

Occupational Therapy Interventions to Support Sleep in Children From Birth to Age 5 Years

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Evidence Connection articles provide a clinical application of systematic reviews developed in conjunction with the American Occupational Therapy Association's (AOTA's) Evidence-Based Practice Project. This Evidence Connection article provides a case report of a young child receiving early intervention services. I describe the occupational therapy evaluation and intervention processes for supporting this child's sleep routines in the home and early childhood education settings. A systematic review on this topic was published in the March/April 2020 issue of the *American Journal of Occupational Therapy* and in AOTA's *Occupational Therapy Practice Guidelines for Early Childhood: Birth–Age 5 Years*. Each article in this series summarizes the evidence from published reviews on a given topic and presents an application of the evidence to a related clinical case. Evidence Connection articles illustrate how the research evidence from the reviews can be used to inform and guide clinical decision making.

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Occupational therapy practitioners work with infants and toddlers and their families to promote participation in meaningful occupations and activities of daily living, including establishing daily habits and routines for sleep and rest (American Occupational Therapy Association [AOTA], 2020). Interrupted sleep routines have a profound impact on the health and well-being of young children and their caregivers. Practitioners provide interventions for sleep routines in the context of neonatal intensive care units (NICUs), early intervention (EI) services, early childhood education programs, and pediatric outpatient clinics.

Sleep habits are often a primary area of concern for families of young children both with and without diagnosed disabilities, developmental delays, or a history of prematurity. Although nighttime waking is normal during early infancy (i.e., ages 0–12 mo), as infants approach and surpass age 6 mo, 16% to 21% continue experiencing nocturnal wakefulness to the extent that parents report that their child has a “sleep problem” (Wake et al., 2006). Moreover, young children with autism and developmental disabilities have more than twice the odds of sleep problems as the general population (Reynolds et al., 2019).

Occupational therapy practitioners provide a distinct skill set to the interdisciplinary team that includes addressing physiological, behavioral, sensory,

and environmental factors associated with sleep. Occupational therapy can promote improved infant and toddler outcomes, including reduced crying, decreased time to fall asleep (sleep latency), decreased night waking frequency and duration, and increased sleep duration. Practitioners should incorporate the most current evidence into interventions for improving sleep hygiene to enhance infants' and toddlers' quality of life, their parents' sense of competence, and their family's well-being.

Evidence is currently available for three types of intervention to promote sleep in young children: infant massage, parent training, and internet-delivered training. The use of massage for sleep can increase sleep duration in infants, although it may cause wakefulness in those in the NICU (Yates et al., 2014). Parent training on behavioral strategies to address sleep problems in infants includes learning what different types of cries communicate, when to assist with soothing, how to provide controlled comforting and anticipatory guidance to encourage self-soothing (Hall et al., 2015; Hiscock et al., 2014; Kusanagi et al., 2011; Salisbury et al., 2012), and how to implement bedtime fading (i.e., compressing sleep by delaying the child's bedtime by 15 min each night) and gradual extinction (i.e., responding to cries with increasing delays); these strategies can lead to improvements in self-soothing, sleep

latency, and nighttime waking (Gradisar et al., 2016; Hall et al., 2015; Price et al., 2012). Parent training to address behavioral sleep problems in typically developing toddlers (Blunden, 2011) and those on the autism spectrum (Johnson et al., 2013; Malow et al., 2014) includes group and individual training in camping out (i.e., patting or sitting near infants until they fall asleep and then gradually reducing contact and moving away), gradual extinction, and communication and sensory strategies and in setting bedtime routines based in sleep hygiene; these interventions can lead to improvements in sleep latency, bedtime resistance, sleep duration, and night waking. Internet-delivered training providing general and customized information can help parents improve their young child's sleep duration, sleep latency, and frequency and duration of night waking (Mindell et al., 2011a, 2011b; Schlarb & Brandhorst, 2012).

Case Study

Davion, age 13 mo (11 mo adjusted), was born at 32 wk gestation via cesarean section after his mother experienced complications from gestational diabetes and preeclampsia. He weighed 4 lb, 6 oz (1,984.5 g) and was 16.5 in. (41.9 cm) in length. Davion stayed in the NICU for 41 days; he was fed via nasogastric tube for 28 days and received continuous positive airway pressure therapy for 18 days. He did not have to be intubated. Before discharge from the NICU, Davion passed his auditory brainstem response newborn hearing test, and his cranial ultrasound revealed no indication of intraventricular hemorrhage.

Davion has achieved gross motor milestones as expected. He rolled over at 5 mo, started crawling at 10 mo, and is beginning to pull to stand and take independent steps. His mother has noticed that he enjoys clapping and banging toys together, but he is not yet releasing toys into her hand or containers. She has started to feed him some finger foods, and most of the time he grabs them with his whole hand (raking grasp). Davion cries when his diaper is changed, and he does not like it when his face and hands are messy at mealtime. He frequently kicks off his shoes in the car and pulls off his socks. He enjoys bath time but is resistant to hair washing and brushing.

Davion attends an early childhood education program 3 days per week from 7:00 a.m. until 4:00 p.m. while his mother attends community college classes. He has a consistent teacher in his toddler classroom and a rotating teacher's assistant. The other 2 days of the week, Davion is at home with his mother. Occasionally, Davion's maternal grandmother cares for him when his mother needs to run errands or attend social events.

Davion receives regular care from his pediatrician and the hospital's NICU developmental follow-up clinic. He visited the follow-up clinic every 2 mo for the first year after discharge and will soon visit only

every 6 mo. At his last visit, his mother expressed stress and concerns about his poor sleep habits and fussiness, and the team noted some fine motor delays. Davion was referred for occupational therapy evaluation through the state's EI program.

Occupational Therapy Evaluation

Corey, the occupational therapist on the EI team who served as the primary service provider for Davion's family, completed an occupational profile with Davion's parents using the AOTA (2021) template. Davion's parents shared information about his medical and therapy history. They noted that many of their initial concerns with feeding and motor development had resolved with support from the NICU follow-up clinic but that Davion has significant difficulty falling and staying asleep for naps and at night. Davion's scores on the Infant/Toddler Sensory Profile 2 (Dunn, 2014), were much higher than most children in sensory sensitivity and demonstrated significant differences on the General Processing, Touch Processing, and Behavioral Responses Associated with Sensory Processing subscales.

At Corey's request, Davion's parents kept a sleep diary for him for 7 days before the evaluation session. The sleep diary indicated the following:

- Davion goes to bed between 8:45 and 10:30 p.m. every night.
- Davion takes approximately 45 min to fall asleep most nights with significant intervention and support from his parents, including rocking, singing, and bottle feeding.
- Davion always wakes at least once at night and as many as three times. When he wakes, he requires 15 min or more of caregiver soothing to fall back asleep.
- Davion typically wakes between 4:30 and 5:00 a.m., is awake for about 2 hr, and then naps around 7:00 a.m., when the family leaves the house to drop him off at day care.
- Davion's teachers report that he naps inconsistently throughout the day, typically no more than 30 min at a time.

On the third edition of the Parenting Stress Index–Short Form (Abidin, 1995), Davion's parents scored in the 90th percentile on the Parental Distress and Difficult Child subscales and in the 85th percentile on the Total Stress subscale. The Parent–Child Dysfunctional Interaction subscale reveals a relative strength, with scores in the 60th percentile.

Davion's parents reported some concerns about his hand skills and no concerns about his gross motor milestone achievement, so Corey administered the Grasping and Visual Motor Integration subtests of the Peabody Developmental Motor Scales, second edition (Folio & Fewell, 2000). Davion had a standard score of 8 on the Grasping subtest and a score of 6 on the Visual Motor Integration subtest, indicating below

average performance. Davion's overall Fine Motor Quotient was 85 (below average performance).

Corey reviewed the evidence presented in the March/April 2020 issue of the *American Journal of Occupational Therapy* (Gronski & Doherty, 2020) and read the recommendations from the *Occupational Therapy Practice Guidelines for Early Childhood: Birth–5 Years* (Clark & Kingsley, 2020). He found the following evidence to use as he planned the intervention:

- strong evidence for parent training programs that focus on infant behavioral interventions that incorporate gradual extinction strategies
- strong evidence for parent training programs that focus on toddler behavioral interventions such as bedtime routines, communication strategies, and sensory strategies
- moderate evidence for internet-delivered caregiver training programs
- low evidence for infant massage training delivered at home

Occupational Therapy Intervention

On the basis of Davion's current individual family service plan, for 3 mo Corey worked once per week in the family's home and once per month at Davion's early childhood education facility with the classroom teachers. Corey consulted with the family regarding their typical bedtime and nap routines to ensure that the sessions would be centered around the times of day when Davion experiences the most difficulty with sleep. They agreed on 1:00 p.m., just before nap time, in the family's home. After speaking with the early childhood education program director, Corey decided to visit the infant room midmorning, when Davion sometimes falls asleep for a morning nap. After one visit, the program added COVID-19 restrictions on nonfamily visitors, so Corey arranged an internet-delivered telehealth session with the teachers.

Corey used a coaching process to engage Davion's parents and teachers in joint planning and reflection. At the end of each session, he helped them set a targeted goal, explore their options for strategies to achieve the goal, and plan ways to implement those strategies within the context of their daily and weekly routines.

Intervention 1: Parent Training in the Home

During home sessions, Corey provided anticipatory guidance training to Davion's mother on how to encourage Davion to self-soothe when placed in his crib for naps and bedtime and when he wakes at night. Anticipatory guidance training provides parents with information about normal infant sleep and cry patterns, ways to encourage self-settling in infants, and ways to develop settling routines before problems begin or to prevent the escalation of emerging problems. Corey pointed out several strengths in the family's sleep routine for Davion: Davion sleeps in his own

crib, the crib environment is clear of loose toys and blankets, and he is placed to sleep on his back (although he freely rolls to his stomach independently and safely during the night). Corey encouraged Davion's mother to continue the sleep diary and to begin journaling about his different cries and what he is trying to communicate with each one. By being mindful of the intent of Davion's cries, Davion's mother could identify when she needed to intervene (e.g., leaking diaper, pain, illness) and when she could help him soothe himself back to sleep (Hall et al., 2015; Hiscock et al., 2014; Kusanagi et al., 2011; Salisbury et al., 2012).

Intervention 2: Behavioral Strategy Training in the Home

Home visits allowed Corey to provide education and coaching to Davion's mother on specific behavioral strategies such as camping out, gradual extinction, and setting bedtime routines based in sleep hygiene that limit activity and stimulation before bedtime. Davion's mother was particularly bothered by his difficulty falling asleep and frequent night waking, so Corey walked her through *gradual extinction*, in which parents initially delay their response to their infant's nocturnal cries—for example, by 2 minutes—and then gradually extend the delay until the infant is able to return to sleep without parent intervention (Gradisar et al., 2016; Hall et al., 2015). Corey reminded Davion's mother to recall the work she had done in prior sessions and to be mindful of what Davion is communicating with his cries.

Corey also shared the idea of controlled comforting as a way of helping Davion adjust to settling himself to sleep. At Davion's nap time, Corey guided his mother to put Davion to bed by comforting, settling, and leaving him and then periodically to quickly check him and reassure him as needed while he settled.

Although the evidence for infant massage is limited and primarily based on NICU studies, Corey decided to include this intervention given Davion's sensory processing pattern and a successful study in which home-based infant massage training for parents resulted in increased sleep duration. Corey had taken continuing education courses in infant massage and provided training for the parents of many infants in EI programs. Corey used one of the home sessions to train Davion's mother and grandmother to use these techniques. Together, they planned how to incorporate massage into Davion's bath and bedtime routine.

Intervention 3: Training for Teachers

After Corey had worked with Davion and his mother at home for several weeks to establish new routines and strategies for bed time and nap time, Corey met with Davion's early childhood education teachers for a visit just before the typical morning nap time. Corey observed the class's routine and noted important aspects of the napping environment, which included

dimmed lights and soft music but also a door that clicked when it opened and shut. Corey also noted that most of the toddlers went from their snack routine to a diaper change to lying down on their cot for a nap. Knowing Davion's difficulty with mealtime tactile sensitivities and diaper changes, Corey planned to provide education to Davion's teachers on strategies for calming Davion's sensory system before nap time.

After the first visit, COVID-19 restrictions meant that Corey could no longer visit the facility. Corey reviewed the supporting evidence for internet-delivered training approaches and planned to hold the next session with teachers using a virtual platform (Mindell et al., 2011a, 2011b; Schlarb & Brandhorst, 2012). During the session, Corey focused on maintaining consistency between home and school strategies, when possible, and implementing sensory-based calming strategies after lunch and diapering routines.

Occupational Therapy Discharge

After 3 mo of intervention, Davion was consistently participating in a caregiver-led sleep routine that involved massage and sleep preparation activities to calm his sensory systems. His sleep latency had decreased to 10 to 15 min, and he remained asleep throughout the night (at least 9 hr) five nights of the week. He continued to wake at night when his grandmother put him to sleep, and Davion's mother planned to collaborate with Corey to promote sleep routine carryover with Davion's grandmother. Davion's nap time at the early childhood education facility continued to be inconsistent but averaged 30 to 45 min twice per day at the same times as the other children in the classroom.

Applying the Evidence to Your Own Practice

Occupational therapy practitioners work closely with families on sleep and rest in the natural, routine-based contexts of EI practice. Family-centered interventions focus on addressing the needs of the parents and the child to support the accomplishment of family goals (Graham et al., 2014). Occupational therapy practitioners can educate parents regarding bedtime and nap routines and behavioral strategies to improve infants' and toddlers' sleep hygiene and parents' confidence and well-being. Service delivery models support the incorporation of occupational therapy into home-based and early childhood education intervention, whether delivered in person or virtually, and the extension of successful NICU sensory-based strategies into these settings. 

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