

## Erhardt Developmental Products®

Videos and other Materials about Child Development and Children with Disabilities

[Home](#)
[Curriculum Vitae](#)
[All Topics](#)
[Video Descriptions](#)
[Continuing Education](#)


[FAQs](#)
[Free Downloads](#)
[Publications](#)
[Recommended Links](#)
[How to Order](#)
[Contact Us](#)

### Therapy During Lifespans of Individuals with Multiple Handicaps

Poster Presentations:

- World Federation of Occupational Therapists 11th World Congress, London, England, April 1994
- American Occupational Therapy Association Annual Conference, Denver, Colorado, April 1995
- American Academy for Cerebral Palsy and Developmental Medicine Annual Meeting, Minneapolis, Minnesota, September 1996
- Minnesota Occupational Therapy Association State Conference, Minneapolis, Minnesota, October 1995

This updated version was presented as a Roundtable Discussion at the TASH Conference, Milwaukee, Wisconsin, November, 2005

#### Abstract

This poster presents longitudinal case studies of assessment and treatment of hand problems in children with multiple handicaps, especially cerebral palsy, as they grow into adulthood. It reflects the changing theoretical and management focus of the therapy professions as well as the multidisciplinary area of cerebral palsy during the past decades. Both quantity and quality of skills are measured by identifying missing components of arm/hand sequential development interfering with functional skills in home, school, and community environments.

A theory of inappropriate prehension patterns based on these sequences compares normal, delayed, and atypical arm/hand positions, providing a method of analysis leading to developmentally targeted intervention and functionally appropriate adaptations. Since atypical patterns are viewed as an expression of compensatory postural stability during efforts to achieve function, one of the goals of intervention illustrated is to teach appropriate points of proximal stability for effective distal mobility, and promote normal prehension patterns with awareness of future adult outcomes.

The case study examples and photographs show how the theoretical model is used to improve postural stability with three individuals with cerebral palsy who have different types and levels of physical and mental dysfunction, in different environmental contexts, and at different age levels within their own lives. The three children are followed through a ten-year period, from ages 4 to 14 years, 6 to 16 years, and 14 to 24 years, as they receive occupational therapy in their homes, schools, and community. The new Occupational Therapy Practice Framework (AOTA, 2002) is used to describe the specific activities which prepare these children for engagement in future occupation to support participation in context include:

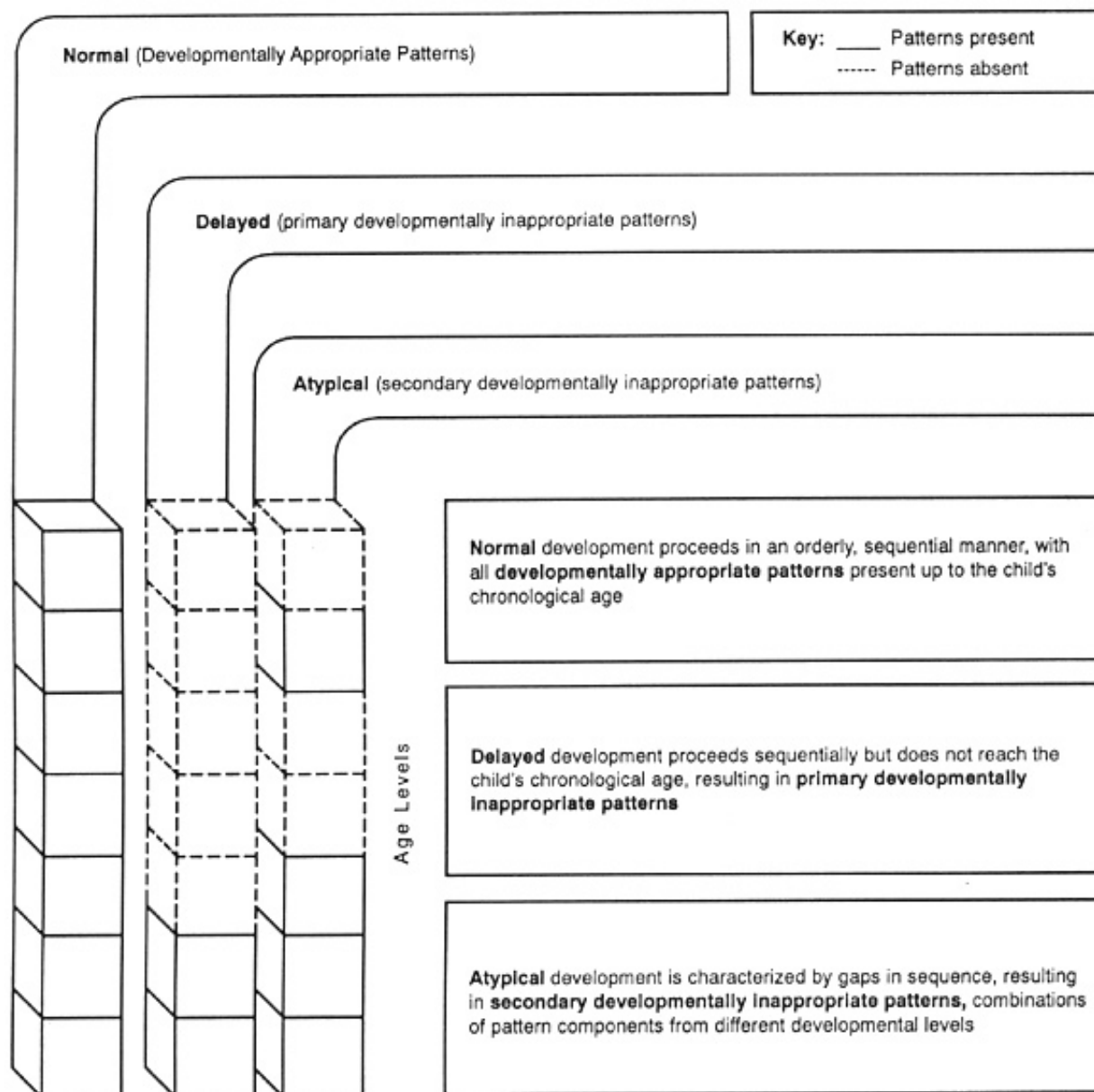
- Mirror play (activities of daily living: grooming)
- Mud play (leisure: gardening)
- Balance activities (work: cleaning crew at pizza shop)

In addition, the theoretical model is used to improve fine motor skills such as:

- Cube grasp (instrumental activities of daily living: handling utensils for meal preparation)
- Pellet grasp (instrumental activities of daily living: handling medications for health management)
- Crayon or pencil grasp (education: handling paint brush in high school art class)

The process of transition from childhood to adulthood needs to begin at birth, with functional activities introduced early in therapy, becoming increasingly important as the individual matures. Intervention models that combine components of developmental theory with realistic functional needs offer a unique challenge for therapy programs integrated into each child's current environmental contexts. As the child's world expands from home to school and community environments, arm/hand skills become increasingly important in determining degree of inclusion, level of independence, and quality of life.

### A Theory of Inappropriate Prehension Patterns Relating to Developmental Hand Dysfunction



**A Comparison of Normal, Delayed, and Atypical Prehension Development**

### A Treatment Model for Grasp of the Cube

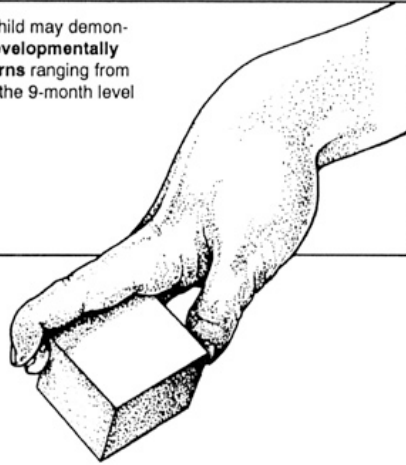
### Treatment

The **normal** 7-month infant demonstrates **developmentally appropriate patterns** at the chronological age

The **delayed** 7-month infant may demonstrate **primary developmentally inappropriate patterns** at the 5-month level

The **atypical** older child may demonstrate **secondary developmentally inappropriate patterns** ranging from the 3-month level to the 9-month level

Months



NORMAL	DELAYED	ATYPICAL	PATTERN COMPONENTS
			<b>Radial-digital grasp:</b> Object held with thumb and fingertips, space visible between
			<i>Radial-palmar grasp: Wrist straight, fingers on far side of object press it against thumb and radial side of palm</i>
			<b>Palmar grasp:</b> Thumb adducted
			Held in ulnar side, wrist flexed

**Key:** \_\_\_\_\_ Patterns present  
 ..... Patterns absent

Current developmental level

Present normal pattern components combining to form atypical patterns  
*Italics indicate absent normal pattern components needed to fill sequential gaps*



Radial-Palmar Grasp  
7-month Component

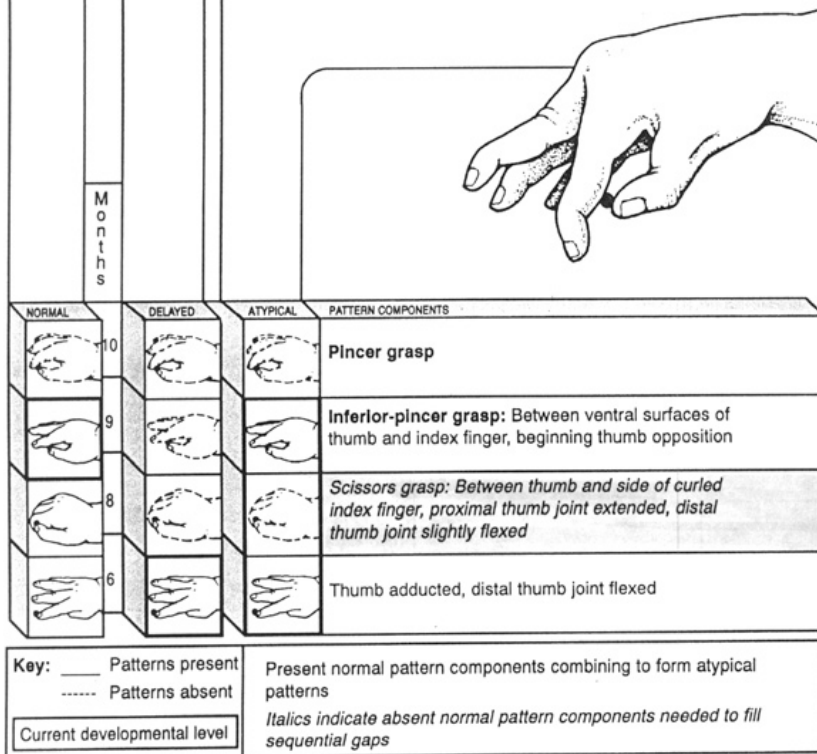
### A Treatment Model for Grasp of the Pellet

### Treatment

The **normal** 9-month infant demonstrates **developmentally appropriate patterns** at the chronological age

The **delayed** 9-month infant may demonstrate **primary developmentally inappropriate patterns** at the 6-month level

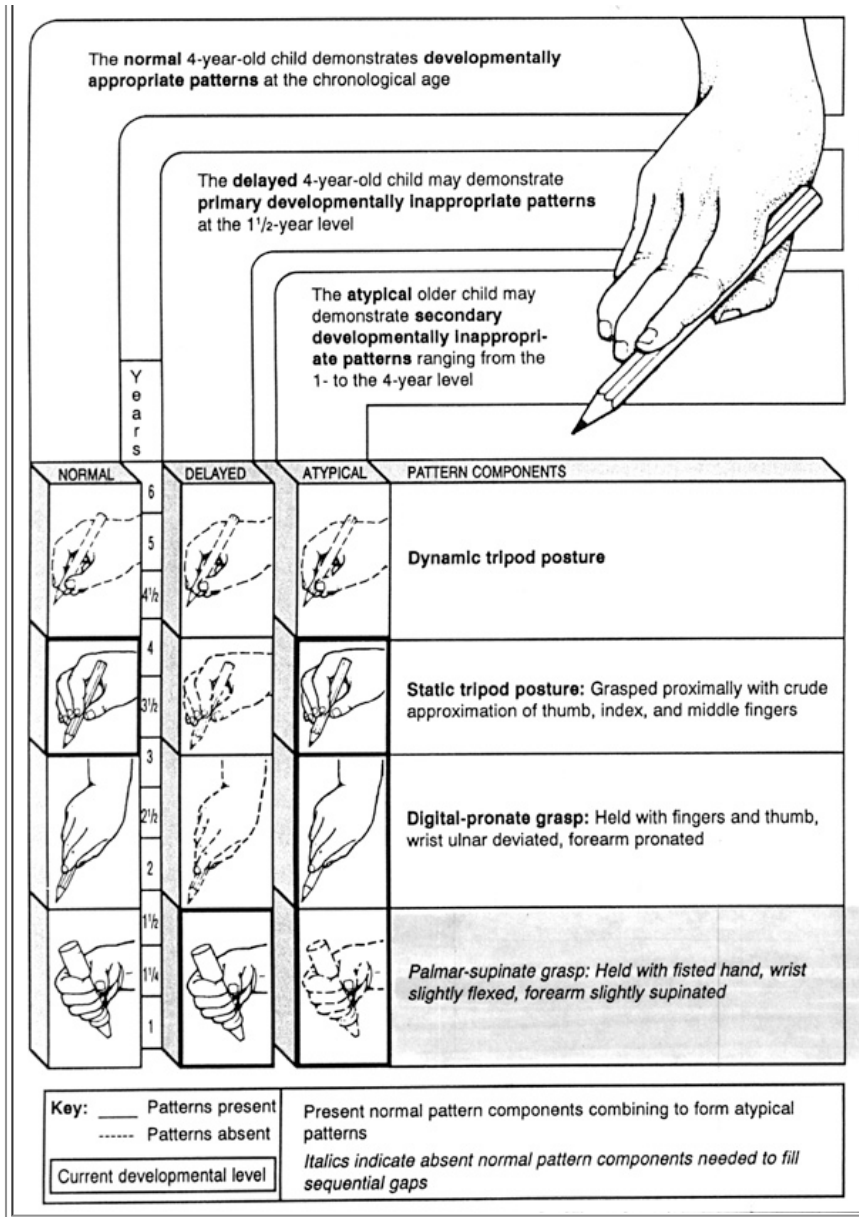
The **atypical** older child may demonstrate **secondary developmentally inappropriate patterns** ranging from the 6-month level to the 9-month level



**Scissors Grasp**  
**8-month Component**

**A Treatment Model for Crayon or Pencil Grasp**

**Treatment**



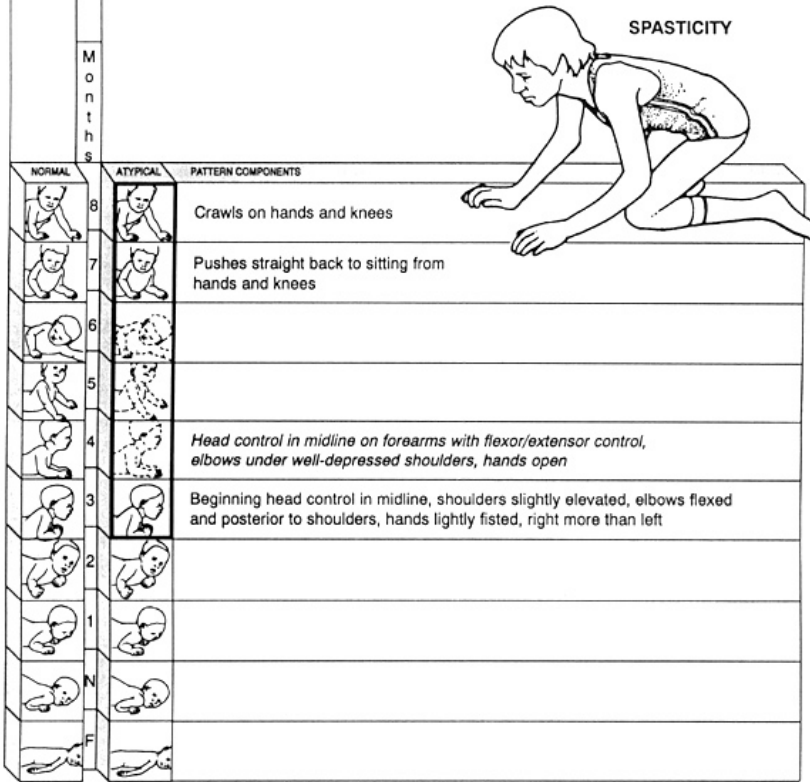
Palmar-Supinate Grasp  
 1-2 year Component

**A Comparison of Normal, Delayed, and Atypical Prehension Development:  
 Treatment Models for Spasticity, Athetosis, and Flaccidity in Childhood**



The **normal** 8-month infant demonstrates **developmentally appropriate patterns** at the chronological age.

The **atypical** older child may demonstrate certain **secondary developmentally inappropriate patterns** ranging from the fetal to the 8-month level.

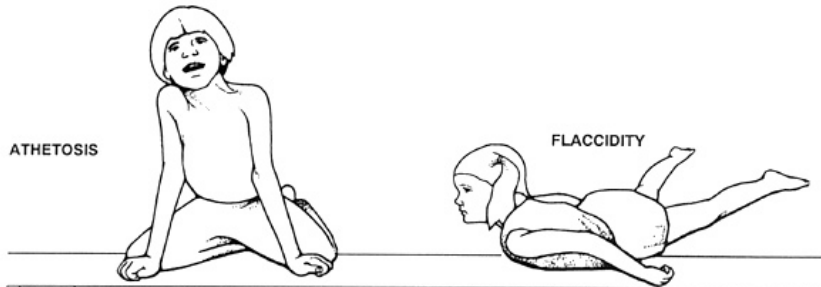


SPASTICITY



Joanne Age 14





ATYPICAL	PATTERN COMPONENTS	ATYPICAL	PATTERN COMPONENTS
5	Pushes up on extended arms, using STNR, neck extended, arms abducted and externally rotated	5	Rolls to supine with neck hyperextension
4		4	
3	Beginning head control in midline, shoulders slightly elevated, weight on forearms, elbows flexed and posterior to shoulders, hands lightly fisted	3	Beginning head control in midline, shoulders slightly elevated, arms adducted and internally rotated, hands lightly fisted
2	Shoulders elevated, lower than ears, right more than left	2	
1		1	
N	Asymmetrical neck extension; hands pronated, ulnar-deviated, and fisted; right thumb inside palm	N	Arms adducted and flexed under body
F		F	Hypotonia



Patrick Age 6

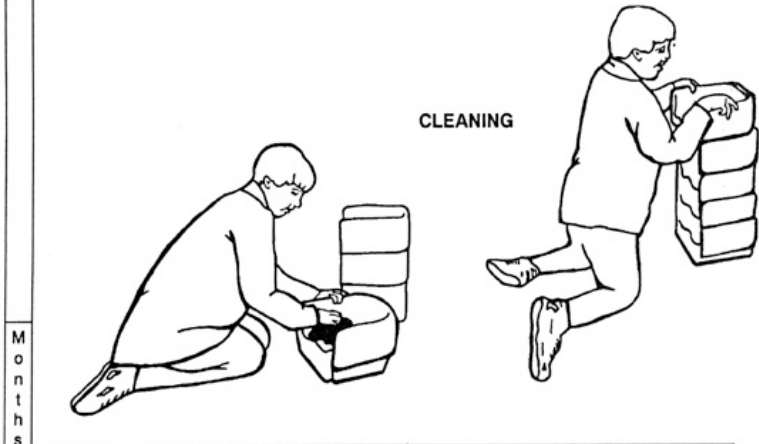


Kristy Age 4

**A Comparison of Normal, Delayed, and Atypical Prehension Development: Treatment Models for Function during Transitions to Adulthood**

The normal 8-month infant demonstrates **developmentally appropriate patterns** at the chronological age.

The older child or adult with atypical prehension may demonstrate certain **secondary developmentally inappropriate patterns** ranging from the 3-month to the 8-month level.



		M o n t h s	
NORMAL	ATYPICAL	PATTERN COMPONENTS	
		8	Stabilizes with hands to rotate from hands and knees to side-sitting
		7	Pushes straight back to sitting from hands and knees
		6	
		5	Wrists extended
		4	Shoulders well depressed
		3	Shoulders slightly elevated Wrists flexed



Joanne Age 24





ATYPICAL	PATTERN COMPONENTS	ATYPICAL	PATTERN COMPONENTS
8	Stabilizes with hands to rotate from hands and knees to side-sitting to the right	8	
7		7	Stable in sidelying Pushes up to side-sitting from sidelying
6		6	
5	Wrists extended	5	Arms abducted and externally rotated
4	Head in midline with flexor/extensor control, shoulders well depressed, Hands open, with arch, thumbs out	4	Head in midline with flexor/extensor control Pushes up on forearms, elbows directly under shoulders
3		3	Arms internally rotated



Patrick Age 16



Kristy Age 14

| [Home](#) | [Curriculum Vitae](#) | [All Topics](#) | [Video Descriptions](#) | [Continuing Education](#) | [FAQs](#) | [Free Downloads](#) | [Publications](#) | [Recommended Links](#) | [How to Order](#) |