CONDITIONAL FACILITATION & CONDITIONAL INHIBITION

Notes p. 9-10

The ability of a muscle to respond to the demands placed on it has a great deal to do with the activity of the motor neurons to that muscle which reside in the anterior horn of the spinal cord. Facilitation refers to increasing the ability of neurons to fire. Inhibition refers to decreasing the ability of neurons to fire.

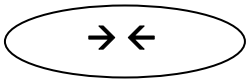
The terms "conditional facilitation" and "conditional inhibition" refer to changes in the motor neuron pools in the spinal cord under the conditions of the moment and hence, the relative ability of a muscle to respond to demands placed on it at that moment. These terms are used because conditions in the spinal cord are constantly changing. For example, note that when we walk, the flexors and the extensors of the limbs are alternately contracting (due to conditional facilitation) and relaxing (due to conditional inhibition) and that these patterns are constantly in flux.

In general, muscles which are conditionally inhibited do not perform well. Muscles which are conditionally facilitated do respond well. Muscles can also be conditionally over facilitated in which case they tend to be tight and have decreased ability to be stretched, which is called increased "tone" of the muscle.

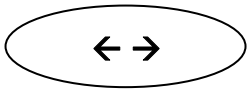
Muscle Belly Directional Manipulation Technique

Digital pressure to the belly of the muscle has been demonstrated clinically to alter conditionally facilitated or inhibited responses during gross motor assessment (manual muscle testing) in two particular manners:

1. Pressure in the belly of the muscle in a direction toward the ends of the muscle presumably stretches the muscle spindles in the belly creating a short-lived facilitated response of the muscle.
2. Pressure in the belly of the muscle in a direction toward the center of the muscle belly presumably reduces facilitation from the muscle spindles and results in a decrease of muscle spindle facilitation, or a net effect of a short-lived inhibited response of the muscle.



Causes a conditional inhibition (weakening response)



Causes a conditional facilitation (strengthening response)

Muscle belly directional manipulation may be used to reduce over facilitation of a muscle. This may be used in many different cases, from reducing the effects of a muscle cramp to altering muscle tone (and hence increasing range of motion) in neurological pathological situations such as in brain injured children or adults (e.g., following birth injury, stroke or other brain trauma.)

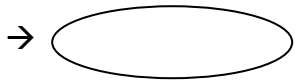
It is also useful in restoring normal activity to a conditionally inhibited muscle following trauma to a muscle belly.

Muscle Tendon Directional Manipulation Technique

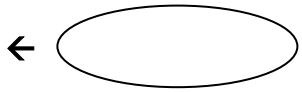
Digital pressure to the tendinous attachments of a muscle has also been demonstrated clinically to alter conditionally facilitated or inhibited responses during gross motor assessment. There are two effects which may be achieved:

1. Pressure on the tendon (at either the musculotendinous and/or tendoperiosteal insertions) toward the belly of the muscle creates a short-lived facilitated response in most cases of conditionally inhibited muscles. It may have a long-lasting facilitating effect in restoring a conditionally inhibited muscle following injury to a muscle's tendinous attachments, which is a common occurrence with trauma. This is particularly useful approach following muscle trauma. (See Origin-Insertion Manipulation Technique below.)
2. Pressure on the tendon in a direction away from the belly / towards the ends usually results in a short-lived net inhibition effect to gross motor assessment of the muscle.

Like muscle belly directional manipulation, muscle tendon directional technique may be used to reduce over facilitation of a muscle. This may be used in conjunction with muscle belly manipulation in many different cases, from cramps to neurological pathological situations such as described above.



→ ← Causes a conditional facilitation (strengthening response)



← → Causes a conditional inhibition (weakening response)

Origin-Insertion Manipulation Technique

In 1964, George Goodheart, D.C. found that conditionally inhibited muscles could usually become facilitated by hard, heavy pressure to the origin and insertion of the muscle. (It was ten years later, in 1974, that the directional muscle belly and muscle tendon manipulations were found to create the patterns of facilitation and inhibition discussed above.) Goodheart observed that this origin and insertion manipulation was most valuable and lasting when used following an injury to a muscle. The muscle trauma could be from either a unique injury or from repeated microtrauma and the response was the same.

Origin-Insertion Manipulation Technique Plus Injury Recall Technique

With the addition of injury recall technique, origin-insertion technique is a powerful tool in normalizing function following trauma. The musculotendinous and/or tendoperiosteal insertions are usually indurated and tender following trauma, and manipulation on these insertions, in a direction toward the belly of the muscle (muscle tendon directional manipulation technique) is performed in conjunction with IRT to the talus, or in the case of cervical muscles, the atlanto-occipital area.