

Neuromuscular diseases and physical activity

What are neuromuscular diseases?

Neuromuscular disease (NMD) encompasses a broad spectrum of disorders directly or indirectly affecting the control of the muscles generating general symptoms such as muscle stiffness, cramps, pain, paralysis and fatigue. It may also affect heart and breathing function [1]. Among the 600 diseases identified, the most frequently described NMDs include amyotrophic lateral sclerosis (ALS), spinal muscular atrophy, myasthenia gravis, Charcot-Marie-Tooth (CMT) disease and Guillain-Barre syndrome. The NMDs are mainly of genetic origin, but can sometimes be caused by a disorder of the immune system. The modifiable risk factors, if any, are not well described and most NMDs have no cure or available treatment. Current treatment aims to increase mobility, to lengthen life and to limit the decrease in quality of life.

What are the effects of physical activity on neuromuscular diseases?

Lack of exercise in NMD patients amplifies the deconditioning induced by disease. However, aerobic exercise may reduce this deconditioning and improve mobility, mood, sleep and quality of life in motor neuron disorders like ALS but also in the other NMDs like CMT disease, Duchenne muscular dystrophy, myotonic muscular dystrophy or metabolic myopathies [2, 3]. Resistance training appears to be beneficial in NMDs patients only if light to medium weights are used [3]. Targeted exercises for specific muscles (e.g. respiratory muscle training) might be more effective than aerobic and strength exercises alone. Respiratory muscle training is effective in the management of most NMDs, at least to limit the respiratory impairments induced by the diseases [3]. Stretching and flexibility exercises may limit the loss in joint mobility. Balance and proprioception training may help to prevent falls in NMDs patients as well [3]. In addition, physical activity could slow the progression of the disease via neuroprotective mechanisms [4].

What are the risks?

Exercise has been traditionally discouraged in the management of NMD. It appears as though highly repetitive and heavy-resistance exercises are detrimental, due to the incapacity to regenerate muscle fibers, especially in patients with motor neuron disorders like ALS [3, 5]. However, this risk depends mainly on the type of NMD. Patients with motor neuron disorders should avoid high-impact exercises and heavy-resistance exercises. The risk of fall is high and should be taken into account. Therefore, patients should exercise carefully in a supervised setting.

Recommendations

Physical activity is recommended in the management of NMD. Patients may need to overcome significant barriers (fatigue, balance disorders, muscle weakness, pain) to adherence of physical activity behaviours [3, 6]. The recommendations vary in relation to the nature of the disease. Patients may start with 10 minutes of aerobic exercise at submaximal levels (65% of the maximal heart rate) 2 or 3 days per week and progress. For motor neuron diseases and most of muscular dystrophies, low impact activities (e.g. stationary bike, aquatic activity) are preferred. In the majority of NMDs, resistance training could consist of the progressive increase in repetitions of maximal weight that can be lifted. In motor neuron diseases (e.g. ALS) and the majority of muscular dystrophies, light to medium weights must be used. In these diseases, more attention should focus on targeted exercises of certain muscles. In addition, breathing and balance exercises are strongly recommended. A caregiver may help the patient for certain exercises. Patients must inform their physician prior to beginning an exercise program [2, 3, 5].

References

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- Full references are available on www.sport-sante.lu

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