

# The Facilitated Segment

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**T**he "facilitated segment" is a subtle and yet extremely powerful bond between the musculoskeletal system (with all of its accoutrements, fascia, ligaments, tendon, etc.) and the various visceral systems throughout the body.

The word "facilitated" is usually considered in a positive way. It is defined as: having been assisted, made easier or helped with forward progress. In the context of the "facilitated segment", it signifies that something has been made too easy, helped too much, i.e., the segment has lost some of its inhibitory control factor. So it overworks and it does so indiscriminately.

The word "segment" signifies one of the parts into which the item in question may be most naturally divided or sectioned. Tapeworms come in segments as do news broadcasts and spinal cords. It does *not* mean that the longitudinal connections that interconnect segments are insignificant. It does mean that if we were to stress the whole tapeworm, spinal cord or news broadcast by tractioning the two ends away from each other it would most easily divide in certain places which are located between segments.

In the context of a functional vertebrate (and in our context, human) nervous system, a "facilitated segment" of the spinal cord refers to a segmentalized section which is more easily activated by a stimulus than is necessary in order to provide optimal service to the total organism. In the case of the "facilitated segment" a very small stimulus which might otherwise be censored out may cause an inappropriately large and indiscriminately wide-ranged neuronal re-

sponse. This response impacts all of the organs and tissues innervated by the spinal cord segment which is "facilitated". In addition, the "idling speed" or "baseline electrical activity" of the "facilitated segment" is turned up all the time. Therefore, 24 hours a day those organs and tissues connected to the "facilitated segment" are bombarded at an inordinately higher than normal level by the electrical impulses conducted to them by the nerve roots, trunks and branches which are related to the "facilitated segment". As if this weren't enough the "facilitated segment" also has its autonomic connections. Via these connections the baseline activity of the autonomic nervous system is turned up. Most often "facilitated segments" connect to the sympathetic nerve chains of the autonomic nervous system. The extra energy which is fed into the sympathetic system by the "facilitated segment" converts into "stress response" involving excess demand upon the cardiovascular system, the adrenal glands, and the reticular alarm system. So you see there is a whole body effect resultant to a chronically "facilitated segment", in addition to the more focused and powerful localized or

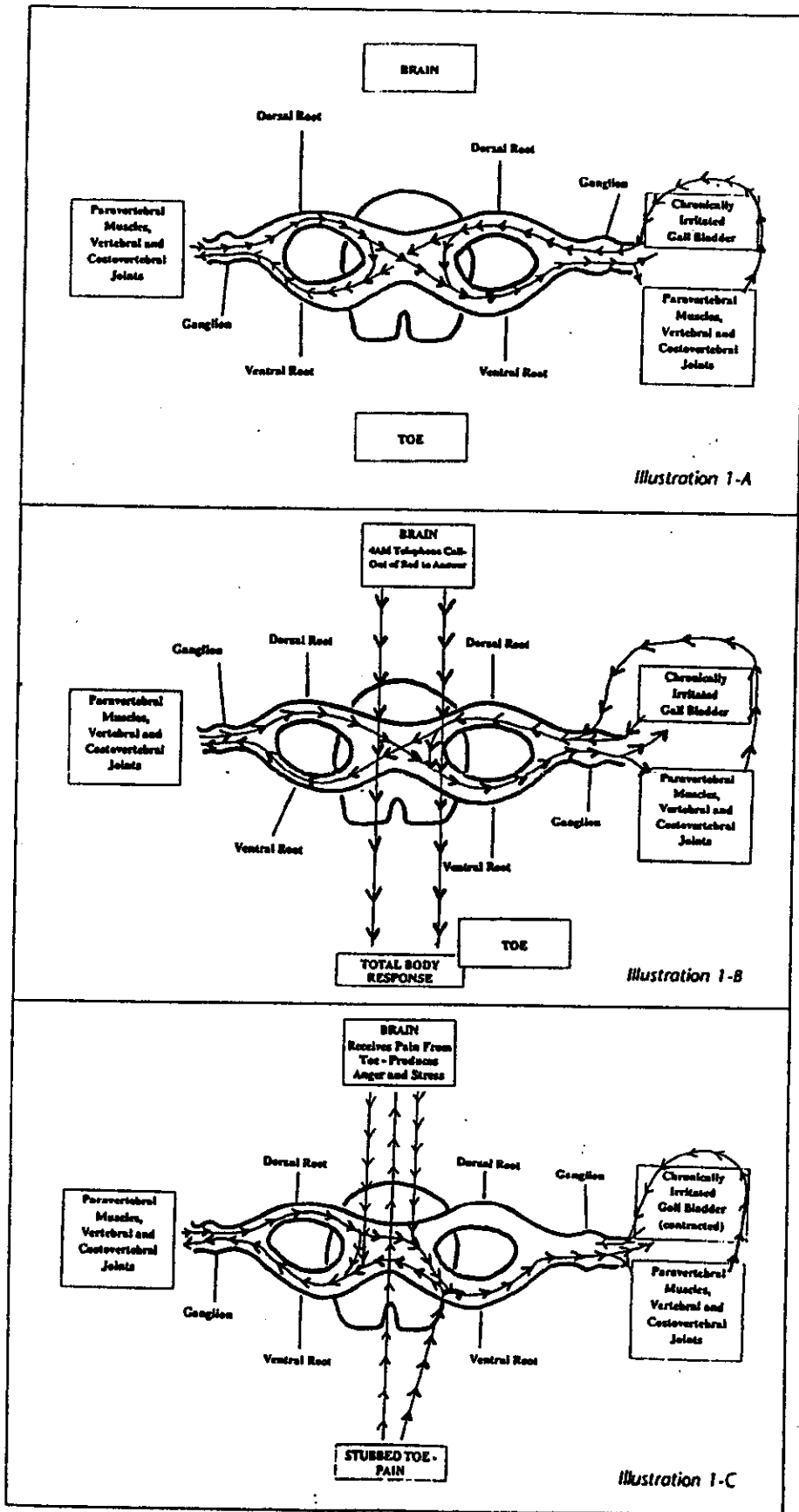
regional effect.

Before we continue with the effects of the chronically "facilitated segment" of the spinal cord, we need to remind ourselves that each segment of the spinal cord is connected with all other segments and ultimately with the brain by the numerous longitudinal nerve fiber tracts. Nerve impulses traveling up and down these fiber tracts, as they perform their normal duties, are quite capable of activating the "facilitated segment" as they pass through it. As an example, (see Illustration 1-A), let's suppose that I have a "facilitation" of the 10th thoracic spinal cord segment. This "facilitated segment" connects to (among other things) my gall bladder. It has been facilitated for several months so that my gall bladder has been chronically bombarded by an excess of nerve impulses for this period of time. The result of this situation is a hyperirritability of the gall bladder. It overresponds to small amounts of fat in my meal. I also have chronic hypertonus of the paravertebral muscles of the T-10 areas as well as joint stiffness. To continue with our hypothetical scenario let us say that at 4 a.m. I am awakened by a telephone call. (See Illustration 1-B) Enroute to the phone I stub my big toe (right side for those obsessed by detail) on the leg of the bed. This "stubbing" of the toe is painful. It causes sensory nerve impulses to go up the spinal cord. (See Illustration 1-C) I reflexly grab my right foot with my hands and hop on my left foot for a few seconds. As the nerve impulses continue up the spinal cord they pass through the 10th thoracic segment which is chronically "facilitated". This segment of my spinal cord overresponds and my gall bladder inappropriately



*The development of the subtle evaluative and treatment approach of CranioSacral Therapy is largely due to Dr. John E. Upledger, an osteopathic physician and surgeon. Founder and Director of*

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contracts and stays that way. It becomes dysfunctional. Incidentally the 10th thoracic also innervates related intervertebral and paravertebral muscles which become hypertonic as the 10th thoracic segment in its state of chronic facilitation overreacts. This segment also offers some innervation to the related meninges. The excess impulses may cause some meningeal irritation the effect of which we will discuss below.

I probably won't notice the effects of the hyperresponse of the facilitated 10th thoracic segment right away because the impulses from my toe will ascend to my brain and I'll start "cussing" at the telephone, the leg of the bed and my toe. This preoccupation with toe pain in addition to trying to get to the phone will take my mind off of the lower thoracic region of my back and my gall bladder for the time being. However, once stimulated it takes a while for the "facilitated segment" to quiet even to its hypernormal baseline idling speed. In the morning when I have a little cholesterol-free margarine on my whole wheat toast I will still suffer some indigestion because even cholesterol-free margarine is made up of fat. Fat digestion requires bile. My gall bladder is already hypercontracted because its related spinal cord segment is facilitated and because I stubbed my toe and my general stress level went up due to the telephone call at 4 a.m. (which only resulted in my listening to some heavy breathing and a few obscene remarks). (See Illustration 1-D) Imagine, gall bladder dysfunction and morning indigestion because I stubbed my toe and answered an obscene prank telephone call at 4 a.m. And due to the same incident my lower thoracic paravertebral muscles are tight and sore, but they are always a little tender. You see what a "facilitated segment" can do? And this is on the local level. It does not consider the autonomic whole body effect.

The spinal cord segment which we saw in Illustration 1 is composed of two dorsal sensory roots which enter the spinal cord, one on the right side and one on the left side. And there are two ventral motor roots at the same transverse level, which exit the spinal cord one on the

right side and one on the left side. These roots are interconnected both ipsilaterally and contralaterally within their segment by internuncial neurons. In addition they connect with neurons which make up the longitudinal fiber tracts. In this way the spinal cord segments are somewhat independent units. But all of these units are interconnected via the longitudinal nerve tracts which go up and down the spinal

pulmonary systems.

The liver and gall bladder will usually relate to spinal cord segment Thoracic 5 through 11 on the right side with the gall bladder usually most directly related to the 10th and 11th thoracic segments. The stomach most often relates to the 11th and 12th thoracic segments. The ovaries will generally relate to the 12 thoracic segment.

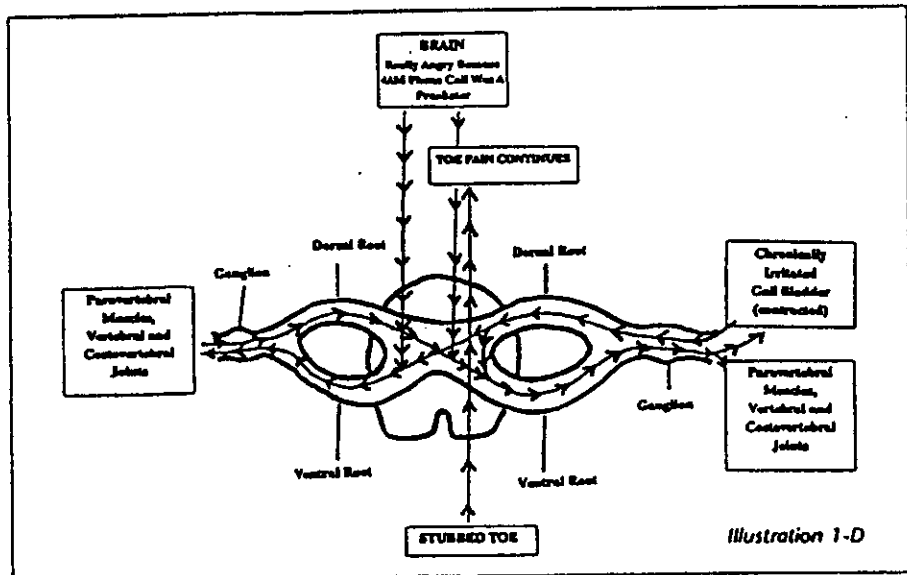


Illustration 1-D

cord and connect with the brain.

The human spinal cord under normal conditions is segmentalized into 8 cervical, 12 thoracic, 5 lumbar, 5 sacral segments and a coccygeal nerve. These spinal cord segments are not to be confused with the vertebrae. The names are the same and the spinal column is segmentalized, but we are speaking here of nerve not of bone. In general these segments are related to visceral organs as follows. (Remember there is room for individual variation. This variation is usually a question of a spinal cord segment above or below being also involved, like a segmental overflow of innervation which sometimes occurs and sometimes does not.) In general however the lungs and bronchi are related to spinal cord segments thoracic 1 through 6. Cardiac muscle seems especially related to the 4th thoracic segment, but it may relate to any of the upper 6 thoracic segments. Remember also that the vagus nerve has great influence on cardiac and

Other intestinal and pelvic organs will generally relate to the lumbar and sacral spinal cord segments respectively.

Now let's take a more detailed look at the "facilitated segment" per se.

In illustration 2 we see the interconnections and potential sources and effects of stimulus input (afferent) from any of the organs and tissues shown on the right. Now let us say that the input becomes chronic as it would in the case of a prolonged irritation of the lung due to smoking, or as it would on the stomach in the chronic overuse of tabasco sauce and jalapeno peppers. There is a prolonged input of sensory stimuli into the spinal cord via the dorsal root. The impulses can go out the efferent ventral root on the same side and they can cross over to the efferent root on the opposite side. Some impulses may enter the ascending tracts to the brain and be perceived as pain or discomfort. In any case as the stimulus continues to enter the segment in question over time, the ease with which the

impulses travel the pathways is increased. The segment becomes "facilitated". The tone goes up, the skin, muscles, fasciae, ligaments, tendons, viscera, vascular structures, glands and meninges all become overactive because they are now all being bombarded by excess impulse. It does not take long before the muscles related to the facilitated segments become hypertonic, the fasciae and other connective tissues become edematous and toxic and the meningeal structures become irritated and swollen. Now let's say that our patient/client who has been smoking and eating hot condiments for years listens to some good advice and stops these habits. The stimulus input from the lungs and stomach to the "facilitated segments" due to these external irritants (smoke and pepper) ends. But the connective tissues have been contracted, edematous and toxic for some time. The related bony joints are hypomobile. There is enough stimulus input from these tissues and structures to keep the hypersensitive "facilitated segment" in its overactive state. Now the patient says, "I stopped my cigarettes and my peppers but I still cough and have stomach pain. Besides that my back hurts all the time up between the shoulder blades." The facilitation is self-perpetuating now because the input of the joints, muscles and connective tissues keeps it going. This facilitation keeps the lungs and the stomach hyperirritable even though the smoke and peppers are no more. In addition the meningeal sleeves over the nerve roots may be swollen. This condition will also keep the level of stimulus input elevated and feed the condition of "facilitation". Time may allow the facilitation to quiet down or it may continue. Therapeutic intervention in the form of hands-on massage, CranioSacral Therapy and joint mobilization will defacilitate the involved segment much more quickly and surely.

The application of therapeutic massage which relaxes the hypertonic muscles and alleviates the edematous and toxic conditions of the connective tissues will most certainly reduce the stimulus input to the "facilitated segment", thus assisting in the process of defacilitation

by helping to interrupt the self-perpetuating facilitative process.

CranioSacral Therapy™ seems to be able to alleviate the meningeal irritation. This in turn reduces stimulus input to the segment involved. Additionally it assists in the process of muscle relaxation and the movement of tissue fluids. Therefore massage and CranioSacral Therapy™ both work systemically in the alleviation

facts are lost.

3. Dysautonomia - Sympathetic chain ganglia are bombarded with an excess of electrical impulses via the ventral nerve roots. The general tone of the sympathetic nervous system goes up and stays up. This lessens all restorative processes such as healing and recuperation. Instead the total organism and all of its components are placed on ready-alert.

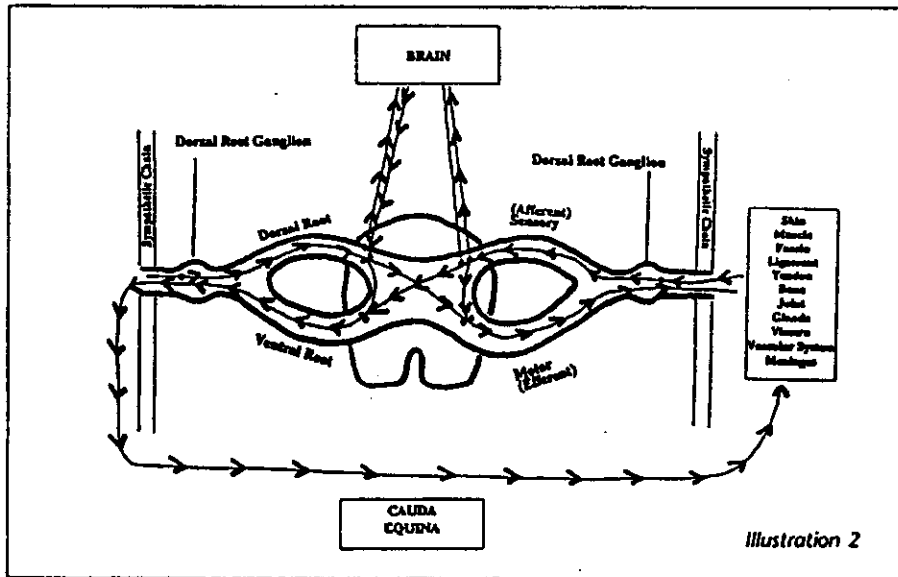


Illustration 2

of the "facilitated segment" and its detrimental whole body effects. A wide variety of joint mobilization techniques can be used to restore motion if immobility persists after soft tissue release has been achieved.

In review, let's look at those effects of the "facilitated segment" on the whole body.

1. Hypersensitivity - A smaller stimulus can cause the "facilitated segment" to activate. Therefore irritants and stimuli that are normally tolerated by the organism may cause inappropriate energy-consuming responses.

2. Hyperactivity - The "facilitated spinal cord segment" overreacts. Not only does it require a smaller than usual stimulus to cause segmental activation - the activation is general and high energy. It loses selectivity for a specific muscle or organ. Not only will the intended muscle receive the impulse, but everything the segment innervates will be activated. Dampening and inhibition ef-

The aging process in all tissues and organs is accelerated. Hallmarks of this condition are coronary artery disease, stomach ulcers, adrenal exhaustion, hypoglycemia, chronic fatigue, reduced effectiveness of the immune system and deterioration of connective tissue to name a few.

In addition, the elevated level of sympathetic nerve activity causes the parasympathetic system to attempt a balance. Parasympathetic nervous system activity goes up. Digestive function is affected. Cardiovascular balance becomes a sympathetic-parasympathetic tug of war. The cost in terms of good health is unimaginable.

4. Dystrophic Function of End Organs - The nerve cell body when allowed to function normally manufactures large molecules of protein. These proteins are transported via the nerve fibers to the end organs where they provide a vitalizing function. When the nerve cell body is in a facilitated state, it does not

seem to have energy left over for the synthesis of these proteins. The end organs thus deprived of all or part of these protein substances become partially devitalized. Thus in the case of our pepper-eating, cigarette-smoking client, the end organs related to the 1st through the 6th thoracic spinal cord segments would be somewhat deprived of these proteins. The delivery of the protein substance to the end organ and the vitalizing effect is spoken of as the "Trophic Effect". Therefore the trophic effect on the stomach, lungs, bronchi, heart, major blood vessels in the upper chest, related intercostal, intervertebral and paravertebral muscles, upper thoracic joints and ligaments and so on would be at least partially lost.

Our patient, due to the reduction of trophic effect (dystrophy), might develop increased kyphosis, myofasciitis, reduced pulmonary capacity, heart disease, chronic bronchitis, lung cancer and infection. Would you believe that appropriate work with muscle, connective tissue, bones and joints and the CranioSacral System might prevent all or most of the sequelae?

In terms of general health the assistance which can be rendered by deep tissue work, joint mobilization and CranioSacral Therapy™ is immense. Defacilitation of spinal cord segments may well change the fate of an individual headed towards certain disaster. Think about it. ■

## References

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For information on CranioSacral Therapy™ and joint mobilization workshops contact The Upledger Institute, 11211 Prosperity Farms Road, Palm Beach Gardens, Florida 33410, (800) 233-5880.