

Theories of Dentin sensitivity

- Exposed Dentin is very sensitive.
- Three main theories have been proposed to explain Dentin sensitivity

- Theories are:

1. Direct Neural Stimulation Theory

2. Fluid or Hydrodynamic theory

3. Transduction Theory

Direct Neural Stimulation

1) DIRECT NEURAL THEORY

The dentin contains nerve endings that respond when it is stimulated.

The pulp is well innervated, especially below the odontoblasts (the plexus of rack show) and that some nerves penetrate a short distance in to some tubules.

Whether these intratubular nerves are involved in dentin sensitivity is not known.

No evidence has been found for nerves in the outer dentin, which is most sensitive .

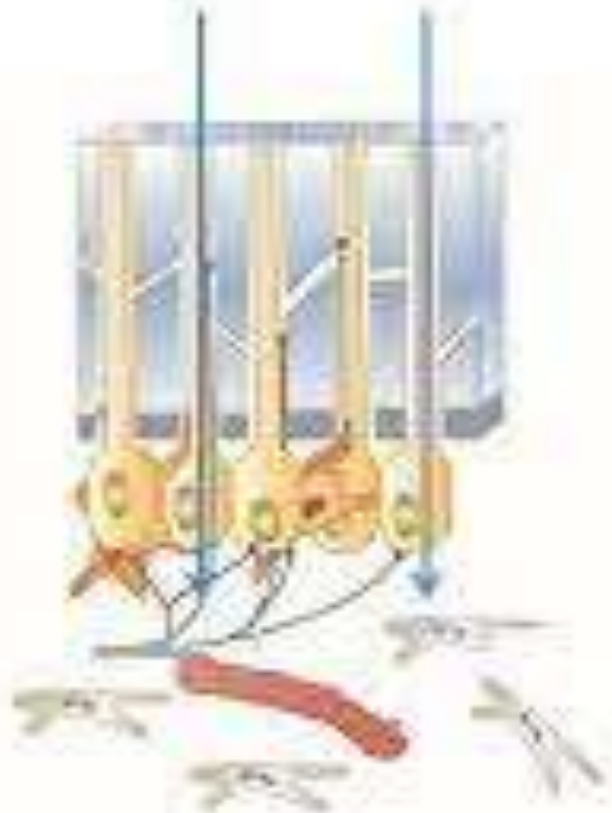
Fluid or Hydrodynamic Theory

Direct stimulation of
nerve terminals



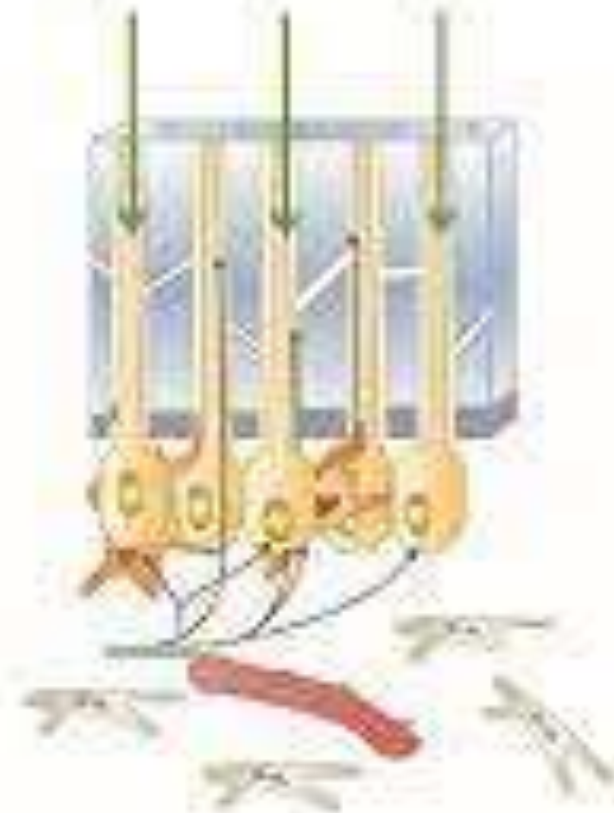
Nerve theory

Movement of dentinal
fluid



Hydrodynamic theory

Direct stimulation of
odontoblasts



Odontoblast theory

Transduction Theory

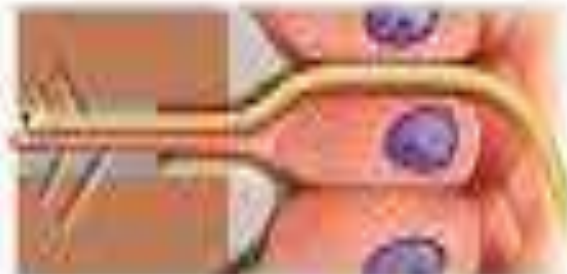
3) TRANSDUCER THEORY

This theory of dentinal sensation takes into consideration the synaptic -like relationship between the terminal sensory nerve endings and odontoblastic process.

If a true synapse were present between these two elements to facilitate the transmission of dentinal sensations, then a neural transmitting substance such as acetylcholine could be expected, but there is no direct evidence of its presence.

Theories of pain transmission

- **Direct neural stimulation:** The dentin contains nerve endings that respond when it is stimulated.



- **Transduction theory:** The odontoblasts serve as receptors and are coupled to nerves in the pulp



- **Hydrodynamic theory:** The tubular nature of dentin permits fluid movement to occur within the tubule when a stimulus is applied, a movement registered by pulpal free nerve endings close to the odontoblasts.

