Case Study

Effects of manual therapy with functional electrical stimulation on scoliosis curve in children with cerebral palsy

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Abstract. [Purpose] The purpose of this study was to investigate the effect of manual therapy with functional electrical stimulation (FES) on scoliosis curve and quality of life in children with cerebral palsy (CP). [Participants and Methods] Two children with CP performed 30 minutes of manual therapy and 30 minutes of FES three times a week for 3 months. The Cobb’s angle and Pediatric Quality of Life Inventory (PedsQL) score were assessed before and after the intervention. [Results] The Cobb’s angle and PedsQL score were improved after intervention. [Conclusion] Our results indicate that manual therapy with FES was effective for improving scoliosis curve and quality of life.

Key words: Cobb’s angle, Functional electrical stimulation, Scoliosis

INTRODUCTION

Cerebral palsy (CP) is group of motor disorders accompanied by sensory, cognitive, communicative, and behavioral impairments. The number of children with CP is increasing, as is the development of treatments for CP. In 2008, the annual prevalence rate of CP in the Republic of Korea was 3.2 per 1,000 births1). The prevalence of scoliosis, which is an alteration in the lateral vertebra curvature, ranges from 15 to 64% among children with CP2). Scoliosis causes a change in the breathing volume, pain, hip dislocation, and digestive problems3). Thus, scoliosis is one of the factors that must be managed in children with CP.

Conventionally, interventions for scoliosis have included physical therapy, spinal braces, and surgery. However, clear evidence for the efficacy of these techniques is lacking, and the results of studies focusing on scoliosis have varied. Of the potential treatment approaches, functional electrical stimulation (FES) has the advantage that it can be used regardless of the level of physical function. Ko et al. demonstrated that the median Cobb’s angle and trunk balance were significantly improved after home-based electrical stimulation for 3 months in children with severe CP4). However, there is a dearth of therapeutic evidence regarding the effect of manual therapy with FES on scoliosis curve. Therefore, the main purpose of this study was to investigate the effect of manual therapy with FES on scoliosis curve in children with CP.

PARTICIPANTS AND METHODS

Participants were two children: 1 boy (11 year-old, 121.5 cm in height, 20.4 kg in weight) and 1 girl (11 year-old, 125.3 cm in height, 15.4 kg in weight), both delivered at 38 weeks gestation. They were diagnosed with CP by a neurologist. Brain magnetic resonance imaging revealed a subdural hematoma on the posterior falx cerebella. The Gross Motor Function

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RESULTS

After manual therapy with FES, the Cobb’s angle of child 1 was improved, from 66.17 to 52.86 degrees. Child 2 also showed improvement in the Cobb’s angle, from 54.63 to 50.89 degrees. Furthermore, the PedsQL score of child 1 improved, from 5.43 to 9.78, and that of child 2 increased from 7.60 to 13.04. These results suggest that scoliosis curve and quality of life are improved after manual therapy with FES.

DISCUSSION

The main purpose of this study was to investigate the effects of manual therapy with FES on scoliosis curve and quality of life in children with CP. Our results showed that the Cobb’s angle was improved by 20% and 7% in child 1 and child 2, respectively, at post- compared to pre-intervention. Our result is consistent with a previous study that showed significant improvement, from 30.5 degrees to 26.5 degrees, in children with CP. Similarly, Dovorany et al. demonstrated that Cobb angles were reduced by 19 and 15 degrees, respectively, after 10 treatment sessions. In our study, the PedsQL scores of the children were 9.78 and 13.04, respectively. The values in the present study were lower than those in the previous study, which were for children with CP at GMFCS levels I–II. The present results also support a previous study showing a correlation between gross motor function and quality of life. Therefore, we recommend applying manual therapy with FES to adjust trunk alignment in children with severe CP. However, our study is based on two cases and should be interpreted carefully. There are two limitations to this paper. First, since this is a case study, future studies will require a randomized control trial. Second, in this study, we recruited children with severe CP. To generalize the results, further studies are required children at various GMFCS levels.

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Conflict of interest
None.

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