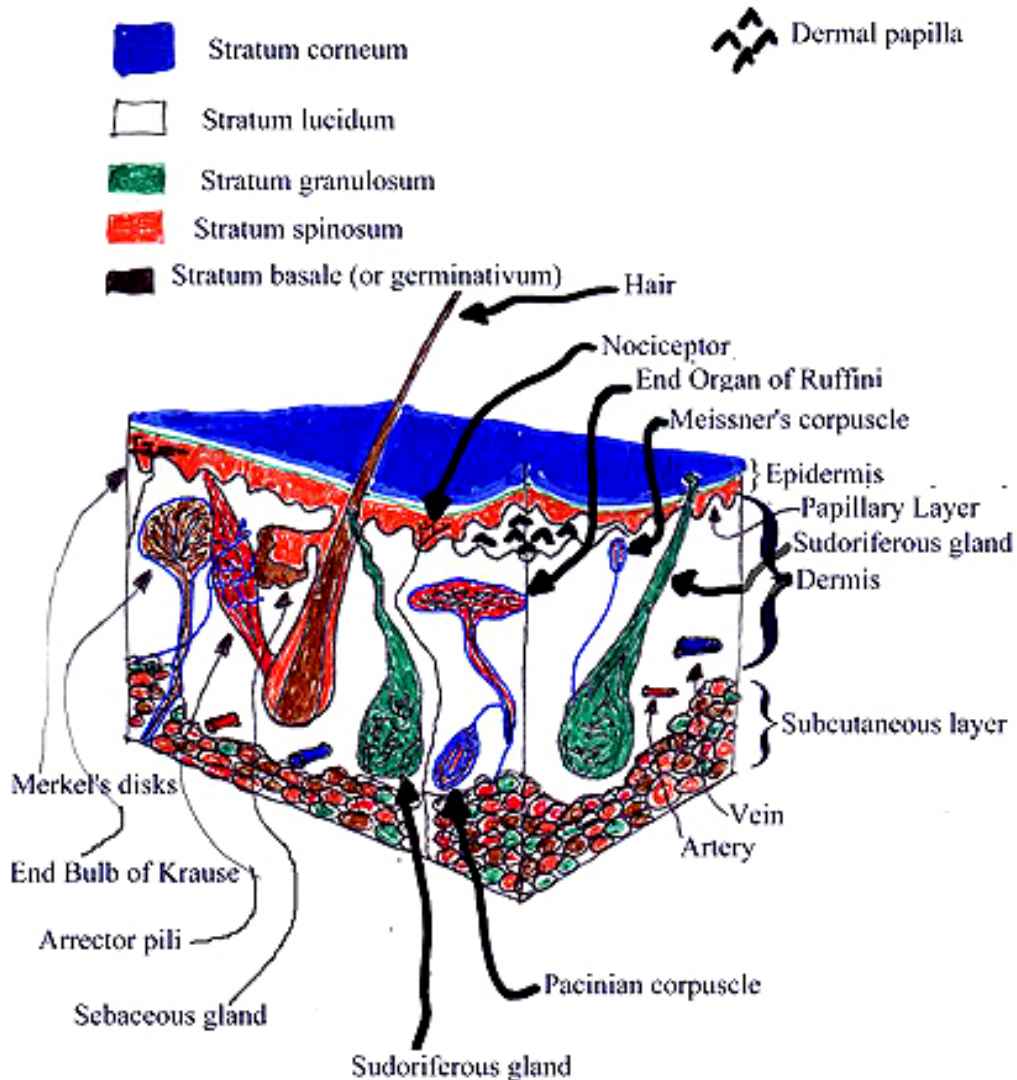


Two Point Touch Threshold

Introductory Background

The skin has many receptors in it:



Krause's (KROW cez) end bulbs are temperature detectors. They are sensitive to cold and are activated at temperatures below 20° C (68° F). Ruffini's (ruh FEE neez) corpuscles are most sensitive in the range of 25-45° C. When these receptors are activated, the brain interprets this as a painful burning sensation.

Pacinian corpuscles are pressure receptors. They are naked nerve endings in deeper tissue. They are found in the SQ under skin and mucous membranes, around joints, in mammary glands and in the external genitalia of both sexes. These receptors are responsible for detecting vibration from steady pressure. They show regressive changes with advancing age as tested for by determining vibratory sensibility with tuning forks.

They are especially abundant in fingertips and toetips, palms and soles (follow Meissner's and Merkel's, below).

Nociceptors are pain receptors. They are naked nerve endings in all tissues in the body. They may respond to any type of stimulation. While receptors for somatic (soe MATT ick; the body) and visceral (VISS er ull) pain are similar, they are sufficiently different that SOMATIC pain is felt where it is, but VISCERAL pain is often felt away from the source organ. This is called referred pain.

Merkel's (remember Stephen Urkel?) discs are touch receptors. They are for discriminative touch (to be able to recognize exactly which part of the body is being touched). They are most numerous in the fingertips, palms, tip of tongue, lips, nipples, clitoris and tip of penis. The End Organs of Ruffini detect heavy and continuous touch sensations. Meissner's corpuscles detect objects which barely move across the surface of the skin (light touch), as well as are used to determine the texture of an object. They are found in the dermal papillae. They are especially numerous in hairless volar regions (palms/soles) of fingers, toes, hands and feet. In addition, Meissner's corpuscles are found in the same areas occupied by Merkel's disks.

Pacinian corpuscles, proprioceptors (receptors that detect mechanical changes in tendons and muscles) and Meissner's corpuscles are "plugged into" the cerebral cortex for interpretation and go through the thalamus (another function of the thalamus is to act as a messenger center).

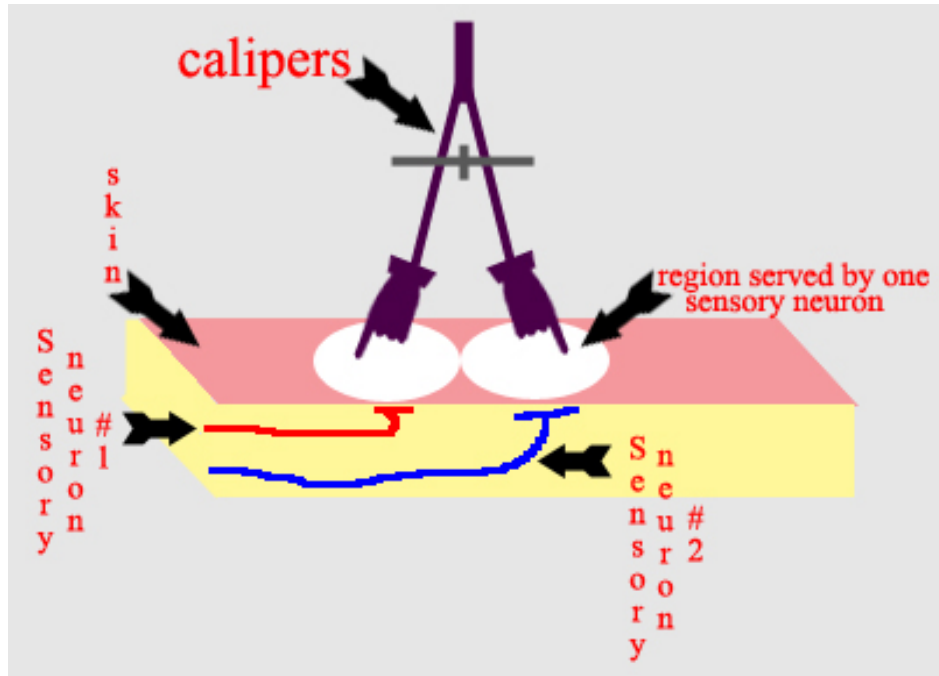
The importance of this experiment is that nerve "endings" detect various sensations over discrete regions of the skin. In addition, these nerve "endings" detect these various sensations DIFFERENTLY over different parts of the body. One manner in which to study this phenomenon is to test people for their "Two Point Touch Threshold" on different regions on their body.

Experimental – Materials

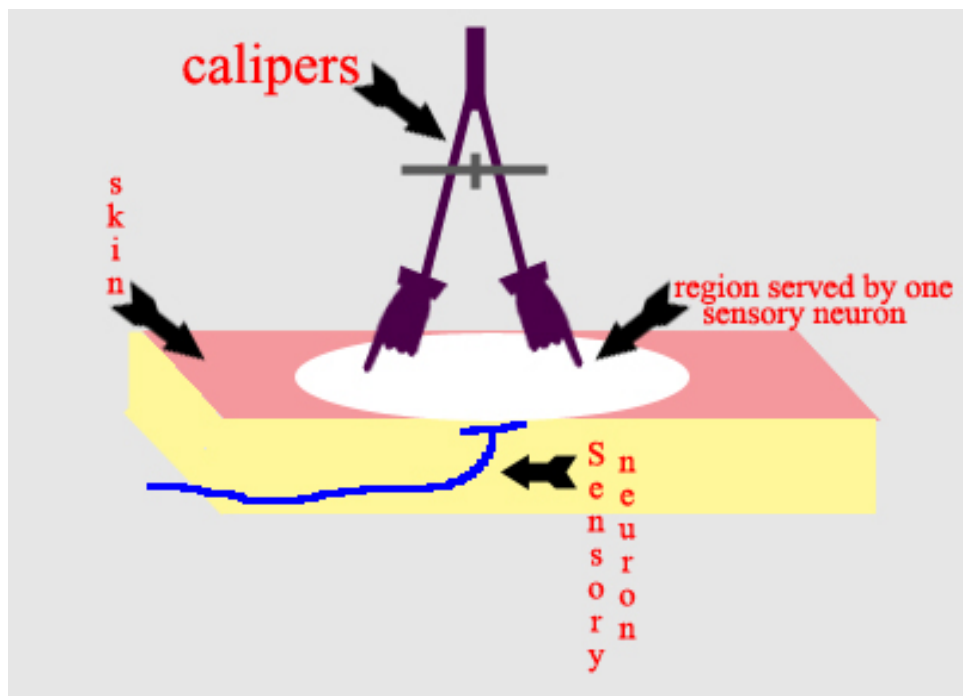
Obtain one paper clip and a 6 inch ruler and find a lab partner and a quiet place to work..

Experimental – Method

The technique is that your lab partner opens the paper clip up into an inverted "V" and touches your skin with the ends of the paper clip. At first, you ought to have the ends far enough apart so as to feel 2 points:



Measure and record the distance between the ends of the paper clip (squeeze the ends together to make them closer; don't look while you are being tested) where 1) you last felt 2 points and 2) where you first felt 1 point. The latter is where you have reached your threshold of being able to discriminate between feeling one or two points. This happens because the closer you make the paper clip ends, eventually these ends will touch one area of your skin that is served/supplied by only 1 nerve "ending" and you will feel only one point touching your skin:



Record both distances (last to feel 2 points and first to feel 1 point) in mm in the table below, for the regions specified (if you prefer the right, that is fine – just stay on one side of the body):

Region of Body	Last to feel 2 points (mm)	First to feel 1 point (mm)
Palm of left hand		
Anterior left forearm		
Biceps surface of left forearm		
left calf		
Sole of left foot		

If you feel creative, perform the same tests on the opposite side of your body and record both distances (last to feel 2 points and first to feel 1 point) in mm in the table below, for the regions specified:

Region of Body	Last to feel 2 points (mm)	First to feel 1 point (mm)
Palm of right hand		
Anterior right forearm		
Biceps surface of right forearm		
Right calf		
Sole of right foot		

Questions

- 1) Does your two-point threshold change over your body?

- 2) Which region was the most sensitive?

- 3) Which region was the least sensitive?

- 4) Does it make a difference which side you tested, i.e., is one side more sensitive than the other?

References

- 1) Carman: **Doc Carman's Necessities of Human Anatomy and Physiology, Volume I.** (WC Brown: Dubuque) ©1995.
- 2) Carman: **Doc Carman's Necessities of Human Anatomy and Physiology, Volume II.** (WC Brown: Dubuque) ©1996.
- 3) Hole: **Human Anatomy and Physiology, 6th Edition.** (WC Brown: Dubuque) ©1993.