

TUBERCULIN SKIN TESTING

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The **Mantoux tuberculin skin test (TST)** is a method of determining whether a person is infected with a bacterium, *Mycobacterium tuberculosis*, which causes a disease known as Tuberculosis (TB). The tuberculin skin test (TST) has limited value in clinical work, especially where TB is common. The test shows hypersensitivity to proteins of the TB bacillus, as a result either of infection with *M. tuberculosis* or induced by Bacille Calmette-Guérin (BCG) vaccination.

It indicates infection and not TB disease i.e. this test cannot distinguish latent TB from active TB (TB disease).

Latent TB infection: people have TB bacilli in their bodies, but they are not sick because these bacilli are not active and a healthy immune system keeps it in check.

- These people do not have symptoms of TB disease, and they cannot spread the bacteria to others.
- However, they may develop TB disease in the future.

TB disease: people are sick from the TB bacilli that are active, meaning that these bacteria are multiplying and destroying tissue e.g. the lungs.

- These people usually have symptoms of TB disease.
- People with TB disease of the lungs or throat are capable of spreading TB bacteria to others through coughing and sneezing, releasing these bacteria into the air, which may be inhaled by people in close contact with them.

How is the TST Administered?

The Mantoux TST is the most reliable test available. The test requires:

- 2 units of tuberculin purified protein derivative PPD-RT23 2TU OR
- 5 units of PPD-S 5TU

The dose is the same for adults and children.

The TST is performed by injecting 0.1 ml of tuberculin purified protein derivative (PPD) of the correct strength into the inner surface of the forearm. The injection should be made with a tuberculin syringe, with the needle bevel facing upward. The TST is an intradermal injection. When placed correctly, the injection should produce a pale elevation of the skin (a wheal) 6 to 10 mm in diameter.

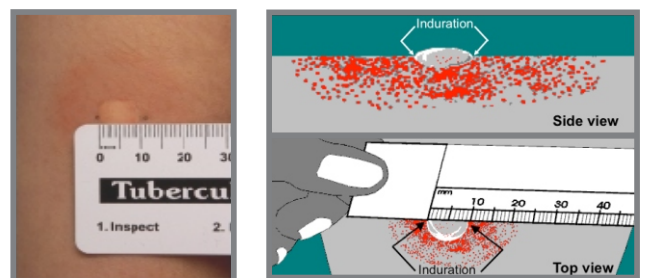
How is the TST Read?

The skin test reaction should be read between 48 and 72 hours after administration. A patient who does not return within 72 hours will need to be rescheduled for another skin test. The reaction should be measured in millimetres of the induration (palpable, raised, hardened area or swelling). The reader should not measure erythema (redness). The diameter of the indurated area should be measured across the forearm (perpendicular to the long axis).

How Are TST Reactions Interpreted?

Skin test interpretation depends on two factors:

- Measurement of the induration in millimetres
- A person's risk of being infected with TB and of progression to disease if infected



Immune Status	HIV positive, malnourished, severe illness	Others (including previous BCG]
Diameter of induration in positive test	≥ 5 mm	≥ 10 mm

Interpreting a positive TST

- A positive test indicates infection with TB, but not necessarily TB disease.
- In a child under 5 years or an HIV-infected child of any age, a positive skin test indicates recent infection and is a risk factor for progression to disease. In the presence of other features such as a history of a TB contact, signs and symptoms suggestive of TB and chest x-ray changes, a positive tuberculin skin test is indicative of TB disease in children.
- Children under the age of 5 years, HIV-infected children of any age and HIV-infected adults, who have a positive skin test and no symptoms or signs of TB, should be put on TB prophylaxis for six months.

Interpreting a negative TST

A negative tuberculin skin test does not exclude TB.

What Are False-Positive Reactions?

Some persons may react to the TST even though they are not infected with *M. tuberculosis*. The causes of these false-positive reactions may include, but are not limited to, the following:

- Infection with non-tuberculosis mycobacteria
- Previous BCG vaccination
- Incorrect method of TST administration
- Incorrect interpretation of reaction

What Are False-Negative Reactions?

Some persons may not react to the TST even though they are infected with *M. tuberculosis*. The reasons for these false-negative reactions may include, but are not limited to, the following:

- HIV infection
- Malnutrition
- Severe viral infections (e.g. measles, chickenpox)
- Cancer
- Immuno-suppressive drugs (e.g. steroids)
- Severe disseminated TB
- Cutaneous anergy (anergy is the inability to react to skin tests because of a weakened immune system)
- Recent TB infection (within 8 – 10 weeks of exposure)
- Very old TB infection (many years)
- Very young age (less than 6 months old)
- Recent live-virus vaccination (e.g. measles and varicella zoster virus)
- Incorrect method of TST administration
- Incorrect interpretation of reaction

How Often Can TSTs Be Repeated?

In general, there is no risk associated with repeated tuberculin skin test placements. If a person does not return within 48 – 72 hours for a tuberculin skin test reading, a second test can be placed as soon as possible. There is no contraindication to repeating the TST, unless a previous TST was associated with a severe reaction.

What is a Boosted Reaction?

In some persons who are infected with *M. tuberculosis*, the ability to react to tuberculin may wane over time. When given a TST years after infection, these persons may have a false-negative reaction. However, the TST may stimulate the immune system, causing a positive, or boosted reaction to subsequent tests. Giving a second TST after an initial negative TST reaction is called two-step testing.

Can TSTs Be Given To Persons Receiving Vaccinations?

Vaccination with live viruses may interfere with TST reactions. For persons scheduled to receive a TST, testing should be done either on the same day as vaccination with live-virus vaccines OR 4 – 6 weeks after the administration of the live-virus vaccine (e.g. MMR, Varicella Zoster vaccine, oral poliovirus vaccine)

In Conclusion:

- **The TST response only indicates local delayed type hypersensitivity. It shows that the person has at some time been infected with *M. tuberculosis* or been vaccinated.**
- **By itself, it does NOT indicate the presence or extent of tuberculosis disease.**
- **The reaction after previous BCG is usually weaker than the reaction to natural infection and remains positive for several years thereafter.**

References:

1. <http://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm>
2. TB DOTS Strategy Coordination. National TB management guidelines 2014; Annexure 1. National Department of Health, Republic of South Africa.