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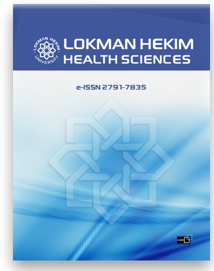

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CASE REPORT

Occupational Therapy for Sensory Processing, Gross Motor, Behavior, and Feeding Behavior in a Child with Prader-Willi Syndrome: A Case Report

Prader-Willi Sendromlu Bir Çocukta Duyu İşleme, Kaba Motor Beceriler, Davranış ve Beslenme Davranışına Yönelik Ergoterapi: Bir Olgu Sunumu

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Abstract

Prader-Willi syndrome (PWS) is a rare neurodevelopmental disorder caused by a deletion in the 15q11-q13 region. This study aimed to examine the effect of sensory integration-based occupational therapy on sensory processing, gross motor skills, behavior, and feeding in a child with PWS. A four-year-old child with PWS underwent sensory integration-based occupational therapy for 48 weeks, with two 40-minute sessions per week. Evaluations using Dunn Sensory Profile, Gross Motor Function Measurement, Child Behavior Rating Scale, and Pediatric Feeding Assessment were done before intervention and at the 16th, 32nd, and 48th weeks. Positive improvements in sensory processing, motor skills, behavior, and feeding were observed at each follow-up compared to the previous one. Evaluation of developmental areas and application of sensory integration-based occupational therapy in a child with PWS is an effective approach to support the child's development.

Keywords: Occupational therapy intervention; Prader-Willi syndrome; Sensory integration

Prader-Willi Syndrome (PWS) is a rare neurodevelopmental disorder caused by a genetic defect in the 15q11-q13 region of human chromosome. Its incidence at birth varies between 1/10,000 and 1/30,000.[1]

Children with PWS often present with developmental delays from an early age in multiple areas, including motor skills, cognitive functions, sensory processing, psychosocial adaptation, language and speech development, academic performance, behavioral regulation, and nutrition.[2] To support their developmental needs, multidisciplinary approaches such as physiotherapy, speech and language therapy, cognitive training, nutritional counseling, and behavioral interventions are commonly used and have been shown to contribute positively to these developmental

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domains.[3] In the literature, sensory integration-based interventions within the field of occupational therapy are widely applied in neurodevelopmental disorders and have demonstrated positive effects on sensory processing, motor skills, and behavioral regulation.[4–6] However, no studies have been found that address these developmental areas holistically and include sensory integration-based occupational therapy for a child with PWS. Accordingly, this study aimed to examine the effects of sensory integration-based occupational therapy on sensory processing, gross motor skills, behavioral status, and feeding behavior in a child with PWS.

Case Report

The case is a four-year-old boy born to genetically healthy parents. He was delivered prematurely via cesarean section at 30 weeks of gestation, weighing 1700 grams, with no immediate postnatal complications. After discharge, caregivers noticed that the baby did not cry and had difficulty lifting his head and arms. Following prolonged evaluations, a diagnosis of PWS was made. At age four, the child was referred to a rehabilitation center for developmental delays. Initial occupational therapy assessment revealed that he could not crawl, stand, or walk independently, though he could roll. His hands and feet were visibly smaller than peers', and he was hypersensitive to touch, often crying when stimulated. His speech was limited; he communicated using gestures and facial expressions and exhibited frequent tantrums. He had significant dental deformities and consumed only liquid or pureed foods. The assessments and interventions were conducted between February 2023 and February 2024. Written informed consent was obtained from the parents, and the study was conducted in accordance with the Helsinki Declaration.

Data Collection Tools

The child with PWS received sensory integration therapy twice a week for 48 weeks, with 40-minute sessions. The child was assessed by the occupational therapist before treatment and at weeks 16, 32, and 48 to evaluate progress.

Dunn Sensory Profile

The scale was developed by Dunn to assess the sensory processing skills of children aged 3–10 years. It consists of 14 sub-domains scored on a Likert scale from 1 (always) to 5 (never). The score range of the sub-domains varies between 4 and 100. An increase in the scores obtained from the scale indicates an increase in sensory processing skills.[7]

Gross Motor Function Measure (GMFM-88)

GMFM-88 was developed by Russell et al. [8] to assess gross motor function in children between the ages of 15 months and 13 years. The scale consists of 5 subdomains and a total of 88 items, and each item is scored between 0 (cannot) and 3 (can do independently). Sub-domain scores range from 0 to 72 and an increase in score indicates improvement in gross motor skills.

Child Behavior Rating Scale (CBRS)

CBRS was developed by Bronson to assess the behavioral status of children aged 3–6 years. The scale, which consists of 17 items in total, has a Likert-type structure scored from 1 (never) to 5 (always). The score obtained from the scale varies between 17–83. An increase in the score indicates a positive development in the child's behavior.[9]

Behavioral Pediatric Feeding Assessment Scale (BPFAS)

BPFAS was developed by Crist et al.[10] to assess feeding behavior in children aged 9 months-7 years. The scale is scored from 1 (never) to 5 (always) and consists of 25 items. The total score ranges from 25 to 125, with an increase in score indicating an increase in problems with feeding behavior.

Sensory Integration Based Occupational Therapy Intervention

The occupational therapy program for the child with PWS spanned 48 weeks, with two 40-minute sessions per week. It targeted sensory processing, motor skills, behavioral regulation, and feeding behaviors using evidence-based sensory integration approaches.[4,6] Sessions were tailored to the child's evolving developmental needs and delivered in safe, ethically appropriate settings. During therapy, the child was exposed to tactile stimuli such as foam, textured fabrics, and bins filled with rice and bulgur, participated in balance and movement activities using various swings, and received proprioceptive input through approximation techniques and massage tools. Visual tracking was supported with illuminated globes in a darkened room, and deep pressure was provided using a Pilates ball and weighted blankets. Oral sensory stimulation was introduced through foods with diverse odors, textures, and consistencies. Motor development was facilitated through resistive play using elastic bands and sandbags, alongside gross motor activities including sitting, standing, squatting, climbing, and walking.

Table 1. Pre- and Post-Intervention Scores on the Dunn Sensory Profile, GMFM-88, CBRS, and BPFAS

	1st assessment (pre-intervention)	2nd assessment (16th week)	3rd assessment (32nd week)	4th assessment (48th week)
Dunn Sensory Profile sub-parameter (score)				
Auditory processing (range: 10–50)	26	27	39	39
Visual processing (range: 9–45)	36	35	41	44
Vestibular processing (range: 11–55)	37	39	48	52
Tactile processing (range: 23–100)	51	63	72	83
Multisensory processing (range: 7–35)	27	27	29	32
Oral Sensory processing (range: 12–60)	29	32	42	48
Sensory processing related to endurance /tone (range: 9–45)	13	16	32	42
Modulation related to body position and movement (range: 9–45)	29	29	36	43
Modulation of movement affecting activity level (range: 7–35)	18	16	24	25
Modulation of sensory input affecting emotional responses and activity level (range: 4–20)	8	8	11	13
Modulation of visual input affecting emotional responses and activity level (range: 4–20)	13	11	15	17
Emotional/social responses (range: 18–75)	65	65	72	76
Behavioral outcomes of sensory processing (range: 6–30)	6	7	7	8
Items defining the response threshold (range: 3–15)	9	9	11	13
GMFM-88 (score)				
Lying and rolling (range: 0–51)	40	45	48	51
Sitting (range: 0–60)	31	34	49	60
Crawling and kneeling (range: 0–42)	6	8	29	42
Standing (range: 0–39)	0	0	3	28
Walking/running/jumping (range: 0–72)	0	0	6	40
CBRS (score) (range: 17–83)	23	28	38	41
BPFAS (score) (range: 25–125)	106	99	96	86

BPFAS: Behavioral Pediatric Feeding Assessment Scale; CBRS: Child Behavior Rating Scale; GMFM-88: Gross Motor Function Measure-88.

Visual-motor integration and spatial awareness were addressed with structured upper extremity exercises. Behavioral regulation strategies involved calming vestibular input, desensitization, attention redirection, and structured play encouraging self-regulation. Caregivers were trained in supportive behavioral approaches. Feeding interventions focused on oral sensory stimulation and chewing skills using foods with varied textures and hardness.

At the end of the intervention, the child began walking independently, showed reduced sensory overreactivity and tantrums, improved communication, and transitioned to solid foods. Improvements were also observed in standardized assessments, including the Dunn Sensory Profile, GMFM-88, CBRS, and BPFAS (Table 1).

Discussion

After 48 weeks of sensory integration-based occupational therapy, the child with PWS showed reduced clinical symptoms and improvements in sensory processing, gross motor skills, behavior, and feeding compared to earlier assessments.

Children with PWS often experience delays in motor, cognitive, sensory, behavioral, and nutritional development.[3] Sensory integration-based occupational therapy has shown positive effects on these areas in various neurodevelopmental disorders.[5,6,11] A study with children having cerebral palsy and visual impairment demonstrated improvements in sensory processing and motor skills following sensory integration intervention.[4] Similarly, sensory integration therapy improved sensory and motor development in a child with Rubinstein-Taybi Syndrome.[11]

These results suggest that structured sensory integration programs using sensory and motor stimuli can effectively manage developmental delays in children with PWS.

Hemati et al.[12] reported that vestibular and proprioceptive sensory interventions improved behavioral problems in a child with autism. Similarly, sensory integration positively affected behavioral regulation in autistic children.[6] In this case, sensory integration-based therapy reduced tantrums, overreactivity, and communication issues in the child with PWS. Post-treatment, the child showed better behavioral adaptation and more consistent responses to stimuli, suggesting the therapy aids behavioral regulation and calms PWS symptoms.

A study on children with autism reported significant reductions in feeding problems like sensory sensitivity and picky eating after sensory integration intervention, leading to better participation in feeding.[6] Kim et al.[13] found that oral sensory stimuli gradually alleviated feeding issues in affected children. Similarly, in this study, oral sensitivity and feeding problems decreased following sensory integration-based occupational therapy in the child with PWS. These interventions likely improved oral defense by lowering the child's sensory sensitivity to food.

The child's cognitive level was not assessed with standardized tests, which is a limitation of the study.

Conclusion

Sensory integration-based occupational therapy led to notable improvements in sensory processing, motor skills, behavior, and feeding in a child with PWS. These findings support its potential as an effective intervention in rare neurodevelopmental disorders such as PWS. Further studies with larger samples are needed to strengthen the evidence base.

Ethics Committee Approval: As this study is a single case report, ethics committee approval was not required in accordance with institutional policies. The study was conducted in accordance with the principles of the Helsinki Declaration.

Informed Consent: Written, informed consent was obtained from the patient's family for the publication of this case report.

Conflict of Interest: None declared.

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