The Effects of Neuromuscular Electrical Stimulation and Kinesiotaping on Sitting Balance in Children With Cerebral Palsy

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OBJECTIVES
Postural control is the one of the main problems for children with cerebral palsy. The aim of this study is to investigate the effects of electrical stimulation and kinesio taping applications, which is applied in addition to neurodevelopmental treatment (NDT), on sitting balance in children with cerebral palsy.

METHODS
Forty five children between the ages 5-12 years, diagnosed with Cerebral Palsy were included in the study. They were at level GMFCS 3-4-5. The study was composed of 3 groups; NDT group (1), NDT+neuromuscular electrical stimulation (NMES) group (2) and NDT+kinesio tape+ NMES group (3). NMES was applied to paravertebral muscles in addition to NDT in the second group. Both NMES and kinesio taping were applied to paravertebral muscles in addition to NDT in the third group. The treatment applied for 6 weeks. Children were evaluated with manual muscle testing for abdominal and back extensor muscles, gross motor function classification system (GMFCS), gross motor function measure (GMFM), seated postural control measure (SPCM), modified functional reach test and WeeFIM before and after the treatment.

RESULTS
Significant differences were observed in abdominal and back extensor muscle strength in the second and third groups (p<0.05). The increase was higher in the third group. In post-treatment, significant difference was observed in GMFM in group 1 (p=0.003), 2 (p=0.001), and 3 (p=0.000). In the posture section of SPCM, significant differences were observed in the post-treatment period between the groups 1 (p=0.001), 2 (p=0.000), and 3 (p=0.000). Increase was higher in the third group in all parameters. There was no increase in the modified functional reach test in groups 1 (p=0.36) and 2 (p=0.06) but significant difference was recorded in group 3 (p=0.01) and there was significant difference in WeeFIM after the treatment in the groups 2 and 3 but the the increase was higher in the third group (p<0.05).

DISCUSSION
Sitting is a position that the child can carry out numerous functional activities and thus gain body control by purposefully using upper extremities. Among the fundamental approaches of CP rehabilitation is to provide the child with maximum independency and functionality in sitting position. Our study is among the first of its kind in which NDT, KT, and NMES applications were simultaneously used in the rehabilitation of individuals with CP. As a result of our administrations, while significant results of NDT were observed in all three groups in terms of motor development and sitting balance, the effects on group 3 that received NDT+NMES+KT proved to be more. While NDT was undisputedly an efficient method in the treatment of children with CP, utilisation of other approaches of treatments was concluded to especially increase the effect.

CONCLUSIONS
Application of kinesio tape and NMES in addition to NDT increases the trunk control and the functionality, and affects postural control and independence in the activities of daily living in children with CP. Thus quality of life is improved. Implementation of all these modalities in addition to NDT is more affective and has to be taken into account in implementing physiotherapy and rehabilitation programmes in children with CP.

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