

## Multiple Sclerosis, Spasticity and Tele-Rehabilitation During the COVID-19 Pandemic

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### ABSTRACT

Spasticity is one of the most frequently occurring symptoms of multiple sclerosis (MS) and requires a multidisciplinary team to manage it. During the COVID-19 pandemic, all non-essential elective procedures were stopped, and patients with MS discontinued physiotherapy with significant repercussions on spasticity and joint mobility. We present the case of a 56-year-old man who underwent a 30-day protocol of tele-rehabilitation in association with pharmacological therapy to manage spasticity. The use of common tools for tele-rehabilitation could improve the quality of care for people with MS during the COVID-19 pandemic.

### KEYWORDS

Multiple sclerosis, spasticity, tele-rehabilitation, COVID-19, case study

### LEARNING POINTS

- The use of common tools for tele-neurology and -rehabilitation could improve the quality of care for people with MS and reduce the consequences related to therapy interruption.
- Nabiximols and tele-rehabilitation do not seem to have a relevant effect on disability-related spasticity.
- The addition of tele-rehabilitation seems to have strengthened the benefits of nabiximols, reducing the symptom severity perceived by the patient.

### INTRODUCTION

Spasticity is one of the most frequently occurring symptoms of multiple sclerosis (MS) affecting more than 35% of patients. It is defined as a form of speed-dependent muscle hypertonia due to hyperexcitability of the tonic stretch reflex<sup>[1, 2]</sup>. The management of spasticity requires a multidisciplinary team, regular follow-ups and a combination of pharmacological and non-pharmacological interventions. Physiotherapy is the most common spasticity treatment but needs to be continuous and protracted over time<sup>[2]</sup>. During the lockdown due to the COVID-19 pandemic, all non-essential elective medical and surgical procedures were stopped. Consequently, patients with MS discontinued physiotherapy with

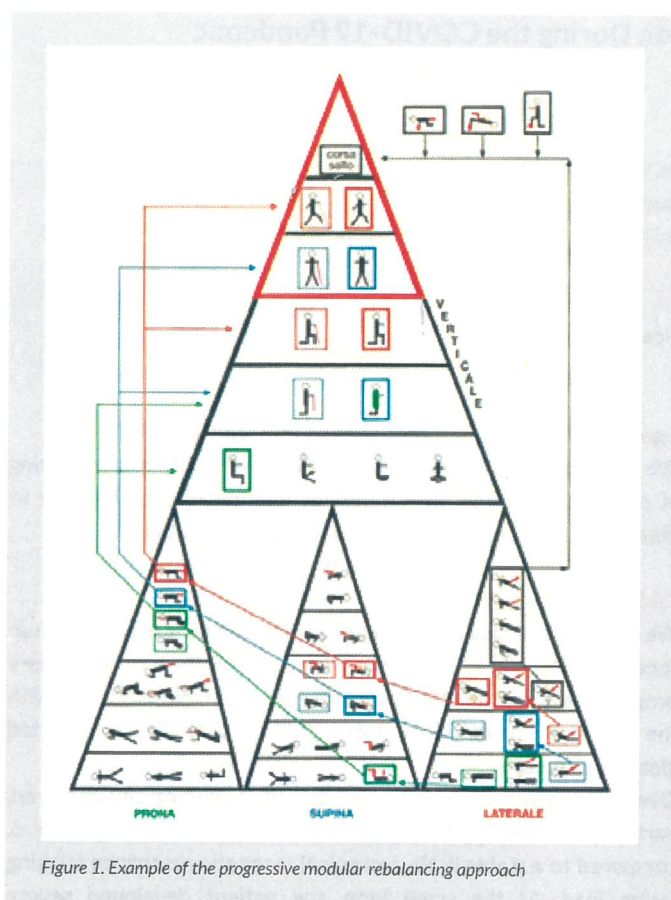
significant repercussions on spasticity and joint mobility<sup>[3]</sup>.

We developed a 30-day protocol of tele-rehabilitation consisting of physiotherapy in association with pharmacological therapy to improve the joint motility and spasticity of our patients.

### CASE DESCRIPTION

We describe the case of a 56-year-old man suffering from relapsing-remitting MS since 1997, who in 2005 shifted to secondary progressive MS. From 2005 to 2007, he was on mitoxantrone, with the last administration in October 2007. In July 2013, he started glatiramer acetate.

Over the years, a progressive clinical deterioration occurred, particularly affecting walking, with an actual EDSS score of 6, compared to a stable brain and spinal magnetic resonance imaging lesion load. At the same time, the patient developed severe spasticity in the lower limbs: the Numerical Rating Scale (NRS) was 7, the Ambulation Index was 5 and the 10 m Walk Test was 45 seconds. He was treated with baclofen 25 mg and physiotherapy and remained stable until March 2020 when, due to the recent COVID-19 pandemic, Italy entered lockdown, and non-essential adult elective medical and surgical procedures were stopped. After 1 month, the patient experienced a progressive increase in spasticity due to abrupt discontinuation of physiotherapy, with a consequent reduction in autonomy, and the appearance of pain due to spasms and contractures. We then added oromucosal nabiximols (Sativex®) and started a 30-day tele-rehabilitation programme. The exercises were chosen to strengthen the functions of the trunk, namely the inclinatory, flexor, extensor and rotatory muscles. A progressive modular rebalancing approach was used, which allows the recruitment and strengthening of structures, joints and muscles to improve skills and their overall function (Fig. 1). The exercises were tailored to the patient's characteristics and performed twice a day. The patient was evaluated before starting the programme (T0) and after the 30-day treatment (T1) with the following scales: EDSS, NRS, Ambulation Index and 10 m Walk Test. Fatigue was evaluated using the Fatigue Severity Scale (FSS), and quality of life was evaluated using the 36-Item Short Form Survey (SF-36). At T0, the EDSS was 6, NRS was 7, Ambulation Index was 6 and



Clinical studies indicate that spasticity is experienced very subjectively by patients, and individuals give different meanings to this symptom and how much it affects their lives. In addition, spasticity is associated with other symptoms, including an increase in the number of painful spasms, which can be triggered by movement, tactile stimulation or hyperventilation. Spasticity is also associated with increased frequency of sleep disorders, resulting from pain and contractions<sup>[5]</sup>. For this reason, therapy for spasticity should be personalized, combining non-pharmacological and pharmacological interventions<sup>[5]</sup>. From this viewpoint, the delta-9-tetrahydrocannabinol:cannabidiol (CBD) oromucosal spray nabiximols represented a valid add-on therapy for our patient. The ability to vary the number of puffs per day allowed us to choose the most appropriate dosage depending on the patient's needs. The best result in our patient was obtained on the NRS score for spasticity. This scale represents a completely subjective parameter for the patient, who assesses the severity of spasticity on a daily basis and according to his or her own judgment, to give a score between 0 and 10. Our patient reported a subjective improvement in muscle stiffness and an improvement in sleep quality. The addition of tele-rehabilitation seems to have strengthened the benefits of nabiximols, and the reduction in symptom severity perceived by the patient played an important role in the psychosomatic sphere and in his quality of life. Nevertheless, the effect on objective parameters, such as EDSS, was small, indicating that both nabiximols and tele-rehabilitation do not seem to have a relevant effect on disability-related spasticity.

In conclusion, the management of COVID-19 is the current healthcare priority in MS patients. The use of common tools for tele-neurology and tele-rehabilitation could improve the care quality for people with MS, because this avoids the interruption of outpatient services which could severely impact patient health assistance.

the 10 m Walk Test was 45 seconds. The mean FSS was 56 and the mean SF-36 was 84. The dosage of nabiximols was increased up to 7 puffs per day with no side effects, and, after 30 days of the tele-rehabilitation programme, the NRS score was reduced by 3 points. The Ambulation Index and the 10 m Walk Test remained constant, while the mean FSS was 48, and the SF-36 was 91.

## DISCUSSION

The current COVID-19 pandemic has resulted in a number of difficulties for patients with MS. Many people with MS were forced to stop their medical services with noticeable worsening of symptoms<sup>[3]</sup>. For this reason, tools for tele-neurology examination (including components of neurological examination that can be assessed through video), patient-reported outcome measures and digital technology have been developed to facilitate interaction with patients<sup>[4]</sup>.

Tele-rehabilitation allows real-time (or synchronous) interaction; all users (health professionals and patients) can exchange information instantaneously through media such as the telephone, virtual reality or video-conferencing platforms. The use of tele-rehabilitation can also be pragmatic and malleable, depending on the situation and needs of the patient and healthcare services alike.

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