

# TETANUS

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# **Titles.**

- 1) Introduction.**
- 2) Causative organism.**
- 3) Epidemiology**
- 4) Pathogenesis .**
- 5) Clinical Features .**
- 6) Complications .**
- 7) Diagnosis .**
- 8) Medical Management .**
- 9) Wound Management.**
- 10) Prevention ( Tetanus Toxoid ) .**

# Definition

- Acute Fatal disease
- caused by an **Exotoxin By Clostridium tetani.**
- Prevented by immunization with “**Tetanus Toxoid**”
- It is characterized by
  - Generalized rigidity
  - Convulsive spasms of skeletal muscles .
  - Lockjaw and neck stiffness

# Charecteristic of Clostridium tetani

- Gram-positive
- Terminal spore = “Drumstick” appearance.
- Sensitive to heat
- **Anaerobic Rod**
- **Not survive in the presence of oxygen.**
- widely distributed
  - **Soil**
  - **intestines and feces** of Animal.

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# Mode of Transmission

- ✓ Contaminated wounds
- ✓ Tissue injury , e.g.
  - ✓ Post Abdominal Surgery
  - ✓ Burns
  - ✓ Deep puncture wounds , crush wounds
  - ✓ Otitis media ,dental infection
  - ✓ Animal bites
  - ✓ Abortion and pregnancy

**Tetanus is not contagious from person to person .**

**It is the only  
vaccine-preventable disease  
that is  
“Infectious but not contagious”.**

**Incubation Period: 8 Days ( 3-21 Days)**

# Host Factors :

- **Age** : 5-40 years, New born baby,  
–female during delivery or abortion
- **Sex** : males > females
- **Occupation** : Agricultural workers are at higher risk
- **Rural > Urban areas** .
- **Immunity** : Herd immunity (community immunity) does not protect the individual.
- **Environmental and social factors**: Unhygienic custom habits , Unhygienic delivery practices.

# Pathogenesis

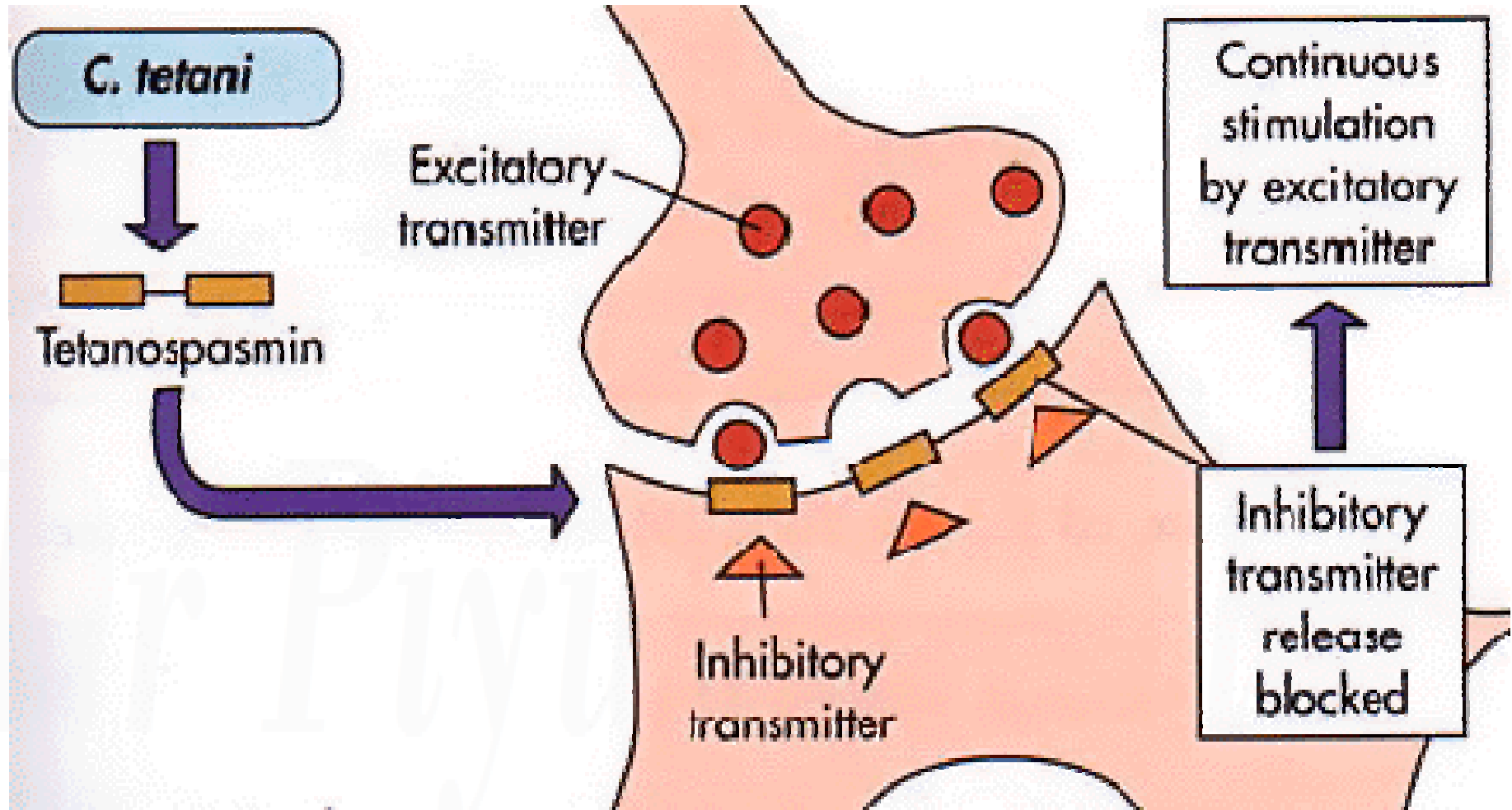
- Clostridium tetani enters through a wound.
- In anaerobic conditions, start to produce toxin
- disseminated via blood and lymphatics.
- Through motor nerves reach to the spinal cord
- Toxin reaches the CNS .
- Toxins act at several sites within the CNS,
  - Peripheral motor end plates
  - Spinal cord & Brain
  - Sympathetic nervous system.



# Pathogenesis

- Tetanus toxin interferes with release of inhibitory neurotransmitters .
- Blocking inhibitory impulses.
- Leads to unopposed muscle contraction .
- Spasm & Seizures may occur
- Autonomic nervous system may also affected.
- No loss in sensory function
- Very painful = Affects ay to control pain.

# *Mechanism of Action of Tetanus Toxin*



# Incubation Period

- Toxin travels = 7.5 -25 cm/day .
- Reach The CNS = 2 -14 days.
- Incubation = 3 to 21 days, usually about 8 days.
- Shorter Incubation period = Poor Prognosis.
- In neonatal tetanus = 4 to 14 days ( Aver. 7 days)

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# **Clinical Features With Type of Tetanus**

- 1. Local Tetanus**
- 2. Cephalic Tetanus**
- 3. Generalized Tetanus**

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# Local Tetanus

- Uncommon
- Persistent contraction of muscles in the same anatomic area of the injury.
- Local tetanus may precede the onset of generalized tetanus but is generally milder
- Only about 1% of cases are fatal.

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# Cephalic Tetanus

- Rare
- Commonly after
  - Otitis media
  - Head injury
- Involvement of the cranial nerves (facial area).



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# Generalized tetanus

- Most common type (about 80%)
- Neonatal tetanus is a form of generalized tetanus
- Usually presents with a **descending** pattern.
- Sequence of Events
  1. Lock Jaw
  2. Neck Stiffness
  3. Difficulty in Swallowing
  4. Muscle Rigidity
  5. Spasm





# Risus Sardonius

**Spasm of Facial muscle**



# Opisthotonos

Spasm of extensor muscle of Head Back

That contractions may cause bone fractures.





# Neck rigidity & retraction.



Unfortunately, the affected individual is **conscious throughout the illness,** but cannot stop these **contractions**

# Tetanus Complication

- Respiratory Spasm & Laryngospasm
- Vertebra Fracture
- Hypertension
- Aspiration Pneumonia
- Death
- 

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# Laboratory diagnosis

- **No laboratory findings**
- **Entirely on clinical features**
- **Does not depend upon bacteriologic confirmation.**
- **C. tetani is recovered from the wound in only 30% of cases**
- **And can be isolated from patients who do not have tetanus.**

# Diagnostic tests for tetanus

## Spatula Test :

- Posterior pharyngeal wall is touched with a spatula
- Reflex spasm of the masseters
- Indicates a +ve.test.
- 94 % sensitivity
- 100 % specificity.

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# Score for Severity and Prognosis of tetanus

**One point** for each of the following **7 items**:

- **I.P.** < 7 days

(period between injury and 1<sup>st</sup>.symptom.)

- **Period of onset** < 48 hours

(period between 1<sup>st</sup>. Symptom and 1<sup>st</sup>. Spasm. )

- **Acquired from** burns, surgical wounds, compound fractures, or septic abortion .

- **Addiction** (Narcotics)

- **Generalized** tetanus

- **Temperature** greater than 104°F (40°C)

- **Tachycardia** greater than 120 beats per minute (>150 beats per min in neonates)

**Total score** indicates the severity and the prognosis as follows:

<b>Score</b>	<b>Severity</b>	<b>Prognosis (mortality rate)</b>
<b>0 -1</b>	<b>mild</b>	<b>&lt; 10 %</b>
<b>2 -3</b>	<b>moderate</b>	<b>10 : 20 %</b>
<b>4</b>	<b>severe</b>	<b>20 : 40 %</b>
<b>5 : 6</b>	<b>very severe</b>	<b>&gt; 50 %</b>

# Treatment

- 1) **Medical Management .**
- 2) **Wound Management .**

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# Medical Management

## Aim of Treatment:

(1) **Supportive care** (until the tetano-spasmin that is fixed in tissue has been metabolized )

- a: treatment of muscle spasm
- b: prevention of respiratory complications.
- c: prevention of metabolic complications.

(2) **Neutralization** of circulating toxin .

(3) **Elimination** of the source of toxin.

# Treatment

1. Admit patients to the (ICU).
2. Maintain a **dark and quiet room** for the patient.
3. Avoid unnecessary procedures .
4. **Prophylactic intubation** with succinylcholine
5. **Tracheostomy**
6. **Tetanus immune globulin** (passive immunization) .
7. help remove unbound tetanus toxin
8. but it cannot affect toxin bound to nerve endings.
9. **single IM. dose of 3000-5000 units**
10. **Some** part of the dose infiltrated around the wound if it can be identified.
11. Because the half-life of TIG is 25 days, **repeated doses are not needed.**

# Drugs

## **Antibiotics**

Penicillin G

Metronidazole

Doxycycline

## **Anticonvulsants**

Sedative-hypnotic agents are the mainstays of tetanus treatment.

Diazepam (Valium):

## **Skeletal muscle relaxant**

Phenobarbital: used to prolong effects of diazepam.

Baclofen (Lioresal) a physiological GABA agonist

# Differential Diagnoses

1. Rabies
2. Meningitis
3. Stroke
4. Encephalitis
5. Subarachnoid Hemorrhage
6. Hypocalcemia

# **Wound Management**

- All wounds should be cleaned with H<sub>2</sub>O<sub>2</sub> & antiseptic.
- Necrotic tissue and foreign material should be removed.
- Passive immunization.
- Active immunization.

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# PREVENTION

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# **PREVENTION:**

- **Active Immunization**
- **Passive Immunization**
- **Active and passive Immunization.**

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**Active Immunization**  
**by using**  
**tetanus toxoid**

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