



2011

# Getting to Know You: Key Clinical Concepts in Relationship-Based Interventions and Neurobehavioral Observations with Young Infants

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▶ **CLINICIAN'S CORNER**

## Transformation

A CLINICIAN'S MIND AND A PATIENT'S BODY IN THE WORLD OF NDT

By Stacy Zousmer, MPT

**There is no reward greater as therapists than observing and successfully facilitating development in a young patient who has been given a dismal prognosis.** Witnessing a parent's fears and disappointments transform into tears of joy are what keeps us determined to facilitate functional outcomes for the people we work with, despite the hard physical and emotional work.

Jack came to me in April, 2010, with his original diagnosis of torticollis and communicating hydrocephalus. He was born thirteen weeks prematurely. His parents were concerned that he did not tolerate prone and that his head was positioned in left rotation and right lateral flexion relative to his shunt. He had a very traumatic first year, undergoing countless surgeries, including several shunt revisions. At the time of the initial evaluation, he was wearing a cranial molding orthosis during most of his waking hours in order to decrease his plagiocephaly. Jack also demonstrated a slight hand preference – while he mostly used his left upper extremity (UE) for reaching and fine motor tasks, he was able to utilize the right UE with cuing. I was cognizant *(continued on page 29)*

## Getting to Know You

KEY CLINICAL CONCEPTS IN RELATIONSHIP-BASED INTERVENTIONS AND NEUROBEHAVIORAL OBSERVATIONS WITH YOUNG INFANTS

By Yvette Blanchard, ScD, PT

**T**he newborn infant is a social organism, pre-disposed to interact with his caregiver and able to elicit the kind of caregiving necessary for successful adaptation.<sup>1</sup> The earliest developmental task of the newborn is to organize behavior to be able to play an active role in influencing the caregiving environment and eliciting the kind of support needed for development.<sup>2,3</sup> This task is accomplished through the attainment of self-regulation or balanced neurobehav-

ior for stimulation and need for support and facilitation.<sup>2,4-6</sup> Infants' behaviors become their "voice," their way of letting us know how they are doing, whether they are experiencing pleasure or discomfort at any given moment. The Neonatal Behavioral Assessment Scale (NBAS)<sup>7</sup> and the Assessment of Preterm Infant Behavior (APIB)<sup>8</sup> are assessment tools specifically designed to capture dimensions of neurobehavioral functioning and the individuality of each infant. For example, using

**The earliest developmental task of the newborn is to organize behavior to be able to play an active role in influencing the caregiving environment and eliciting the kind of support needed for development.**

ioral functioning of the infant's autonomic, motor, state, and responsivity behavioral dimensions as described by Als.<sup>2</sup> In the clinical setting, neurobehavioral functioning has been used to understand how infants adapt to their extrauterine environment while their specific behaviors inform clinicians of their readiness

the infant's behavioral responses during specific handling maneuvers and demands, both assessment tools measure the infant's capacity to habituate to repeated stimuli; respond to visual and auditory stimuli; and level of alertness, motor maturity, and peak of excitement. *(continued on page 20)*



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We invite members and non-members to submit articles, ideas and comments to the editor. Editorial assistance and guidelines are available for writers. Look below for upcoming deadlines and themes.

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# Building Blocks of Baby Treatment

## THE 2011 NDTA NATIONAL CONFERENCE

**B**abies, Babies, Babies! We are beguiled by their smiling faces, their original communication strategies, and their novel and creative approaches to movement. However, do we feel confident in our understanding of how to apply our clinical skills and clinical decision making to develop successful interventions for babies?

All too frequently, the emphasis of infant treatment is described as the attainment of motor milestones. While the end goal of treatment is to optimize function and therefore the ability to participate in daily activities and play, the way to achieve this outcome cannot be effectively achieved by simply practicing motor milestones. To successfully treat infants requires an intimate knowledge and application of the International Classification of Function (ICF) to identify the impairments that interfere with function. Based on the identification of the system impairments limiting the infant's function, we can then develop individualized treatment strategies to address each impairment and optimize function and participation.

From May 19-22, 2011, the NDTA annual conference will offer an exciting opportunity for each of us to expand our understanding and the skills necessary to apply the ICF model to assess and develop interventions for infants. **Building Blocks of Baby Treatment** is designed for the novice therapist venturing into the world of infant treatment and for master clinicians looking to validate and broaden their clinical practice. **The conference promises something for therapists of every skill level and every discipline.** Please, take a moment to visit the NDT website ([www.ndta.org](http://www.ndta.org)) and download the brochure.

The NDTA Conference Planning Committee has worked to develop a program that is both exciting and meaningful. The preconference courses on feeding and swallowing, applying

clinical decision making to infant treatment, and interventions for torticollis will facilitate an in-depth learning experience in each of these topic



areas. These pre-conference courses are structured to offer both evidence based didactic instruction along with opportunities to problem solve with colleagues, and explore and practice relevant clinical handling skills.

The general sessions will include a wide range of relevant topics such as infant gait, respiration, sensory processing, and distal hand function. In addition to these evidenced-based theoretical presentations, there will be a wealth of opportunities to translate knowledge into clinical application via discussion and hands-on practicum sessions.

Of course, no conference would be complete without exhibit and poster sessions, which offer opportunities for learning and networking. And don't forget to register for the annual Awards Luncheon when the NDTA Award of Excellence will be presented to this year's worthy recipient.

As always, CEUs earned will fulfill requirements for both professional licensure and your certified NDT (C/NDT) credentials. What more can you ask for? **We invite you make plans to spend an intellectually stimulating weekend with other therapists who share the joy of treating those Babies, Babies, Babies!**

*Gay J. Girolami, PT, MS*

Gay Girolami, PT, MS, C/NDT  
President, NDTA, Inc.



# Launching the www.ndta.org Makeover

By Jennifer Inglett, PT, DPT, C/NDT • Membership Committee Chair • ok\_kyung@hotmail.com



Association growth and project expansion has been remarkable over the last decade, in part due to advances in web-based technology. Let's face it, we are largely a community of therapists who take pride in their hands-on application. We have a skill in interpersonal relationship development through teaching and mentoring both our peers and our patients. But even with our talents in NDT handling skills, we have all embraced technology to some degree. The NDTA's website, for us, has been two-fold. First, we connect therapist to therapists, members to members all around the world. Second, we connect our professional niche and mission of the NDTA to the public. The Website has been home to NDTA's "find a therapist," all NDTA-sponsored course listings, the *Network on the Net*, video streams, and news and updates on research advances in NDT, Regions news and local contacts, and a whole host of other benefits and resources.

In February, 2011, NDTA launched the website makeover, a carefully designed project well over six months in the making. Aside from its cleaner, brighter, more user-friendly personality, the new website is designed to be your one-stop-shop for all things NDTA. We've removed all the redundancy and added in some useful new features. Keeping in line with the NDTA strategic plan of advancement in NDT Education, the website now offers calendars and maps in its database for quicker ease and viewing. Google maps have been added in addition to the regions map to find corporate and facility partners and regional committee members. Your membership accounts offer easier access to

your CEU bank, useful for keeping track of CEUs towards C/NDT re-certification. Steps to membership renewal are also streamlined once you log-in with your membership number. And don't forget, with your membership number, you can receive discounts on NDTA educational opportunities, NDTA publications in the "Marketplace," and access to research summaries and past issues of the *Network*.

## COMING SOON!

With our website makeover, NDTA can now offer new programs. Programs in development include online CEUs through *Network* articles, distance learning opportunities, expanded parent and caregiver Web pages, and expanded consumer member benefits. We will soon be adding a photo wall where members can share their NDT experiences and

The screenshot displays the NDTA website interface. At the top, there are navigation tabs: Find a Therapist, Membership, Resources, Family/Caregiver Support, and Education. Below this, there are several featured sections:

- The Mission of NDTA:** A section explaining the association's purpose and listing services like specialized clinical training, clinical research, and family support.
- Grandfathering Ends Soon!** A banner with a red cross icon and a call to action to click for more information.
- Education:** A section with a "View Classes on our Map" button and a calendar view for April and May 2011. The calendar shows dates for various courses.
- Course Listings:** A list of courses with details such as location, dates, and a "View Details" button. Examples include:
  - Building NCU Therapy Skills: An NDT Approach** by Karen Goldberg, PT, MS, PCS, C/NDT in Kirkland, Washington (April 29, 2011-May 01, 2011).
  - NDT/Booth Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuromotor Disorders** (May 09, 2011-October 22, 2011).
  - NDT/Booth Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuromotor Disorders** (July 04, 2011-January 27, 2012).
  - NDT/Booth Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuromotor Disorders** (September 06, 2011-May 20, 2012).
  - NDT/Booth Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuromotor Disorders** (October 16, 2011-October 19, 2012).
  - NDT/Booth Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuromotor Disorders** (April 19, 2012-October 07, 2012).
  - Adult:** NDT/Booth Certificate Course in the Management and Treatment of Adults with Hemiplegia (May 12, 2011-June 28, 2011).

success stories. NDTA will be unveiling the new complimentary consumer category membership program in late spring. Look in your inbox for your NDTA e-news or find us on [Facebook](#) [here](#) for more details when these programs unveil. ■



## **NDTA SEMINARS 2011**

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**APRIL 29-MAY 1, 2011**

Building NICU Therapy Skills: An NDT Approach

Instructed by Karen Goldberg, PT, MS, PCS, C/NDT, in Kirkland, Washington

**JUNE 10-11, 2011**

Treatment Strategies & Case Studies Using NDT for Pediatric Gait

Instructed by Jane Styer-Acevedo, PT, C/NDT, in Kansas City, Missouri

**JUNE 24-25, 2011**

Lower Extremity Problem Solving For Children with Cerebral Palsy and  
Other Neuro-Motor Disorders

Instructed by Linda Kliebhan, PT, C/NDT, in Lafayette, Louisiana

**JULY 23-24, 2011** →

Ready, Set, Move: The Neuro-Developmental Treatment  
Perspective for Pediatric Practice

Instructed by Mary Hallway, OTR/L, C/NDT, in San Marcos, California



**AUGUST 4-6, 2011**

Rib Cage: Focus On the Rib Cage for Improvement in Respiration,  
Phonation, Postural Control, and Movement (Level I)

Instructed by Rona Alexander, PhD, CCC-SLP BRS-S, C/NDT, in Puyallup, WA

**SEPTEMBER 16-18, 2011**

An NDT Approach to Treatment of the Baby

Instructed by Kim Westhoff, OTR/L, C/NDT, and  
Debbie Evans-Rogers, PT, MS, PCS, C/NDT, in Puyallup, WA - Seminar

**NOVEMBER 11-12, 2011**

Using the Ball for Therapeutic Intervention for Children with Movement Disorders

Instructed by Barbara Hodge, PT, C/NDT, in Houston, Texas

▶ **REGISTRATION OPEN!** ◀



# BUILDING BLOCKS OF BABY TREATMENT

MAY 20-22, 2011  
HILTON RYE TOWN  
RYE BROOK, NY

PRE-CONFERENCE  
MAY 19, 2011



Watch for more details at [www.ndta.org](http://www.ndta.org)



## EAT. MOVE. PLAY.

If you are a Physical Therapist, Occupational Therapist, Speech-Language Pathologist, Academic, Student, or other professional interested in the NDT approach to treatment of babies, you won't want to miss this conference!

- Three-and-a-half days of Focused Educational Sessions
- Distinguished Faculty of Renowned Researchers & Clinicians
- Three separate Pre-Conference Programs
- Concurrent Track Designed Especially for Therapists with the C/NDT Designation
- An Abundance of Social & Networking Opportunities
- Special Events Including Region Get-Together, Reception & Awards Luncheon
- Exhibitor Showcase



The 2011 conference will be the occasion for the unveiling of the new book by Lois Bly. In addition to presenting a session on "Baby Handling," Ms. Bly will be available for book-signing of her new publication during the conference.

RETREAT & MEET IN NEW YORK'S GOLDEN APPLE

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by train or by car, our host hotel offers convenience to New York City and to many Westchester County attractions. Experience the luxury of a \$17 million renovation and enjoy the hotel's numerous recreational facilities, including two swimming pools, year-round tennis facilities and a state-of-the-art Fitness Center.

Watch for the detailed conference schedule and additional information coming soon to [www.ndta.org](http://www.ndta.org)



# BUILDING BLOCKS OF BABY TREATMENT

MAY 20-22, 2011  
HILTON RYE TOWN  
RYE BROOK, NY

PRE-CONFERENCE  
MAY 19, 2011





# NDTA™ JOIN US IN NEW YORK'S GOLDEN APPLE



## Build Your Future at NDTA's Building Blocks of Baby Treatment

Join your peers, mentors, researchers, and internationally recognized instructors for an intensive weekend of applying the NDT Approach to treating babies. Educational sessions will increase your depth of knowledge about the world of infant development, and practical, clinically oriented breakout sessions will increase the breadth and depth of your treatment skills. In addition, plenty of social networking, poster presentations, and vendors who understand the needs of practicing therapists will be interspersed with the educational sessions.

**Register today for the conference by going to [www.ndta.org](http://www.ndta.org). See you in New York for the NDTA 2011 National Conference.**

## PRE-CONFERENCE SESSIONS PREVIEW

### Infant Feeding and Swallowing: The Neonatal Intensive Care Unit and Beyond

By *Therese McDermott, CCC-SLP/L, C/NDT*  
*Monica Wojcik, CCC-SLP, C/NDT*

As therapists, we continue to struggle and search in our efforts to obtain helpful information about how to manage infant feeding and swallowing challenges. We are faced with more and more complex medical conditions that ultimately affect the nutritional intake of the medically fragile preterm in the neonatal intensive care unit (NICU) and upon discharge to home.

Multiple strategies to assist infants and their parents to achieve more success in oral feedings will be addressed during the May 19, 2011 Pre-Conference Program that will be presented by two speech pathologists renowned for their experience in the NICU and Early Intervention. One treatment strategy will be to look at the impairment of the respiratory/pulmonary system and how to directly treat this delicate system in order to

insure more success with the coordination of the suck/swallow/ breathing triad. An infant's respiratory system responds favorably to certain touches by the therapist. These touches prior to bottle/breast feeding can secure a more safe and successful feeding session.

In this interactive session, we will combine use of lecture, video, demonstration, and participation labs to provide a wealth of information for the participants in order to assist with the management of feeding and swallowing in the NICU and at home.

### Clinical Decision Making for Therapists with C/NDT Credentials

By *Gay Girolami, PT, MS, C/NDT*

» C/NDT REQUIRED

Clinical Decision Making – we do it every day. We cannot treat clients without assessing their needs and working with them to establish goals. However, clinical decision-making must also be an integral part of every treatment session and requires minute to minute, sometimes second



**THURSDAY, MAY 19, 2011 • PRE-CONFERENCE PROGRAMS**

to second, decisions that alter our handling and our tactile, sensory, visual, and verbal cues guiding client performance.

In this pre-conference program, using case reports of twin infants, we will explore how clinical decisions are formulated based on the needs of the child and with respect to the therapy disciplines involved. For example, one of the twins is unable to sit upright without support. This impacts her feeding and respiration, ability to reach in sitting, and protective responses in sitting, making her needs in therapy specific to her functional limitations. The process of identifying impairments and designing treatment strategies as it applies to each therapy discipline will be presented and supported through video examples.

*Gay Girolami, PT, MS, C/NDT and Diane Fritts Ryan OTR/L, C/NDT will present this day long program on May 19, 2011, at the Baby Conference in Rye Brook, NY. This course is reserved for therapists who hold the C/NDT credentials.*



**Torticollis: Current Perspectives**

*By Cindy Miles, PT, MEd, PCS*

Has the clinical presentation of torticollis changed? Has this diagnosis affected the acquisition of motor skills and midline postural development? Hylton<sup>1</sup> states that torticollis retained beyond four months of age has a profound effect on “body image formation and midline axial postural stability.”

This one-day course for novice and experienced clini-



cians will explore the possible effects of torticollis, sleep posture, and increased use of positional devices (containers) on infant postural development. Functional, clinically oriented evaluation and evidenced based treatment strategies for infants through two years of age will be provided. Clinical pathways of management of infant head shape, diagnostic procedures, and surgical intervention will be investigated. Participants will recognize the value of parent input when establishing individualized goals and a home exercise program. Learning opportunities will transpire through lectures, group problem solving and video review.

*Cindy Miles will present this pre-conference course on Thursday, May 19, 2011, from 9:00-5:00*

**REFERENCES**

<sup>1</sup> Hylton N. Infants with torticollis: the relationship between asymmetric head and neck positioning and postural development. *Physical and Occupational Therapy in Pediatrics*. 1997;17(2):91-117.



## CONFERENCE SESSIONS PREVIEW

### Oral Motor Strategies for the Pre-Term Infant and Beyond

By *Monica Wojcik, M.A., CCC-SLP, C/NDT*

The mouth of the preterm infant presents a challenge for all therapists who recognize the importance of oral motor treatment with infants in the neonatal intensive care unit (NICU) and graduates in the home settings. Do you treat infants with limited jaw movements because of medical intervention during the NICU stay? How do you decrease the high arched palate in a premature infant who has been on long-term oral intubation? How do you change a particular tongue pattern that interferes with breathing and eating? One red flag during your evaluation is the appearance of a bunched, thick tongue that sometimes is



fixed to the roof of the mouth. Gentle input to the tongue with a tip swab can change the contour of the tongue in a short period of time.

These and many other oral motor questions will be addressed during a participation lab approach at a concurrent session on Friday, May 20, 2011, from 3:45-5:15, at the NDTA Baby Conference. Monica Wojcik, speech pathologist, will provide useful, practical hands-on oral motor treatment strategies to take back to your therapy settings.



### Clinical Decision Making for Advanced Handling Strategies for Infants with Neuromotor Challenges

By *Gay Girolami, PT, MS, C/NDT*

» C/NDT REQUIRED

Babies. We love to watch them and to laugh at their antics, but treating these little bundles of joy is a sacred trust and should not be taken lightly. We must learn from babies. It is our responsibility to watch and to understand how they move and transition within and between postures. One critical transition I look for when treating infants is lateral head righting during rolling. This tells me that the infant has learning to activate in all planes and can now integrate rotational movements so necessary for transitions.

Join Gay Girolami, PT, MS, C/NDT in the journey to understanding infant movement at the NDTA Baby Conference on Friday, May 20, 2011, from 3:45-5:15. This session is reserved for therapists with C/NDT credentials. During this session, you will have the opportunity to ask treatment questions, practice handling strategies, and learn from your colleagues through discussion and problem solving.

### Sensory Processing in Baby Treatment

By *Kim Barthel, OTR/L, C/NDT*

» C/NDT REQUIRED

Challenges in the processing of sensory information can have a profound impact upon a baby's ability to acquire motor skills. During a Neuro-Developmental Treatment session, babies experience multisensory information through our handling and during their movement through the environment. Some babies may require specific attention to distinct and interfering sensory processing issues, however. Hypersensitivity or hyposensitivity to touch, sound, light, smells, movement, or proprioception, for example, can hinder the handling experience and requires focused sensory treatment intervention integrated within the NDT approach. *(continued next page)*



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Additionally, infants may also experience a general dysregulation in their overall arousal system, limiting alertness, attention, attunement, and action. Sensory interventions such as deep pressure touch, rocking, bouncing, or swinging can be incorporated within a handling session to soothe or activate a child's state of connection to their experience of movement.

Selection of a sensory strategy relies upon the careful attunement of the therapist to the infant's state of being through observation of facial expression, vocal tone, body



language, and emotional expression. With a close eye on the baby's comfort, alertness, and engagement, therapists can simultaneously employ their NDT knowledge of alignment, typical development, and movement sequences while varying the intensity, frequency, and duration of specific sensory strategies to keep the baby within the zone of optimum state for learning. Perhaps an infant will need to begin a session with swaddling while gently bouncing in the therapist's arms to regulate the arousal system to a receptive state of tolerance to movement in space. Alternately, a baby may require vigorous bouncing with controlled alignment to create sufficient alertness to connect to the task. Through discussion, lab, and videotape analysis, this session will help you to fine tune your sensory detective and therapy skills.

*Kim Barthel will present two sessions at the 2011 Baby Conference. She will speak on Arousal, Attention & Action during a general session on Friday, May 20, 2011, from 2:00-3:30.*

*Her session on Sensory Processing in Baby Treatment will be presented on Saturday, May 21, 2011 from 3:45-5:15. This session is reserved for therapists who hold C/NDT credentials.*

**Natural Environment Revisited: Sharing Experiences and Problem Solving**

*By Gay Lloyd Pinder, PhD, CCC-SLP, C/NDT*

Working home based with families in birth to three services is now the norm across the country. While each state approaches funding differently through different lead agencies, the actual intervention is basically the same, with therapists working from their cars, going into each home, and working with the parent and child in their "natural environment."

In these past seven years since IDEA 2004-Part C was established as law, we have been dealing with the ramifications of this enormous shift from center based to home based services and single service providers. Each state has further delineated the broad law, some adding more stringent rules while others have remained more flexible, allowing the service providers to develop their own system.

In preparation for this round table, a questionnaire has been sent out to therapists across the country in order to gather information about what is happening geographically. That information will be organized and presented at this round table. We will have the rare opportunity to meet together with therapists from all across this country to discuss what we have learned and what problems we have encountered in our journey through the many and varied natural environments of our caseloads. We will then have a chance to problem solve together, venting as needed, celebrating together, and most importantly, brain storming and sharing ideas we have learned over these years of working in natural environments. This round table is a wonderful opportunity for people from east and west, north and south to share and learn together how to better serve our youngest children.

Come prepared to voice your experiences and opinions at the general session round table at the NDTA Baby Conference on Sunday, May 22, 2011, from 8:00-12:00. Gay Lloyd and Cindy Miles, PT, Med, PCS will lead the session.

## CONFERENCE SESSIONS PREVIEW *(continued)*

### Establishing the Foundation for Distal Hand Function

By Gail Ritchie, OTR/L, C/NDT

Children spend an endless amount of time learning about themselves and their environment through their hands. They use their hands for touch, grasp, release, emotional stability, and tools. As an occupational therapist, I am often challenged by the complexity of achieving functional hand use with the child who has been diagnosed with a neurological condition. Very often, I find myself observing and researching about how a child develops the infinite combinations of movement that result in what we consider grasp. Whether the grasp is powerful enough for use of an assistive device, intricate enough to access an augmentative communication device,



or precise enough to tie a shoe, hand function is critical, allowing us to feel, learn, and engage in our world and with others.

When we observe the newborn baby to the young toddler with a critical eye, we can discover countless treatment ideas and strategies, applying these ideas when treating a child with atypical posture and movement. For example, when I observe a baby who is bound by atypical flexion without the ability to assume a prone prop position, I refer back to the typically developing three to four-month-old and visualize what skills that baby has developed that permits her to visually explore her environment. With that image in my mind, I elongate the



anterior surface of the trunk, allowing for alignment of the shoulder girdle and upper spine and pushing of the forearms against the surface for postural activation, allowing for visual engagement of the environment and promoting sensory input into lower arm and hand. This treatment sequence prepares the baby to develop supination and isolated control of the wrist and hand.

In the breakout session entitled “Establishing the Foundation for Distal Hand Function” on Saturday, May 21, 2011 from 3:45-5:15, we will review short video clips observing the typically developing baby, understanding the critical posture and movement behaviors related to developing hand function. Treatment strategies that enhance hand function will be practiced throughout the sessions.

### Problem Solving the Treatment of Feeding & Swallowing Limitations in the Infant Population » C/NDT REQUIRED

By Therese McDermott, MHS, CCC-SLP/L, C/NDT

As therapists, we address and facilitate progress toward the functional limitations we identify in infants’ feeding and swallowing, constantly considering the multiple system impairments that contribute to a child’s resistance to feeding and/or safety in feeding. Our background in NDT, specifically multi-system assessment, and use of a problem solving approach to treatment, prepares us to effectively treat this population. In this session, we will explore contributing system impairments, prioritize impairments, problem solve treatment strategies, and collaboratively develop an optimal treatment plan for facilitating that goal all parents establish – the ability to safely and effectively feed their child.

With our respective backgrounds in NDT, we will explore dynamic treatment strategies for improving postural stability, shoulder girdle stability, and head control (with an emphasis on appropriate head/neck alignment), rather than relying solely on static positioning. One such treatment example would include facilitation of flexion/extension rotation with recruitment of associated head/neck alignment with *(continued next page)*



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the infant positioned on the therapist's lap. We will also incorporate use of equipment and handling to facilitate experiences for weight bearing through the upper extremities and shoulder girdle complex to afford greater dynamic stability through the pharyngeal, laryngeal, and oral areas and positively impact the safety and efficiency in the swallow. Lab experiences will be included as we share our ideas.

*Therese McDermott will present this session on Saturday, May 21, 2011, from 2:00-3:30. This portion of the Infant Feeding track is reserved for therapists holding C/NDT credentials.*

*This will be followed from 3:45-5:15 with a panel discussion led by Therese, Rona Alexander, PhD., CCC-SLP, BRS-S, C/NDT and Monica Wojcik, SLP, C/NDT.*

**The Test of Infant Motor Performance (TIMP): Development of an Outcome Measure for High Risk Infants Based on a Neuro-Developmental Approach to Infant Treatment**

*By Gay Girolami, PT, MS, C/NDT*

There is a common misconception that the answers to all our clinical questions will be found in the scientific evidence. Did you know that Sackett, the father of evidenced based medicine, identifies three pillars of evidence? One of these pillars is the clinical experience of the practitioner.

The Test of Infant Motor Performance was born from the clinical experience of Dr. Elsbeth Köng and Mary B. Quinton, MCSP, who originated NDT Baby Treatment. Join me to learn how their understanding of infant movement paired with clinical experience lead to the development of items on the TIMP. For example, the clinical experience of the importance of antigravity pelvic lifting led to an item designed to assess this competency. We now know this is important because there is evidence to support the loss of antigravity hip flexion in infants diagnosed with cerebral palsy.

Come share the journey from clinical experience to scientific evidence. Join Gay Girolami, PT, MS, C/NDT as she discusses the TIMP on Saturday, May 21, 2011, from 3:45-5:15, at the NDTA Baby Conference.

**Cruising: Why Do Babies Do It?**

*By Joan Day Mohr, PT, C/NDT*

Cruising, as a pre-gait activity, plays a very important role in both muscle and skeletal development. The muscles of newborns have approximately an equal number of posture and movement fiber types that develop and differentiate in response to functional use. Because of this, therapists have the opportunity to influence fiber type development. This will be emphasized as it relates to cruising and walking during a breakout session on Friday, May 20, 2011, from 3:45-5:15, at the NDTA Baby Conference.

Changes in biomechanical and movement components during cruising and pre-gait will be explored during this session. Participants will have the opportunity to practice movement analysis and handling strategies. The following pictures are examples of the strategies that will be discussed, analyzed, and practiced.



Handling strategies to develop the initiation of movement from the lower trunk/pelvis.



Facilitation from stand toward squat for eccentric activity of hip extensors, external rotators and abductors. ■



# NDTA CONFERENCE EVENTS

## ■ 2011 AWARD OF EXCELLENCE LUNCHEON

**Saturday, 12:00 – 1:45 pm**



Please join us as we honor the 2011 recipient of the NDTA Award of Excellence. This award, the highest that NDTA bestows on an individual, will be presented during the very special Saturday luncheon event. Watch for the announcement of this year's award winner.

**Event Ticket Required!** This event is included in your registration fee. However, you **MUST** sign-up in advance on your conference registration form. Luncheon tickets for those not registered for the full conference are available for advance purchase at \$55 per person.

## ■ REGION GET-TOGETHER

**Thursday, 7:00 – 8:00 pm**

Hotel Lounge (No-Host Cocktails)

Meet colleagues from your region of the country in a relaxed social atmosphere.



## ■ EXHIBITOR SHOWCASE

The exhibit hall is the setting for many of the exciting events taking place during this year's conference. As always, our Exhibitor Showcase is an integral and important part of the conference program. Our exhibitors understand the needs of therapists and are here to offer the best products and services available in the marketplace today. You won't want to miss any of these opportunities to shop, socialize, take a break, have some fun and maybe even win a prize!

Get off to a great start on Friday evening's social activities with a fabulous wine tasting event hosted by our exhibitors. As you visit each booth you will be served a favored wine especially chosen by the vendor. An assortment of international and domestic cheeses will be available for you to sample as you make your rounds of the exhibit booths and the staffed poster displays. This year NDTA's fundraising raffle offers many exciting prizes. You must be present to win!



### FRIDAY, MAY 20

- 9:30 – 10:30 am . . . . . Exhibit Hall Opening & Break
- 1:00 – 2:00 pm . . . . . Dessert with Exhibitors
- 5:15 – 7:15 pm . . . . . Exhibitor Hosted Wine & Cheese Reception  
Staffed Poster Session, Fundraising Raffle

### SATURDAY, MAY 21

- 9:30 – 10:30 am . . . . . Exhibitor Showcase & Drawings

## ■ BE A PART OF IT – NEW YORK, NEW YORK

### **Saturday Evening Excursion to Manhattan**

Get together with your NDTA friends for a trip to the city that never sleeps. We have arranged for shuttle transportation to the Metro North Station where you can board the train for the quick 30 minute ride to Grand Central Terminal. From there, you can choose to spend your time on any number of activities or attractions the city is famous for.

There are always events and attractions to be seen in Times Square. This vibrant and historic landmark in New York City has it all! Times Square offers an incredibly wide array of dining and food options. The area is a cultural hub featuring music, nightlife and a wide variety of shops and stores. See a musical or play on Broadway, or go to a concert at a variety of nearby venues offering all forms of live music.

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# Visual Processing in Neurological Disorders

## IMPLICATIONS FOR THERAPISTS IN EARLY INTERVENTION

By Linda Baker-Nobles, MS, OTR

Occupational and physical therapists in early intervention often work with infants with cerebral palsy, a variety of other neurological and genetic syndromes, and developmental delay. Many times these infants have coexisting visual processing impairments that may include a diagnosis of cortical visual impairment (CVI). This diagnosis is becoming prevalent in developed countries. Data collected through Babies Count: The U.S. National Registry for Children with Visual Impairments, Birth to 3 Years<sup>1</sup> found that cortical visual impairment was the most common diagnosis of visual impairment for infants and

tions and/or the visual cortex in the occipital lobe is affected.<sup>5</sup> This results in difficulty with visual processing and interpretation of visual information.<sup>6</sup> CVI is often caused by hypoxia, brain bleeds, and subsequent periventricular leukomalacia.<sup>7</sup> The infant brain seems to be the most susceptible to these incidents during or shortly after birth. Other causes of CVI include cardiac arrest during heart surgeries, trauma, epilepsy, encephalitis and meningitis, drugs and poisons, central nervous system developmental defects, metabolic disorders, and twin pregnancies. Most often, these infants present with other

### Children with a history of preterm birth and cerebral palsy were most at risk for cortical visual impairment when compared to children who were not preterm or did not have cerebral palsy.

children receiving early intervention services in 27 states. One reason for this increasing number is the improved survival rates of premature infants.<sup>2</sup> Ortibus, Lagae, Casteels, Demarel, and Stiers<sup>3</sup> found that children with a history of preterm birth and cerebral palsy were most at risk for cortical visual impairment when compared to children who were not preterm or did not have cerebral palsy.

In another study,<sup>4</sup> 72 children with cerebral palsy from 18-96 months were evaluated with visual evoked potential scans (VEPs). VEPs are tests often used to diagnose cortical visual impairment. This study found that 59% of the children demonstrated abnormal VEPs. These abnormal VEPs were statistically correlated with motor deficits, low developmental quotients, and poor visual acuity.

CVI refers to a condition where the eye and eye structures are normal, but the neural pathways (the geniculocalcarine tracts that travel from the lateral geniculate body and calcarine sulcus to the occipital lobe) are affected by neurological condi-

cognitive, sensory, and motor problems associated with central nervous system involvement and are receiving home-based early intervention services.<sup>5</sup>

#### VISUAL CHARACTERISTICS OF INFANTS WITH CORTICAL VISUAL IMPAIRMENTS

Infants with cortical visual impairment present different visual behaviors when compared to infants with ocular visual impairment. The eyes of infants with CVI usually look normal compared to infants with ocular impairments, although these infants often cannot visually track an object. Infants with CVI may also present with a strabismus.<sup>5,8</sup> Their visual attention span can be very short and they may appear to look at the object peripherally. Sometimes, they are observed to briefly look, look away, and then return for another brief look. When infants with CVI reach for an object, they may not look at the object while trying to reach but look away and then attempt

*(continued on next page)*

**Visual Processing in Neurological Disorders** (continued)

to reach. This short visual attention may be due to either field loss in the area of the visual cortex that processes detailed vision or the stimulus may be too complex for the child to maintain attention.<sup>9</sup> Many infants and children with CVI demonstrate visual field defects and lose variable portions of their visual fields.<sup>5,10,11,12</sup>

Some infants with CVI keep their eyes half-closed or closed completely for periods of time to reduce the amount of visual input. They may compulsively light gaze, a characteristic not associated with infants with ocular impairments. If these children can move around, they may get very close to objects to reduce the background clutter of the effects of figure ground because

from the environment. As stated earlier, normal visual environments can be too enriched and too complicated for infants and children with CVI. This may result in visually disengaging and not using vision for learning. Evaluating responses to visual input and how it affects the behavior of the infant is critical.

Parents are usually the best sources of information about how sensory input affects the visual performance of their infant. They often report that their infant is totally visually unresponsive to the environment or looks at specific items only. Sometimes parents report that certain visual input will agitate or upset the infant. Parents can also provide information about certain colors of toys that influence visual attention. In addition to

## CVI is often caused by hypoxia, brain bleeds, and subsequent periventricular leukomalacia.

it is so difficult to visually attend to a form against the background. Infants with CVI do not usually have problems with color perception and are often attracted to the primary colors.<sup>5,10,13</sup>

Many of the visual characteristics presented above are related to difficulty with visually processing information in the environment. Vision is a critical sense in human performance and learning. It plays a significant role in survival, orientation and navigation, anticipation, adaptation, non-verbal communication, and integration of information from all of the other senses.<sup>14</sup> Generally, the typical visual environment is enriched and busy and may be too overwhelming for infants and children with CVI. They are unable to process and interpret all that they see. The overstimulating visual environment appears to cause them to visually disengage or “shut down” from the environment. They do this by looking away, closing their eyes, or sometimes sleeping.<sup>6</sup> At times, visual input combined with noise or other sensory stimulation contributes enough sensory overload to cause “shut down.”

### ADAPTING THE ENVIRONMENT FOR VISUAL ATTENTION

The majority of infants with the diagnosis of cortical visual impairment have other pathologies in the central nervous system that affect their ability to regulate behavior and learn

this information, it is important for the early interventionist to evaluate whether the infant responds to certain light, pattern, or form perception<sup>13</sup> in order to assess how much functional vision the infant appears to be using.

### INTERVENTION STRATEGIES

Modification of the visual environment to encourage visual orientation and attention to the world is an important part of assisting infants and children with CVI to initiate movement for the purpose of self-directed play, learning, and communication.<sup>5</sup> Typical intervention strategies for infants and children with ocular visual impairments concentrate on enriching the visual environment. Although this is good for infants and children with ocular impairments, it is contraindicated for those with CVI. Since infants with CVI tend to visually disengage with an enriched environment, it is necessary to simplify the visual environment.<sup>15</sup> Examples of visual simplification include:<sup>13</sup>

- The use of a solid color blanket or sheet
- The use of one simple visually contrasting object or toy at a time
- The use of a background shield when introducing a

(continued next page)



**Visual Processing in Neurological Disorders** (continued)

contrasting object or toy to reduce the effects of figure-ground

- Removal of extra visual stimuli from the infant's room and crib
- The use of one or two high contrast items to assist the infant to focus attention
- Provision of a tactile cue to the hand when the infant appears to be visually attentive
- The use of a primary colored bottle during feeding to reinforce visual discrimination of a common object
- The use of common objects that have meaning in the infant's and child's life
- The use of simple primary colored cause and effect toys that have a light cue to reinforce and promote reaching

If an infant or child is diagnosed with cortical visual impairment and a motor impairment, it can be difficult to work on visual attention simultaneously while working on motor responses, such as neck and trunk control. When the infant attempts to work against gravity, it may be very difficult to control visual muscles and attend to a visual stimulus, and the infant may visually disengage. When this situation exists, treatment strategies that reduce or eliminate the effects of gravity will be necessary when working to develop visual attention.<sup>13</sup>

**SUMMARY**

Being aware of the visual environment and adapting it are critical when working with infants and children with CVI. Vision is the motivation for moving and the primary sensory system of integration. When infants or young children have visual processing problems and are not using the visual system for some or all of its functions, the potential for optimal development is compromised. Careful evaluation and treatment based on the individual needs of infants and children with CVI and differentiating their needs from those of infants and children with ocular impairments that interfere with reception and acuity of vision is critical to the provision of intervention. ■

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*Linda Baker-Nobles will be expand on this information at the NDTA Baby Conference in Rye Brook, NY. She will present her keynote address on May 20, 2011 from 8:15-12:00. Go to [www.ndta.org](http://www.ndta.org) and register for this conference today!*

*Linda Baker-Nobles, MS, OTR, is an occupational therapist who has worked with infants and children with both ocular and cortical visual impairments for over 30 years. Her research and writing interests cover these topics. She will be a keynote speaker at the NDTA Building Blocks of Baby Treatment conference in Rye Brook, NY, May 20-22, 2011. Linda can be reached at [jnobles@kc.rr.com](mailto:jnobles@kc.rr.com).*

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**Visual Processing in Neurological Disorders** (continued)

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## WANT TO KNOW MORE ABOUT NDT?



### NEURO-DEVELOPMENTAL TREATMENT APPROACH: Theoretical Foundations and Principles of Clinical Practice

By Janet M. Howle, PT, MACT, in collaboration with the NDTA™ Theory Committee

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**Getting to Know You** (continued from pg. 1)

The observation of infant behaviors in the clinical setting has also provided clinicians with a powerful intervention tool that has been used in two major ways. One way is to support preterm infants' optimal developmental outcome in the neonatal intensive care unit (NICU) by using their behaviors to assess their current level of adaptation to this environment and adapt the care they receive to meet their individual needs.<sup>9</sup> The Neonatal Individualized Developmental Care and Assessment Program (NIDCAP) is the tool par excellence to accomplish this task and is specifically designed for use in the NICU. The information gathered from a NIDCAP observation is used to develop a highly individualized developmental plan of care that has drastically changed the approach to infant care in the hospital setting worldwide.<sup>8,9</sup>

Infant behaviors have also been shown to be a powerful

matched support to the infant. The following will briefly describe these clinical concepts.

### **THE USE OF INFANT BEHAVIORS IN RELATIONSHIP-BUILDING**

The effective use of infant behaviors as a relationship-building tool includes active listening and the shared observation of the infant in the parents' presence, narrating to the parents what the clinician is doing and what he or she observes while involving the parents actively in the session.<sup>10,16</sup> The observation of infant behaviors with parents should not be a passive experience for parents. The clinician needs to draw them in and actively involve them in the session by creating the opportunity for them to share their own observations of their infant and express their own interpretation of their infant's behaviors and developmental

## **Infants' behaviors become their "voice," their way of letting us know how they are doing, whether they are experiencing pleasure or discomfort at any given moment.**

catalyst for the parent-infant relationship in the newborn period.<sup>10-15</sup> Most of the work on relationship-building intervention is based on a modified use of the NBAS to render it more effective as a teaching tool for parents in the clinical setting. Inspired by this work and in support of the powerful effect of preventative care in the newborn period, Nugent and his colleagues<sup>6</sup> created the Newborn Behavioral Observations (NBO), which is designed to sensitize parents to their infant's competencies and uniqueness and thus contributes to the development of a positive parent-infant relationship from the very beginning.<sup>10</sup> The NBO is also well suited to the needs and realities of practitioners working with young infants and their families in a multitude of clinical settings. It shifts the focus from assessment to shared observation with parents and relationship-building between parents and infant and between parents and clinician.<sup>10</sup>

Using the NBO has taught us that the isolated observation of specific infant behaviors provides only part of the information needed for effective interventions with neonates. The effective use of behavioral observations in intervention also depends on the clinician's understanding of key clinical concepts and the ability to respond appropriately with well-

status. The clinician becomes adept at using infant behaviors as a catalyst for relationship building by using strategies designed to foster healthy relationships.<sup>10</sup> The clinician can refine the parents' attempts to support their infant by modeling supportive strategies that match the infant's own efforts at comfort. For example, infants who make grasping movements of their fingers when upset respond well to grasping their parent's finger to console. This individual approach shows respect toward the infant's individual style and fosters their sense of competency. The Newborn Behavioral Observation system and its training program are specifically designed to provide clinicians with a structured approach to include relationship-building concepts in their clinical practice ([www.brazelton-institute.org](http://www.brazelton-institute.org)).

### **THE USE OF INFANT BEHAVIORS IN NEONATAL CLINICAL PRACTICE**

Neurobehavioral functioning is described as the unfolding of sequential achievements in four behavioral dimensions organized as subsystems. The behavioral dimensions are interdependent. Infants must stabilize their autonomic or physiologic behavior; regulate or control their motor behavior; organize their behavioral states and (*continued next page*)

**Getting to Know You** (continued)

responsiveness through interaction with their social and physical environment; and orient to animate and inanimate objects. The maturation and control of these behavioral dimensions allow infants to organize their behavior so that they are able to actively participate in their social world and elicit the kind of care from caregivers that is best suited to meet their needs.<sup>2,3</sup> An infant capable of organizing, regulating, and modulating his behaviors displays competent self-regulation and will more easily be able to handle stress or demands placed on him than the infant who has not yet fully accomplished this first developmental task.

Als' synactive theory proposes that infants' behaviors are mean-

to one of loss of self-regulation and that a traffic light metaphor, with red, yellow and green light behaviors, may best capture the behaviors that indicate the transition from self-regulation to sensory overload and subsequent loss of self-regulation.<sup>18,19</sup>

Other important clinical concepts that refine the clinical use of neurobehavioral interventions in neonatal interventions include the concepts of infant behavioral states, competency, best performance, and examiner facilitation. The infant's behavioral state (deep sleep, light sleep, drowsy, alert, active alert, and crying) provides the matrix on which the quality of the infant's responses can be understood. Following in the tradition of the NBAS and APIB, all neonatal interventions

## **The clinician can refine the parents' attempts to support their infant by modeling supportive strategies that match the infant's own efforts at comfort.**

ingful, communicative, and indicative of their efforts, successes, and failures at self-regulation.<sup>2</sup> Therefore, when one is observing an infant, his or her behaviors indicate the level of self-regulation at the moment or how compromised it may be at any given time. An alert infant with a soft face and relaxed tone indicates a controlled state of self-regulation and a capacity to tolerate the challenges presented. On the other hand, an infant who is looking away and squirming is indicating difficulty in reaching or maintaining a controlled state of self-regulation given the intensity of the interaction or level of fatigue at the moment.

In order to assist clinicians and parents understand the level of self-regulation of a given infant, Als has categorized behaviors within each of the behavioral dimensions as either "approach/regulatory" or as "avoidance/stress" behaviors.<sup>2</sup> Regulatory behaviors indicate a state of well-being and are observed when an infant's self-regulatory abilities are able to support the social and environmental demands placed on him; he is then described as organized. Stress behaviors indicate a state of exhaustion and are observed when the infant's threshold for self-regulation is exceeded by the demands placed on him; he is then described as disorganized.<sup>17</sup> It is proposed that this bimodal system of approach and avoidance behaviors may not sufficiently account for the behaviors that are manifested as the infant transitions from a state of self-regulation

should aim at supporting the infant's competency and eliciting best performance with the provision of well-matched examiner facilitation to the infant.

Blanchard and Mouradian have previously described the importance of behavioral observation in clinical practice with young infants by relating it to the role they play in developmental assessment and the identification of individualized intervention strategies.<sup>5</sup> Neonatal occupational and physical therapists can draw valuable information about the developmental status of the infant from behavioral observations. The infant's attempts to self-regulate and the successes at self-regulation are indicative of the current level of developmental maturity, robustness, and vulnerability. What the infant can do and the context under which he shows his competency provides a powerful starting point for clinicians who are in the process of developing a relationship with each family and infant.

The infant's behavioral manifestations of disorganization or loss of self-regulation are indicators of the developmental vulnerabilities and sensory thresholds. Refining skills in that particular area can greatly enhance neonatal therapists' clinical competencies with young, sensitive infants. It is while the infant shows his inability to maintain self-regulation that individualized strategies for support can be identified.<sup>20</sup> The information gathered from neurobehav-

*(continued on next page)*

**Getting to Know You** (continued)

ioral observation can also provide the therapists with documentation to substantiate clinical judgments for recommending medical and educational services after graduating from the NICU.

**CONCLUSION**

Infant behaviors provide powerful tools for neonatal therapy practice. Under skilled hands, these behaviors can assist the therapist's efforts in supporting both infants and parents during the phase of adjustment often present in the neonatal period.<sup>21</sup> Infant behaviors can be used to support both the infant's development by using them to facilitate prolonged periods of self-

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## Modeling the support necessary to achieve self-regulation will also assist the parents' own efforts to support their infant.

regulation. Modeling the support necessary to achieve self-regulation will also assist the parents' own efforts to support their infant. With proper clinical training, infant behaviors have been shown to be a powerful catalyst for the parent-infant relationship and promote the clinician-parent relationship. ■

*Dr. Blanchard will deliver a keynote address on this topic at the NDTA Building Blocks of Baby Treatment conference in Rye Brook, NY, on Saturday, May 21, 2011. You can register for the conference at [www.ndta.org](http://www.ndta.org).*

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**Getting to Know You** (continued)

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# My Kindergarten Experience

By Nancy A. Jaekle

*Nancy Jaekle first wrote about her life in the January-February 2010 issue of Network. There she described her very early life, including the difficulty she and her mother encountered when Nancy was tested for kindergarten entrance.*

With a wave and a smile, I left my mother's side and walked proudly into my first day of kindergarten. Being the first child to be mainstreamed, from day one I was the guinea pig experiment. One of the requirements for entering school was that all students were to be toilet trained, but that was achieved long before kindergarten. Despite having proved to the school psychologist I was of normal intelligence, I still had to prove I was capable of competing with my able-bodied peers.

Before this transition into the public school system took place, my mother had to confer with the principal and teachers as to what daily challenges they would encounter with me. Back in the sixties, teachers did not have training for children with special needs; therefore, my mother had to step in and educate my teachers. For instance, the fact that I had to sit on my right hand to help control involuntary motion might raise a few eyebrows. Another example is that like most kids my age, I used a straw to drink. However, probably the biggest concern of my teachers was for my safety. Because of my condition, I would fall down often and knock things over. My teachers learned that was to be expected.



Five-year-old Nancy sets off for the first day of kindergarten, while younger brother Ricky looks on.

**Despite having proved to the school psychologist I was of normal intelligence, I still had to prove I was capable of competing with my able-bodied peers.**

For me, though, I was too impressed by the colorful bulletin boards, fish tanks, and all the other odds and ends that made up my classroom. With a combination of nervousness and excitement, I started my first day. My teacher, Miss Carlyle, welcomed me to the class and showed me my seat at a table with four other students. Several minutes later, Miss Carlyle started to pass out our materials. I was thrilled to be given a new box of crayons, paste, and blunt point scissors. I soon discovered I liked coloring the best using my left hand with the paper taped down to the table. I could color and stay within the lines. Now cutting and pasting was another matter. I did

not have the coordination required for simple cutting. Therefore, all things had to be pre-cut for me. That was not too bad, since most of my peers had problems cutting too.

My first field trip was to the zoo, and my mother was asked to accompany me. I guess my teachers felt that being outside of the school environment, I might have some anxiety about keeping up physically with my peers. This was where we found out that a wheelchair comes in very handy for that kind of situation. Being pushed around, I was able to enjoy the animals and surroundings and still be part of the group.

One thing about little kids is that they (*continued next page*)

*My Kindergarten Experience (continued)*

are honest. No matter how harsh the comments may have seemed, it took only a matter of minutes before others noticed my disability. I remember one little boy asking, "Why is she walking like that?" Obviously, he was curious and the teacher told him simply that Nancy had a disability that made walking difficult. But like all kids, he was just being honest. Looking back, I thought I was probably the topic at many dinner tables,

mother was very concerned that I was in the classroom with her son. She felt I needed extra help that would take away some time and learning experiences for the rest of the class. Her assumptions were unfounded. All in all, kindergarten was a positive experience. I do think that if I hadn't had a good time in nursery school, the transition to the public classroom would not have been as easy one. ■

**Looking back, I thought I was probably the topic at many dinner tables, as kids began to chat about me.**

as kids began to chat about me. Most parents were kind and understanding, and tried to explain to their children that some children are born with physical limitations and that people need to be kind and understanding and helpful to others with special needs. Of course, there will always be exceptions. One

*Nancy A. Jaekle worked as a freelance journalist, and worked as a staff and features writer for North Jersey Newspaper Company for twenty-four years. She lives in Stow, Ohio, and can be reached at 330-686-7138.*

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# Designing Orthotics to Better Mimic Normal Gait

By John Izak, CPO

**A**s a practicing orthotist for nearly 20 years, I have developed a great passion for treating children with various disabling conditions. These children and their parents have been seeking all means possible to attain the ability to walk, play, and run. I have aligned myself with wonderful physical therapists and open-minded physicians that share in my goals and passion. Though I enjoy being a co-owner and practicing clinician in a successful orthotics practice, I struggle with the premise that the children I treat can do even better. It seems, despite the traditional orthotic interventions that I provide, that many of the children continue to return to unstable alignment and tightened musculature from heel to toe.

The advent of flexible devices and jointed devices has not been the total answer. In our attempt to rush and provide children of all ages and with many pathologies with free motion and articulating devices, we perhaps have caused more long term kinematic problems than we realize. I understand range



Working on weight shifting in orthotics.

**It seems, despite the traditional orthotic interventions that I provide, that many of the children continue to return to unstable alignment and tightened musculature from heel to toe.**

of motion is important in helping children achieve functional mobility; however, the dependency on assistive devices for gait and more medically invasive interventions to achieve anatomical correction is disheartening.

Recent, or I should say latent contributions, from colleagues in physical therapy have brought promising outcomes to pediatric care as we know it. Elaine Owen, MSc, SRP, MCSP, in Scotland has researched range of motion as it relates to the gastrocnemius muscle group in children with neuropathophysiological problems.<sup>1</sup> Her research shows that without adequate range of motion of the gastrocnemius muscle group, a child will have difficulty ambulating with or without the use of a device. Ms. Owen and her colleagues have found that

children respond better when her team included the R1 range of motion (first catch in full dorsiflexion with knee extension) in the planning and fabrication of the device.

Historically in traditional pediatric orthotic management, devices were fabricated as close to 90° neutral as possible without regard to standing sagittal alignment and its effects of forcing the knee straight. This 90° position was and continues to be seen as the way to prevent heel cord tightening and the way to position the ankle to initiate a normal heel strike. The problem is that the focus is below the knee only.

Ms. Owen's Scottish team has found that not only were children more tolerant of ankle foot orthoses (AFOs), but they also actually gained range of *(continued on next page)*

**Designing Orthotics to Better Mimic Normal Gait** (continued)

motion at the ankle when the gastrocnemius muscle group was stretched while wearing them. Furthermore, the Scottish group found that by using rigid orthoses aligned to the patients' R1 or soft R2, depending on spasticity, to establish orthosis alignment, the foot and ankle structure was stabilized, greatly reducing compensation all the way up the body. (R2 is the maximum end range with slow stretch.)

They then aligned the orthosis to the floor, finding that 10°-15° of tibial inclination (the angle of the shank [tibia] relative to the horizontal surface when standing in AFOs with

heels down and weight equally distributed between heel and toe) provided the most effective and stable gait. The Scottish research team then worked with an algorithm of shoe design features that assist in achieving normal alignment for gait by further manipulating how the AFO – shoe combination reacts with the floor. If the ankle angle in the device is set without regard to the available gastrocnemius group R1 range of motion, there will be insufficient length to allow knee extension at initial heel contact and terminal stance, and compensations will occur. Ms. Owen is well published in her research on weight line transition work and her team's findings are deserving of reading.

The Serial Casting Program at Children's Memorial Hospital in Chicago is another wonderful program started nearly two decades ago that echoes these findings, but in a systematically different way. Mary Weck's physical therapy team, in conjunction with the hospital's orthotics department, has been helping children achieve independence with standing and walking for many years. Ms. Weck's program has also seen promising results when serial casts are applied respecting the R1 position of the gastrocnemius muscle group. The casting program may go many weeks and the protocol is typically followed by the use of day and/or nighttime devices. Ms. Weck's group monitors many measurements, including muscle circumference, range, and strength. Both work in Scotland and Chicago involve a strict

## DRAFO System

- The DRAFO System Mimics gait biomechanics of normal human locomotion –
- The 3 foot rockers are incorporated into the orthosis
- 2<sup>nd</sup> rocker achieved by Tibial Alignment
- Stabilizes and maintains desired alignment without requiring excessive pressure
- Plantar aspect functions like a prosthetic foot



- **Forefoot design:**

- Posting designed to have dual function:
  1. Align forefoot
  2. Manipulate terminal stance
- Allows for functional 3<sup>rd</sup> rocker

- **Calcaneal Wrap**

- Locks in the Hindfoot
- Allows 1<sup>st</sup> Rocker at heel strike
- Achieves Stability at Heel Strike
  - Sach heel effect de-accelerator
  - De-rotator
  - Proprioceptive feedback



program of weight shifting and wearing schedules. The outcomes of both programs are promising.

## WORKING ON WEIGHT SHIFTING IN ORTHOTICS

The devices used in both programs are typically solid AFOs. They are fabricated with respect to the current ankle positions present in the children. Although the outcomes from these two teams are worthy and very exciting, the practicality of shoe modifications (with Owen's program shoe modifications are necessary to affect the biomechanics of the shank through stance phase by manipulating loading response, mid-stance, and terminal stance) and availability of skilled serial casting may be difficult. Despite being difficult, this paradigm shift is necessary, in my opinion.

With the encouragement of many, including Beverly Cusick and me, Davin Heyd of Bracemasters Intl. has come up with a wonderful line of devices that embrace the weight line transitional work and incorporate the center of gravity work of both programs. These devices predominantly present as solid AFOs, but are enhanced in design by the use of flexible inner liner supramalleolar orthoses (SMOs) that includes an incredible trademarked soft open heel. Furthermore, when indicated, the forefoot alignment is posted and the uninvolved medial or lateral forefoot soft interface is exposed. Please see

## Designing Orthotics to Better Mimic Normal Gait (continued)

the descriptive diagram on previous page.

The hopes of Heyd's Dynamic Response Ankle Foot Orthosis (DRAFO) is that limited R1s will also be posted for and that the exposed heel will get sensory feedback, improving R1 over time as established by the work of Weck and Owen. At the time of this publication, the DRAFO concept is undergoing comparative gait analysis at several centers with much anticipated promise for use throughout all pediatric care centers.

Initial results in my clinics have shown amazing differences in some children. For example, standing balance has increased and upper extremity tone has been reduced. I see that much reflection and understanding of the current literature and experiential work is required. I also recognize that a greater understanding and harmony of spasticity management on behalf of each individual team needs to be established in order for these programs to be successful in this paradigm shift. ■

*John Izak is a certified prosthetist/ orthotist (CPO). He graduated from Temple University and Northwestern University School of Medicine's Prosthetics-Orthotics Program. He has practiced in the field for twenty years, and is co-owner and practitioner of*

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## SUGGESTED READINGS

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These links offer clients, parents and caregivers access to reliable health care information and general advocacy resources.

**Administration on Developmental Disabilities** – The ADD is the U.S. Government organization responsible for implementation of the Developmental Disabilities Assistance and Bill of Rights Act of 2000, which ensures that individuals with developmental disabilities and their families participate in the design of and have access to culturally competent services, supports, and other assistance and opportunities that promotes independence, productivity, and integration and inclusion into the community.

**American Academy for Cerebral Palsy and Developmental Medicine** – The AACPM is a multidisciplinary scientific society devoted to studying cerebral palsy and other childhood onset disabilities, to promoting professional education for the treatment and management of these conditions, and to improving the quality of life for people with these disabilities.

**American Academy of Neurology** – The AAN is an international professional association of more than 18,000 neurologists and neuroscience professionals dedicated to providing the best possible care for patients with neurological disorders.

**American Academy of Pediatrics** – The AAP is dedicated to the health of all children. Its member pediatricians are committed to the attainment of optimal physical, mental, and social health and well-being for all infants, children, adolescents, and young adults.

**American Occupational Therapy Association, Inc.** – The AOTA is a nationally recognized professional association of approximately 40,000 occupational therapists, occupational therapy assistants, and students of occupational therapy. The AOTA mission is to advance the quality, availability, use, and support of occupational therapy through standard-setting, advocacy, education, and research on behalf of its members and the public.

**American Physical Therapy Association** – The APTA is a national professional organization representing more than 63,000 physical therapists, physical therapy assistants and students of physical therapy. The APTA mission is to further the profession's role in the prevention, diagnosis, and treatment of movement dysfunctions and to enhance the physical health and functional abilities of members of the public.


**American Speech-Language-Hearing Association** – ASHA is the professional, scientific, and credentialing association for more than 115,000 members and affiliates who are audiologists, speech-language pathologists, and speech, language, and hearing scientists. The ASHA mission is to promote the interests and provide the highest quality services for professionals and to advocate for people with communication disabilities.

**Association of University Centers on Disabilities** – The AUCD is a non-profit organization that promotes and supports a national network of interdisciplinary university centers that advance policy and practice for and with individuals with developmental and other disabilities, their families, and communities.

**California State Council on Developmental Disabilities** – The SCDD is a federally-funded independent state agency established in federal and state law to assist in planning, coordinating, monitoring and evaluating services for individuals with developmental disabilities and their families.

**Exceptional Parent Magazine** – EP's on-line resource continues to provide information, support, ideas, encouragement and outreach for parents and families of children with disabilities, and the professionals who work with them.

**Family Village** – The Family Village is a global community that integrates information, resources, and communication opportunities on the internet for persons with cognitive and other disabilities, for their families, and for those that provide them with services and support. Our community includes informational resources on specific diagnoses, communication connections, adaptive products and technology, adaptive recreational activities, education, worship, health issues, disability-related media and literature, and more.



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**Transformation** (continued from page 1)

that his diagnosis of hydrocephalus is often associated with neurodevelopmental challenges, but his range of motion (ROM) in all extremities was within normal limits, and at the time, abnormal tone was not notable. Jack had slightly decreased active movement in his right lower extremity, but I observed his muscle strength to be at least 3/5 throughout both lower extremities (LEs). Reciprocal kicking of the LEs was slightly decreased, but intermittent, and at the time of the evaluation, Jack had a strong preference for lying in supine. The plagiocephaly I observed was likely a result of his lack of strength and lack of motivation to abandon his supine positioning.

From the moment I evaluated him, I was determined to “cure” Jack’s torticollis and improve his functional limitations. My focus was simply stretching and strengthening the involved



Jack at 19 months (16 months, corrected), beginning to sit independently. He is still challenged by an imbalance of strength of his cervical muscles.

unparalleled value of learning and practicing simultaneously and repeatedly throughout the eight-week course is an amazing method of instilling this theoretical framework into clinical

## Just like Jack’s entrance into this world, my depth of clinical thinking before my NDT certificate course was premature.

cervical musculature while keeping in mind my goals of symmetrical and age appropriate developmental milestones. I fervently worked on ROM and insisted that his mom follow a stringent home program.

In October, Jack’s mother arrived at therapy in a fury of grief. Jack had been examined by a physical medicine and rehabilitation physician who had diagnosed him with triplegic cerebral palsy. She had in her hand prescriptions for a stander and bilateral solid ankle orthoses. She was surprised and devastated to learn that the smiling, happy baby whom she thought would have a few minor challenges had been given a prognosis characteristic of a severe physical disability.

Just like Jack’s entrance into this world, my depth of clinical thinking before my NDT certificate course was premature, to say the least. I had been a pediatric physical therapist for almost eleven years, employed at the same outpatient hospital satellite clinic since my graduation. I had fallen in love with pediatrics

practice. There is simply no better way to enhance one’s skills.

Until I became a student of NDT and Jane Styer-Acevedo, I took for granted any variability that may be present in the NDT course. I had assumed that all courses were taught in the exact same manner. While I am very certain that all of the courses do have a similar format, and are all taught by talented and knowledgeable instructors, Jane had a unique way of sharing her understanding of this problem-solving approach, and fostering and facilitating each and every student’s growth in a very personal and dynamic manner. She is a brilliant clinician, remarkable teacher, and a true gift to all of her students. Jane’s influence has guided me to think critically and coherently, connecting cause and effect while I assess each patient and organize my treatment strategies.

When goals are not met, it is now so natural to simply “break down” posture and movement into system impairments, and then naturally and directly identify *(continued on next page)*

**Transformation** (continued)

what needs to be addressed. NDT has taught me to prioritize effectively, and how to truly treat the “whole patient,” considering all contextual factors when creating goals. NDT makes so much sense. The Bobaths’ theory has continued to evolve and holds such practical applications; each patient becomes a “puzzle,” and it is our job as therapists to fit the pieces together. Jane’s passion for NDT was, and is, contagious; she created within us a community of passionate students who were all anxious to discover the interminable positive results of applying NDT to all of our patients, both throughout the course and in the clinic.

I am so grateful for all of the knowledge and confidence I have gained through my NDT course, but there are a few areas I want to highlight and emphasize, as they have completely transformed my thought process, and hence, my assessment techniques and treatment plans. I now feel confident in my ability to identify directly and prioritize the impairments that result in abnormal posture and movement. I am also able to facilitate good alignment in my patients using effective preparatory techniques. Finally, I am able to utilize powerful treatment strategies that facilitate the patient to use the base of support (BOS) for active stability.

The NDT Enablement Model has provided for me a most valuable framework to prioritize my patients’ functional limitations and how to address them. Prior to NDT, I attributed Jack’s list of problems to his hypotonicity and lack of strength and cervical ROM. Following my NDT education, I am able to observe Jack in a variety of postures, many of which are appropriate for his family’s goals, and I use a critical eye to observe not only his head, but the position of his scapulae, UEs, pelvis, and LEs, which all contribute to his lack of sitting balance and dislike for prone positioning.

When I first performed the intake during Jack’s evaluation, my problem list consisted of abnormalities I thought I could “fix” regardless of Jack’s family’s main concerns. I had always been taught to treat the root or the cause of the problem and to use the developmental sequence of a typically developing baby as a guide for positioning and facilitating movement. Because Jack was not tolerating prone, regardless of his age and lack of sitting balance, I wanted to stretch his “tight” cervical muscles



Jack is now standing at a support surface independently. We are working on lateral weight shifts and cruising with facilitation, often using his lower extremities as key points of control.

and then begin facilitating movement with prone as my goal.

Having an NDT trained mind now, I am driven to identify all of the components necessary to develop a movement required for function. Since NDT education, I am able to see and analyze Jack’s limitations in a more global view. And ironically, the position of his head and cervical spine appears to be more toward midline, and is less of a concern, when working on sitting balance and mobility, both goals his family had expressed early on in treatment.

An important and invaluable tool that has transformed my clinical analysis is the ability to separate and identify single system impairments that contribute to a patient’s various abnormal posture and movement

behaviors. This skill requires a very organized thought process, but is most appreciated when establishing goals and creating a treatment plan. Previously, I had considered weakness only as a lack of muscle strength; my treatment plan would then include concentric and eccentric strengthening activities and exercises.

After NDT, I am able to divide Jack’s system impairments into neuromuscular, musculoskeletal, and sensory-perceptual categories. Jack’s lack of sitting balance is not simply a result of “low tone” and weak proximal muscles. I am now able to direct my treatment toward improving his ability to sustain postural muscle activation by using gravity and facilitation of movement to work on this neuromuscular impairment. Jack can activate his abdominal muscles using quick, phasic bursts. He does, however, require significant work on sustaining activation, grading and coordinating muscle activity for static and dynamic balance, as well as for coordination of extremities for mobility.

Now that Jack is standing with support and transitioning to stand with assistance, I am able to observe his decreased pelvic-femoral mobility, which may also be attributed to his small repertoire of posture and movement behaviors. This is one of the many musculoskeletal impairments that contributes to some of his abnormal postures and movements. Muscle strength and muscle endurance have also been identified as factors that require guided treatment planning.

Finally, Jack’s sensory-perceptual experience as a 19-month-old with limited mobility, was yet *(continued on next page)*

**Transformation** (continued)

another factor that challenged his postural control and balance. I now know how poverty of movement can adversely affect a child's postural proprioception, altering and decreasing the amount of sensation needed to generate the correct posture and movement for transitions. Jack's tactile awareness was also impaired; he did not tolerate weight bearing through his LEs in supported standing and preferred to maintain a closed-fist position with both hands in prone and supported sitting. Whether this was due to lack of experience or a neurological response, I now knew it was something I needed to address in my treatment strategies.

At this point, I was able to recognize that limited ROM of cervical movement (musculoskeletal system) was not the most important system that needed to be addressed in order for Jack to reach his functional outcomes. Now that I had identified his abnormal posture and movement behaviors, I had recognized the need



The ball has been a wonderful tool for facilitating transitions into sitting. Jack responds so well when provided input down into his BOS, but patience is a necessity.

to activate and work off his BOS, Jack needed help with alignment. Once he was in good alignment, it was easier to activate his BOS. For example, Jack did not know how to activate his gluteal muscles in sitting. I had been so focused on his trunk, but through my NDT practical experience and labs, I learned the need for coactivation of the gluteals and abdominals in order to activate the BOS in sitting. Now I was ready to facilitate normal posture and movement for Jack.

Jack responded immediately to my facilitation. I had always wanted to achieve the ability to facilitate movement without "moving" the patient. This was another of the most valuable tools I received from my NDT training. I knew Jack could learn to initiate movement by generating weight shifts and activating his BOS. All of the work I had practiced in my NDT course with patients, fellow students, and instructors using various key points gave me the requisite tools to problem solve with greater insight and success. Suddenly, I

## The NDT Enablement Model has provided for me a most valuable framework to prioritize my patients' functional limitations and how address them.

to consider Jack's functional limitations, participation restrictions, and contextual factors. Jack is very motivated and very intelligent; he communicates well with his very supportive and loving family, as well as with his therapists. He is beginning to verbalize and has a quickly growing vocabulary. He now loves to be placed in a supported standing position at a small tabletop and is able to play independently there for five minutes. Once he can activate his BOS, Jack is quite capable of cruising with a little bit of facilitation. Jack's family is thrilled that he is not a candidate for a prone stander after all.

Postural alignment for Jack was an issue, not only because of the position of his head relative to his body, but in prone, his weight was shifted in a cephalic direction and in sitting, his posterior pelvic tilt brought his BOS posteriorly. In order

was finding my hands on muscle groups, not bony prominences. A simple light touch was now all that was needed for Jack to align his center of mass (COM) over his BOS, and now he is now capable of sitting independently for at least ten seconds.

I finally discovered where to target my treatment because I had identified specific postures Jack couldn't maintain and movement transitions he couldn't make. My goals became specific and functional and were very appropriate within Jack's contextual factors. The NDT approach involves constantly reassessing treatment strategies and outcomes. I am now setting specific goals for Jack. This is empowering for both Jack and his family, knowing that progress never ceases. Writing and re-writing goals is challenging, but I have learned to focus on only a couple of posture and movement (continued on next page)



*Transformation (continued)*

behaviors, and after identifying system impairments, I am able to quickly focus on just a few goals that are achievable and very appropriate for Jack and his family.

My new variety of treatment strategies has undoubtedly grown, and their effectiveness is quite evident after plenty of practice. I am aware of, and have incorporated into my practice, many preparatory techniques that are invaluable when used before implementing my treatment. Increasing pelvic femoral mobility, gaining ribcage mobility, and elongating some of the shortened muscles Jack uses ineffectively to gain stability and mobility have all assisted me in working toward our functional goals. During treatment, Jack loves to bounce on the ball, and since NDT, I am able to focus on getting him to sustain activation of postural muscles – gluteals, abdominals, and spinal extensors – while I continue to keep an eye on the position of his head and neck over his BOS. He is able to coactivate muscle groups now, and motor learning has played a role in his adapting new patterns of movement into his repertoire.

NDT has also improved my ability to WAIT for Jack's motor response. Previously, if I facilitated a movement, I was impatient, and eventually created the movement for the patient.

Jack is able to generate his own movements, sometimes not as quickly as I would anticipate, but eventually with the right handling techniques, he can initiate his own weight shift. This active initiation provides the right sensory feedback and motor learning experience required for him to continue to move in an energy efficient manner with good postural alignment.

Jack's functional progress improves with every visit. His family was first devastated to learn of his cerebral palsy diagnosis. Now they are observing a remarkable shift in his motor behavior. He is independent and even happier as he becomes more mobile and is able to work against gravity. He is proud of his own success, and so am I. My simultaneous transformation in clinical thinking has fostered his motor development, and I am so very grateful for my NDT education. I will continue to be amazed by Jack's progress, as the principles of NDT guide my treatment. ■

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Dates: May 9, 2011 – October 22, 2011

Location: KidzSPOT Pediatric Therapy, Scottsdale, AZ

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Dates: June 12, 2011 – March 18, 2012

Location: KidZ TherapEZE, Killeen, TX

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Dates: July 4, 2011 – January 27, 2012

Location: Gold Coast, Queensland and Yooralla Glenroy, Melbourne, Victoria, Australia\*, Geelong, VIC, AUSTRALIA

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Dates: September 8, 2011 – May 20, 2012

Location: Fairview Rehabilitation Center, Burnsville MN

NDT/Bobath Certificate Course in the Management and Treatment of Children with Cerebral Palsy and Other Neuro-motor Disorders:

Dates: October 16, 2011 – October 19, 2012

Location: City Kids, Inc., Chicago, IL

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Dates: April 19, 2012 – October 7, 2012

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Location: Regional Hospital, San Jose, CA

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Location: Texas Children's Hospital, Houston, TX

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Advanced Baby Course:

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Location: City Kids, Inc., Chicago, IL

Advanced Upper Extremity Course:

Dates: October 11 – 15, 2011

Location: Toronto Rehabilitation Institute, Toronto, ON, Canada

Advanced Baby Course:

Dates: November 6 – 17, 2011

Location: Florida Hospital, Celebration, FL

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Location: Paediatric Neurodevelopmental Clinic & Research Center, Mumbi, India, Near Nana Chowk, Mumbai – 400 007



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