

## Effects of Intensive Rehabilitation Therapy on Sleep in Children with Developmental Disorders

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**Abstract :** Introduction: Sleep disturbance is common in children with developmental disorders (D.D.). Sleep disturbance has a variety of negative effects, such as behavior problems, medical problems, and even developmental problems in children with D.D. However, to our best knowledge, there has been no proper treatment for sleep disorders in children with D.D. Therefore, we conduct this study to know the positive effects of intensive rehabilitation therapy in children with D.D. on the degree of sleep disturbance. Method: We prospectively recruited 22 patients with a diagnosis of D.D. during the period of January 2022 through May 2022. The inclusion criteria were as follows: 1) a patient who would participate in the intensive rehabilitation therapy of our institution; 2) the age participant under 18 years at the time of assessment; 3) a child who has consented to participate in the study by signing the consent form by the legal guardian. We investigated the clinical characteristics of participants by the medical record, including sex, age, underlying diagnosis of D.D., and Gross Motor Function Measures (GMFM). Before starting the intensive rehabilitation therapy, we conducted a Sleep disturbance scale for children (SDSC). It contains 26 questions about children's sleep, and those questions are grouped into six subscales, such as Disorders of initiating and maintaining sleep (DIMS), Sleep Breathing Disorders(SBD), Disorders of arousal(DOA), Sleep-Wake Transition Disorders(SWTD), Disorders of excessive somnolence(DOES) and Sleep Hyperhydrosis(SHY). We used the t-score, which was calculated by comparing the scores of normal children. Twenty two patients received 8 weeks of intensive rehabilitation, including daily physical and occupational therapy. After that, we did follow up with SDSC. The comparison between SDSC before and after intensive rehabilitation was calculated using the paired t-test, and  $P < 0.05$  was considered statistically significant. Results: Demographic data and clinical characteristics of 22 patients are enrolled. Patients were  $4.03 \pm 2.91$  years old, and of the total 22 patients, 14 (64%) were male, and 8 (36%) were female. Twelve patients(45%) were diagnosed with Cerebral palsy(C.P.), and the mean value of participants' GMFM was  $47.82 \pm 20.60$ . Each mean value of SDSC's subscales was also calculated. DIMS was  $62.36 \pm 13.72$ , SBD was  $54.18 \pm 8.39$ , DOA was  $49.59 \pm 7.01$ , SWTD was  $58.95 \pm 9.20$ , DOES was  $53.09 \pm 15.15$ , SHY was  $52.14 \pm 8.82$ , and the total was  $59.86 \pm 13.18$ . These values suggest that children with D.D. have sleep disorders. After 8 weeks of intensive rehabilitation treatment, the score of DIMS showed improvement( $p=0.016$ ), but not the other subscale and total score of SDSC. Conclusion: This result showed that intensive rehabilitation could be helpful to patients of D.D. with sleep disorders. Especially intensive rehabilitation therapy itself can be a meaningful treatment in inducing and maintaining sleep.

**Keywords :** sleep disorder, developmental delay, intensive rehabilitation therapy, cerebral palsy

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