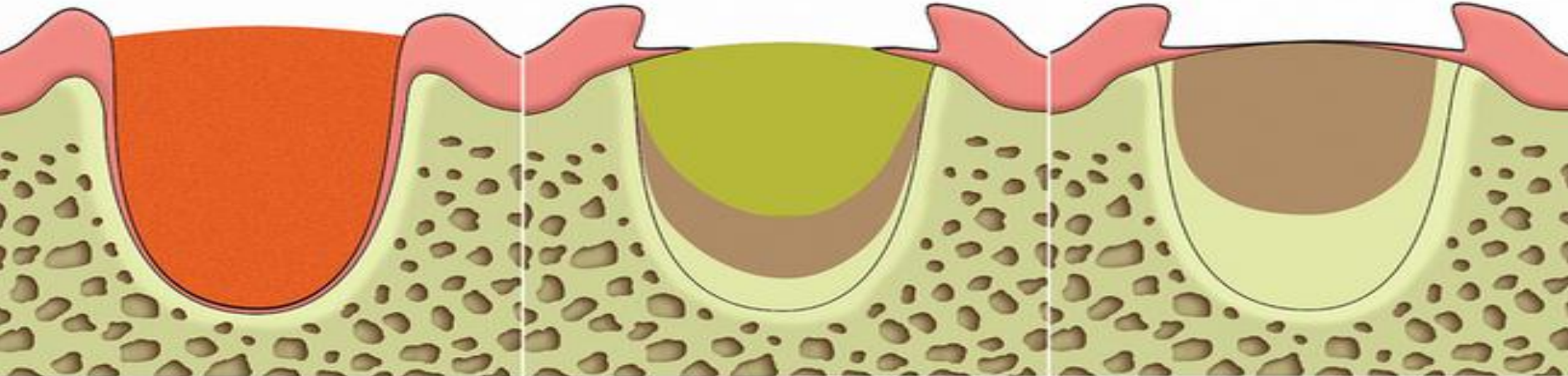
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HEALING OF AN EXTRACTION SOCKET

Tooth extraction
day 1

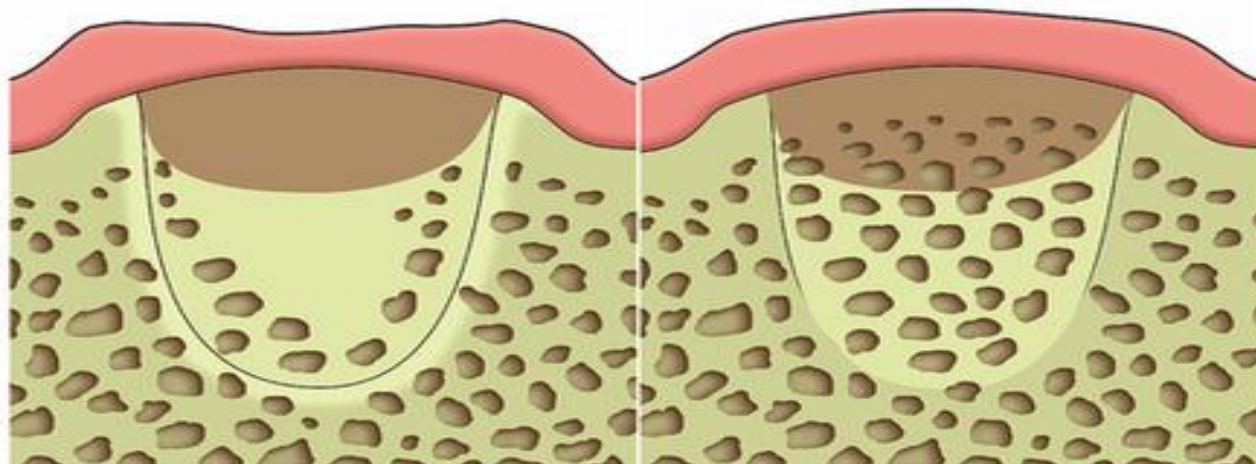
Initial angiogenesis
day 1 to 3 weeks

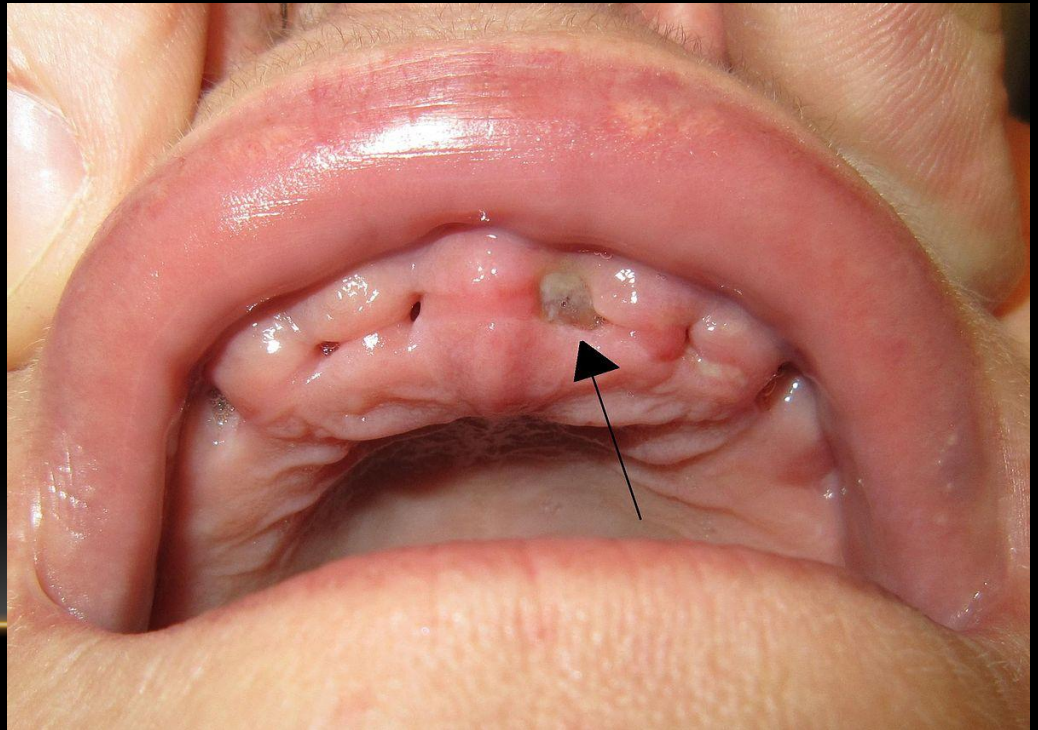
New bone formation
3-4 weeks



Bone growth
4 to 6 weeks

Bone reorganization
6 weeks to 4 months





ALVEOLAR OSTEITIS (DRY SOCKET):

- **unpredictable complication 1-3% (molars)**
- **Food debris, saliva, and bacteria collect in the empty socket, becomes infected and necrotic.**
- **Tiger inflammatory reaction sequestra separated by osteoclasts.**
- **Associated with severe pain radiates to ear, temporal region, or eye.**
- **Trismus, foul tasting and lymphadenopathy**

CAUSES OF DRY SOCKET

- **Failure of a blood clot formation due to poor blood supply, osteopetrosis, Paget's disease of bone, radiotherapy, excessive use of vasoconstrictors in local anaesthetics.**
- **The premature loss of clot due to excessive mouth rinsing, or by action of fibrinolysis of proteolytic bacteria.**

TREATMENT

- **Radiograph.**
- **All sutures should be removed.**
- **The socket irrigation with warm saline and clinical inspection of the socket for any unexpected pathosis.**

- **Curation of necrotic and infected blood clot.**
- **Use of an antiseptic dressing such as iodoform gauze then it should be changed every 2-3 days until a problem resolution.**
- **Broad spectrum antibiotic (bactericidal), metronedazol and anti-inflammatory should be prescribed.**

OSTEOMYELITIS:

- **it is an acute or chronic bone inflammation due to bacterial colonization secondary to hypoxia, hypocellularity, and hypovascularity.**
 - **It is rare nowadays.**
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- The pathological features vary according to nature and severity of the irritant, the host defences, and local and systemic predisposing factors which includes:
- **Fractures, gunshot wounds, radiotherapy, osteopetrosis, Paget`s disease, Diabetes Mellitus, Tobacco, alcohol and intravenous drug abuse, AIDS and immunocompromised status, Malignances, malnutrition and dry socket**

ACUTE SUPPURATIVE OSTEOMYELITIS:

- It is a rapid inflammatory destruction of bone marrow spaces when there is insufficient time for the body to resist the inflammation due to reduction of systemic resistance.



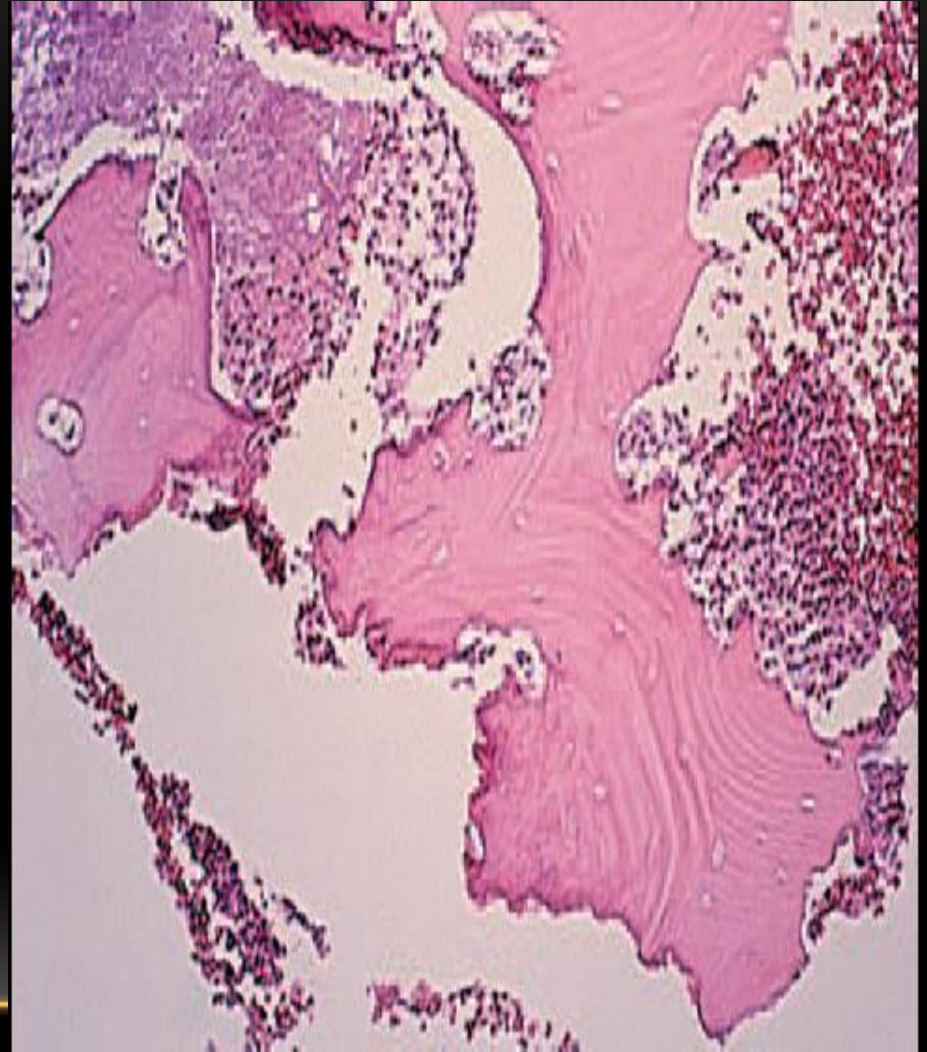
CLINICALLY:

- **Fever, leukocytosis, regional lymphadenopathy**
- **swelling of the affected area and tender.**
- **Alteration in sensation and paresthesia of the lower lip**
- **spontaneous exfoliation of Sequestrum**
- **ill-defined radiolucency**



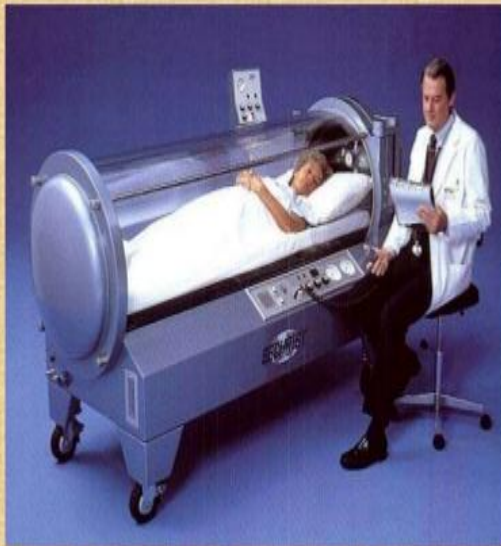
HISTOPATHOLOGY

- **predominantly acute inflammatory cells infiltration (polymorphonuclear leukocytes)**
- **necrotic bone, loss of the osteocytes from their lacunae, peripheral resorption, and bacterial colonization that diagnosed as a sequestrum.**



TREATMENT

Hyperbaric Oxygen Chamber



- sensitivity test
- heavy antibiotic treatment
- Analgesic
- drainage and debridment.
- Additional treatment:
- Sequestrectomy
- Decortication,
- Hyperbaric oxygen
- Resection and reconstruction and Immobilization of weakened bones.

CHRONIC SUPPURATIVE OSTEOMYELITIS:

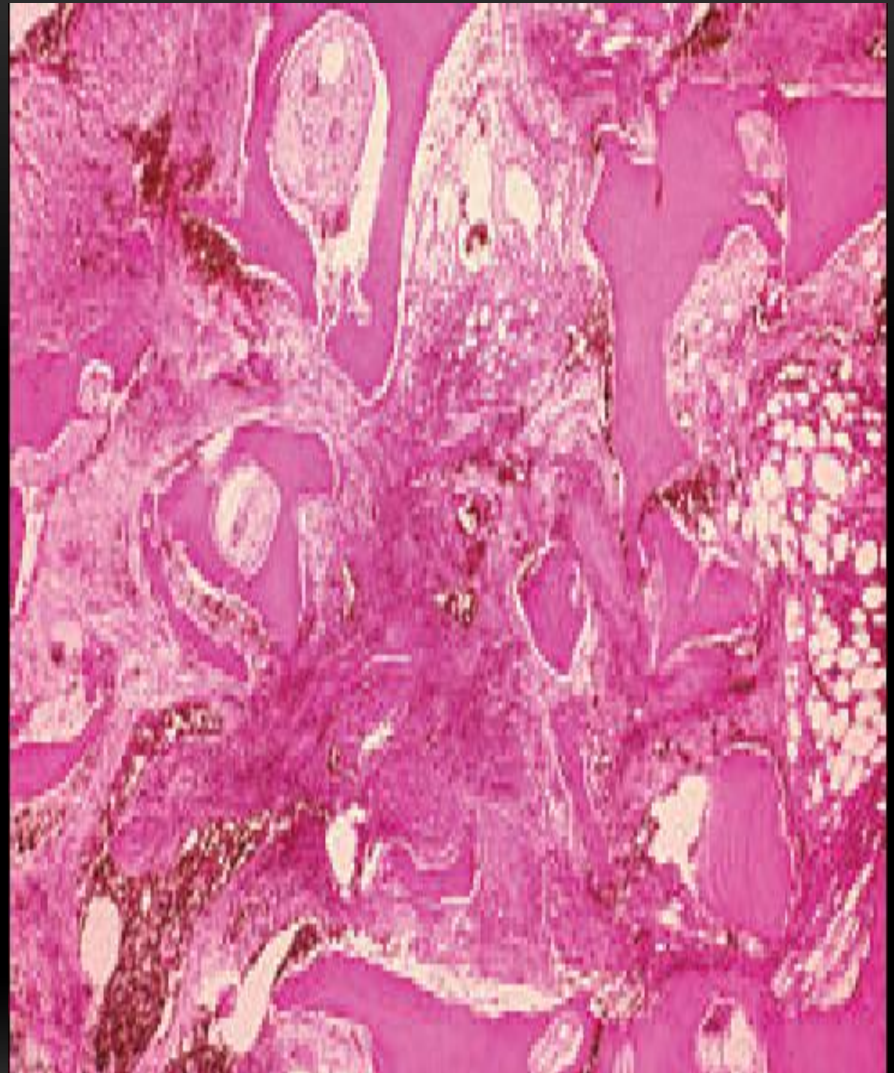
- **Defensive response leads to formation of granulation tissue with dense scar tissue to wall off the infected area.**
- **It acts as a reservoir for bacteria and antibiotic have great difficulty reaching the site.**
- **It begins about 1 month after the initial acute infection or the process may arise primarily without a previous acute episode.**

CLINICALLY

- **Swelling, pain, sinus formation, purulent discharge, sequestrum formation, tooth loss, or pathologic fracture may occur.**
- **Radiograph: ill-defined radiolucency that often contains central radiopaque sequestra.**



- **Pathological feature consists of chronically inflamed fibrous connective tissue filling the intertrabecular areas of the bone with sequestra and abscess formation is common.**



TREATMENT:

- **it is difficult to manage medically because organisms are protected from antibiotic drugs by FCT**
- **antibiotic must be given intravenously in high doses**
- **surgical intervention depends on the spread of the process**
- **Weakened jawbones must be immobilized.**

DIFFUSE SCLEROSING OSTEOMYELITIS

- It is extend or multifocal area of bone deposition and sclerosis characterized by vague pain, inflammation. It occurs in the mandible. Radiograph appears as diffuse or seclerosis (cotton wool appearance)..

- Pathologically shows sclerosis of dense irregular and remodeling of bone reflecting periods of resorption followed by repair with prominent reversal lines. **Chronic inflammatory process in soft tissues is seen (proliferating fibroblast and connective tissue with lymphocyte and plasma cells infiltration. Treatment: resolution of the adjacent foci of chronic infection**

CONDENSING OSTEITIS (FOCAL SCLEROSING OSTEOMYELITIS):

- **Localized areas of bone sclerosis associated with the apices of teeth with pulpitis, it is most frequently in children and young and most cases in premolar and molar areas of the mandible. Radiograph shows localized, uniform radiopacity adjacent to the apex of a badly carious tooth. Treatment: After extraction or endodontic therapy will regress 85%.**

OSTEOMYELITIS WITH PROLIFERATIVE PERIOSTITIS (PERIOSTITIS OSSIFICANS OR GARRE'S OSTEOMYELITIS):

- **periosteal reaction to chronic periapical inflammation leading to periosteal new bone formation that cause expansion of affected bone.**
- **It appears as radiopaque laminations of bone parallel to each other as onion-skin.**



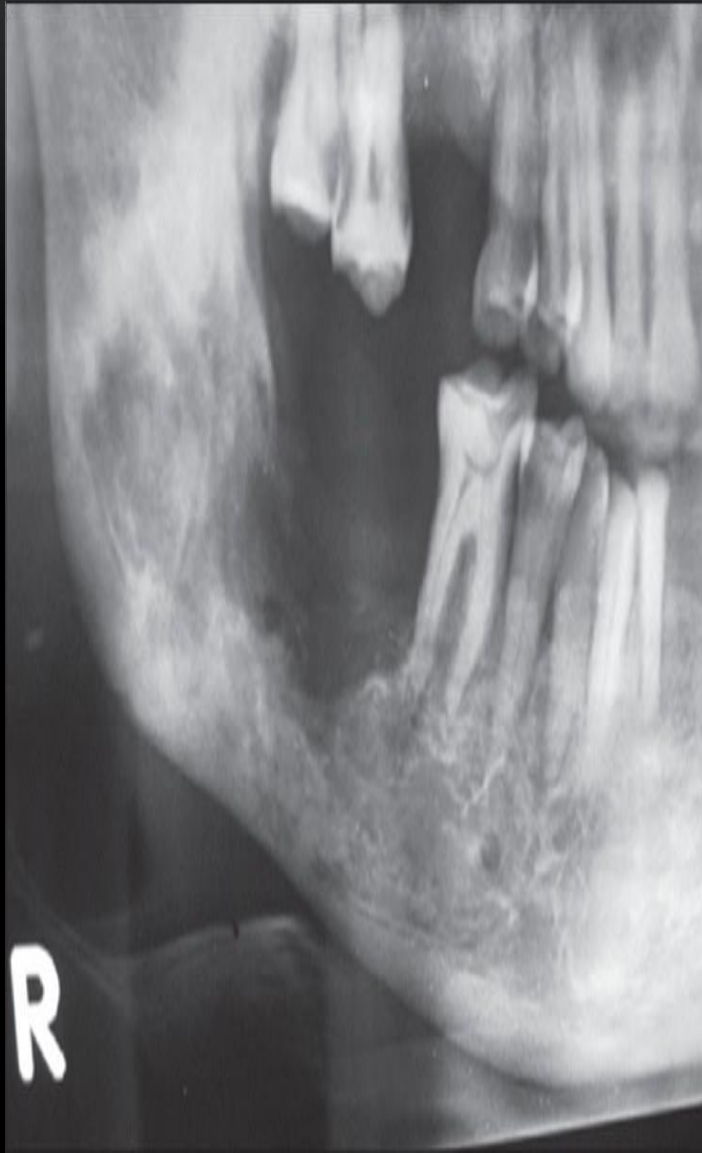


- It occurs in children and young adults in mandible with mild pain.
- Pathologically, it reveals parallel rows of highly cellular, reactive woven bone trabeculae that are oriented perpendicular to the surface with fibrous connective tissue between them. Sequestra may present as typical features of bone necrosis.
- Treatment: extraction or endodontic therapy is directed toward the source of the infection.

RADIATION INJURY AND OSTEORADIONECROSIS

- radiation therapy affects bone vascularity causing reduce blood supply, tissue hypoxia, hypocellularity, hypovascularity and osseous necrosis.
- inferior dental artery
- Sterile non-vital bone but very susceptible to infection resulting in osteomyelitis, cortical perforation, fistula formation and ulceration of the overlying oral and facial soft tissues and pathological fracture may be present.





- It reveals ill-defined radiolucent area that may develop zones of radioopacity as the dead bone separates from the residual vital bone.
- Modern methods of radiotherapy have greatly reduced the incidence of this condition.

THE SEVERITY OF THIS CONDITION IS

- Radiation dose **AFFECTED BY**
- Proximity of the tumor to the bone
- The presence of remaining dentition
- Type of treatment
- And it is increased in prevalence in older age, male, poor health or malnutrition and used of tobacco or alcohol.



AS PREVENTION MEASURES SHOULD FOLLOWED:



Osteoradionecrosis involving the mandible

- Any oral foci of infection should be eliminated and all carious teeth should be extracted or restored.
- Extraction or bone trauma is contraindicated during radiation therapy.
- Excellent oral hygiene should be maintained.
- A healing time of at least 3 weeks between dental procedures and radiotherapy.

BISPHOSPHONATE- ASSOCIATED OSTEONECROSIS:



- **it is an osteogenic necrosis associated with medication used to slow osseous involvement of multiple myeloma, metastatic carcinoma, treatment Paget`s disease and sever osteoporosis.**

- This drug inhibit osteoclast function and interfere with angiogenesis, mandible more affected with asymptomatic necrotic bone exposure.



- **Treatment:** it depends on drug formula, disease being treated and duration of drug used. All patients take these medications should be warned about the risks and maintain good oral hygiene.

Suggestive Reading

*Brad W Neville, Douglas D Damm,
Carl M. Allen, Jerry E Bonguot.
Oral And Maxillofacial Pathology,
4th Edition, Elsevier, 2015*

Thank
You!

