Introduction: In 1965, Pat Wall (who died August 8, 2001) and Ron Melzack published their paper in Science, entitled a 'New Theory of Pain'(1) The Gate Control Theory of Pain is a mechanism, in the spinal cord, in which pain signals can be sent up to the brain to be processed to accentuate the possible perceived pain, or attenuate it at the spinal cord itself. (2) The 'gate' is the mechanism where pain signals can be let through or restricted. One of two things can happen, the gate can be 'open' or the gate can be 'closed': (2) ● If the gate is open, pain signals can pass through and will be sent to the brain to perceive the pain. (2) ● If the gate is closed, pain signals will be restricted from travelling up to the brain, and the sensation of pain won't be perceived. (2) If someone experiences a painful (noxious) stimulus, the application of a non-noxious (soothing or light rubbing) stimulus can help activate the gate control mechanism , and reduce the pain. (3) There are also other factors which can help facilitate the pain gate mechanism in reducing the perceived pain. These will be further outlined belowFactor affect the gate: The gate control theory suggests that finding ways to close the gate between the spinal cord and brain may help reduce pain. There are several strategies you can use to do this.(4) i. Focus on something else. Have you ever been in pain, then noticed that the pain decreased while talking to a friend on the phone or when watching your favorite TV show? Finding a way to distract yourself is one way to get the gate to close, thereby reducing your pain. II. Get regular exercise. Being in good physical shape is another way to stop pain signals from making it to the brain. The Physical Activity Guidelines for Americans recommend getting at least 150 minutes of moderate-intensity activity a week. If you have a chronic health condition (such as chronic pain), the recommendation is to stay as active as your condition allows.(5) III. Relax. Find ways to relax, such as by taking walks in green spaces or curling up on the couch with a good book. Progressive muscle relaxation (PMR) is another option. One study found that practicing PMR helped reduce pain severity in patients with gynecologic cancer who were being treated with chemotherapy.(6) Other research notes that relaxation therapy with guided imagery appears to ease post-operative pain.(7) IV. Stay optimistic. Another way to keep pain signals from reaching the brain is to develop an optimistic outlook. Work to stay positive and do things that make you happy. Research supports that happier people tend to have less intense pain while people who worry a lot often experience greater pain intensity.(8) V. Use counter-stimulation techniques. Massage, a heating pad, and acupuncture are all techniques that may help inch the gate shut. Make these a part of your self-care routine to help keep pain at bay. Stress, tension, focusing on the pain, and a lack of activity can all make the gate open instead of close.(4) So, avoiding or limiting these factors whenever you can may be helpful in reducing pain. Site of the gate : The pain gate mechanism is located in the dorsal horn of the spinal cord, specifically in the Substantia gelatinosa. The interneurons within the Substantia gelatinosa are what synapse to the primary afferent neurons, and are where the gate mechanism occurs.(2) Thus, the substantia gelatinosa modulates the sensory information that is coming in from the primary afferent neurons.(3) Primary neurons come in three different types: ● A-⚿ fibers, large diameter fibers, have a quick transmission of impulses, due to their myelination(2) – these type of fibers are activated by non-noxious stimuli, such as light touch, pressure, and hair movement. (10) ● A-⚿ fibers, a smaller diameter fiber(2) – they are thinly myelinated, and are stimulated by noxious stimuli, such as pain and temperature, specifically sharp, intense, tingling sensations. (10) ● C fibers, similar to A-⚿ fibers, have

the slowest transmission of impulse since they are not myelinated(2)– these type of fibers are activated by pain and temperature, namely prolonged burning sensations. (10) If the interneurons in the substantia gelatinosa are stimulated by the non–noxious large diameter A– fibers, an inhibitory response is produced and there are no pain signals sent to the brain, and in this instance the 'pain gate' is closed. (2)(3)