





TETANUS

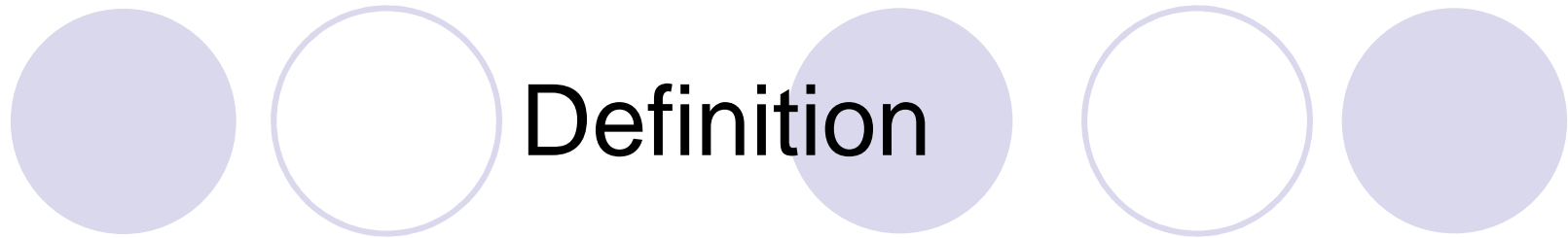
Presenter: J.J. Kambona
(M.B.Ch.B; M.Med)



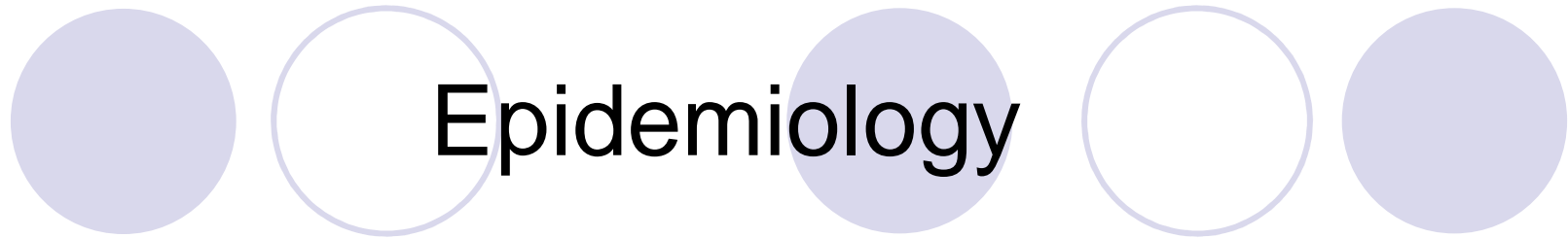
OBJECTIVES

At the end of this session each student should be able to:

1. Define tetanus.
2. Describe the epidemiology of tetanus.
3. Describe the cause of tetanus.
4. Describe the predisposing factors for tetanus.
5. Describe the pathophysiology of tetanus.
6. Describe different forms of tetanus.
7. Describe clinical features of tetanus.
8. Describe complications of tetanus.
9. Diagnose tetanus.
10. Describe differential diagnoses of tetanus.
11. Investigate patients with tetanus.
12. Treat patients with tetanus.
13. Describe the prognosis in tetanus patients.
14. Describe preventive measure for tetanus.



- Tetanus is a nervous system disorder characterized by muscle spasms that is caused by the exotoxin-producing anaerobic organisms called Clostridium tetani.
- The word tetanus comes from the Greek, and it is derived from the term teinein, meaning to stretch.



- **Mortality:**

Reports show up to 1 million cases annually, mostly in developing countries.



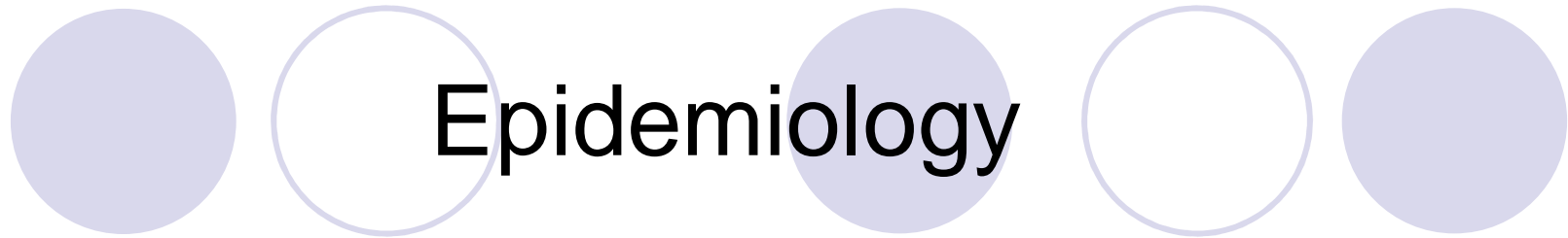
Epidemiology

- **Age:**

Tetanus is more serious in neonates and elderly patients.

In USA deaths from generalized tetanus is 30%, overall 52% in patients older than 60 years and 13% in patients younger than 60 years.

- Neonatal tetanus accounts for 50% of the tetanus-related deaths in developing countries

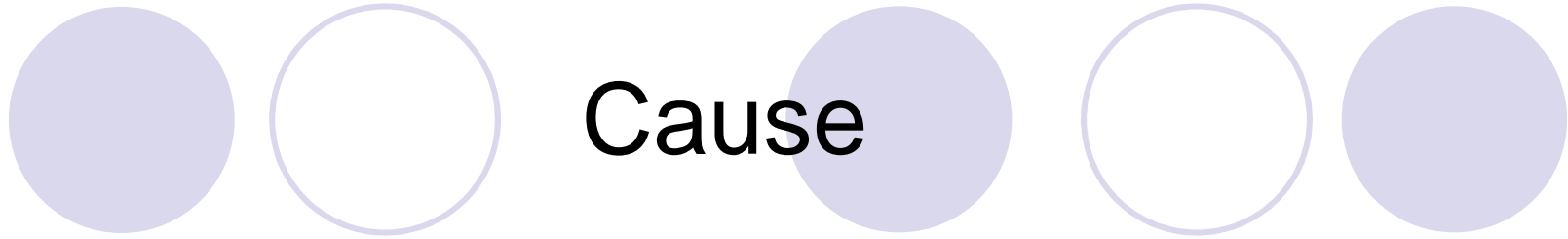


- **Sex:**

Tetanus more common in males than females.

- **Site of the lesions:**

Lesions that lead to tetanus are commonly found on lower limbs.

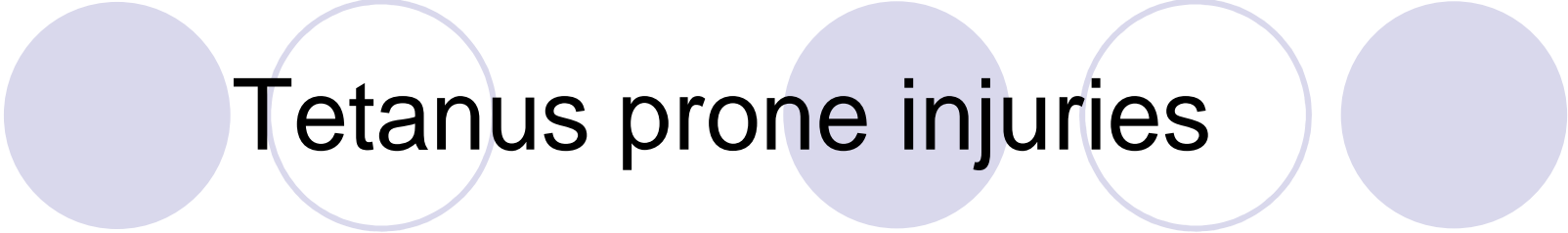


- Tetanus is caused by a strain Clostridium tetani.
- The organism is a slender, motile, anaerobic, spore-forming, gram-positive bacillus.
- The spores have a characteristic drumstick appearance, highly resistant to heat and disinfectant, and can survive for years in a contaminated soil.
- Where do clostridium tetani organisms found?



Predisposing factors

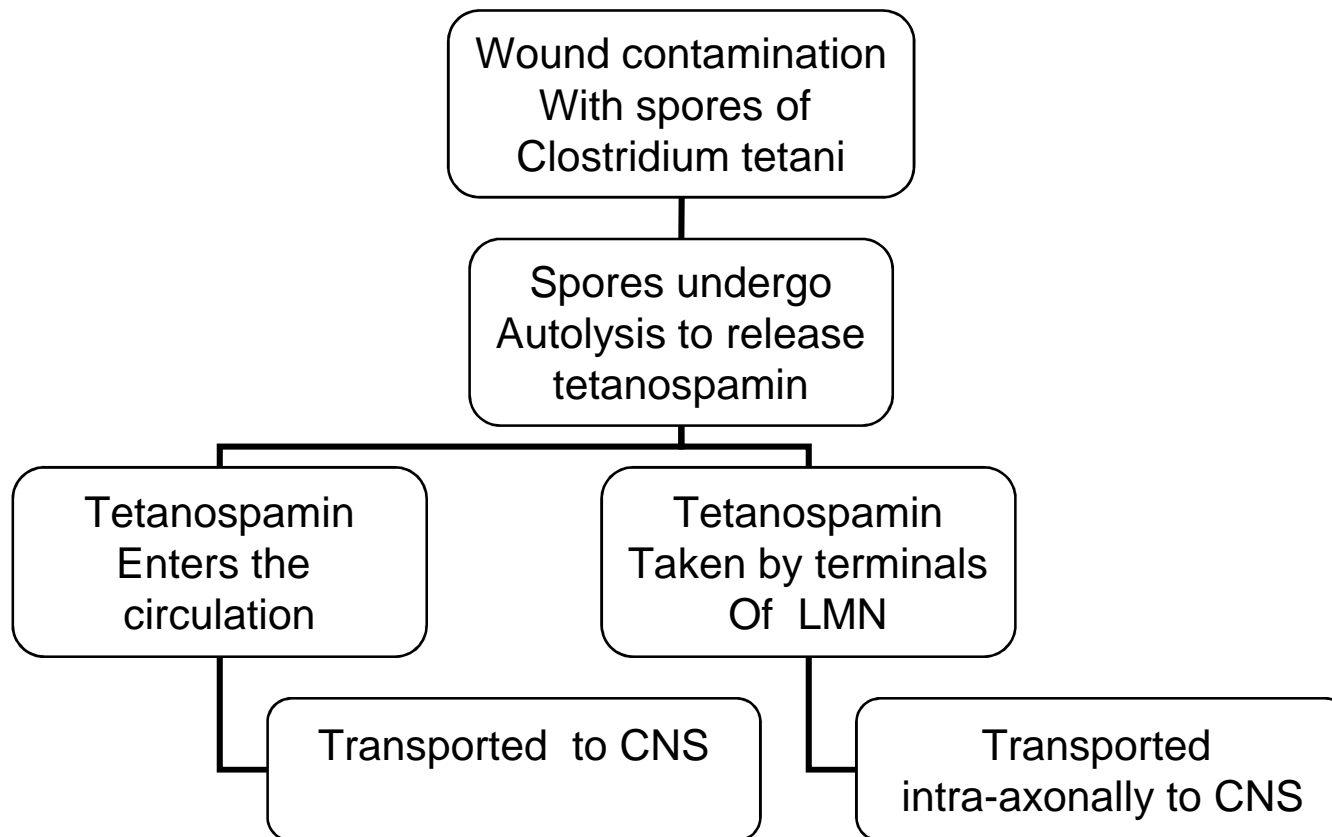
- A penetrating injury.
- Co-infection with other bacteria.
- Devitalized tissue in the wound.
- A foreign body in the wound.
- A localized ischaemia.



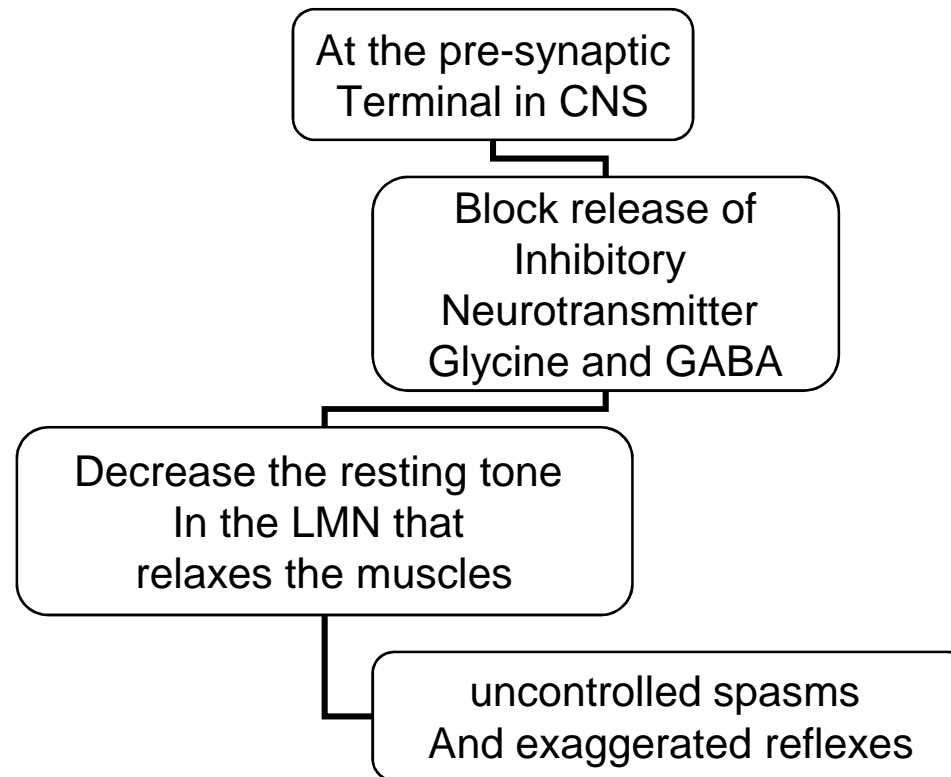
Tetanus prone injuries

- Splinters and other puncture wounds.
- Gunshot wounds.
- Wounds sustained more than 6 hours before surgical treatment.
- Open fractures or crush injuries.
- Burns.
- Wounds contaminated with dirt (saliva, faeces, soil or manure).
- Clinical evidence of sepsis.
- Unsterile intramuscular or subcutaneous injections.

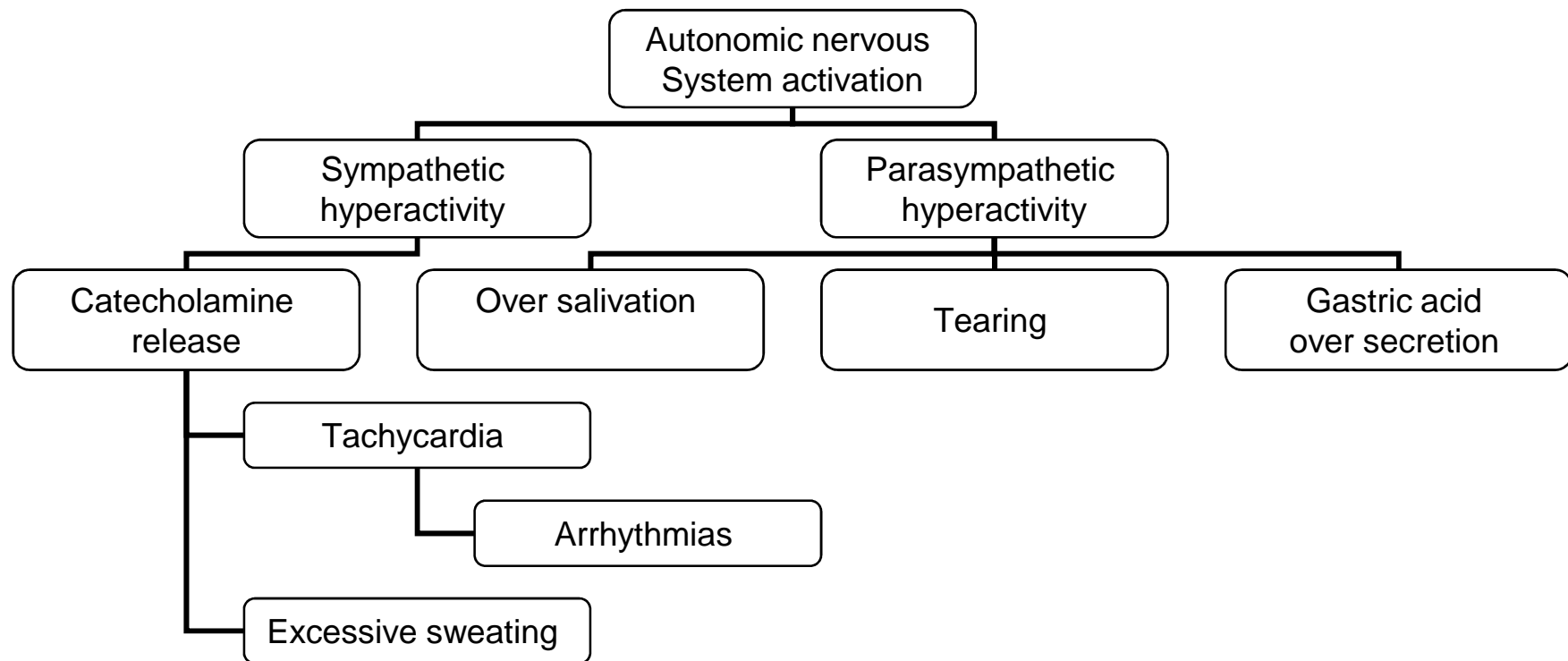
Pathophysiology



Pathophysiology



Pathophysiology





Clinical forms of tetanus

- Neonatal tetanus.
- Local tetanus.
- Cephalic tetanus.
- Generalized tetanus.



Clinical features

- Approximately 30% of individuals with tetanus have either no obvious wound or have wounds that they consider to be trivial.
- The incubation period of tetanus varies from three days to three weeks or longer.



Neonatal tetanus

- More than 85% arise as a result of either unattended or 'traditional' deliveries in unhygienic surroundings.

Non-specific symptoms:

- Irritability.
- Refusal to breastfeed.
- Weak sucking.

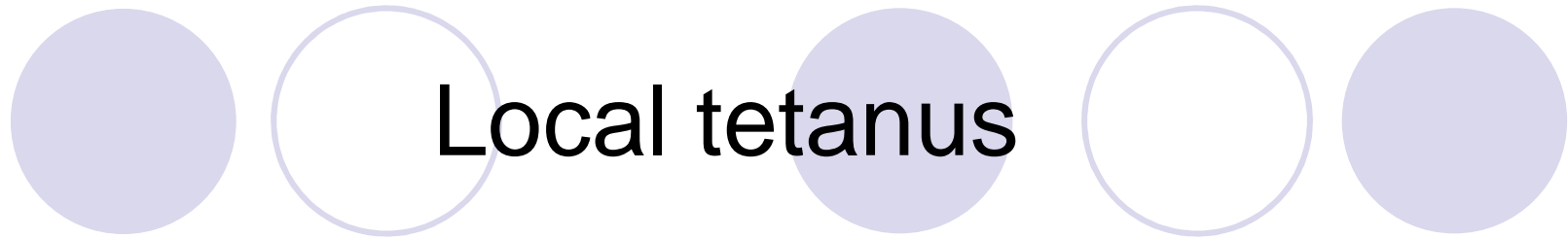


Neonatal tetanus

Tetanus specific symptoms:

- Spasticity.
- Facial grimacing (risus sardonius).
- Trismus.

More than 70% of children develop complications such as septicaemia and bronchopneumonia.



Local tetanus

- It is a very rare form of tetanus.
- Most cases progresses to generalized tetanus in a matter of days or weeks.

Clinical features:

- Rigidity of muscles in the vicinity of the wound on the extremities.
- Weakness and loss of tone of the affected muscles.
- These symptoms usually resolve spontaneously but may persist occasionally for months.



Cephalic tetanus

- Rare form of tetanus.
- It is commonly associated with head injury or Clostridium tetani infection of the middle ear.

Clinical features:

- Trismus.
- Dysfunction of many cranial nerves. Facial nerve being commonly affected leading to difficulties with feeding, swallowing and oral hygiene.
- More than two third of cephalic tetanus, progresses to the generalized tetanus.



Generalized tetanus

- The most common form of tetanus.

Clinical features:

- Trismus (lockjaw).
- Localized or generalized weakness.
- Difficulty swallowing or chewing.
- Intense pain associated with each spasm, which may occur spontaneously or precipitated by aural, visual, or tactile stimuli.
- Patients are conscious throughout the illness.



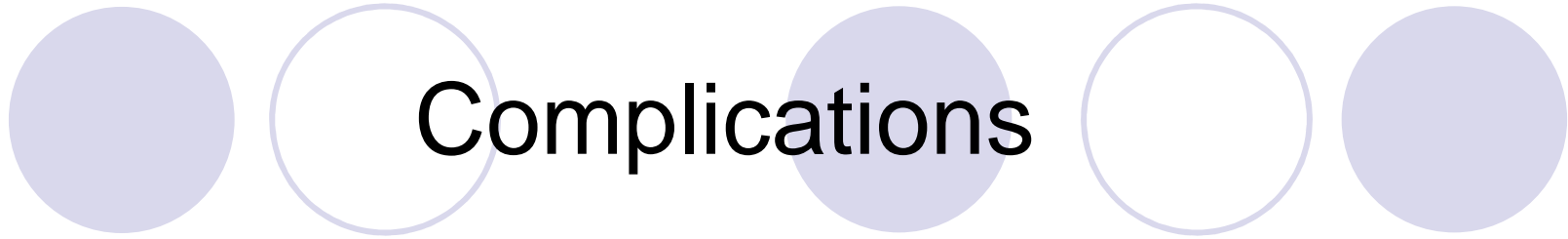
Generalized tetanus

- Involvement of the autonomic nervous system may cause:
 - Arrhythmia.
 - Extreme oscillations in blood pressure.
 - Diaphoresis.
 - Over-salivation.
 - Hyperthermia or hypothermia.
 - Urinary retention.
- Only 60% of patients with uncomplicated tetanus presents with fever of more than 38⁰c.



Complications

- Fractures from sustained muscle contractions.
- Aspiration pneumonia.
- Pulmonary embolism.
- Septicaemia.
- Dehydration.
- Respiratory failure.
- Arrhythmias.
- Cardiac arrest.



Long-term complications:

- Irritability.
- Sleep disturbance.
- Myoclonus.
- Seizures.
- Osteoarthritis as a consequence of bone damage.



Diagnosis

- The diagnosis of tetanus is made clinically (from history and examination)
- Spatula test: reflex spasm of the Masseters when the posterior pharynx is touched, so that the patient bites the spatula when the posterior pharynx is touched. (Sensitivity: 94% and specificity: 100%)



Differential diagnosis

- Hypocalcaemia.
- Epilepsy.
- Cerebral malaria.
- Meningitis.
- Encephalitis.
- Local infection e.g. oral abscess, mumps etc.
- Dental infection.
- Strychnine poisoning: Antagonizes the release of neurotransmitter glycine.
- Drugs:
 - a. Narcotics and alcohol withdrawal.
 - b. Phenothiazines side effect e.g. tardive dystonia or overdose.
- Hysteria.
- Stiffman syndrome.




Investigations

- Blood slide for malaria.
- Serum electrolytes to exclude hypocalcaemia.
- A lumbar puncture is necessary after funduscopy to exclude CNS infections, although cerebral spinal fluid is normal (except for the increased opening pressure especially during spasms.)



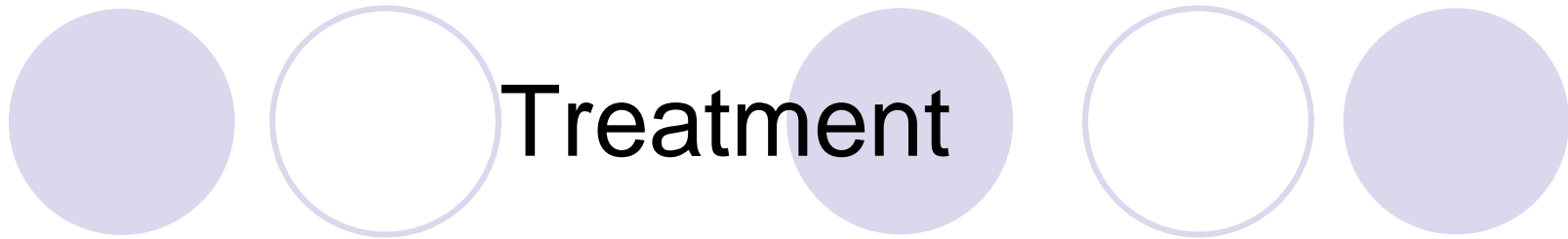
Investigations

- Serum antitoxin levels of more than 0.01 i.u/ml are protective, making the diagnosis less likely.
- Swab cultures from the wound are usually not helpful because Clostridium tetani can be isolated from wounds of only 30% of patients with clinical tetanus.



Treatment

- Elimination of the source of toxins.
- Neutralization of unbound toxin.
- Anti-spasms:
 - a. Diazepam 2-20 mg 2-8 hourly orally.
 - b. Chlorpromazine 50-150 mg 4-8hourly orally.
 - c. Phenobarbitone 60-180 mg 4-12 hourly orally.



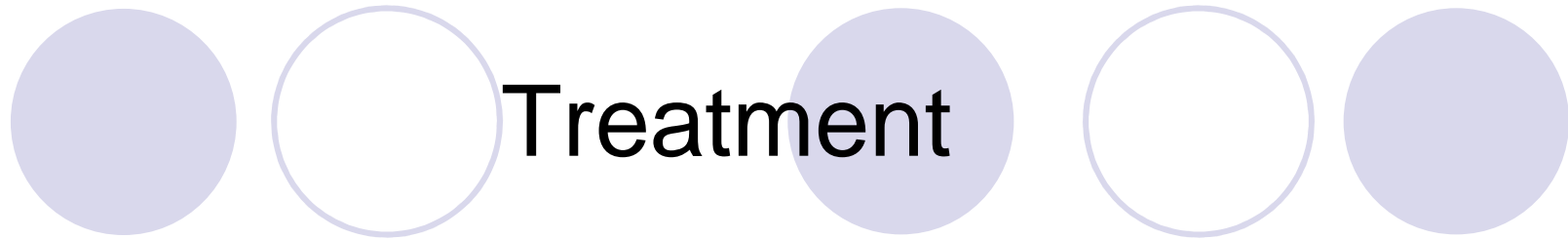
Supportive:

A. Nursing care:

- 2 hourly turning.
- Quiet environment with less light.
- Reduce stimuli precipitating spasms.
- Catheterization.

B. Pulmonary care:

- Mechanical ventilation: It needs close supervision requiring specialist and it is associated with poor prognosis.
- Suction PRN.
- +/- Intubation.
- +/- Tracheostomy.



Supportive:

- Nasogastric tube (NGT) or Percutaneous Endoscopic Gastrostomy tube (PEG).
- +/- H₂ receptor blockers, antacids, Sucralfate.
- Heparinization.
- Water, electrolytes and nutrition balance.
- Wound debridement, cleaning with hydrogen peroxide and removal of foreign body, and then leave the wound open.
- To prevent dysautonomia give beta blockers (Propranolol) or combined alpha and beta blockers (Lobectolol).
- Consider physiotherapy when spasms stop.



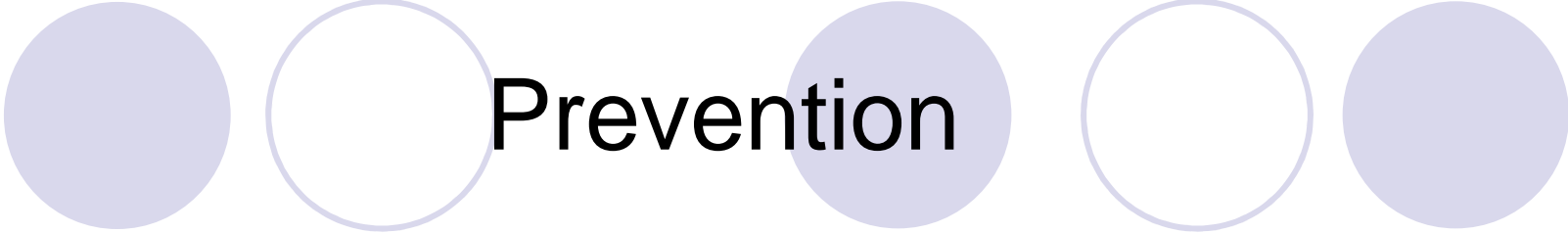
Prognosis of the patient with tetanus depends on:

- Incubation period: The shorter the incubation period the worse the prognosis.
- Site of the lesion: The shorter the distance from CNS the worse the prognosis.
- Age: The prognosis is usually poor in neonates and elderly patients.
- Forms of tetanus: Cephalic and neonatal tetanus have poor prognosis.



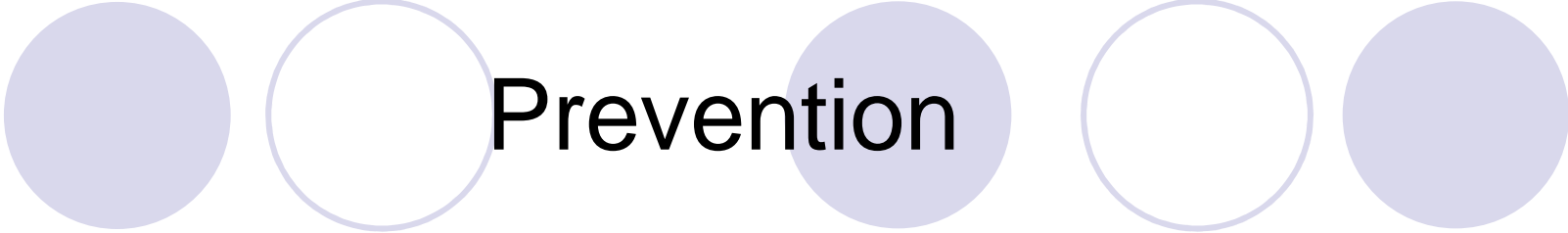
The common causes of death are:

- Exhaustion.
- Asphyxia.
- Aspiration pneumonia.



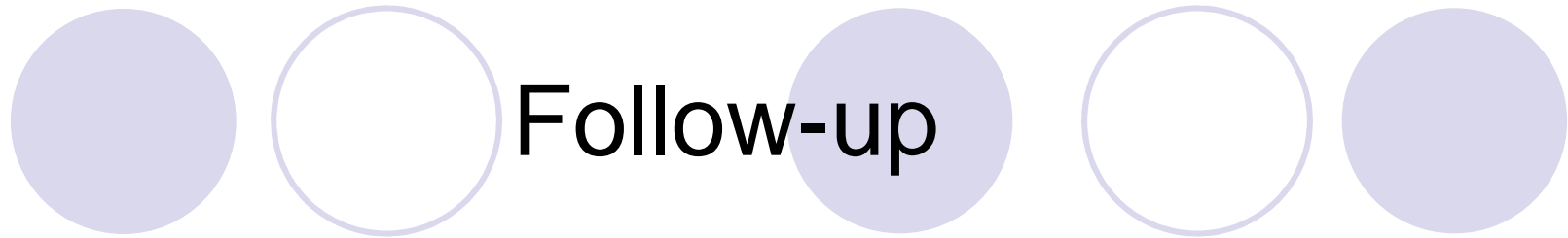
Prevention

- Contaminated injuries should be treated by debridement.
- Give tetanus toxoid 0.5ml IM on discharge.
- DPT is administered to children at ages: 2 months, 4 months, 6 months, 12-15 months and between 4-6 years. Then a tetanus booster shot every 10 years is recommended.
- If the patient has not had a tetanus toxoid booster in the previous 10 years, administer a single dose booster injection on the day of injury. For severe wounds, consider administer a booster injection if more than 5 years have elapsed since the last dose.



Prevention

- Non immunized women should receive at least 2 doses of tetanus toxoid according to the following schedule:
 - The first dose at initial contact or as early as possible during pregnancy.
 - The 2nd dose 4 weeks after the first or preferably at least 2 weeks before delivery.
 - The 3rd dose could be given 6-12 months after the 2nd dose or during her next pregnancy.
 - Additional 2 doses should be given at annual intervals.
- Consider vaccinating males on routine basis just as females do.



These patients should be given an appointment to attend MOPD for follow-up after discharge for long-term complications and booster doses of tetanus toxoid.

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Thank you for your attention



References

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