Hemisection model information sheet

Regions of the body affected by a left-sided hemisection (Brown-Séquard syndrome) of spinal cord thoracic segments are illustrated in the drawing below and in the hemisection model.

The hemisection drawing and model illustrate the effect of a hemisection on three specific pathways: the dorsal column medial lemniscus pathway, the spinothalamic pathway and the corticospinal pathway.

The blue shading, green shading and black diagonal line areas in the drawing below represent lesioned fibers that are shown in the model.



Blue shading represents lesion of the left dorsal columns (i.e. neurons that enter the left side of the spinal cord). The functional deficit is perceived on the side of the body ipsilateral to the lesion.

Green shading represents lesion of the left spinothalamic tract (i.e. neurons that enter the right side of the spinal cord). The functional deficit is perceived on the side of the body contralateral to the lesion.

Black dashed lines represents lesion of the left corticospinal tract (i.e. neurons that originate in the right cerebral hemisphere). The functional deficit is perceived on the side of the body ipsilateral to the lesion.

The model shows two thoracic transverse sections of the spinal cord with undamaged spinal cord tracts (straight wires) and damaged tracts (bent wires). The lesion site is indicated by the silver clip compressing the wires.

Spinothalamic tract damage: Loss of pain and temperature sense occurs contralaterally below the level of the lesion (green shading in drawing and green wire on model).

Dorsal column damage: Impaired joint position sense, impaired vibratory sense and loss of discriminatory abilities occur ipsilaterally below the level of the lesion (blue shading on drawing and blue wire on model).

Corticospinal tract damage: Upper motor neuron lesion signs are present in muscles innervated by neurons originating in spinal cord segments ipsilateral to and below the level of the lesion (**diagonal black lines** on drawing and black wire on model).

Hemisection causing damage to Dorsal column, Spinothalamic tract and Corticospinal tract

This model shows a lesion of the left side of the spinal cord at the thoracic level.

Blue wire represents lesioned left dorsal column (i.e. the ascending fiber bundle in the left side of the spinal cord, note that these neurons entered the left side of the spinal cord).

Green wire represents lesioned left lateral spinothalamic tract (i.e. the ascending fiber bundle in the left side of the spinal cord, note that these neurons entered the right side of the spinal cord)

Black wire represents lesioned left lateral corticospinal tract (i.e. the descending fiber bundle in the left side of the spinal cord, note that these neurons originated in the right cerebral hemisphere)

Straight wires indicate undamaged tracts Bent wires indicate damaged / lesioned tracts