

Pattern recognition and modification through DFA or the Duggan/French Approach

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Muscles tonus is at the physical base of all human behaviour and experience. It determines not only the way we perceive ourselves and the world but the quality of all our movements and even our rest. No hypertonic muscle exists without at least one hypotonic muscle to compensate it and keep the overall tonic-postural balance we have developed as we grew up, our primary patterns of holding, movement and behaviour.

Both hypertonic and hypotonic muscles contribute to the development of many diseases and discomforts of the physical body as well as the mind. The Duggan/French Approach, developed by Annie B. Duggan and Janie French, works at the interface of body and mind, in the place where the alpha and gamma motor systems link. DFA combines work with the physical shape of the body by means of a series of characteristic manipulations, work with the emotional and mental contents of this shape as well as the education of movement, body awareness and our relationship to the force fields we are living in, mainly the gravitational field, but also the force field of our family, and other systems we belong to. (4)

As hypertonic muscles relax and learn to move with more freedom, hypotonic muscles begin to participate in the activities of life and develop a more vital tonus. DFA clients then gain freedom of movement, responsiveness, a fuller sense of themselves as an individual and as a part of life and the world itself. Also their health improves as they are more aligned with gravity, themselves, and their place in the world. (4) In this study I would like to present my hypothesis as to how the physical manipulations of DFA work. In this context I will not go any further into the domains of emotional process and education.

On the physical level, DFA uses a series of body segment manipulations in order to obtain significant increases in joint range of motion as well as in flexibility and responsiveness of soft tissues. These manipulations inhibit resistance to stretching and influence neuromuscular mechanisms through two elements which are particularly important in them: muscle spindles and Golgi tendon organs (GTOs) and their respective reflex arches. These reflex arches link alpha and gamma motor systems and make it possible to influence tonic-postural mechanisms in relationship to gravity.

Through their reflex arches, the receptors of the spindles and the GTOs keep our movements within the range of the muscular tonus, which we know as "normal". Normal muscle tonus keeps our postural balance within our habitual holding patterns, movement and behavioural patterns; it influences our motor skills which in the beginning we learn with much attention but then, as time goes by and we get used to them, they also become habitual patterns; we may say, it *in-forms* the shape of these patterns, which the gamma motor system knows as important for survival. Usually, its activity remains outside our awareness. By means of its characteristic manipulations, DFA is able to influence this tonus

and introduce changes into the range of what is "normal". The resulting contrast makes it possible to sensorially recognize the habitual pattern as such and to become aware of its emotional and mental contents in order to be able to develop a freer and more differentiated behaviour, as well as a body structure which is supported by gravity instead of having to struggle with it.

In order to understand how the DFA manipulations works, let us look at the complementary functioning of the muscle spindles, the GTOs and their respective reflex arches. (1, 3, 5, 6, 7)

The anulospiral receptors of the muscle spindles wrap around some muscle fibres. They are sensitive to changes in length, the speed of these changes and to pain. If intrafusal fibres are stretched rapidly, or beyond a certain length or point of pain, the spindles activate their reflex arches, i.e. they send afferent impulses to the spinal medulla to the associated alpha motor neurons, which send efferent impulses to the extrafusal fibres causing them to contract, the so called stretch reflex or myotatic reflex. Through a monosynaptic connection they excite the muscle they belong to as well as its synergetic muscles. Through an interneuron they inhibit the antagonist muscles. Also via various interneurons, they send information about the state of contraction of the muscle to the higher centres. (3) A shortening of the spindle eliminates the tension, and the terminations stop their response. Habitually, in this moment efferent gamma motor neurons come into action to proportionally increase the tension of the intrafusal fibres and keep up the habitual tonus; i.e. they stimulate their terminations in the polar extremes of the spindle to contract, resulting in a stretch of the equatorial portion which is wrapped in the anulospiral receptor and excites, once again, the stretch reflex to keep up the habitual muscle tonus. (7)

The GTOs are found in the collagen structures of the tendons close to the place where muscle fibres attach to the tendons. They are sensitive to the tension, which the muscle applies to the tendon when contracting. As this tension increases, the GTOs activate their reflex arches; i.e. they send afferent impulses to the spinal cord through one interneuron to the associated alpha motor neurons, which send efferent impulses to the extrafusal muscle fibres inhibiting their contraction, at the same time diminishing the tension of the antagonist musculature, making both adequate for each job at hand. (3)

All muscles have several reflex arches of both types –the small muscles of hands and feet even have a hundred and more spindles in one gram of muscle tissue (1)- to make sure that their fibres contract and relax just the right amount for correct execution of their job, as a part of complex human activity and in order to make sure that tonic-postural balance be kept within the range of the "normal" pattern.

There are several authors who describe an inverse stretch reflex brought about by stretching techniques. (1, 2, 3) In his studies of modified stretching techniques called proprioceptive neuromuscular facilitation (PNF), at the University of North Texas in Denton, William I. Cornelius, Ph.D., (2) found that the tension resulting from passive stretching and isometric contraction of the target muscle group stimulates the GTOs and, being held long enough for the signal of the GTOs to override the signal of the muscle spindles, the GTOs then provide the inverse stretch reflex, which inhibits contraction of the muscle, thus increasing the flexibility of soft tissues and the range of motions of the joints.

DFA manipulations also stimulate an inverse myotatic reflex, but they bring it about in another way. (8) In order to carry out the manipulations, DFA practitioners adapt their hands to the shape of the body part they are touching without trying to change it. They move the body segment with a sinusoidal and arrhythmic motion following the shape traced by the pattern of habitual holding, thus "going into" the joint, a bit beyond the shape held by habitual contraction. Duggan and French say the practitioner "goes into the shape" and "takes over the holding". (4) On one hand, like this a passive shortening of the muscles is achieved in a very brief lapse of time without any effort of the client.

On registering their intrafusal fibres shorter than habitual, the muscle spindles stop sending the signal, which stimulates the extrafusal fibres to keep their tonic contraction, so they relax. The gamma motor system is incapable of anticipating the non-linear, arrhythmic motion of the manipulation and cannot adapt the tonus back to what is habitual.

In a second phase of the manipulation, the new, more relaxed tonus makes it possible to "come out" of the joint, slowly lengthening and extending the tissue without stretching the fibres of the muscle spindle. As the gamma motor system does not register any quick stretching of the intrafusal fibres it would have to resist, it cannot stop the extension of the tissue through the spindle reflex arches.

An important factor throughout both phases of the manipulation is the verbal interaction with respect to the sensations being perceived in both positions. W. L. Cornelius also underlines the importance of verbal exchange for the stretching to be effective. (2) In the Duggan/French Approach, this exchange aims at becoming aware of sensorial perceptions as well as emotional and mental contents associated with those perceptions. While the DFA practitioner is taking over the holding and staying in the shape, s/he leads the client's attention towards the sensations that appear in relationship with that shape. With questions and contact statements s/he helps the person to recognize the sensations, which habitually remain outside their awareness, being considered simply "normal". (4)

As sensorial receptors as well as links between the alpha and gamma motor systems, muscle spindles and GTOs, stimulated through DFA manipulations, make this awareness possible. The contrast between the shape of the contraction, passively exaggerated, and the new, more extended and relaxed shape makes it possible to gather more differentiated sensorial information and describe it. The attention and time dedicated to describing sensations and finding or creating the words for that are important for the complex circuits of the interlinked systems of the older and newer parts of our brain to notice the new tonus as a possible option which can be recognized, remembered and repeated. With time, practice will make it possible to include this option into the range of what is "normal", a "normalcy" which is freer and richer, more variable, modest and beneficial than the "normalcy" of restrictive patterns and defensive habits. Like that, both body and mind are better equipped to respond adequately to whatever situation they find themselves exposed to.

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(34) 93 217 32 74

- (1) Alter, Micheal J., Los Estiramientos, Bases Científicas y Desarrollo de Ejercicios, Ed. Paidotribu, 1990
- (2) Cornelius, William L., Ph. D., Sports Medicine: Stretching technique maximizes range of motion, BioMechanics: Sports Medicine, 1999, 9902 sports 39-44
- (3) Fucci, M. Benigni; V. Fornasari, "Biomecánica del aparato locomotor aplicada al acondicionamiento muscular", Mosby/Doyma Libros
- (4) Hansmann, Brigitte, Con los pies en el suelo, Forma del cuerpo y visión del mundo, Icaria, Barcelona 1998
- (5) Juhan, Deane, Job's Body, A Handbook for Bodywork, Station Hill Press, New York 1987
- (6) Netter, F. H., Sistema nervioso, Anatomía and fisiología, tomo 1.1, Masson-Salvat Medicina, Barcelona 1987
- (7) Rosenzweig, Mark R., Leimann, Arnold I., Psicología fisiológica, McGraw-Hill, Madrid 1992
- (8) Schleip, Robert, The Golgi Tendon Reflex Arc As a New Explanation of the Effect of Rolfing, Rolf Lines Winter 1989, p. 18-20

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