

1. A 30 year old woman who runs a cappuccino bar came to you because she has been burning her left and right fingers on the steam pressurizer when she makes coffee. She says that she never notices the pain. She doesn't realize that she has hurt her fingers until a few hours after it has happened. On examination you find the following signs: :

1. touch sensation was normal over the entire right and left sides of body and face
2. position sense was normal for her upper and lower limbs
3. vibratory sense was normal when tested with a tuning fork on the bony prominences of the right and left arms and legs
4. pin prick sensation was normal on both sides of the face
5. pin prick sensation was absent on all fingers of both right and left hands and forearms
6. pin prick sensation was normal on the arms and rest of the body and face

Draw a cross-sectional diagram (similar to your slides) showing the damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **SIDE** of the lesion, the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged, and the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found.

2. A 70 year old man awoke one morning to find that the right side of his body felt numb. He also said that he had no feeling on the right side of his face. On examination you found the following signs:

1. touch, vibratory, and proprioceptive sensation was absent over the entire **right** side of the body; touch and vibration was absent from the **right** face.
2. touch, vibratory, and proprioceptive sensation was normal on the **left** side of the body and face.
3. pin prick sensation was absent on the **right** side of the face but was normal on the **left** side of the face
4. pin prick sensation was normal on the **right** and **left** sides of the body.

Assume that damage at a single location in the nervous system caused the above symptoms. If more than one CNS level is possible, choose one. Draw a cross-sectional diagram (similar to your slides) showing a damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **SIDE** of the lesion, the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged, and the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found.

3. A 60 year old man is examined in the ED with the following neurological findings:
1. touch, vibratory, and proprioceptive sensation was normal over the entire **right** and **left** sides of the face and body.
 2. pin prick sensation was absent on the **left** side of the face.
 3. pin prick sensation was absent on the **right** side of the body, but was normal on the **left** sides of the body

Assume a lesion at a single location in the nervous system caused the above symptoms. Draw a cross-sectional diagram (similar to your slides) showing a damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **SIDE** of the lesion, the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged, and the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found. If you wish to receive full credit, **DRAW NEATLY**.

4. A hockey goalie noticed that her **left** foot has felt clumsy lately and she has missed several goals because of it. A neurological exam showed that she could not describe the position of her left foot and toes when they were passively flexed or extended. Vibratory sense was absent from her left foot also. Position and vibratory senses were normal in her right foot and elsewhere on her body. Pin prick sensation in her left foot was felt but it was not sharp or well localized. Response to pin prick was normal over the rest of her body.

Draw a diagram showing the damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **SIDE** of the lesion, the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged, and the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found. If you wish to receive full credit, **DRAW NEATLY**.

5. A 20 year old man came to the emergency room after he had been stabbed in the back. On examination you found the following signs:
1. touch, vibratory, and proprioceptive sensation was normal over the entire **right** and **left** side of the body.
 2. pin prick sensation was absent on the **right** side of the body from the level of the nipple down.
 4. pin prick sensation was normal on the **left** side of the body.

Draw a cross-sectional diagram (similar to your slides) showing a damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **SIDE** of the lesion, the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged, and the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found.

6. A 25 year old man who was trimming branches from tall trees in front of his house, fell off his ladder and was found unconscious on the ground. He was rushed to the emergency room and he was subsequently admitted to the hospital. After 24 hours, he regained consciousness. On examination he was alert and answered questions normally. However, you found the following signs:

1. Tactile and vibratory sensation was absent over the entire **left** lower body and lower limb. He could not tell the orientation of his **left** leg when you moved it into different positions.
2. Tactile sensation was normal on the entire **right** side of his body. He correctly indicated the position of his **right** leg when it was moved.
3. Pin prick sensation was absent on the **right** side of the lower body and leg from the level of the umbilicus down.
4. Pin prick sensation was normal on the entire **left** side of the body.

a. What **SIDE** is the lesion on: _____

b. What is the most likely **LEVEL** (e.g. caudal pons, T2 of spinal cord, dorsal part of postcentral gyrus, etc.) where the lesion would be found: _____

Draw a *cross-sectional* diagram (similar to your slides/**not** a longitudinal drawing) showing a damaged area of the nervous system that would produce these symptoms. Indicate on your diagram the **POSITION** and **NAMES** of structures (tracts or nuclei) damaged.

ANSWERS

1. ventral white commissure of spinal cord C6-C8; Recognize the symptoms of bilateral loss of pain and temperature producing a “suspended” sensory loss as a sign of SYRINGOMYELIA. This condition produces a single lesion that interrupts crossing pain and temp fibers in the ventral white commissure of the spinal cord.
2. mid/rostral pons or midbrain; Left side; VTT and medial lemniscus. At this location, the VTT contains second order trigeminal fibers for both tactile and pain/temp systems. The close proximity of VTT to the medial lemniscus makes it certain to be included in a lesion. The lateral spinothalamic tract may or may not be included in a lesion in this area. Especially at the more rostral locations, the pain fibers move laterally to separate themselves from medial lemniscus.
3. rostral or caudal medulla; Left side; spinal trigeminal tract and spinothalamic tract; This produces an ipsilateral loss of pain and temp for the face but a contralateral loss of pain and temp for the body.
4. posterior portion of paracentral lobule in Right hemisphere; the fast pain component terminates in the postcentral gyrus and paracentral lobule, which are involved in localization of a noxious stimulus. Inability to localize a noxious stimulus would be caused by a lesion in this area. The foot is represented in the posterior portion of the paracentral lobule.
5. Left ALS at level of T2; a lesion in the spinal cord ALS produces a contralateral loss of pain and temperature starting at a dermatome 2 levels below the lesion and including the entire body below.
6. Left half of spinal cord at level T8; recognize the symptoms of loss of tactile sensation on one side of the body and loss of pain and temperature sensation on the opposite side of the body as the Brown-Sequard syndrome that localizes the lesion to the SPINAL CORD.