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## Editorial

# Spasticity: To treat or not to treat?



### 1. What are we talking about?

To treat or not to treat spasticity... that's the challenge! Making this decision is the first and most difficult step, before choosing the optimal treatment. Why a patient should be treated is the most important issue and includes:

- questioning all potential causes of disability and potential subsequent consequences of spastic paresis by a careful examination to disentangle the possible neurological, orthopaedic, cognitive or other causes involved in the impairment;
- investigating the possible triggering factors of spasticity, and;
- defining the goals that should be customized for the individual in their environment. Tailoring the treatment strategy to meet the individual's precise and personalized objectives will increase the probability of success and satisfaction with the treatment.

Here, we use the term "spasticity" in the wider sense of muscle over activity, including spasticity *stricto sensu*, co-contractions of the antagonistic muscles, spastic dystonia, as well as involuntary movements such as synkinesia or spasms. Spasticity occurs in a multitude of neurological diseases in which there is an abnormal regulation of mono- and polysynaptic reflexes resulting from a wide range of aetiologies: acquired lesions of the central nervous system (whatever the cause: cerebral palsy, stroke, traumatism, infection or tumour), inflammatory chronic diseases such as multiple sclerosis, and degenerative disorders such as amyotrophic lateral sclerosis.

### 2. Clinical evaluation of spasticity?

Physicians must be aware that the consequences of spasticity vary by the period of the day, the activity performed by the patient, and the level of fatigue and stress. The clinical examination performed at rest is not always contributory and does not always allow for highlighting the troubles induced by spasticity. Thus, the individual must be assessed in some specific conditions and situations to allow for appropriate goal-setting (gait, transfers, dressing, etc.). A close interrogation of the individual is always necessary to identify the disabling situations and define the goals of treatment. Of course, the physician is aware that another source of variability of spasticity is the possible existence of nociceptive triggering factors, from urinary tract infection to painless fracture.

A sudden change in the character and severity of spasticity is a warning signal.

However, spasticity is only one component of the main disorders affecting motor control after a lesion of the central motor pathways devoted to motor command execution: first, the paresis with loss of motor control selectivity, then the muscle overactivity including spasticity, and also changes in contractile muscle properties and soft-tissue contractures due to immobility and spasticity. Moreover, the strong relation between motor control and sensory information is now well investigated. The role of sensory impairments must be questioned.

At the end of the examination, one should then be able to define one of 3 situations for the patient:

- spasticity is present but surely not the cause or the main cause of the complaint; no or a very limited positive effect would result from treating the spasticity;
- spasticity is present and surely causing part of the troubles but only part; then the treatment is expected to only have partial effect;
- spasticity is present and mainly causing the disability; the treatment is expected to have the best effect;

### 3. Which potential negative consequences of muscle over activity?

Spasticity leads to impaired motility, with consequences on functional activities. Voluntary movements may be hindered by spasticity or spastic dystonia, even in patients with fairly good motor control. In the same way, co-contractions of agonist and antagonist muscles may increase the impairment owing to muscle weakness. In the upper limb, spasticity may impair reaching, grasping and releasing objects. With the lower limb, spasticity may impair the swing phase of walking, active hip flexion, knee motion and active dorsiflexion of the ankle. Ankle equino-varus due to dystonia/spasticity of the tibialis anterior together with the tibialis posterior and the triceps surae as well as toe clawing can impair walking by modifying the stance phase of the gait cycle.

Muscle over-activity may lead to muscle contractures, requiring specific treatment. With or without secondary contractures, prolonged postures induced by spastic dystonia may be painful and unaesthetic, with a negative effect on comfort, sitting posture, nursing, washing, dressing and perineal hygiene. Pain during

passive or active movements can be due to abnormal prolonged postures, excessive muscle contracture and inflammatory tendon disease secondary to the excessive muscle tension.

#### 4. Selective motor nerve block (SMNB) in the strategy of treating spasticity

Before treating spasticity, one of the main questions is to ensure that the range of motion of the joint is still preserved or at least functionally adapted. Orthopaedic limitations can be due to muscle contractures or other joint limitations such as arthritis, adhesive capsulitis or heterotopic ossification. SMNB with local anaesthetic drugs performed by physical and rehabilitation medicine physicians allow for:

- distinguishing spasticity or dystonia from muscle contracture;
- predicting the potential functional outcome of long-lasting medical or surgical therapies such as neurotomy, phenol or alcohol blockade and botulinum toxin injection;
- predicting the potential detrimental effects of local treatment of spasticity: blockage of the distal branches of the femoral nerve can help in assessing the eventual unlocking of the knee before botulinum toxin injection in the rectus femoris or vastus intermedius; blockage of the median and/or ulnar nerve can predict the detrimental effect of neurotomy on holding objects; and blockage of the obturator nerve can help in predicting the negative consequences of treating hip adductor spasticity in patients with cerebral palsy;
- defining in some patients the surgical treatment strategies by predicting the amount of voluntary motor control in muscles antagonistic to the spastic deformity.

#### 5. Choosing the target of the treatment?

The benefit/risk ratio of various treatment interventions need to be thoughtfully considered because all are associated with adverse effects. Also, no treatment is absolutely and uniformly effective.

Questioning the individual on the impact of spasticity during daily life is mandatory, as is sometimes questioning relatives or caregivers. A careful clinical examination is needed to precisely describe the disorder in real functional situations. Scales and scores are designed to assess the effect of treatment; they can be a guide for the treatment decision by defining different goals. Instrumental assessment, such as video analysis and recording of gait temporo-spatial parameters, which are low cost and easy to perform, is recommended. 3-D gait analysis is common in children, especially before any surgical treatment. In some cases, electro-neuromyography can help choose the muscles to be treated.

#### 6. Defining the goal of the treatment?

The objective of treatment is not of course to reduce the symptom spasticity in itself but rather some consequences of the symptom or to prevent some complications of spasticity such as contractures or pain. Patients and physicians must agree on specific, personalized and realistic goals. This goal setting also improves communication between the medical team and the patient and carers. These goals need to be measurable. Goal Attainment Scaling (GAS) is probably the best tool to assess the effect of the treatment once precise goals have been defined with the patient. Finally, some specific goal can be defined for a particular patient and its achievement assessed by a visual analog scale. Finally, this approach for the decision to treat or not to treat must be always renewed, questioning the efficacy of the previous treatments and the need to change, renew or give up.

This special issue devoted to spasticity highlights some crucial, new or actualized points within this wide field: the spontaneous evolution of spasticity, botulinum toxins and antibodies, ways to improve the efficacy of the treatments, role of Chinese medicine and other non-pharmacological treatments, relative interest in neurosurgical procedures, management of spasticity in children with cerebral palsy, and acquired deforming hypertonia in older individuals.

#### Disclosure of interest

The authors declare that they have no competing interest.

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