

Introduction to Developmental Diagnosis

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Goals of Presentation

- Develop an understanding of the goals for developmental monitoring.
- Have a better appreciation of the major developmental disabilities and their associated deficits.
- Have a better appreciation of the clinical presentation of developmental disabilities in early childhood.

Outline of Presentation

- Case Presentations
- Goals of Developmental Monitoring
- Introduction to Developmental Disabilities
- Streams of Development

Outline of Presentation

- Developmental History
- Physical Examination
- Defining “Developmental Delay”
- Approaches to Diagnosis
- Basic Management Strategies

Goals for Developmental Monitoring

- Identification of developmental delays should not be the primary goal
- Developmental monitoring, including accurate histories and observations, should be directed at identifying infants and children with or at high risk for developmental disabilities, or other static or progressive disorders affecting development.

Developmental Disabilities

- Communication Disorders:
 - Developmental Language Disorders
- Intellectual Disability
- Autism
- Learning Disabilities
- Cerebral Palsy

Approaches to Developmental Diagnosis

Four Major Streams of Development

- **Language**
 - Verbal: Expressive and Receptive
 - Pragmatics:
- **Cognition (visual learning)**
- **Motor**
 - Gross and Fine Motor
- **Adaptive or Functional Skills**

Principles of Early Neurodevelopment

- Development is generally orderly and sequential.
- Diagnosis is largely dependent accurate developmental histories and observations.
- Developmental disabilities by and large present during infancy.

Developmental Diagnosis

- **History:**
 - Parent perceptions and concerns:
 - Risk factors: Family history, neonatal period, health history, behavior, school performance, social/environmental
 - “Developmental histories are notoriously inaccurate” Why?

Developmental Delay

- **Developmental Quotient:**

$$\frac{\text{Developmental Age}}{\text{Chronological Age}} \times 100 = \text{DQ}$$

- **Developmental Delay:**

DQ < 70 in any developmental stream

Nature of Developmental Delays

- Avoid reliance on determining developmental function at one point in time.
- A developmental history will confirm the following:
 1. Static Process
 2. Progressive Process

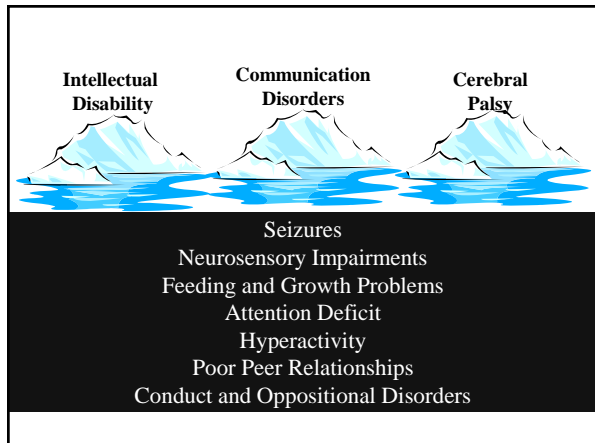
Developmental Dissociation

- Dissociation is manifested by a difference between the developmental rates of two streams of development, with one stream significantly more delayed.

Developmental Dissociation

Developmental Deviancy

- Manifested by nonsequential unevenness in the achievement of milestones within one or more streams of development.
- Examples:
 1. Child is reported to speaking short sentences and has a 30 word vocabulary.
 2. A child who pulls to stand before sitting.



Assessment Motor Development

Goals of Presentation

- Develop a better understanding of the risk factors for cerebral palsy
- Increase knowledge regarding normal motor milestones in the first 15 months of life.
- Appreciate the normal evolution of the neurological examination during the first year of life.

Goals of the Presentation

- Increase knowledge regarding the more common neurological findings found in young infants with motor disabilities including cerebral palsy and neuromuscular disorders.
- Develop effective strategies in identifying infants with motor disabilities.

Outline

- I. Focus: first 9-12 months
- II. History
 - A. Risk Factors
 - B. Static vs Progressive Presentation
 - C. Motor Milestones
 - D. Parents perceptions

Outline

- III. Physical Examination
 - A. Muscle tone and posture
 - B. Primitive Reflexes
 - C. Movement

Risk Factors for Cerebral Palsy

Although a number of well-recognized risk factors for cerebral palsy have been documented, most cases of cerebral palsy remain unexplainable.

Motor Delay

- Static
 1. Reduced rate of motor milestones
 2. Motor quotient less than 70
$$MQ = \frac{\text{Motor Age}}{\text{Chronologic Age}} \times 100$$

Motor Delay

- Progressive
 1. Loss of previously acquired motor milestones

Equilibrium in Prone

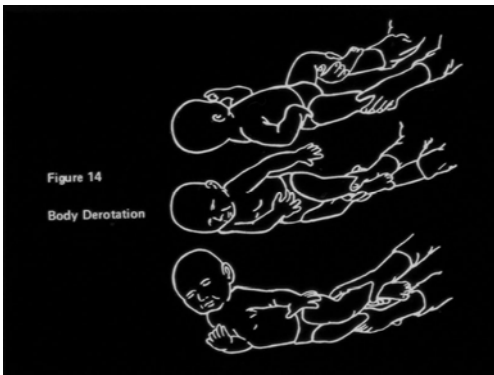
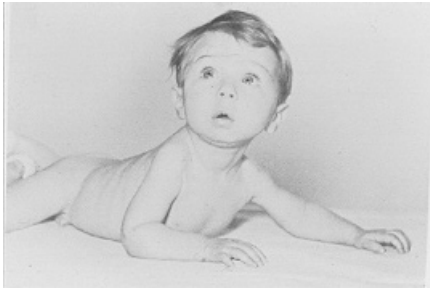
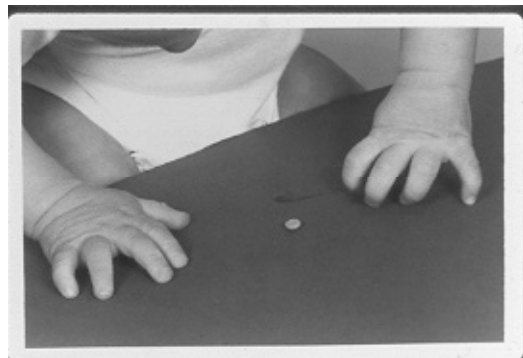
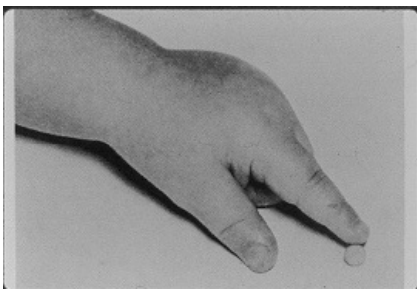
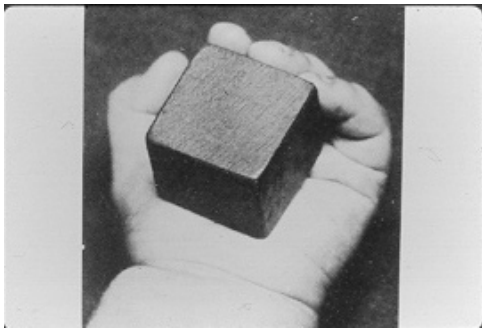
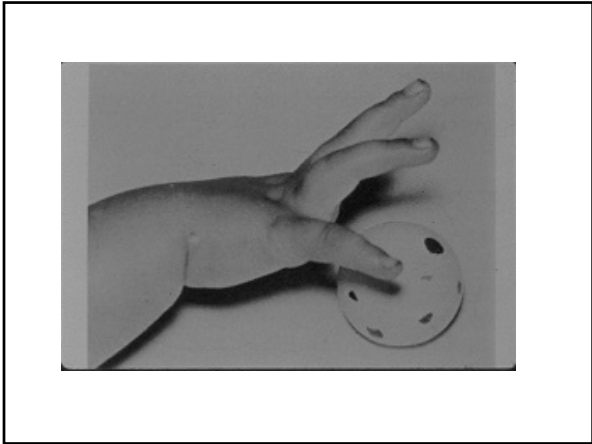


Table V. Mean Age of Gross Motor Attainment in Normal Children

Development of Prehension



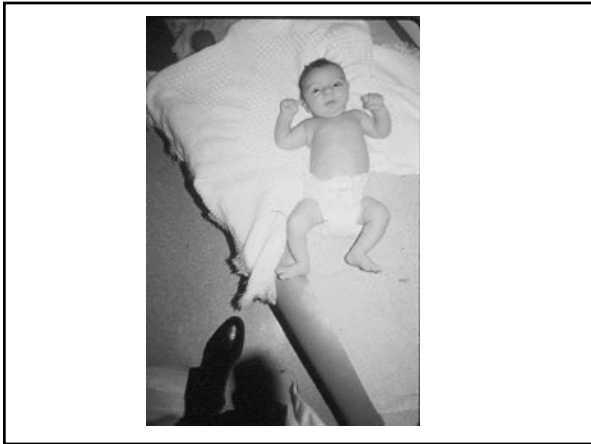
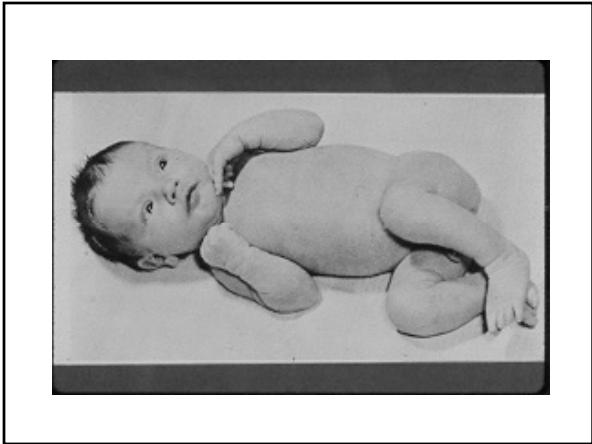


Passive Flexor Tone

- Resistance to passive extension of the extremity
- Appearance:
 1. Prenatal
Caudal to Cephalic appearance
 2. Postnatal
Cephalic to Caudal dissipation

Passive Extensor Tone

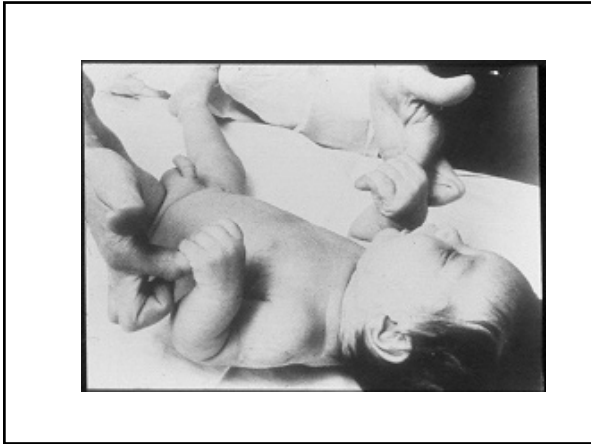
- Resistance to passive flexion of the extremity
- Consistent extensor tone is never normal
- Examination of elbows, knees and ankles





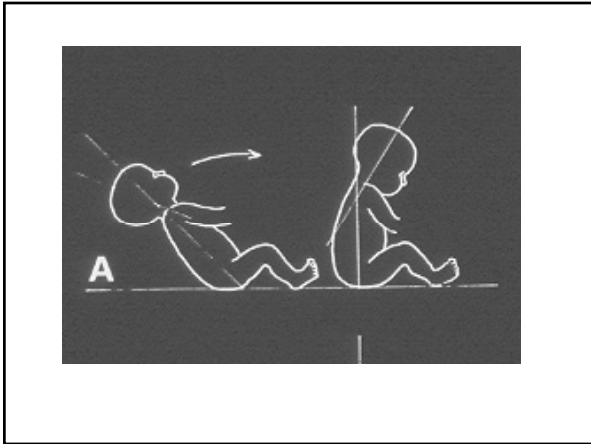
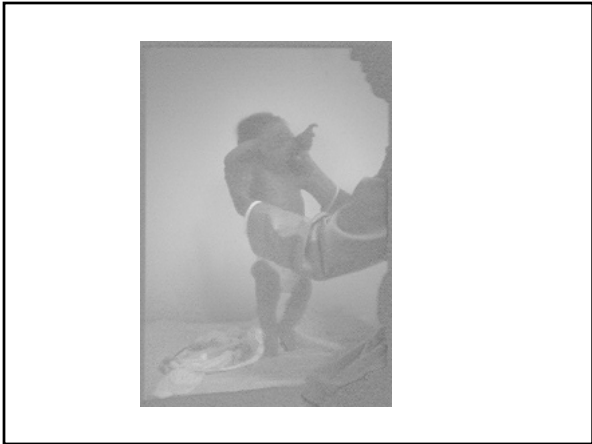
Normal Neuromotor Development
Cortical Superceding Subcortical Control
(Amiel-Tison)

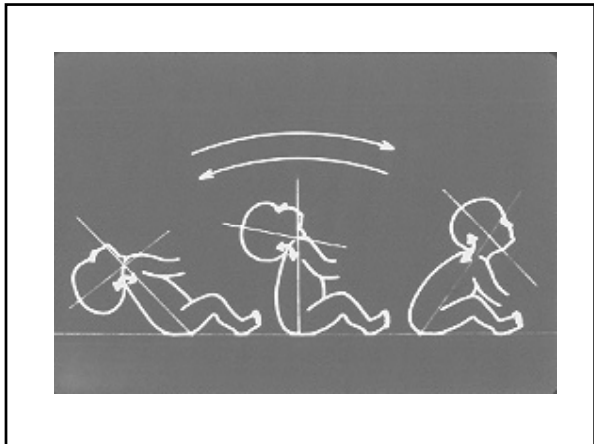
- Passive muscle tone
 1. Relaxation of flexor tone is first observed in upper limbs and later in lower limbs. Physiologic hypotonia by 9 months.
 2. Extensor tone of extremities not observed.



Truncal tone

- Prone suspension
- Axillary suspension
- Pull to sit

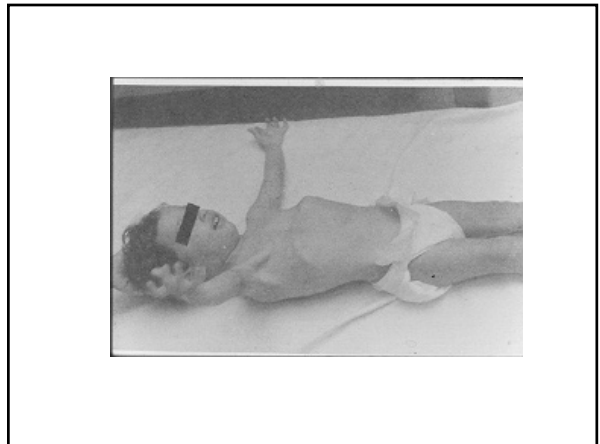


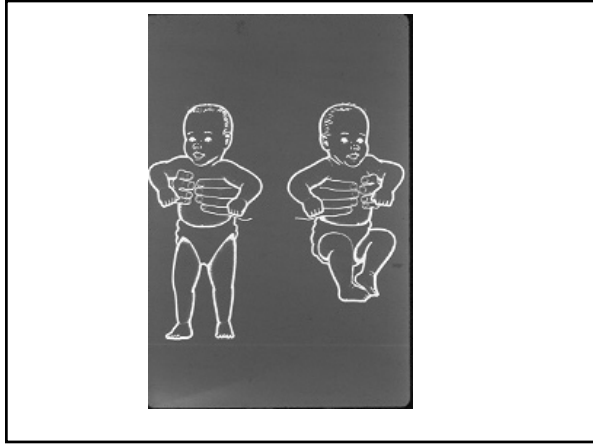
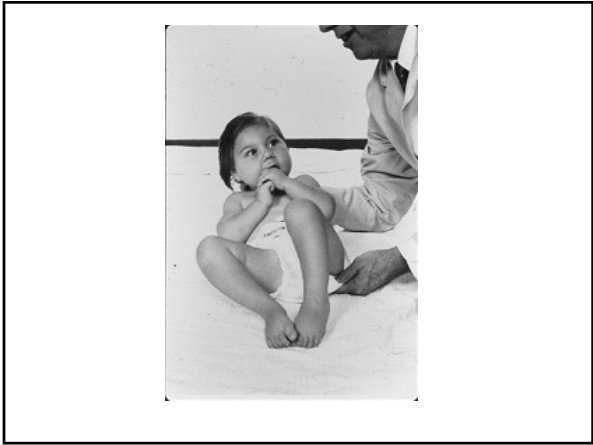
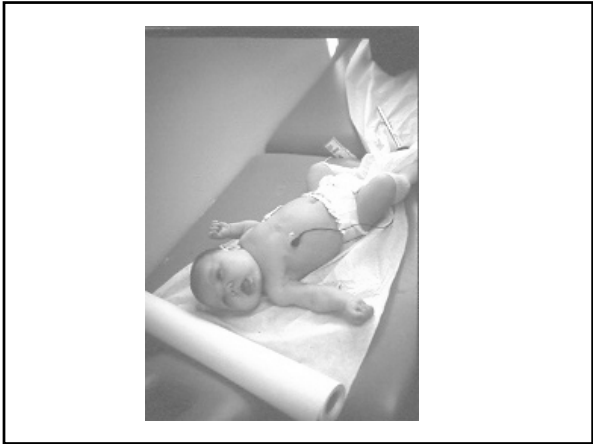


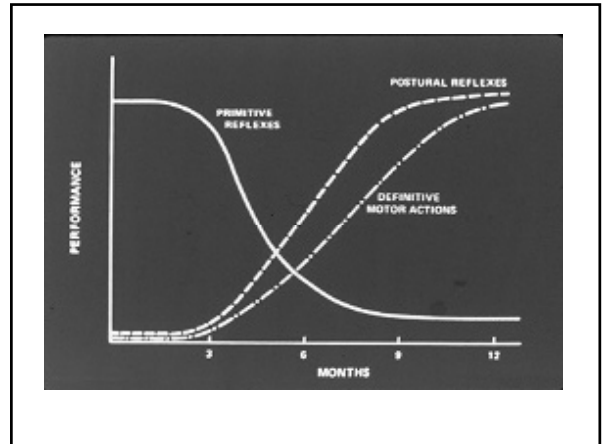
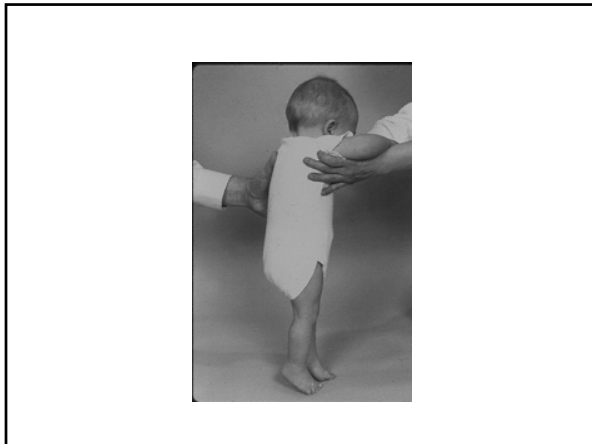
Primitive Reflexes

Brain stem mediated reflexes, that are predominately manifested during the first six months of life. These are elicited by positions of the head and neck in space.

1. Moro Reflex
2. Asymmetric Tonic Neck
3. Tonic Labyrinthine
4. Positive Support







Spontaneous Movements

- Quantitative

1. Normally, alert states accompanied by an abundance of extremity movements
2. *Red Flags*
Paucity of movements or asymmetries

Spontaneous Movements

- Qualitative

1. Normally, trunk and extremity movements are variable
2. *Red Flags*
 - Lack of independent extremity movements
 - Repetitive postures or movements
 - “Jerky” movements
 - Extensor postures
 - Persistent fisting at any age

