Pediatric Rehab Reinvisioned

Helping your patients reach their full potential
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The Neurological And Physical Abilitation Center was founded in 2008 by Lynette LaScala. Lynette envisioned an organization that would provide disabled individuals cutting edge treatments and therapies. As a mother of a child who experienced a near drowning accident, Lynette struggled to find quality therapies for her son Cody.
The Intensive Model of Therapy (IMOT) is a multidisciplinary, therapeutic approach utilized at NAPA Center to treat children and young adults with cerebral palsy and other conditions with neurodevelopmental disabilities. NAPA therapists utilize the IMOT by treating patients 2-6 hours each day, 5 days a week, for 3 full weeks using a combination of tools and techniques that compliment physical, occupational, speech, and feeding therapies.

The popularity of the IMOT is spreading worldwide as patients, therapists, and doctors continue to see outstanding results. The 3-week intensive program focuses on strengthening and facilitating improved motor patterns through repetition and correct alignment, in addition to caregiver education. Each child has an individualized program based on recommendations according to their needs, goals, and diagnosis.

NAPA Center therapists utilize numerous modalities and techniques including:

- NeuroSuit and/or TheraTogs: Dynamic motion orthoses
- Dynamic Movement Intervention: Gross motor postural intervention
- Universal Exercise Unit: Body weight support and strengthening device
- PROMPT: Manual technique for speech therapy
- AAC: Augmentative and Alternative and Communication
- Vital Stim®: NMES for swallowing dysfunction
- NMES: Neuromuscular Electrical Stimulation for Muscle Training
- Galileo Training: Whole body vibration
What the research says

“Intensive PT regimens were more beneficial than standard therapy in spastic CP, especially in children with a low functional level” (Elgawisha M.H., & Zakaria M.A. 2014). ⁷

“Children with cerebral palsy may benefit significantly over the long-term from intensive physical training that prevents deterioration of their motor skills” (Størvold G.V., et al., 2018). ²⁷

“Parents found intensive speech therapy to be acceptable and effective describing their children as more confident, more successful in conversations, and having increased social participation” (Pennington et al., 2018). ²²
Case Study

No 1.

Introduction:
Intensive therapy results in significant improvement in the gross motor abilities of children with neurological conditions and physical disabilities.

Case management and outcome:
A 12-year-old child with spastic diplegia cerebral palsy, GMFCS level-III, participated in an intensive therapy session. She received 4 hours of physical and occupational therapy per day, 5 days per week, for 3 weeks. She made significant improvements in her strength, balance, posture, and endurance, as evidenced in a 7.2% increase in her GMFM-88 score from 62.2% to 69.4%.

Her individualized treatment plan included traditional occupational and physical therapy with the use of unique interventions such as NeuroSuit, Whole Body Support System, Whole Body Vibration, and Neuromuscular Electrical Stimulation.

Discussion:
The mean amount of improvement over the course of 12 months for a child GMFM level III over 6 years of age is 1.89% with a standard deviation 4.85%. (68% Of children will show a change of -2.96% to 6.74%). This child’s progress of 7.2% over the course of 3 weeks therefore represents a remarkable improvement. It is 3.8 times the mean improvement over one year. The progress of children GMFM level III is typically expected to plateau around age 6. This case demonstrates that the potential for improvement persists throughout childhood and even into adolescence.

Jenny Swan, SPT, Touro College, 2020
Case Study

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Purpose:
Determine benefits of individualized intensive model of therapy on children with neurological and physical disabilities.

Intervention:
An 8-year-5-month-old child with unspecified cerebral palsy, GMFCS level III, participated in intensive therapy. He received a total combined 3 hours of physical and occupational therapy per day, 5 days per week, for 3 weeks. His individualized treatment plan included a traditional occupational hour and a physical therapy hour in the NeuroSuit, an hour of occupational therapy in the Whole Body Support System, with use of Whole Body Vibration Plate throughout various exercises in his plan of care.

Outcomes:
The patient made significant improvements in his strength, balance, posture, and endurance, as evidenced by clinical observations, improvements in gross motor strength, coordination, and endurance. This is further confirmed by his improved standardized score in the GMFM: This patient demonstrated a net 7.908% increase over the course of 3 weeks, 4.18 times the mean improvement over one-year, which the patient accomplished in a span of 3 weeks.

Implications:
The mean amount of improvement over the course of 12 months for a child GMFCS level III over 6 years of age is 1.89% with a standard deviation 4.85%. (68% of children will show a change of -2.96% to 6.74%) This child’s progress of 7.908% over the course of 3 weeks therefore represents a remarkable improvement. It is 4.18 times the mean improvement over one year. The progress of children GMFM level III is typically expected to plateau around age 6. This case demonstrates that the potential for improvement persists throughout childhood and even into adolescence.

Jonathan Rodil, OTD, OTR/L, NAPA Center 2020
Purpose:
The purpose of this case study was to investigate changes in gross motor function using the GMFM-88 in a child with Down syndrome after a 3-week intensive program of 3 hours, day for 5 days per week with the NeuroSuit.

Intervention:
A 3 year, 7-month-old male with Down syndrome participated in a combination of physical and occupational therapy services for a total of 3 hours per day, 5 days per week, for 3 weeks. His individualized treatment plan included physical and occupational therapy with use of modalities and techniques including NeuroSuit and Dynamic Movement Intervention exercises.

Findings:
The subject demonstrated taking 4 steps independently during the 3-week period, however, was unable to demonstrate on the final evaluation but showed improvement in walking with one handheld assist. Per therapist report, the subject demonstrated a weekly increase in ability to stand independently, starting with 2-3 seconds during the second week, 7-10 seconds during the third week, and 27 seconds on his last day. The patient made significant improvements in his strength, balance, posture, and endurance, as evidenced by a 12.4% increase in his GMFM-88 score from 48.39% to 60.79%.

Implications:
For children in the same age range and same GMFM level (level 2), the mean total score was 61.2% with a standard deviation (SD) of 14.9. Therefore, our subject fell within 1 SD of the mean before the interventions. The mean change after 6-months of traditional therapy is a value of 5.31% with a SD of 6.06. The subject’s change in their total score was 12.4%. Therefore, the subject was 2 SD above the mean after 3-week of intensive therapy.

Amanda Rohlkohl, SPT 2018
Purpose:
To understand parent perception of progress of an individualized intensive model of therapy over the course of three weeks. The Canadian Measure of Occupational Performance (CPOM) was utilized to gain an understanding of caregiver concerns related to areas of occupational performance and determine goals. The Impact of Feeding on the Parent and Family Scales (Feeding Impact Scale) was used to understand the impact of the patient’s feeding on the family and caregiver. Caregiver interviews were conducted to track perception of progress and satisfaction over the course of the 3-week intensive.

Intervention:
A 7-year-old child with quadriplegic cerebral palsy participated in an intensive therapy program. The child’s individualized treatment plan included three hours of physical and occupational therapies and one hour of feeding therapy, 5 days per week, for 3 weeks. In addition to therapeutic exercise and activities, modalities utilized include whole body vibration, neuromuscular electrical stimulation, NeuroSuit, dynamic motion orthosis, and body weight support system.

Findings:
The patient made significant improvements in various areas including balance, postural control, motor planning, and pelvic and gluteal strength as reported by the caregiver and through clinical observations from treating therapists. Additionally, improvements were seen during feeding therapy as the patient showed increased participation during mealtime and decreased rigid behaviors by accepting different flavored foods and reducing length of screen time during feeding. Per caregiver report, the 3-week intensive program had a significant impact on overall functional performance.
Case Study

Purpose:
Determine benefits of individualized intensive model of therapy on children with neurological and physical disabilities.

Intervention:
An 11-year-old child with spastic diplegia cerebral palsy, GMFCS level II, participated in intensive therapy. He received 4 hours of physical and occupational therapy per day, 5 days per week, for 3 weeks. His individualized treatment plan included traditional occupational and physical therapy with the use of modalities such as NeuroSuit, Body Weight Support System, and Whole Body Vibration.

Outcomes:
The patient made significant improvements in his strength, balance, posture, and endurance, as evidenced by a 3.5% increase in his GMFM-88 score from 86.94% to 90.4%.

Implications:
The mean amount of improvement over the course of 12 months for a child GMFCS level II over 6 years of age is 1.55% with a standard deviation of 7.06%. (68% of children will show a change of -5.51 to 8.61%). This child’s progress of 3.5% over the course of 3 weeks therefore represents a remarkable improvement. It is twice the mean improvement over one year of children in the same age group and GMFCS level.

This case demonstrates that the potential for improvement persists throughout childhood and even into adolescence. Three factors that make the intensive model of therapy so successful are the dosage (time and duration) of treatment, the use of diverse and innovative modalities, and the skill and consistency of specially trained therapists. Interdisciplinary collaboration and shared passion in a team-like environment also play important roles.
Dynamic Movement Intervention (DMI) is a comprehensive intervention that incorporates current research on neurorehabilitation, technologies, and methodologies. Utilized to treat children with neurological diagnoses, this dynamic therapeutic technique is used by physical and occupational therapists to facilitate verticality, postural alignment, strength, and progress towards motor milestones.

DMI exercises are task specific and novel to enact changes to provoke new milestones and their subskills effectively. Relying on the concept of neuroplasticity as described by Nudo (2013): "Plasticity in motor cortex can be said to be skill- or learning dependent, rather than strictly use dependent. Tasks that require acquisition of new motor skills induce neurophysiologic and neuroanatomic changes in the motor cortex, but simple repetitive motion or strength training tasks do not."¹⁹
Therapy tool: NMES

Neuromuscular electrical stimulation (NMES) is a modality aimed at improving strength, coordination, endurance, sensory feedback, and timing in muscles used to promote improved motor control and strength in patients. It is implemented during therapeutic activities to assist with promoting or restoring function in muscles that may be weak and/or uncoordinated, and to assist with decreasing spasticity.

Targeted application of NMES can have positive effects in children with cerebral palsy and other neurodevelopmental disorders. When applied to the gluteus medius, NMES was found to improve temporal spatial parameters of gait in children with spastic diplegic cerebral palsy (Al-Abdulwahab & Al-Khatrawi, 2009).¹

Stackhouse et al. (2007) demonstrated that when compared to isometric strength training, targeted NMES use garnered more positive effects in walking speed as a result of strength gains.²-six

Yildizgoren et al. (2014) demonstrated that when paired with conventional therapy, NMES can be utilized as a tool to address involved upper extremity in children with cerebral palsy resulting in decreased spasticity, improved active wrist extension, and improved overall function.³-one

Therapy tool: WBV

Whole Body Vibration (WBV) is delivered via a mechanical vibrating platform. As the machine vibrates, it transmits energy to the individual standing, sitting, lying or kneeling on the plate causing the muscles to contract and relax many times each second. The Galileo plate WBV device provides a side alternating motion based on the natural movement of human gait, creating a tilting movement of the pelvis. With frequencies ranging from 5 – 30 Hz depending upon the platform, therapists are able to use the Galileo to address a variety of therapeutic goals including balance training, mobilization and stretching of tight muscles, spasticity reduction, and strength and coordination building.

Lee and Chon’s (2013) research of WBV demonstrated improvements in gait speed and stride length in children with cerebral palsy²-nine and Cheng et al. (2014) findings suggest that WBV normalized muscle tone, improved active joint range and enhanced ambulatory performance in children with cerebral palsy.³-five

In a systematic review of patients with Cerebral Palsy (Ritzmann et al., 2018), it was found that using Vibration Therapy reduces reflex excitability, spasticity, and coordination deficits. It has a positive effect on the ability to move, manifested for GMF, strength, gait, and mobility in patients with CP. Long-term effects manifest as reduced muscle tone and spasticity occurring concomitantly with improved movement ability in regard to GMF, strength, gait, and mobility, as well as increased muscle mass and bone-mineral density.²-three
We frequently see results in three weeks, that would typically take a year to accomplish using traditional and ongoing weekly therapies.

The three main impacts of Neurosuit wear include:
1. Increased proprioception by loading and approximation of the joints allowing for increased feedback and positional awareness.
2. Loading of the body through tension to provoke antigravity extension and provide global strengthening.
3. Facilitation of musculoskeletal alignment.

Suit-orthosis improved postural stability in children at MACS II-III during APA. The suit may assist with arm function control during postural sway when preparing to reach for objects positively impacting upper extremity functioning in children with cerebral palsy (Pavão et al., 2018). ²¹

Dynamic motion orthosis wear “seems to have some positive immediate effects on gait kinematics in children with spastic unilateral cerebral palsy by providing a more functional and safer gait pattern” (Martins et al., 2019). ¹⁵

A Systematic Review of the Effectiveness of a Strength Training Program for People with Cerebral Palsy (Dodd et al., 2002), eight of the 10 selected studies reported significant increases in strength. Three studies reported significant increases in ROM after completion of a strengthening program at the knee and ankle. One found a significant increase in the section of the Gross Motor Function Measure (GMFM) that relates to walking, running, and jumping (dimension E). Similarly, another found that a significant number of subjects showed improvement in dimensions D (standing) and E of the GMFM after a strength-training program. ⁵

The NeuroSuit is a dynamic motion orthosis comprised of a vest, shorts, knee pads, elbow pads, and head piece that are connected by a series of elastic/rubber cables acting like an exo-skeleton producing a vertically directed load. The main actions of NeuroSuit wear include inducing strong afferent proprioceptive input, facilitation of alignment, and provocation of antigravity extension. Paired with targeted therapeutic exercises and activities, NeuroSuit wear provides an excellent foundation for postural control, strengthening, and motor learning via normalization of muscle tone, increasing of body awareness, and improvement of motor coordination.
The Universal Exercise Unit is a unique 4-sided metal device that can be used in two different ways to facilitate improved independence of functional skills including as a dynamic body weight support system or a system of pulleys, straps, and splints utilized for therapeutic strengthening exercises. **Body Weight Support System:** Acting as a body weight support system utilizing a system of bungees and harnesses, the UEU allows for the participant to execute developmental transitions and functions using dynamic lateral displacement of body weight. Eliminating gravitational forces experienced by the participant allows for increased freedom of independent movement and improved precision for the therapist facilitating balance and strengthening exercise with proper positioning and alignment. **Strength Training System:** Utilized as a system of pulleys, straps, and splints to perform a variety of strengthening exercises. A major goal of UEU use is to improve strength, active range of motion, and muscle flexibility of the user. By eliminating gravitational forces, even a patient with muscle strength graded 1 or 2 out of 5 can initiate movement with a goal to progress to active resistive exercises. **Dynamic Balancing** UEU allows patients to experience dynamic balance activities such as transitioning from sitting to quadrupeded, quadrupeded to kneeling, and eventually standing with the assistance of bungee cords attached to the patient from four angles. **Confidence** The UEU builds strength, increases balance, and more importantly, increases self-confidence and independence inspiring more challenging activities. **Autonomous Exercise** This tool encourages the child to participate in body-weight-supported functional and strengthening exercises with added security, thereby decreasing physical contact from therapists. **Supporting research:** A 2018 study revealed that children with severe cerebral palsy who participated in body weight supported treadmill training made gains in trunk control and gross motor function (Flores & Silva, 2018). Children with non-spastic severe cerebral palsy (Su et al., 2013) and children with spastic diplegia (Emara et al., 2016) demonstrated improvements in standing and walking skills and measured by the GMFM. Treadmill training has also been proven to positively impact gross motor skills for children with developmental delays (Lowe et al., 2015) and Down syndrome (Ulrich et al., 2001). Use of the UEU has been shown to be more effective in increasing lower limb strength when compared to functional resistive training exercises in children with spastic diplegic cerebral palsy (Mohamed et al., 2020) as well as be considered an effective method to improve standing balance in children with spastic cerebral palsy (Olama et al., 2019). Furthermore, Khalid et al. (2016) found that UEU used in conjunction with conventional physical therapy lent to positive effects on trunk control in children with cerebral palsy.
Therapy Technique: PROMPT

PROMPT technique for speech therapy is appropriate for a wide range of patients with communication disorders. The most common patients have motor speech disorders, articulation problems or are non-verbal children. Many patients with aphasia, apraxia/ dyspraxia, dysarthria, pervasive development disorders, cerebral palsy, acquired brain injuries, and autism.

This technique is a tactile-kinesthetic approach that uses touch cues to a patient’s articulators (jaw, tongue, lips) to manually guide him or her through a targeted word, phrase, or sentence. The goal is motor control and the development of proper oral muscular movements, while eliminating unnecessary muscle movements, such as jaw sliding and inadequate lip rounding.

How speech language pathologists implement PROMPT into a therapy session:
Therapists begin by helping patients produce certain phonemes. A phoneme is the smallest increment of sound in speech. For example, the “d” sound in the word dog is one phoneme, the “o” is another and the “g” is yet another.

Each phoneme requires different muscle contractions/retractions and placement/movement of the jaw, lips, tongue, neck, and chest to produce. All of these things have to happen with the proper timing and sequence to produce one phoneme correctly.

PROMPT is an effective intervention to improve speech motor control, speech articulation, and word-level speech intelligibility in children with speech motor delay (Namasivayam et al., 2021). This is an important aspect of the PROMPT technique. The therapist attempts to “teach” the patient’s muscles to produce a phoneme correctly by stimulating all of these through touch. With the timing and movement of more than 100 muscles involved, you can see why the training is so intense.

What the research says:

PROMPT technique for speech therapy is appropriate for a wide range of patients with communication disorders. The most common patients have motor speech disorders, articulation problems or are non-verbal children. Many patients with aphasia, apraxia/ dyspraxia, dysarthria, pervasive development disorders, cerebral palsy, acquired brain injuries, and autism.

PROMPT improves speech, communication, oral motor control, and the development of proper muscular movement.

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Augmentative and Alternative Communication (AAC) encompasses forms of communication, other than oral speech, that a communicator uses to express themselves. Such communication techniques and tools to help the individual express thoughts, wants, needs, feelings, and ideas, may include the following: manual signs, gestures, finger spelling, tangible objects, line drawings, picture communication and letter boards, and speech-generating devices.

A comprehensive evaluation, interdisciplinary collaboration, and ongoing assessment help our speech language pathologists determine which AAC system will provide a communicator with the tools for functional communication. Our therapists are familiar with the following aided communication tools and techniques:

- Low tech communication boards/books
- Voice output switches
- Alternative access methods: eye gaze devices, switch scanning, headpointer
- Partner assisted auditory and/or visual scanning
- High tech communication devices and systems including, but not limited to: PRC-Saltillo, Tobii Dynavox
- AAC communication programs, but not limited to: TouchChat, TD Snap, POGO, Proloquo2Go, LAMP, GoTalk, Unity, CoreScanner
- Access equipment such as mounting, Bluetooth connector, and keyguards

Some believe that AAC reduces motivation to improve natural speech and delays language development. However, AAC use may help improve natural speech when used in a multimodal approach (Millar et al., 2006). 

Research Continued:
We are firm believers that it’s never too early to start AAC. Early AAC use can help develop speech and language (Lüke, 2014; Romski et al., 2010) and can increase vocabulary for children with developmental delays aged 3 years and younger (Romski et al., 2015). Caregivers and professionals may think that cognitive skills such as demonstrating communicative intent and understanding cause and effect are prerequisite to AAC use. However, impaired cognition does not preclude communication (Cress & Marvin, 2003). AAC may help children with complex communication needs develop functional communication, cognitive, literacy, and social communication skills (Drager et al., 2010).
NAPA Center’s Intensive Feeding Program, Mastering Mealtimes, is a 4-month comprehensive program that provides families and their children with the skills and techniques necessary to love eating and to become safer, more comfortable, and confident in advancing their child’s feeding and swallowing skills.

We offer relationship-based developmental feeding services to address various feeding difficulties and VitalStim for the treatment of dysphagia and swallowing difficulties. Through a combination of in-home consultation, clinic-based treatment and nutritional consultations if needed, our program to support children’s independence in eating and support families in creating successful mealtime routines.

High-quality feeding instruction is administered from our trained staff of occupational therapists and speech language pathologists who utilize a multitude of approaches including: The Division of Responsibility Model, Get Permission Approach, The Sequential Sensory Oral or SOS Approach, AEIOU Systematic Approach, Beckman Oral Motor, and Responsive Feeding.

Therapy Tool: VS VitalStim

VitalStim® Therapy is an FDA cleared method to promote swallowing through the application of Neuromuscular Electrical Stimulation (NMES) to the swallowing muscles. The goals of NMES treatment within swallowing treatment are to strengthen and reeducate the muscles and improved motor control of the swallowing mechanism to facilitate safer swallowing.

Improves Swallowing

When used in conjunction with traditional swallowing exercises and during the functional task of feeding and swallowing, VS is an effective treatment.

Uses Neuromuscular Electrical Stimulation

By placing surface electrodes over the target swallowing muscles, this helps muscle strengthening, which will rehabilitate the swallowing process. It also provides sensory stimulation, helping improve muscle recruitment and swallowing.

Treats Aspiration

VitalStim stimulation targeting submental muscles is effective in reducing aspiration.

What does the research say?

Children with cerebral palsy who participated in low level electrical stimulation to bilateral masseter muscles demonstrated improvements in swallowing functions including drooling, tongue movements, chewing, eating large food ability, and feeding duration when compared to a control group (Umay et al., 2020). ³⁰

83.3% Of 15 medically complex children who were treated for dysphasia using NMES in the head and neck as a component of their feeding therapy demonstrated improvement in their aspiration status (Andreoli et al., 2019). ²

Ma and Choi (2019) found that the use of VitalStim electrical stimulation targeting submental muscles is effective in reducing aspiration in children with cerebral palsy as measured by the Penetration Aspiration Scale. ¹⁴
The NAPA Difference

We do things differently.

With an emphasis on teaching, training, continuing education and ongoing mentorship, NAPA Center firmly believes in continued learning, evidenced-based practice, and staying connected with the academic community. We extend teaching to our families and patients, and the allocation of home exercise programs for both parents and home-based therapists is an integral component of our therapeutic model.

Continuing Education Classes
Each year, we host a minimum of 15 courses including Kinesiotaping, VitalStim, NDT, Serial Casting, PROMPT, Theratogs, and more!

Students
We are a teaching clinic accommodating no less than 40 occupational, physical, and speech therapy clinical students each year across our stateside clinics.

Hours of Training
We offer over 180 hours of in-house training during a therapist’s first year at NAPA Center.

Insurance and Funding
NAPA accepts private insurance plans and works with families directly to verify coverage for patients.
Choose from five US based locations

NAPA Austin
7801 North Lamar Blvd, Suite A114
Austin, Texas 78722
Phone: (512) 466-4673
Fax: (720) 791-2881

NAPA Chicago
Opening October 2022
210 Bear Hill Road, Suite 401
Waltham, MA 02451
Phone: (781) 790-8479
Fax: (781) 205-1882

NAPA Boston

NAPA Denver
11211 East Arapahoe Rd, Unit 118
Centennial, CO 80112
Phone: (730) 791-2881
Fax: (303) 226-1703

NAPA Los Angeles
11840 S La Cienega Blvd
Los Angeles, California 90250
Phone: (888) 711-6272
Fax: (310) 882-5451


“There is a temptation to label our kids as (never going to walk) or something similar. NAPA is a place to challenge those boundaries and shatter expectations.”

- Intensive Parent Connor T.