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PEDIATRIC REHABILITATION: USING OCCUPATIONAL THERAPY TO SUPPORT DEVELOPMENTAL MILESTONES

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ABSTRACT
Pediatric rehabilitation is a vital resource to help children achieve their developmental milestones. Parents often have concerns about how their children are developing, with the idea that "all children develop at their own pace". It can be difficult to know when to push for more, get another opinion, or let go of the worry concern. Pediatric rehabilitation is the plurality of services available to support a child and their family in reaching developmental milestones of concern. Pediatric occupational therapists work in conjunction with the family and other caregivers to not only address areas of concern for a child's development, but to also help families know when they're right on track (K. C. Dluhosh & Y. Burns, 2014). This text is intended for parents and caregivers who may have concerns about their child's development but aren't sure where to start.
Developmental milestones are categorized into four areas: gross motor, fine motor, speech/language, and social/emotional. Gross motor refers to the use and development of large muscles in the body. Fine motor is the development and use of small muscles in the hands and fingers. Speech/language includes the ability to comprehend and communicate thoughts and ideas verbally. Social/emotional includes the ability to interact with and respond to others, as well as developmentally appropriate emotional responses to situations (Soref et al., 2023). Key developmental milestones for each of these areas are included, along with a general timeline of when parents might expect to see these skills emerge. Breakdowns of what gross motor, fine motor, speech/language, and social/emotional skills should be expected at different ages are provided. There is an emphasis on the "red flags" that might signal a child needs further support in a particular area, as well as general signs that might signal other concerns outside the scope of pediatric rehabilitation.

1.2 **Keywords**
Keywords: developmental disabilities; participation; preschoolers; occupational therapy intervention; sensory–motor

1.3 **1. Introduction**
Occupational therapists working within pediatric rehabilitation advocate for children's participation in meaningful daily activities, enhance functional performance, and improve participation in routines and settings through the use of easily understandable tools. In addition, pediatric rehabilitation occupational therapists provide early intervention and skilled support at

home, in day cares, and in community recreational settings to foster optimal growth and development. Pediatric occupational therapists provide screening, evaluation, intervention, and consultation services in a variety of settings, including early intervention services for infants and toddlers with developmental delays and to help preterm infants with developmental progression. In the home setting, occupational therapists work with the family unit to help facilitate developmental milestones, enhance caregiver/intervention strategies, address environmental adaptations, and modify daily routines to maximize developmental potential (K. C. Dluhosh & Y. Burns, 2014).

Pediatric rehabilitation OT provides education, consultation, screening, evaluation, and intervention services in outpatient clinics and in schools for preschool and school age children. Occupational therapists work with the child and family to understand the child's cognitive, physical, and sensory strengths and challenges, and to develop and implement strategies at home and in school to maximize the child's performance in academic tasks as well as supporting social skill acquisition within the preschool/school environment. Pediatric rehabilitation OT participates in intra- and interdisciplinary teams in a variety of settings to help enhance understanding of child development, improve knowledge of activities and performance considerations, enrich intervention strategies that build on child strength and family understanding of environmental considerations, facilitate peers carrying out common activities, and provide ideas for accommodations or adaptations to improve a child's independence when needed.

In addition, pediatric rehabilitation OTs conduct group therapy sessions in outpatient clinics and schools to support children with socially or physically delayed skills (Soref et al., 2023). Group occupational therapy is often utilized to enhance social skills among children with disabilities. Groups facilitate accessibility through a buddy system between children with disabilities and peers without disabilities as part of the intervention. Attending occupational rehabilitation group therapies is a common practice for children with disabilities, as the positive effects of group therapy have been found on occupational performance and sensory-motor improvement for children with disabilities. Group therapy practices were perceived similarly among occupational therapists across disciplines, while education practice was perceived as more appropriate for preschool-age children than other practices, while knowledge on group therapy for children with disabilities was specially acknowledged.

1.4 2. Understanding Developmental Milestones

Developmental milestones are specific skills or tasks children should acquire at a given age, according to child development specialists. Skilled healthcare professionals, including paediatricians and occupational, speech, and language therapists, should monitor children's developmental milestones. Primary caregivers, such as parents or nursery staff, should first recognize the child's developmental milestones (Kumar et al., 2024). Parents should notice their child's milestones before the patient's screening and diagnosis, since pediatricians and medical professionals cannot assess every child's milestones. It is beneficial for future parents to learn about developmental milestones before their first child's birth (M Alghamdi et al., 2023). Various normal developmental milestones for children aged zero to 5 years are sensitive indicators.

Child development is multidimensional and includes the development of gross and fine motor skills, speech and language, social and self-help skills, and cognition. Child development is generally classified into five major areas, each of which has sub-areas. The general and sub-areas of child development include social and emotional development, cognitive and intellectual development, physical development, language and speech development, and self-help development. A certain developmental delay may run in families, including severe mental retardation, autism, cerebral palsy, and other disability/noise, and there are some congenital problems. Spending time interacting with children is important for their language and social development. The first relationship with primary caregivers may impact the social, language, and emotional thinking with which children relate to other family members. The quantity of maternal speech positively correlates with language development. Children in orphanages and neglected children have poorer developmental milestones than others.

Delays in motor development and ability to crawl, stand up, and sit on a chair are a strong indication of physical disability, in both meningitis cases and anomalies. Delays in social and verbal development and inability to call primary caregivers, respond to simple instructions, express likes and dislikes, and indicate when excessively hungry or thirsty can lead to the child becoming deaf and/or mute. Children who demonstrated a delay in reaching developmental milestones at 18 months got poorer scores in the outcome measures (years) compared to children who did not demonstrate a concern, especially if screening/cross-sectional survey tool screening, diagnosis, and intervention were in place. Hence, universal screening of developmental milestones at 18 months using the CS questionnaire may help in the early identification of at-risk children.

2.1. Definition and Importance

Pediatric rehabilitation refers to the early, ongoing, and progressive medical, therapeutic, and educational services needed to maintain and/or enhance health, development, and participation (or performance) of children with, or at risk for, disabilities. Within this definition, a number of important key concepts are highlighted. Developmental delays and disabilities refer to a different standard or scope of physical, cognitive, emotional, and/or social development that is atypical, restrictive, and qualifies for special services. Children at risk for developmental delays or disabilities are those who have one or more problems (based on risk factors) such as congenital conditions, prenatal exposure to drugs and alcohol, prematurity, abuse and neglect, medical conditions, or other chromosomal abnormalities. Impairments also differ from the more broadly defined developmental delays. Impairments refer to a loss or abnormality in function, structure, or body systems that make up the dimensions of the person's body (e.g., paralysis or misshaped limb). The term 'developmental disabilities' is used to describe children with various difficulties in performing activities that require fine or gross motor coordination, maintaining their own organization, or difficulties with learning or with the regulation or processing of sensory information, which typically emerge early in life (Soref et al., 2023).

Occupational therapy (OT) is a health and rehabilitation profession that promotes engagement in activities of daily living (ADLs) for maximal functioning and quality of life. Children are unique consumers of occupational therapy services, and the practice framework devised by the American

Occupational Therapy Association is particularly relevant. Input from developmental and service needs perspective of parents on the scope, methods, cultural aspects, and impact of OT in young children has been promoted, while governmental entities in Israel and abroad have commenced a process of establishing criteria and methods for measuring the contribution of OT.

2.2. Typical vs. Atypical Development

There are a variety of developmental milestones that typically occur as babies and children grow. These include milestones related to physical development, cognitive development, language development, and social and emotional development. Children grow and develop at their own rates but by age 3, children typically: Here's a summary and some key points:

Overview of Typical Developmental Milestones by Age 3

Gross Motor (Physical Development):

- Walking, running, climbing stairs with alternating feet, kicking and throwing balls, jumping, using push or ride toys.

Fine Motor (Physical Development):

- Building towers with blocks, copying circles, using scissors, completing simple puzzles, dressing with help, removing shoes or socks independently, stacking rings, building trains from blocks, scribbling or “writing” on paper.

Cognitive (Intellectual Development):

- Connecting puzzle pieces, looking at picture books, matching objects, identifying colors and shapes, searching for hidden toys, imitating complex activities, following three-step commands, understanding concepts of “same” and “different,” asking and understanding more complex questions, beginning counting or recognizing letters.

Language Development:

- Using sentences of three to five words, listening to stories, speaking in longer sentences, using pronouns correctly, singing simple songs, understanding words like before/after, sequencing words.

**Social & Emotional Development: **

- Listening to stories, playing independently for longer periods, taking turns, expressing fears, showing a range of feelings, saying “please,” “thank you,” “excuse me,” “I’m sorry.”

This information helps caregivers and professionals identify typical versus atypical development, guiding early intervention if needed.

1.5 3. Role of Occupational Therapy in Pediatrics

Children are unique in their own way, as they are each born with their own personality and traits – some children are constantly busy and require many sensory experiences, while some children prefer to take their time exploring the world around them. This variety makes child-rearing a challenging yet rewarding process. Likewise, children come in all shapes, sizes, and with individual skill sets and interests. In order to facilitate growth and development, parents will typically enroll their child in educational opportunities before they are considered of age for

Kindergarten. With schooling comes the need to develop an appropriate skill level in self-help and activities of daily living, as well supportive services to ensure successful inclusion in the classroom and social settings.

There are many different professionals who can provide support to a child, whether that be in the schools, an outpatient clinic, or an inpatient hospital. Educationally, these services are considered related services, which means they are provided to enable the child to benefit from special education. Child-rearing has led to an efficiently-run society, although the demands of our society also create concerns regarding childhood obesity and elevated levels of anxiety and depression. As of late, these issues appear to result in children that are functioning performance-wise far below their peers, causing them to lag in developmental milestones. As a result, many children are entering the school system with unpreparedness for and avoidance of school tasks.

Playing and learning are the primary occupations of a child. As kindergarten screening approaches and children are referred for evaluation, this leaves many parents and educators wondering what preparation is needed before entry into the classroom. The preceding questions were posed to a few key people involved with child development and within the pediatric field. These professionals included pediatric occupational and physical therapists, a public health nurse, a kindergarten teacher, and a preschool teacher. School readiness questions and concerns that arose were discussed; the importance of a child's confidence, body awareness, independence, and problem-solving skills emerged from this discussion.

3.1. Overview of Occupational Therapy

Occupational therapy (OT) is a client-centered health profession that focuses on promoting engagement in meaningful occupations to support physical, mental, and social wellbeing. The goal of OT is to enable individuals to perform meaningful occupational activities. These activities include self-care, productivity, and leisure activities. If OT services are needed, an assessment is completed to determine the client's strengths, limitations, support systems, and needs. After completing an evaluation, the OT develops goals with the client and determines the frequency, length, duration, and type of service delivery needed to achieve those goals. OT interventions can include therapeutic exercises, mobility training, wheelchair and other equipment assessments, support in self-care, community activities, and development of social skills, motor skills, attention, and other skills (Soref et al., 2023).

OT is also provided by designating OTs in Community Impairment Teams (CITs) at the local government level, or an OT may be employed by the school district. An important role for the OT in a team is participating in standard operating procedures and developing protocols for the implementation of psychosocial interventions. OT may be called on to present to the team on sensory-motor, executive function, cognitive, or behavioral factors that affect participation and inclusion in school. In some locations, there may be OTs and occupational therapy assistants, and OTs may need to supervise others' practice and support them to develop their knowledge and practice skills.

Although some children with ID may require support to access the limiting demands of their context, there are many children for whom there is a lack of developmentally appropriate

intervention. For example, there is recognition of the positive role of OT in supporting cognition, activity, and participation for young children with ID. There are significant practice gaps for this population, such as the lack of access to OT to support ability and participation addressed with evidence, type, and dosage of supports. There is also limited knowledge of existing OT interventions or programs for this population and limited recognition of the additional intervention goals for this sub-group of young children. There is a need for collaborative, flexible, and blended practice models that enable the application of inclusive and specialist OT intervention on the same platform.

3.2. Goals of Occupational Therapy in Pediatric Rehabilitation

Rehabilitation in children focuses on achieving developmental goals within their natural context, which enables them to perform age-appropriate skills in their environment (Soref et al., 2023). Pediatric occupational therapy is concerned with treatment of infants, children, and adolescents who demonstrate difficulties with physical, perceptual-cognitive, social, emotional, or adaptive self-care skills. It is essential to identify the childhood developmental milestones and analyze how occupational therapy could work in order to reach these milestones.

Developmental milestones are the time frames during which a child achieves specific skills or abilities in the four domains of development. Physical (motor), cognitive, social or emotional, and communication or language are the four areas of growth that developmental screeners assess. These developmental domains are related to one another and affect one another over time. Developmental milestones can be divided into four domains: the large muscles or gross motor domain, the small muscles or fine motor domain, the language or communication domain, and the social or personal development domain.

Occupational therapy assists children with disabilities to execute the jobs of life in the home, school, and community settings using approaches and interventions developed by an occupational therapist. In healthcare centers, schools, and other practice environments, a variety of methods and techniques are employed. Standardized assessment tools that have been validated for use with particular populations of children in a particular place are often used. The involvement of clients in the primary decision-making process is promoted by client-centered, evidence-based, culturally sensitive, and strength-based practice methods used in occupational therapy. Interventions based on the client's priorities, wishes, and needs, as well as their match with the cultural characteristics, are employed. For desired family participation and child participation, collaborative occupation-based therapeutic activities are used. A meta-analysis of family-centered care for children with disabilities demonstrates that it significantly improves family life quality, child growth, parent satisfaction, self-efficacy, and family–professional partnerships.

1.6 4. Assessment of Developmental Delays

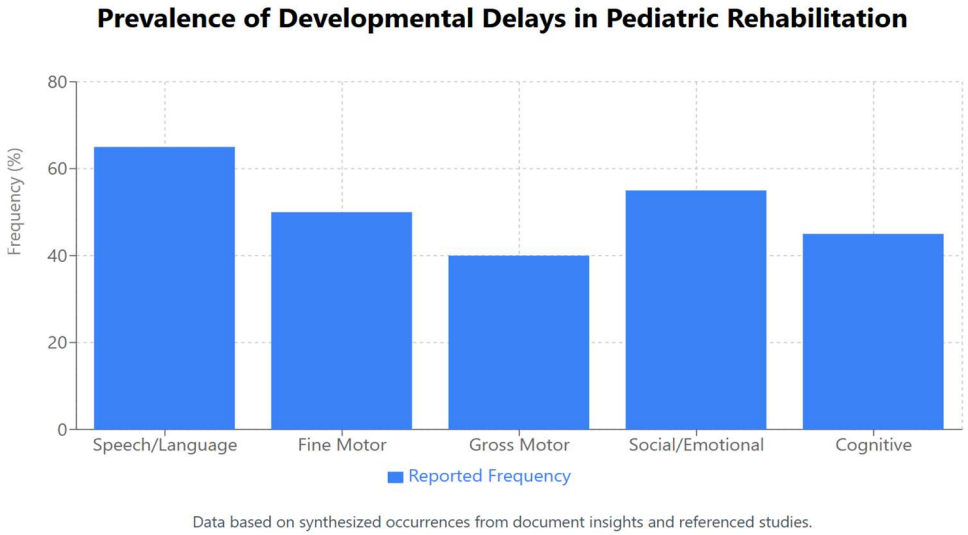
Developmental delay can be an alarming diagnosis for parents. Clinicians use the term "developmental delay" to describe a wide range of impairments that a child might be experiencing in areas such as cognitive development, physical development, social and emotional development, and language development. Developmental delay refers to conditions in which a child is taking longer to reach certain developmental milestones than what is typically expected. Developmental

delay can be further classified as global developmental delay or specific developmental delay. Global developmental delay is when an individual has a significant impairment in intellectual functioning and adaptive behavior before the age of 18 years impacting the ability to cope and adapt to a child's environment. Specific developmental delay involves impairments in one or a few areas of functioning that can be specific to that area. Developmental delay in a general sense elucidates children who do not yet reach developmental milestones appropriate for their age (Taywade et al., 2024). It is a complex phenomenon indicating some deviation for age norms where children have not reached their expected milestones in one or more of the developmental domains of cognition, language, motor, social-emotional growth, sensory, and self-help skills. Developmental delay refers to lag in one or more areas of development including fine motor skills, gross motor skills, social skills, self-care skills, language skills (communication), and cognitive skills (thinking). The delays may be minor in some children and severe in others. Developmental delay and the provision of care may be varying and based on culture, resources, customs, and socioeconomic status. A child may have a predictable course of development or an unexpected course. Unlike many health or disability conditions, developmental delays are of significant public health concern as developmental milestones are not uniformly achieved. No instrument comprehensively screens for developmental milestones in Indian-built environments. Current instruments cover only one developmental domain. Tools developed in one context may be developmentally inappropriate in another context. Prevalence estimates of developmental delays garnered from existing studies are highly variable and a function of the differing methodology used. Factors associated with an increased prevalence of developmental delays remain unexplored in India. Caregivers may have varying learned and experiential models surrounding childhood development. Diagnoses may rely on normed cutoff scores for developmental delay, but cutoffs are often ill-fitted for the child's culture, generating false positives. While developmental delays may be appropriately identified, service availability, access, and/or normative responses may be mismatched.

4.1. Screening Tools and Techniques

Research indicates that children in adoptive and foster care placements may lag in the achievement of developmental milestones when compared to that of their peers. Various developmental components are assessed through this screening tool including: (1) sensory processing, (2) fine motor skills, (3) gross motor skills, (4) adaptive self-care skills, (5) play skills, and (6) social-emotional skills. This screening tool was created to identify areas of development children involved with the adoption and foster care systems may lack based on research depicting typical developmental milestones. A rubric with typical scoring practices compared to the Likert-type scale was created alongside to better ensure accurate administrations that span the widest range of children. An occupational therapist would be able to simply glance at the scoring to determine which given areas on the screening tool most warrant further assessment due to it being a potentially significant concern and to even explain the reasoning behind their choice. Sensory processing, fine motor, gross motor, adaptive self-care, play, and social-emotional skills would be equally assessed as there had been no anticipated developmental areas that would have been

relatively neglected in this population. Additionally, collaterals of the screening would be able to understand its scoring. A few examples are provided to illustrate the purpose of the scoring system.



The scoring system utilized mathematical relationships that spelled out the importance of addressing high-scored items, yet ensured the simplicity of clicking numbers in boxes instead of complex odds. Whereas the formulae intended for the screening itself was for internal use only, the final scores presented to an occupational therapist were designed to be straightforward. The reflection for developing the screening outlined what the authors wanted a potential user to walk away with regardless of their acquired training and comprehension of the thorough expectations and scoring of the OTRT. Substantial simplification of the scoring may be necessary before actively employing the screening. Nevertheless, it was felt that complete transparency concerning the scoring was paramount when followed up on by a potential user with the developmental history of adoptive or foster care systems that had been clearly illustrated. This screening tool serves only to help explain and quantify any concerns scored (Fox & Kollodge, 2019).

4.2. Interdisciplinary Collaboration

Collaboration is key to successful pediatric rehabilitation efforts; however, this ideal approach is often easier to describe than to put into practice. With a limited number of therapists serving large caseloads, service delivery options are often limited. Schools are increasingly directed to develop models of collaborative service delivery that incorporate occupational therapy interventions and are consistent with a response-to-intervention framework (Richardson, 2013). Creating and running effective service delivery options is an enormous challenge and needs input from families as well as skills and knowledge from a variety of perspectives. Educators, therapists, and family members need to communicate regularly to ensure that collaborative service delivery options are well-coordinated and meet everyone's needs and expectations.

Casey, who works with second grade students in a general education classroom, announces that she will be meeting with John's and Mark's special education teachers to discuss the students' goals and progress. Initially, she makes assumptions about who should attend based on her experience in Oklahoma school districts more than a decade prior. Casey's assumptions lead her

to leave out Casey's mom and John's mom from this first meeting. During the meeting, general and special education teachers share student data as well as ideas about goal priority, intervention, and progress monitoring, as well as their strengths and weaknesses in working collaboratively. A second part of the team meeting is scheduled so that the parents can be included. On behalf of his students, John's teacher comments, "I feel like a weird disembodied voice." Casey's attempt to later ensure that the second team meeting includes parents fails as well. Consequently, Casey solicits feedback from parents via phone calls, as well as sending home a meeting agenda to be gathered and returned the next day before class.

Casey's decisions about organizing the meetings are made from the framework of her experience in Oklahoma, but seem to disregard cultural context. Parents are not able to attend school-based meetings without significant notice in advance, as they need to arrange for childcare. Furthermore, this expectation for families to attend meetings might be counter to the culture of the school district and families, where they are not expected to ask questions or debate adults' going-on in meetings. Casey is incredulous when parents do not arrive for the second meeting or return feedback. Working in a bilingual context where children are socialized to speak about their learning outside of school actors but not within the classroom complicates communication between Casey, the teachers, and the families.

1.7 5. Therapeutic Approaches in Occupational Therapy

Therapeutic approaches in occupational therapy focus on various therapeutic and practical methods. The rehabilitation strategy of children varies depending on their age and development. There are times when disability is not treated under the assumption that it is due to immaturity if the child is unable to perform the task expected for their developmental stage. However, by observing the developmental process involved in the task, there are many cases in which treatment is possible even if it is far from the expected developmental milestone ((祐子, 2015)).

Thus, the children's rehabilitation of interest in this paper is in the Pre-Operational (2 to 7-year-old) developmental stage. Particularly playing activity, items used in the activity, and development supporting treatment methods are described here. It is expected that there may be some new perspectives or ideas used in practice from what? is familiar to those involved in rehabilitation of children with disabilities. Pursuing the developmental support required for children newly diagnosed with disabilities, or those who become interested in treatment after several years in rehab, can mean much for the practice of occupational therapy for children ((祐子, 2016)).

In order to control the posture, using the head and side back as axis of rotation, it is useful to support weight bearing. To facilitate this, parents are encouraged to check where the contact point is and how much weight is added during feeding and playing with the toys on the table. The next point is toys that touch the fingers. In addition to the educational toys, there are variations of blocks made of foam and rubber. Fine movement with two fingers can be practiced by using the flat parts of building blocks and nuts with holes. Blocks with holes can be used selectively for hand shaping by picking up interlock-type building blocks and chips. Crafts can also be used as a means of enabling fine manipulation. It requires attention to prevent the paper being cut too small from

falling off the table. Considering the possibility of tearing, a NPO with resistance could be provided. In addition to scissors, hole punching and crayon peeling can be provided.

5.1. Play-Based Interventions

Parent-implemented play-based therapy is an intervention implemented through a parent with children aged 2–6 years and designed as two parts: 'What to do?' and 'How to do?' The program aims to support child development based on children's interests and needs through play with parenting and OT team support. The program incorporates children's self-initiated curiosity about toys. To develop the program, a review was conducted using relevant papers published from 2006 to 2018. Of 283 articles screened, twenty-eight were included in the final analyses.

A broad understanding of children's interests and curiosity leads to the development of OT programs that promote mobile play activity as a way to achieve milestones. In this mobile play, sensory exploration and motor constraints were introduced. Utilizing two body movements of "sitting" or "on my tummy," control of postural movements was provided as a playful game of go or stop. Dressing, wearing a carrier on the tummy while crawling, and laying prone on mobility toys were also introduced to achieve various mobility development. During mobile play and OT programs, parent-child interactions or play can be explored to satisfy parent occupational needs. This play interval promotes co-occupation and supports a bonding child-parent relationship.

Based on the findings from this review, play duration and OT strategies that can be utilized based on children's interests are considered for intervention. This program can encourage parents to be their child's first therapist in routine play through simple interactions. In the future, the program should be confirmed with healthy children's parents and categorized by parents, OTs, and intervention setting type.

5.2. Sensory Integration Therapy

Sensory Integration therapy applies Ayres' Sensory Integration framework through rhythmic and playful activities to help children learn to process and react to sensory inputs in more adaptive and organized ways. As a subfield of occupational therapy, Sensory Integration therapy can reduce children's sensory modulation deficits and help them reach their full potential at home, at school, and in the community. In the Sensory Integration project implemented for the 2nd grade class composed of 25 children, teachers were given strategies to help children who are impulsive, inattentive, and less appropriate during activities. Recommendations for using Sensory Integration activities during morning warm-ups and throughout the school day will decrease inappropriate behavior and attention deficits exhibited by children in the classroom. These strategies are culturally sensitive, easy to implement, and inexpensive. (Evanson & Pitsch, 2007).

As a method of therapeutic intervention, sensory integration theory focuses upon processing and utilizing sensory information for the purpose of adaptation and learning. Sensory Integration focuses on four areas of sensory processing: visual, tactile, vestibular, and proprioception. Sensory processing disorders can result in a child's behavioral, attention, and learning deficits. After implementing Sensory Integration activities for several weeks, it is hypothesized that there would be a detectable change in active participation and impulse control at circle and freely-chosen work time. This indicates children's perception of Sensory Integration activities as enjoyable and

valuable and also suggests that Sensory Integration activities are acceptable to the broader school and community context.

Research indicates that Sensory Integration therapy can be effective in helping children with various forms of sensory modulation deficits. Known as processing disorders or sensory defensiveness, these diagnoses can negatively affect physical, psychosocial, and academic function. Though these symptoms are seen in many children and impacts are felt by teachers, parents, and children alike, they are often still undiagnosed. These sensory modulation concerns can cause problems with social interaction and peer relations, difficulty maintaining attention and completing tasks, and manifested as inattention, impulsivity, hyperactivity, and inappropriate behavior. Sensory Integration therapy is based on the idea that sensory and motor activities are essential for developing academic, social, and self-care skills. It is a technique that falls under the umbrella of sensory-based approaches. Sensory Integration therapy is presented as an intervention using Ayres' theoretical framework and as a subfield of occupational therapy.

5.3. Task-Oriented Training

Task-oriented training (TOT) is a therapeutic approach that resembles daily life activities and enhances child engagement. Children with hemiparetic CP (HCP) encounter difficulties in controlling spastic muscles and regulating timing and force during manipulating objects. Usually, their handwriting starts late compared to peers and becomes worse due to suboptimal performance. TOT is sufficient to enhance upper limb function from a close eye view. Laboratory tasks cannot yield functionally relevant improvement of upper limb skills. (Moon et al., 2017) concluded that TOT would most likely induce functional and performance improvement in activities of daily living (ADL) tasks when performed after the age of 6 years. However, children who experience brain lesions starting at birth appear to be inspired to manipulate objects outside immediate manual access or in the context of free play exploring constructively.

TOT aims to fuse temporal and functional, previous encouragement, with the hope that a fine kinesiology will result that will compensate lost or deteriorating limb capabilities. TOT will improve abilities likely to be used in playing games preserving interaction with other children, and that might motivate exercise beyond therapeutic sessions. The study investigated the effects of TOT on hand dexterity and strength in children with spastic hemiplegic cerebral palsy (HCP). In total, 24 children with HCP and 16 age-matched typically developing children participated in the study. Data were collected from the Bernstein Test, the Box & Block Test (BBT), and a grip strength measuring instrument. The data were analyzed using parametric and non-parametric statistical methods.

TOT training for 6 weeks, 60 minutes twice a week, improved hand dexterity and grip strength in children with spastic HCP, suggesting that this child-oriented and family-rooted approach is feasible and successful. In addition, TOT may be recommended as an alternative intervention to enhance hand dexterity and grip strength in children with spastic HCP. For children with CP, upper limb impairments may lead to participation restrictions in activities and social issues. Daily feeding and writing with the affected hand may be more challenging. As a compensatory strategy, some children learned to use the non-affected hand, affecting social interaction with non-affected peers.

1.8 6. Supporting Motor Skills Development

Collaborate to provide appropriate adaptation for the unique needs of each child to minimise developmental delays. Address ways to promote development of motor skills at this critical stage as well as ongoing evaluation to monitor motor milestones and growth of children (Soldner, 2011). Occupational therapists have knowledge of child development and trained in providing adaptation strategies to enhance fine and visual-motor skill acquisition.

Fine and visual-motor skill development is in the early stages of motor skills and activities addressed in this focus area are the higher level of performance expected when children enter kindergarten. Fine and visual-motor skills include journaling, drawing, cutting, and coloring. Children are also expected to assist with self-care items expected of them, such as zipping, buttoning, tying shoes. Everyday objects, materials, and activities are accessible to preschool children in the environment so they can practice fine and visual-motor skills. Division of Labor, opportunities for adults to facilitate a child learning a skill or task and opportunities for the child to practice learned skills or tasks.

Preschool teachers, daycare providers, and staff assist the child with opportunities to facilitate the growth of fine and visual-motor skills. It is hoped this will better prepare the child to meet curriculum expectations once they begin kindergarten. As preschool children are in all different stages of motor skill development, collaboration among the adult caregivers in these settings will facilitate each child's continual progress through each stage and successful school adjustment. The development of this project was based on the Ecology of Human Performance framework, considering person, context, task, and performance.

Necessary components for successful learning situations were addressed with the addition of specific adult mediation strategies to prepare early childhood educators for and to empower them to implement the plan. Occupational therapists must keep all these components in mind when providing interventions to facilitate a child's learning. Once a therapist has identified the necessary components for implementation of a successful learning situation, it is imperative that the adult mediators use expertise in the other three components to customize the learning situation to meet the ability and needs of the child. An occupational therapist should instruct those who interact daily with the child to continue those interventions. Ongoing practice of newly learned skills within non-therapeutic contexts will enhance a child's acquisition of the skill. Mastery of newly learned skills makes for greater independence, success in completing a task, and positive self-esteem.

6.1. Gross Motor Skills

There are many ways to assist children in improving their gross motor skills. In the classroom, a teacher can include movement breaks, such as chair stands, yoga, animal movements, jumping, and running laps, for 1-5 minutes before curricular work to reset attention and refocus students (Neall, 2007). Children can spin around, jump off stairs, and bounce balls after school. This can also be incorporated into daily routines such as brushing teeth, getting in the car, or doing chores, for example, hopping to the sink daily to wash hands. Playgrounds with a variety of equipment, such as climbing, balancing, spinning, and swinging equipment, are great ways to improve core

and upper body strength which are important for handwriting and cutting stabilization and control. Solo spinning on a tire swing or inflatable bouncy ball can enhance a child's vestibular system and improve focusing skills. Recreation-based activities such as gymnastics, swimming, martial arts, and team sports can also promote gross motor growth while providing opportunities for social engagement. A registration, schedule, and consistent commitment to the activity are important to be set up.

Children can find two obstacles and pre-position them, stand away from the obstacle for a jump, and hop on one foot four times before they are able to cross midline. If the activity becomes difficult, it is okay for them to start over or try another activity. It is best to create an obstacle course outside in nice weather. Creating the course first takes away the tediousness of it and allows other people to join in. Jumping frogs using a backyard hammock or trampoline requires anticipation of trajectory and working towards more planned movements. Jumping up from an obstacle that your child has to touch or jump over is a "trick." This takes more planning because they will be looking for their landing target up in the air. This focuses their attention and they will miss very few times. When this happens, they start most often spin or jump off an unexpected angle because they are already looking somewhere else. It is best to create a target or hold up a landing target as a developmental milestone. Such tasks serve to improve muscle strength, proprioceptive input, and other abilities of the body.

6.2. Fine Motor Skills

Fine motor skills involve the controlled use of fingers and hands to grasp, manipulate, and control small objects. Fine motor skills and their development are often not considered until a child is experiencing difficulties (Kapaun, 2007). Fine motor skills are crucial to a child being successful in school as writing, coloring, cutting, class work, and assessments are often completed with the expectation that the child is progressing in those areas. Parent as well as preschool staff input into concerns about these skills not developing or progressing as expected are crucial in a child receiving a developmental assessment. Preschool staff are often the first to note that children are struggling in these areas and have not developed to the expected level. They may see a child using one hand consistently for everything or using their mouth rather than hands while playing. Children often also see the model of a skill and will try to do the task the same way they observed and may develop an atypical skill according to their observations (Soldner, 2011). If the parent and preschool staff have similar concerns, then obtaining an OT evaluation may be beneficial. Assessments can be completed that require little language and mostly visual or hands-on responses for those children that aren't yet verbal. There are many formal assessments that are standardized with children such as the Peabody Developmental Motor Skills Assessment, the Bruininks-Oseretsky Test of Motor Proficiency, the Visual Motor Integration Test, and the Ages and Stages Questionnaire-3. Screening tools or observations can also be used effectively to assess children. Many early childhood assessments now have an OT component to them such as the Battelle Developmental Inventory. Many times, a variety of the above is needed to get a complete picture of the child's abilities. This is especially true of busy and active little bodies where a screening may indicate that an evaluation is needed, but not what areas should be targeted. If assessment of

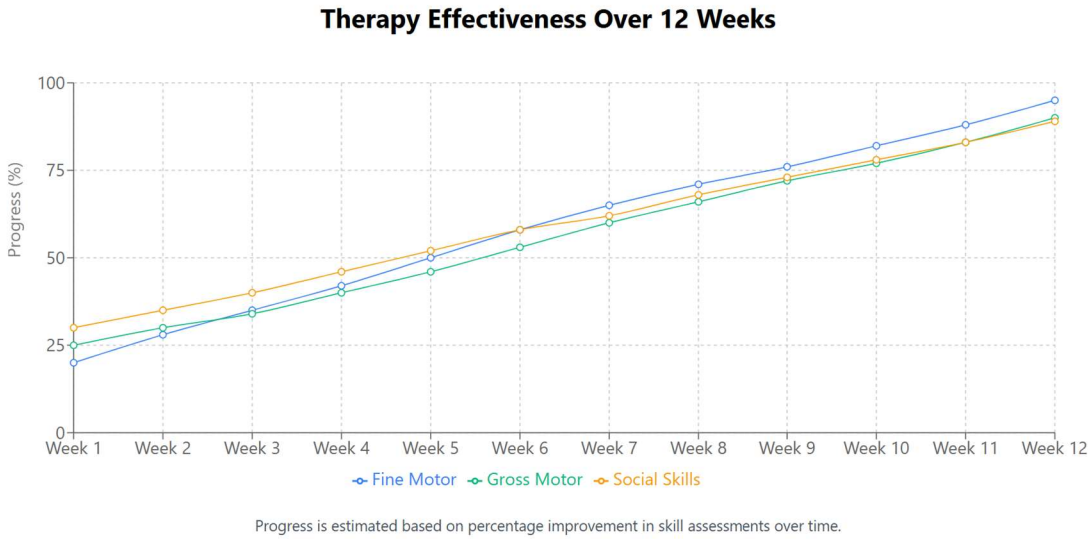
visual motor integration deficits are suspected, the Visual Motor Integration Test could be administered in conjunction with other assessments. Ongoing observations would also provide information on eye/hand coordination, eye tracking, hand preference, ability to follow visual directions, and visual field problems. A child skilled in any of the above could assist in a screening for a child or peer group with concerns about the same skills.

6.3. Adaptive Equipment and Modifications

Motivating children to participate in therapy can sometimes be challenging. Fun activities that capture the child's interest in their different therapies could help with participation in therapy. Children, especially preschool-age children, tend to keep moving quickly, making it more difficult for them to handle the equipment and materials used in the current session. To help resolve this issue, in addition to designing activities based on the child's interests, it might be reasonable to modify the equipment and the environment to help the child actively participate in the therapy as needed. When the equipment and environment are suitably modified, even children with extremely limited movement ability may be able to control the materials using their existing motions. Therefore, developing ways to help children take part in developmental and rehabilitation programs could increase the likelihood that these children will foster their development. In this chapter, examples of equipment and environmental modifications usable in therapy for children with disabilities are presented.

It is essential to select toys and materials carefully, as they must match the child's current capability levels. Modifying the toys or materials could also make them more accessible, even children with limited motion ability can actively participate. A switch on/off mechanism could be added to the materials, which would make it easier for the child to use them. It is also suggested that toys be mounted: at the right height, in front of the child, and in the required attitude. The motivation of the child to master new motor skills could be stimulated by providing an active demonstration of the target behavior through imitation.

Occupational therapists could play a significant role in helping the child you support prevent or mitigate developmentally limiting risk factors or conditions throughout the lifespan. The scope of practice of occupational therapy can include the provision of all types of therapeutic tools, devices, modifications, and systems to assist with participation in daily life roles. A variety of individualized environmental modifications could form part of a treatment program (Olivieri et al., 2018). Examples of recommended modifications include switching the materials or equipment used in current activities, modifying mobility strategies, providing adaptive seating or task positioning, and making changes to the layout of the home, daycare or school, or community environment.



1.9 7. Cognitive and Social-Emotional Development

Cognitive and social-emotional development is influenced by biological, personal, and environmental factors. In the clinical setting there is often dialogue around these influences, yet less dialog related to the cognitive and social-emotional development. Cognitive and social-emotional milestones categorized by age range and diagnosis are presented in Table 2. Communication Though the development of specialized language, such as sign language and symbols, has permitted communication with children with more significant disabilities, communication remains a significant barrier (Willis, 2016). Noteworthy challenges of children and youth with physical disabilities include understandability of speech production between and including the ages of 2 and 10 years, use of alternative communication systems and devices, and knowing how to converse with peers. For a child who is visually impaired there is also the difficulty of understanding or using language in a naming aspect. With regard to social-emotional development children with disabilities are perceived to be less socially accepted, less socially competent, and more socially withdrawn. Regardless of disability type, received peer options, and parental education children with physical disabilities are peers with less acceptance. Establishing friendships, receiving social participation options, and feeling included in activities are challenges commonly mentioned by children with physical disabilities. Children with developmental coordination disorder recognize the issues of isolation, lack of acceptance from peers, exclusion from games, and worries over being bullied outside of organized activities. Yet, peer relationships are important and reported benefits of friendships include emotional support, successful social-emotional development, initiation of peer interaction and friendships, generalization of social participation skills and social connections. Social participation options related to social recreation and community engagement are considerably fewer, less successful, and not as frequent. Therefore, despite their importance these social-emotional milestones remain a challenge.

7.1. Cognitive Skills Enhancement

Cognitive skills enhancement involves activities that improve various cognitive functions that include attention, memory, reasoning, and problem-solving abilities (祐子, 2016). This involves

enhancing memory and attention functions, reasoning and judgment skills, an understanding of the cause-and-effect relationship, and the introduction of various activities that present cognitive challenges that necessitate responding to the stimuli. Engagement in cognitive training can support the development of cognitive skills and strategies in both domains, executive function, and perception-based thinking. The aim would be to help students acquire higher-order thinking skills. Cognitive skills include, but are not limited to, attention (sustained, selective, alternating, divided), memory (working, short-term, long-term), reasoning (induction, deduction, visuo-spatial reasoning), and executive functions (memory retrieval, cognitive flexibility, inhibition). Practicing tasks that require cognitive processing can yield significant improvements. Cognitive functions also play significant roles throughout the development of children and adolescents. For example, working memory is important in both the fast development of mathematical cognition and numerical reasoning. Therefore, computer-based cognitive intervention programs are a viable option that facilitates cognitive enhancements which can, in turn, facilitate the development of Mathematics and reading. Computer-based cognitive training intervention programs with multi-disciplinary approaches are beneficial for students with a learning disability/disorder.

7.2. Social Skills Training

Social skills are the verbal and nonverbal behaviors someone uses when communicating and interacting with others. Developing social skills is an important developmental milestone that allows children to build relationships and friendships with peers, promoting school success and interpersonal relationships. Skills such as nonverbal communication, cooperative play, making and maintaining friendships, sharing, and seeking help from others should develop as children get older. However, for some children, this skill development is not typical. Deficits in social skills can significantly impact a child's ability to build relationships, learn effectively, and engage in cooperative play. For children, social competence is connected to a sense of well-being, coping with stressful social situations, and receiving social support from peers. Social skills deficits can, therefore, greatly affect a child’s well-being, contributing to anxiety, depression, and aggression. In addition, these deficits can intensify across development, as children enter school and peer relationships become more central to emotional well-being.

Groups of peers can influence children’s social skills development positively or negatively. Peer groups can serve as models or sources of reinforcement, providing social feedback that promotes positive behaviors or retaliates against negative behaviors. However, peer rejection and victimization can also lead to further social difficulties and dysregulated behavior, which can then reinforce rejection. Many children learn new skills through practicing them in reciprocal interactions with their peers rather than through adult instruction; it is essential to focus on group-based and peer-mediated intervention strategies. Treatment must also focus on naturalistic settings to promote ecological validity and reduce the stress of new interactions. Group members benefit from observing others in their group and for children to feel they are part of a community. Supporting the development of social skills through group treatment can provide a structured environment to practice new skills with peers and can facilitate generalization and maintenance of

skills. Social skills interventions should also be individualized, as children's social behavior varies widely across age, diagnosis, and culture.

Group treatment is a common intervention model for social skills training, but individual treatment can also be effective. A social skills group involves a group of children with similar social skills deficits who receive targeted instruction to improve specific social skills through role-playing, modeling, video feedback, and peer-reinforced activities. Some interventions are designed for a particular population, while others are more universal. Targeted intervention typically requires participation in a standardized program to improve specific behaviors but may also involve individual treatment to address co-occurring concerns or allow more individualized approaches. When compared, both approaches significantly benefit individuals with autism or developmental delay, and individual treatment focusing on social situations and social cognition or video feedback can also produce good outcomes. Pediatric occupational therapists may choose group-based or individualized treatment depending on the population of clients.

7.3. Emotional Regulation Strategies

Emotional regulation is when individuals monitor and evaluate their emotions. It involves processes engaged in emotions through various ongoing processes aimed at decreasing, increasing, maintaining, or inducing one's emotions. Four major procedures of emotional regulation involve situation selection that involves anything from avoiding certain situations to approaching them (Brannon, 2013); situation modification, which focuses on making changes to the situation; attentional deployment that encompasses altering one's focus of attention; and cognitive change, which involves reappraisal of the situation. Regardless of the types of strategies involved in emotional regulation, regulation strategies can be grouped into two broad categories—adaptive strategies and maladaptive strategies. Adaptive strategies are characterized by aiming at successful emotion regulation, while maladaptive strategies aim at finding short-term solutions that eventually lead to worsening the situation. Early on in life, children have to miss some key moments in their social and cognitive development as a result of the problems that they have. An occupational therapist chosen carefully can support healthy development.

Occupational therapists can help caregivers identify functional challenges and develop strategies to promote healthy emotional regulation. Teaching caregivers to recognize their own emotional responses to kids' behavior and then helping them identify the actual behavior and the expected response can improve parenting and can have a big impact on how kids feel and react. Caregivers are then guided to create replacement skills or teach emotional vocabulary as needed. Caregivers attending parenting classes can also be helpful for some parents. Providing a visual representation of expected emotions and responses with photos of themselves and their kids can help both establish predictable patterns in the home and support the development of emotion vocabulary. Using a simple visual representation like a stoplight to identify when kids are moving beyond appropriate emotional responses can also support self-regulation skills. Fostering a sense of mastery by gradually reducing assistance for efforts, either through fading prompts or consider the use of structured visuals, can also be helpful.

1.10 8. Family-Centered Care in Occupational Therapy

Family-centered care is an element common across pediatric care. A caregiver is the legal and primary caretaker of the child. Caregivers are integral in all aspects of pediatric care such as referrals, decisions of services needed, and the daily interactions in an individual's care. Caregiver engagement in their child's occupational therapy is seen as their deliberate efforts for their child and family to benefit from therapy. Caregiver engagement spans supporting their child in therapy, advocating for their child, seeking out therapy, and coordinating services with other professionals (Carlson & Schwartz, 2019). Caregiver engagement positively impacts the child's participation in therapy, progress toward goals, and their overall outcome. There is a mutual interaction and reciprocal relationship between children and caregivers; children engage in occupations that interest them, while caregiver continuing engagement ensures that these occupations are meaningful, reinforce skills, and are available. An engagement gap occurs when the caregiver is absent or less engaged in the interactions with their child. This gap can negatively affect child participation and ultimately, performance. Therefore, an avenue to facilitate caregiver engagement in pediatric occupational therapy is to focus on the caregiver to bridge an engagement gap.

Occupational therapy is a diverse healthcare field that works with clients across the lifespan, with children being a prevalent population. The goal of occupational therapy is to assist clients to maximize independence in meaningful activities in everyday life. Occupational therapists work not only with clients, but with the families and caregivers of the clients. The functioning of the family unit is a primary goal in pediatric care. Occupational therapy practitioners assist children and families with various needs to work on gaining independence in activities of daily living, social participation, and improve overall sensory, cognitive, and motor functioning. Occupational therapy practitioners have the clinical knowledge of childhood development and the skills to incorporate meaningful activities of both child and family in order to facilitate skill acquisition and minimize the consequence of disability.

Occupational therapy practitioners work with pediatric clients in various settings including: early intervention, schools, home health, outpatient clinics, and acute care. Across these settings, occupational therapy is an essential component of an interdisciplinary team, often working alongside physical therapy and speech language pathology. However, the most important, and often overlooked member of the team, is the caregiver of the child.

8.1. Involving Families in the Rehabilitation Process

Families are directly involved in the all-day activities of their child. Occupational therapy, to be effective, is practiced within the context of that family's routine. Learning which skills are important to handle, and identifying activities relevant to a family's life are first steps taken collaboratively with families along in the therapy. The family system provides the context, motivation, and resources for occupational engagement into which learning can occur (Carlson & Schwartz, 2019). Involving families in the rehabilitation process enhances the therapeutic engagement of children with disabilities and their families. An interdisciplinary approach helps in tailoring individual approaches making the best use of each profession's expertise. It also creates an opportunity to shape family to help with child's occupational therapy needs. Each therapist can

draw on a different type of expertise – for example, an occupational therapist may know about assistive technologies and how to retrieve more independence; some physiotherapists may have better access to information about special or adapted pickups. Involving families in the rehabilitation process earlier and longer can allow for more heart connection; a new understanding of OT; a strong recognition of the role of same peers; and hope for self-sufficiency in the future.

The major work of involving families in the rehabilitation process is to improve communication and the therapy's daily activity planning in such a way that, in line with child's chronic disease and specific framework conditions, constructive development can still occur. In the collaboration with doctors and nurses, the WiRE was regarded predominantly as a tool for negotiation of separation and discharge periods from the hospital. Increasing familiarity with the method allowed the family to shape it more as they gained some experience and realized that the effect on the therapy would otherwise be uninvoked. Communication efforts to make insecure feelings of having to take on an unknown role more shareable, and enhancing knowledge about one another's practices in therapy increased. So, families acquired more input beyond mere negotiation shaping.

8.2. Education and Support for Parents

The role of education and support for parents in occupational therapy cannot be understated. Education and support can take many forms. Parents can be educated about their child's diagnosis or disability. Parents can also be educated about specific treatment techniques used in occupational therapy and how to implement them at home with their child. This can involve giving parents material and resources, which is a common structure for education. Resources can include visual aids, social stories, or structured treatment materials, all of which give parents strategies to implement at home. In addition, resources also help inform parents about their child's disability, something all parents want to know about their child. Resources help bring clarity to a situation that often seems overwhelming. Parents report wanting to know more and worried about the unknown (Bakken et al., 2015). In terms of treatment techniques used in occupational therapy, parents want to be able to help their child and understand how they can contribute to their child's treatment. Parents stated feeling more empowered as parents after having been educated about treatment techniques. Schools and staff should provide this information.

Collaborative treatment of both the child and caregiver/family also provides opportunities for providing education and support but is less commonly used than the empower parents structure (M Lim et al., 2021). The intent of collaborative treatment is for child and caregiver/family treatment to occur in the same session. This can be used to provide specific occupational therapy techniques to the caregiver/family on a more personal level. Opportunities for practice can also be provided, and questions can be answered in real-time. Treatment is often more effective when two adults are involved rather than just one. Having both groups in the same space can affect the course of both treatments, with each group acting as a mode of support for the other. Caregivers/families can also support the success of the child during treatment, while the child can be less anxious and more willing to work with their caregiver/family.

1.11 9. Evaluating Outcomes of Occupational Therapy

Evaluation and re-evaluation of children participating in occupational therapy services includes obtaining and reviewing information about the child and their context. Children are encouraged to engage in top-down assessments and routines that characterize typical independent participation. Before initial evaluation, the occupational therapist (OT) may review the health record, including physician notes, referrals, and prior evaluations. Areas for potential services may be identified from review of service records, including IEPs, prior service plans, notes, and progress reports. In addition, current and previous screening results may also be reviewed.

The OT then contacts the primary caregiver by phone and uses a focused interview format, considering the eight areas of possible occupational therapy involvement. It is paramount to clarify with families that the information obtained will be used solely to develop evaluation goals and strategies. Family member concerns are central to the evaluation process, as OTs have the expertise to determine how to address concerns, but family members know their children best and may provide important insight (Soref et al., 2023).

If the family members identify concerns, they work collaboratively with the OT to formulate measurable goals that reflect children's desired outcomes. Sample goals include improved unassisted independent participation in use of the toilet, dressing, shoes, and hand washing routines. The evaluative strategies developed may include top-down, bottom-up, and systems assessment methods. Top-down assessments may range from a brief screening of participation and performance patterns to in-depth analysis of family routines and roles.

9.1. Measuring Progress and Effectiveness

Caregivers are curious about the child's progress and efficacy of services following occupational therapy. Pediatric occupational therapy is based on theory, clinical reasoning, and best available evidence. There are many valid screening tools and standardized assessments that can be used to measure progress and effectiveness of occupational therapy services. Because the goals of occupational therapy services may be different for each child, it is necessary for the pediatric occupational therapist to select valid and reliable standardized assessments that best address the child's needs. It is also important for the pediatric occupational therapist to receive training in selection of standardized assessments, scoring and interpreting results, and utilizing assessments to guide intervention planning and determine efficacy of services. Screening tools without sufficient psychometric properties can be used to inform the evaluation process, but should be used with regard.

Recent findings in this area of practice indicate that technically adequate assessments are available that assess engagement in daily occupations of children with developmental disabilities (Soref et al., 2023). Incorporating parent/caregiver perception of the ability of their child to perform life routines is vital for a thorough understanding of the child's capabilities. Tools such as the Canadian Occupational Performance Measure, and Child/Adolescent Scale of Participation which includes caregiver-report standardized interview and/or questionnaire adequately identify child participation and participation interventions. Some of these assessment tools, however, do not provide normative scores across all ages and abilities, limiting clinical utility, yet identification of

difficulties can be used to inform the selection and use of occupation-focused intervention strategies.

9.2. Feedback Mechanisms

In occupational therapy, meaningful participation in daily activities is found to support children's developmental milestones or in other words their occupational performance as it refers to physical, social, and cognitive performance abilities in activities of daily living, play, and education (Soref et al., 2023). Furthermore, quality of life related factors such as satisfaction with participation, routine, and performance of daily activities are also viewed as significant predictors of children's further development. Daily activities are supported by environments match with children's abilities, resources, and personal factors at home and school. Ecological models of human development posit that children's occupational performance in daily activities is the result of an interaction between child, activity, and context characteristics. With regards to children's development, participation in daily activities and their occupational performance in addition to developmentally related factors are emphasized in the context of occupational therapy. As such, children's context is assumed to be the rationale of budget reallocations and policy decisions in order to support equal opportunities in life. The environment is also a context within which changes can be made to influence children's development.

In order to influence or promote children's participation in daily activities and their occupational performance, occupational therapy is founded on evidence as a profession that aims to support children's development through inclusion in activities of daily living, play, and education. Children pass a series of stages and face particular milestones determined by philosophy models of occupational therapy. As development and performance of children are interrelated, children who are unable to pass the normative path lose participation opportunities and are at greater risk to develop additionally or more complex problems. These problems will influence their quality of life significantly. Therefore timely interventions are recommended. Preschools are recommended to be the earliest target setting for preventive interventions. The justification for this choice is mainly threefold relating to important milestones passed at preschool age; the percentage of children who might benefit from interventions is thought to be considerably most during preschool age, and early performance deficits might negatively influence participation opportunities and therefore lead to sensory-motor development delays.

1.12 10. Challenges and Barriers in Pediatric Rehabilitation

Pediatric rehabilitation is a vital aspect of child care that can assist individuals in reaching their full potential. However, the availability of rehabilitation services can differ from region to region. Children with health or disability-related needs may suffer from a variety of barriers to access and equity in care, which impacts their quality of life. Multiple factors hinder access to rehabilitation services, including social, geographic, environmental, resource, and systemic considerations. Utilization of infant brain care services for brain-injured infants is said to improve infant development, but these services are not accessible for all eligible infants. The aim of this research was to identify and illustrate barriers impeding access to care for pediatric rehabilitation service eligibility groups. Framed around an updated framework, an environmental scan of pediatric

rehabilitation was conducted across Australia. Environmental scanning was used to target stakeholder groups with knowledge of barriers to access. Stakeholders were asked to fill out a two-part survey that contained open-ended questions regarding existing barriers to access, as well as a mapping activity. Part 1 asked participants to list barriers impacting caregiving choices and then classify these barriers on a grid depicting the ecological levels of analysis. Part 2 comprised several vignettes portraying early caregiving barriers impacting care access. A total of 108 surveys were collected across care, funding, health, and policy groups. Participants demonstrated a willingness to be involved with service access initiatives in the future, and a scoping review and terms of reference were suggested to narrow the focus of potential initiatives. Overall, a variety of substantial barriers to care access were highlighted, related to the community, provider, policy, and practice levels of analysis. These barriers had direct impact on family outcomes, which reinforces the need for systemic change (A. Ospina et al., 2023).

Pediatric rehabilitation consists of an array of health services that aim to optimize development in children experiencing health or disability-related needs. These needs can arise from a variety of underlying conditions which may impact mobility, self-care, communication skills, and social-emotional and behavioral needs. Pediatric rehabilitation can take many forms and may include therapies that focus on physical, occupational, or social communication and feeding support skills. Additionally, enabling health supports such as mobility equipment, augmentative and alternative communication devices, and orthopedic, surgical, and medical interventions are considered under pediatric rehabilitation. Children may also access more generalised health system-wide support such as those aimed at improving general well-being through mental care and physical activity. Pediatric rehabilitation is crucial in supporting children and young people to realize their potential and participate meaningfully in day-to-day life. Not all children with health or disability-related needs are able to access care, and deep inequities exist across geography, context, and demography both internationally and within Australia. Accordingly, children can be exposed to multiple barriers to the access and equity of care, which impacts their ability to live well and thrive. Well-meaning initiatives to increase and improve access to rehabilitation services may be turned away if they fail to understand and address barriers suffered by children in their target regions. Additionally, some children may miss out on access to care entirely, which perpetuates disparities in health and social well-being.

10.1. Access to Services

In the United States, approximately 1 in 44 children has been identified with Autistic Spectrum Disorder (ASD). Developmental disabilities affect about 1 in 6 children aged 3 to 17 years. There is a wide variety of developmental disabilities, including intellectual disabilities, autism spectrum disorders (ASD), and motor disabilities. These disabilities can affect how a child thinks, learns, speaks, acts, interacts with other people, or understands their environment.

An early diagnosis or detection of developmental disabilities by a healthcare provider is important to support children in the areas of play, self-care, social activity, expressive language, physical activity, participation in academic endeavors, and addressing issues with sitting and moving that affect daily functioning (Soref et al., 2023). Occupational Therapists use play, joint attention, and

environmental enrichment strategies to promote development across a wide range of areas. Across the world, there are large discrepancies in children's access to services due to differences in rehabilitation models, cultural attitudes toward disabilities, education systems, and funding.

Global trends in the use of health services based on survey data are documented; however, little is known about the global use of educational services. To find out how challenges in accessing services influence families and how occupational therapy can help, the unmet needs of families have to be examined through (preliminary) explorative focus interviews.

10.2. Cultural and Socioeconomic Factors

Cultural and socioeconomic factors influence participation and outcomes for many children with disabilities (Willis, 2016). Conversely, participation and outcomes are factors that influence the extent to which children feel included and fulfilled (Echsel et al., 2019). Understanding participation and outcomes of families with children with behavioral disorders in the community is a critical need when seeking to understand more effective supports and barriers in the community triad of school, home and community. Through this lens, a systematic scoping review on participation and outcomes was conducted. Just as young children participate in the community through independent and caregiver-mediated effort driven participation subtypes (some of which are context specific), the triadic influences of community on child development through a 5-tier modeling structure was presented as an innovative means to present and further research this burgeoning area of child development. The extreme need to better understand the influences of behavior, environment and context provenance is highlighted. Furthermore, this triadic perspective has useful applications to consider the many facets of participation and outcomes in other historically neglected research areas such as children with spinal cord injury. Identifying perceived environmental barriers to participation is essential for understanding the challenges faced by youth with spinal cord injury. To gain a better understanding of the perceived environmental barriers to participation in recreation, community and school contexts in youth with spinal cord injury, a mixed methodology approach was adopted. Employing the qualitative phase allowed for a wider breadth of barriers to be identified not previously captured in the quantitative phase. More effective intervention strategies can be developed to better guide rehabilitation services. Insights garnered from children with disabilities about their successful participation experiences can inform the practice of occupational therapists. Even when much effort went into volunteering to hear from children about their participation experiences, value was still found. Many children with disabilities experienced frustration about the lack of familiarity or willingness to engage in their participation experiences.

1.13 11. Future Directions in Pediatric Occupational Therapy

The goal of pediatric occupational therapy is to facilitate participation in meaningful activities or occupations. Depending on the environment, different roles are fulfilled as a child, either in the school or at home. At the heart of this one is the emergent role of a student. Schools provide necessary structure for a child to learn the very important skill of attending to and learning from the environment (K. C. Dluhosh & Y. Burns, 2014). In order to be successful in this role, a child must be able to understand expectations, conform to conventions, and follow rules. Understanding

when and how to use aids, such as note taking, extra time, manipulatives, modeling, and peer partnerships are strategies employed as skill and independence develop. Both social and cognitive skills are required for successful participation in the student role and the development of these skills in the school setting has long-term impacts on life as a productive citizen.

Occupational therapy research has mostly focused on the illnesses and diseases that have affected the child's ability to attend school and pass tests. At present there is ample literature to support the efficacy of an occupational approach in the treatment of children with attention-deficit and learning disorders. Though these research studies can inform best practice, current literature is lacking regarding emerging evidenced based practices fitting of the 21st century. The expectation is for an understanding of methods and techniques of traditional OT practice, as well as current theorist's phenomenological models of analysis, which also allow fusion of the profession with current technology. Finding a method that can capture what has been done, without limiting what can be done, is the goal. School districts are now better equipped with technology than background knowledge in programing it for classroom success.

Most available programs are researched and designed for special populations in sparsely available literature limited by a parent's resources to pay for the therapy outside of school. Broader, more open-ended questioning, allows for the emergence of systems based on a child's daily or near-daily activities, rather than individual skill interactions selected to test one variable within the craft of OTs. Integrating technology into the profession can help unite state regulation and licensure structures that haven't recognized OT's place in pediatrics, while also expanding outside the box of traditional services provided. This can bolster access to services for all populations 7-19 years old without limiting options just to those with qualifying disabilities.

11.1. Innovative Practices and Technologies

Innovative practices in pediatric therapy during the early years have expanded dramatically in recent years with the growing popularity of mobile technologies such as tablet computers, smartphones and the applications that accompany them. Occupational therapists (OTs) are exploring how tablets might be used as a therapy tool in pediatric practice with children three-to-six years of age. The purpose of this exploratory study was to determine what occupational therapists in an urban metropolitan center know about tablet use for therapy with preschool children and their families (K. C. Dluhosh & Y. Burns, 2014). Questions explored the therapists' experience with tablet applications and how they recommend apps as part of their service delivery to preschool children and families. Focus groups with practitioners revealed the following themes: therapist perceptions of tablet advantages and disadvantages; suggestions for app recommendation or referral; considerations in recommending apps or tablet use; and thoughts about tablet use by families and schools. The study's findings underscore the important role OTs will play in the consideration of mobile technology for young children with disabilities in the 21st century. With the growing popularity of mobile technologies it is anticipated that there will be an increasing number of applications (apps) to support children's learning in a variety of settings. Occupational therapists working in public schools are increasingly seeing children on the autism spectrum who are adored and who rely on tablets for learning and communication. These children are often found

sitting quietly for extended periods of time engaged with the tablet, focused on the task it has to offer, unresponsive to surroundings. Academic skills using mathematics and early literacy apps are obvious for development. The ability to express a need or comment on a situation using text or illustration is an exciting possibility for a child with severe speech and language impairments. Broadening the horizons of children with autism spectrum disorder will add learning experiences that, at this time, are not apparent to them. Some preschool teachers are putting aside traditional teaching materials and using only tablets with children labeled at risk for special needs. There appears to be a push in some preschools to move toward a fully digital curriculum. The aims of this survey focus on tablet use during therapy by OTs working in pediatric practice with preschoolers in an urban metropolitan area.

11.2. Research and Evidence-Based Practice

Approximately 10% of preschoolers are developmentally disabled, requiring earlier intervention to better their participation in meaningful daily activities. The home and preschool environments are both significant to the participation of preschoolers in daily activities. A short-term intervention plan was composed, consisting of playful activities focused on three specific sensory-motor abilities (i.e., balance, visual integration, and fine motor precision) to encourage participation in home and preschool activities. Following the intervention, significant improvement in children's sensory-motor abilities was found in balance, visual integration, and fine motor precision. There were also improvements in the measures of diversity, children's independence, and parental satisfaction (Soref et al., 2023). Children with cerebral palsy (CP) experience deficits in social participation in family and recreational activities with peers, secondary to movement and postural challenges. Understanding family/caregiver, child, and professional factors associated with levels of physical, occupational, and speech therapy can provide insight into how PTs, OTs, and SLPs can best support children with CP, families, and services. Ongoing health care reform and increasing demands for documentation of service impact has intensified scrutiny of therapy intervention decisions. Therapists strive to balance evidence, best practice guidelines, and patient- and family-centered quality of care. Qualitative inquiry demonstrates that families prioritize child-centered goals and collective problem solving. (Westcott McCoy et al., 2019)

1.14 12. Case Studies in Pediatric Rehabilitation

Below, we present shortened versions of two case studies of children in 1st grade who received occupational therapy as part of their special education services.

Ryan

Ryan, an 8-year 10-month old boy, was found eligible for the school-based occupational therapy by the local education agency due to a 30-minute-per-week focus on fine motor skills, visual motor skills, sensory modulation, and handwriting via the Occupational Therapy Evaluation and Assessment Process. Ryan was identified as having a specific learning disability in part due to his deficits in this area during the school-team evaluation process. As Ryan was in 1st grade at the time of this study, he had received school-based OT services for nearly 4 years. All six dimensions of the Personal Factors Model were identified as being involved in Ryan's participation in writing. Personal factors related to development were broad motor skills (broad motor deficits such as

clumsiness and difficulty with activities such as jumping jacks), visual processing skills (inattention such as not knowing where to start reading circle, losing place while reading, and omitting small words), sensory regulation (poor sensory modulation in response to internal and external sensations).

Ryan's broad motor deficits affected almost every facet of his ability to write including sitting posture, hand position for holding the pencil, letter formation, grip pressure, and effort exerted resulting in fatigue quickly which made him miss out on writing practice opportunities that involve higher-level thinking skills and learning outcomes. One of Ryan's visual processing skills deficits, losing his place while reading due to inattention, made it difficult for him to scan his notebook to quickly find the right materials during writing. Ryan's fine motor skills such as poor pencil grip and letter formation made it difficult for his prototype to produce cursive copies following the scribbled notes/marks in the context of note-taking which is a very important learning strategy for recording, retaining, and recalling information for the generation of high-quality inputs to writing. Based on the analysis results, the functions (e.g., poor fine motor skills), structures (e.g., brain development in the fine motor area), activity limits (e.g., writing deficits), participation restrictions (e.g., avoidance of writing tasks due to frustration), and personal factors were written in the order of Ryan's PT's development prior to the target activity. The intervention, a group-based fine motor intervention, was delivered to Ryan twice a week, 30 minutes, for 12 weeks. An activity/task analysis, modifying physical and social environments, sensitivity control of presenting auditory/visual stimuli and proper timing in presenting sensory stimuli were intended to be delivered to Ryan and a careful combination of the presented conditions were monitored at the beginning of each session so that they were distinct from regular classroom contexts and both exciting and feasible to Ryan while being resistant to non-engagement and moving on towards other activities.

Elizabeth

Elizabeth, a 7-year 4-month girl, was found eligible for special education services due to significant deficits in the areas of writing, spelling, reading and math and received occupational therapy services 45-minutes a week, including direct individual therapy and consultation with the classroom teacher. She had been diagnosed with a learning disorder and had received therapy since the beginning of 1st grade. Elizabeth's cognitive functions (e.g., short-term memory) on which writing was related were developmentally appropriate; however, the personal factors explored in this study were identified as affecting her participation in writing. Elizabeth applied the knowledge/abilities, so-called cognition and executive functions, in both strategic processing and quality of writing which necessitated oral or digital methods of generative planning/means of communication. A potential mediation challenge in the framework of writing development theory, a lack of understanding of writing as a rigid task with unchanging procedures, was identified for Elizabeth.

She was passive in understanding that the environments, messengers, and means/channels through which people communicated ideas may differ. Embedded within the understanding were two main potential challenges; being influenced by the anticipated audience in diction and tone and not

participating in planning (i.e., thoroughly discussing main ideas with peers prior to writing). Elizabeth's writing environments situated in the classrooms and at home were very well described. A potential mediation challenge was identified for Elizabeth's writing environment; being unable to feasibly offer assistance or materials to other children when they have writing difficulties. The analysis revealed potentials for improving Elizabeth's participation in writing in term of environments.

12.1. Successful Intervention Examples

As children develop, they begin to be able to engage in activities expected in their age and context of health, school environment, and home environment. The degree, consistency, and complexity of accomplishment of expected activities are the child's participation (Soref et al., 2023). Play, communication, and self-care at school are examples of childhood participation from the daily life activities perspective, and playing with friends, climbing stairs at home, and self-feeding with a spoon are from the context perspective. Increased participation in the same activities in the same contexts can also be conceptualized as participation improvement. Developmental disabilities can impair the performance of children in play, communication, and self-care tasks within naturally occurring contexts, and thus impair their participation. The disabling condition can thus be stated in the more general terms of disability in context-sensitive performance of daily activities. The interaction between the organization of the task with developmental disabilities and the context condition can delineate the child's performance better than identification of a specific disability.

Children's activities and development are hypothesized to be strongly influenced by their participation in day-to-day contexts (Killeen & R. Anaby, 2022). Day-to-day contexts of participation are defined as the family, health, community, and school environments. The context variable of participation and its influences on development and activities are examined using the nested contexts model of child inclusion/exclusion in participation contexts. Developmental disabilities were associated with significant exclusion in participation abilities in few and more specific contexts. In conclusion, the nested contexts model and machine learning were found valid for new studies and analyses of children's participation in cultural, social, and community contexts and the circumstances in which it occurs. Developmental disabilities influence children's inclusion/exclusion in participation contexts. Immediate interventions that increase exposure in recommended contexts and remove barriers are expected to be effective.

12.2. Lessons Learned from Challenges

In completing the pilot study, participants gained invaluable lessons from the process. This section outlines the key learnings and reflections from the preliminary study. In the analysis of the pre-assessment documentation of children, OT practitioners found an abundance of useful information. Tap completion indicated school readiness and delays in motor skills, sensory processing, social participation, and social-emotional coping in a significant number of children. The wealth of information presented in the documentation reinforced the need for OT services at the ECEC centers and that even when the optional assessments are conducted by ECEC teams, the results of children's needs are not always translated appropriately into new services provided.

Contacting the parent's questions of whether there were any problems regarding their child's assessments and participation of services also illustrated the range of assessments and services taking place prior to the initiation of the project. Some parents acknowledged that although there were concerns regarding children's development, the issues were beyond the scope of the services they received. Others had no knowledge of any concerns regarding their children's development, indicating that the services were addressing their children's needs. Parent interviews revealed that while many parents sought services for their children at a relatively young age, there was still a notable cohort of parents who had no awareness of a possible problem until being called by the ECEC teacher.

The online platform of the assessment and questionnaire pack was also used for the pilot study as opposed to spreading the assessment distribution over multiple sessions for the feasibility study, and this caused an unanticipated strain on stakeholders. Parents commented on the length of the questionnaires/assessments and that they perceived the assessments as very lengthy and burdensome. Another note left by a parent expressed the level of emotion experienced by parents participating in this type of assessment.

Targeting stakeholders' roles effectively and prior to the pilot study would have minimized tensions and provided greater opportunities for all parties to contribute to the necessary adaptations. Affected roles and overall panel functioning could have been shared with stakeholders prior to the meeting, to allow clarity and time for stakeholders to consider their contributions. Adapting the platforms, taking the time to seek services in the hope of maintaining conditions for panel review, providing compensatory mechanisms to parents and stakeholders would all have undoubtedly improved stakeholder experience and the overall efficacy of the panel meeting.

1.15 13. Conclusion

A child's early years are spent acquiring skills needed to succeed throughout life. Motor, sensory, cognitive, social, and emotional skills develop together in a complex system that affects each other. Developmental milestones refer to the tasks a child acquires during particular age periods, beginning in the first months of life and continuing through development. Developmental delays may occur due to a variety of stressors. Children experiencing developmental delays present with skills deficits that may be temporarily altered but more often impact tasks many will encounter in later development such as feeding, learning, and forming relationships. Pediatric rehabilitation is where techniques are applied, in this case occupational therapy, to the child's life context with the goal of improving outcomes at a young age. Changes that occur early on, often referred to as "plasticity," enable children to recover from injuries (Soref et al., 2023).

Currently, at least 15% of children in the U.S. are estimated to experience developmental disabilities which may affect movement and the body, visual and intellectual, or communication and social skills. The earlier a child with developmental disabilities receives intervention, the better. Many conditions such as cerebral palsy may be evident at birth or soon after. In others, such as autism or attention-deficit/hyperactivity disorder, symptoms may appear later. Occupational therapy is the therapeutic use of meaningful occupations with individuals or groups to promote developmental, prevention, health, and wellness. Occupational therapists understand the

importance of meaningful occupations in the lives of clients and how they contribute to development in all domains. They assess the interaction among person, environment, and occupation to help clients participate primarily as it relates to children, in daily living activities.
Occupational therapy interventions for preschoolers with developmental disabilities are effective in improving their sensory–motor abilities, as well as in promoting their participation in daily activities. Most parents perceived a positive change in their children following the intervention. The findings provide evidence for the effectiveness of short-term culturally responsive occupational therapy intervention and confirm the occupational therapist's unique contribution in the field of early intervention. Most studies on the effects of occupational therapy interventions were conducted by researchers who are not occupational therapist. In such cases, the treatment model viewed the child as surrogate and used stimulation techniques developed in fields other than occupational therapy. In addition, occupational therapy studies focused only on changing the child's performance without investigating changes in occupational partnerships. The findings underscore the importance of addressing capacities and needs at both the child and parent–child relationship levels even in time-efficient and short-term interventions.
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