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**TETANUS**

by

**Dr A B. Christie  
WHO Consultant**

Epidemiology

The cause is Clostridium tetani. there are at least 10 types but they all produce the same toxin, and antitoxin prepared against one protects against all. toxoid prepared from one strain will provoke antitoxin against all. So there is no problem in the preparation of a vaccine

Cl tetani is an inhabitant of the soil It can survive as a spore for many years It is commonest in manured ground, the germ being present in the intestine of some animals, especially the horse, but it may also be present in dry dust So the disease may occur in agricultural workers but also in street accident cases Cl.tetani does not need to infect man in order to survive. in fact, human infection is really an epidemiological waste of time for the germ This, of course, means that immunization will never eradicate Cl.tetani . it will continue to survive in soil, and herd immunity is of no importance in the epidemiology of the disease.

What stimulates Cl.tetani to produce toxin is not clear A low concentration of oxygen in a wound seems to be important. so a dirty wound, a deep wound, a wound with much tissue damage may all provoke toxin production if Cl tetani is present. Calcium seems to lower oxygen so that lime in soil may favour toxin production All this seems to be true, but tetanus quite often follows minor, superficial wounds. So the exact cause is unknown.

Tetanus may follow surgical operations. The cause may be some contamination of materials, e.g. dressings Cl tetani has been isolated from gauze, but also from theatre dust Puerperal tetanus most often follows abortions, especially if performed unhygienically.

Neonatal tetanus is a serious cause of death in many countries The cause is bad obstetric practice, especially with regard the treatment of the umbilical stump. Neonatal tetanus is called "eight day fever" in the Punjab because so many babies die of tetanus at this time If the mother is immunised during pregnancy she will pass on antibody to the baby and this may protect the baby against neonatal tetanus This is well worth doing in areas where obstetric practice is poor, but, of course, the real prevention is good obstetric practice

Unsterile injections, even badly done smallpox vaccination have occasionally caused tetanus Minor operations such as ear-piercing may let the germ in Occasionally discharge from the middle ear contains Cl.tetani and otogenic tetanus is a well recognised type of illness.

But, by far the commonest cause of tetanus is a wound contaminated with soil or dust containing the germ.

### Clinical aspects

The diagnosis of tetanus usually becomes obvious, with spasm and convulsions of muscles. In the early stages of the disease it may not be so easy. It is important to know about neonatal tetanus, for many infants probably die undiagnosed. Infection occurs usually immediately after delivery and is caused by bad treatment of the umbilical cord. The baby is normal at birth and sucks normally, but after a few days symptoms appear and one of the first signs is failure to suck. The baby cannot suck because the muscles of the mouth go into spasm. The course of the disease is rapid after this, with convulsions, starvation and death usually within ten days. The important point is "normal at birth". A baby with brain damage at birth is abnormal at birth and does not suck well from its first day. So in cases of neonatal death one must enquire carefully into the symptoms before death. (EPI manual, Book 1, Annex 3(a), pages 1 to 3) Sometimes the muscles of the larynx go into spasm and this can cause sudden death. This may occur early in the illness before any nurse or doctor sees the baby. In such cases of sudden death the diagnosis of tetanus may be missed.

### Tetanus vaccine

The germ of tetanus, Clostridium tetani, does not invade the body. It produces a toxin and this toxin gets into the bloodstream and reaches the central nervous system where its presence in nerve cells causes spasm and convulsions of muscles served by those nerves. When tetanus bacilli are grown in a suitable fluid and at a suitable temperature they produce toxin which passes into the fluid. The fluid is separated from the bacilli and is treated with formaldehyde, a chemical which changes toxin into toxoid. When injected into a patient this toxoid cannot cause tetanus but it makes the body react by producing tetanus antitoxin and this protects the patient against tetanus. After a full course of tetanus toxoid protection lasts for many years. Even after twenty years one booster dose of toxoid will cause a steep rise of antitoxin in the body.

Tetanus toxoid is often given combined with diphtheria toxoid (DT) or with diphtheria toxoid and pertussis vaccine (DPT). The first dose is usually given to a child at age three months. The second dose at the fifth month. The third dose at the seventh or eighth month. There should always be at least one month, better six weeks, between these three doses. A booster is given at 18 months and another at school entry. School learners should also be given a booster dose. The first four doses are usually given combined with diphtheria toxoid and pertussis vaccine (DPT). The dose at school entry is given with only diphtheria toxoid (DT).

The dose to school learners can be tetanus toxoid only (TT) or diphtheria tetanus vaccine (DT)

Neonatal tetanus is a preventable disease. Aseptic obstetric practice is the best way of preventing it. If a pregnant woman has tetanus antitoxin in her blood this can pass through the placenta and protect the infant against tetanus. If a pregnant woman is given two doses of tetanus toxoid during her pregnancy this will make sure that there is antitoxin in her blood and that her baby will be protected.

There is usually very little reaction to tetanus toxoid. The vaccine must be kept in the refrigerator but must not be frozen.