

Developmental Red Flags

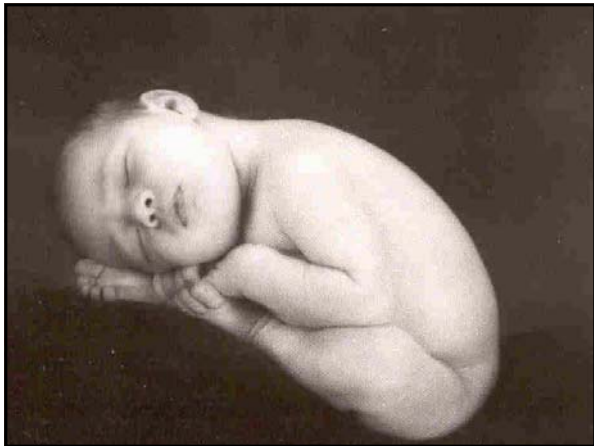
Beth Ellen Davis, MD, MPH
Developmental Pediatrics
UWLEND
11/14/11



OBJECTIVES

"The most common presentation of a developmental disability is failure to achieve age-appropriate developmental milestones."

- How common are developmental problems?*
- How does one approach developmental delay?*
- What are some "rules of thumb" for recognizing delay?*
- What are the developmental implications of common newborn findings?*





DEFINITIONS


- Delay vs. Deviance
- Surveillance vs. Screening
- Streams vs. Domains

 LOOK FOR PATTERNS!



Streams of Development

- Gross motor
- Fine motor
- Language
 - Expressive
 - Receptive
- Problem solving
- Social



Patterns in Development


	MOTOR	PS	RL/EL	SOCIAL
ID	V	D	D	D
CP	D	V-N	V-N	D
VI	D	D	N	D
HI	N	N	D	V-N
AUTISM	N	V-N	D	D

Prevalence of DD

Dx	per 1000	age (mo)	MD 1 st
GDD	50	24	30%
ID (mild MR)	25	39	60%
ID (mod/severe MR)	5	12	90%
Learning disability	100	69	12%
ADHD	90	59	45%
CP	3	12-14	99%
AUTISM	8	40	30%
Visual impairment	.5	55	60%
Hearing Impairment	1-3	39	40%

What's the problem?

- 16% of preschool children have developmental or behavioral problems.
- The Federal Law mandates early identification.
- <30% of MDs screen.

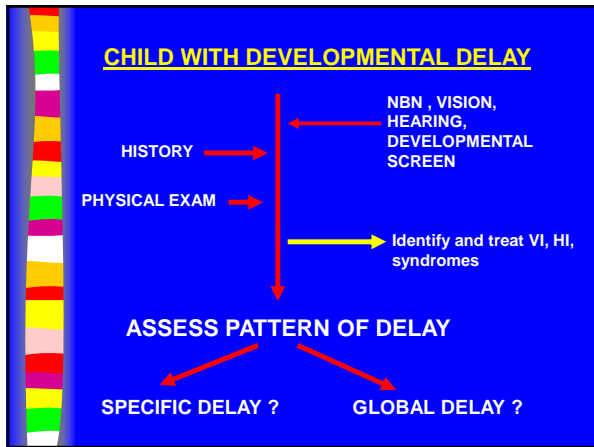


Use the parent!

Parent concern	PPV
Behavior-emotions	41%
Speech/language	55%
Social/self-help	NS
Fine motor	75%
School readiness	40%
Global concerns	80%

Ages for early diagnosis

0-12 mo.	1-2 yr.	2-3 yr.	3-4 yr.
ID, mod/sev.	ID, mod	ID, mild	ID, mild
VI/HI	HI	HI	
CP	CP	CP mild	
	Autism	Autism/LD	LD



RED FLAG

Any time there is a history or exam consistent with **LOSS of SKILLS (regression)**

THINK.....metabolic, genetics w/u, neuroimaging, seizures, hydrocephalus, toxin exposure, autism

Developmental Quotient

DQ = Developmental Age/ Chronologic age X 100

DQ <70	Delay
DQ 70-85	Monitor
DQ >85	Typical range

*Perform for each stream of development

Gross motor milestones

• Prone		• Crawl (1/3 don't!)	8-9 mo
Head up	1 mo	• Pull to stand	9 mo
Chest up	2 mo	• Cruise	9-10 mo
On elbows	3 mo	• Walk alone	12 mo
On hands	4 mo	• Run	15 mo
• Roll		• Jump in place	24 mo
Front to back	4-5 mo	• Pedal trike	30-36 mo
Back to front	5-6 mo	• Gallops	48 mo(4)
• Sit		• Skips	60 mo(5)
With support	5 mo	• Tandem	
Without support	6 mo	Forward	5 yr
		Backward	7-8 yr

RED FLAG



RED FLAGS

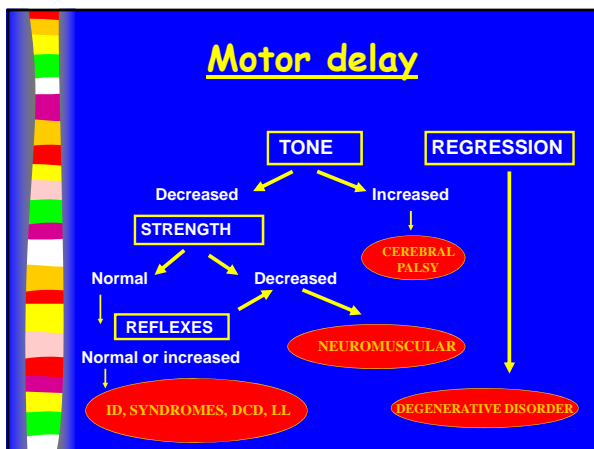


- Any boy not walking by 15 months should get a CPK to r/o MD
- The most common cause of delayed GM is global delay.

MD = muscular dystrophy



- 3/10,000 boys
- 30% have no Fam Hx
- Absent dystrophin
- Xp21.2
- CPK is >20x normal!
- DNA analysis of blood can make dx in 2/3's.



Motor delay: Evaluation

<ul style="list-style-type: none"> ● Central (CNS) <ul style="list-style-type: none"> – MRI – CHROMOSOMES – FRAGILE X – ? METABOLIC EVAL – ? TFT – Get PT or OT eval 	<ul style="list-style-type: none"> ● Neuromuscular <ul style="list-style-type: none"> – CPK – LFT'S – ESR – LACTATE/PYRUVATE – TFT – CARNITINE – EMG/NCV – MUSCLE BX
--	--

Definitions

- **Language**- a system of verbal, written, or gestured symbols used to communicate information or feelings.
 - Components: phonology, morphology, syntax, semantics, pragmatics
- **Speech**- The physical production of spoken language.
 - Components: articulation, phonology, voice quality, pitch, loudness, resonance, fluency, rate, rhythm

Identify early!

- 5-10% of all children have developmental language disorder (that is 2 / day for PCM)
- Language is the BEST predictor of later cognitive function
- Delayed language may be a marker of other developmental disorders
- Early intervention yields best outcomes

Normal Language Development

- Expressive: two phases

<ul style="list-style-type: none"> Social smile 5 wk Coos 6-8 wk Laughs 3-4 mo Rasberry 4-5 mo Squeals 5 mo Babbles 6 mo UNTIL 6-8 mo! 	➔	<ul style="list-style-type: none"> 1st word 11 mo Immature jargon 12 mo 4-6 words 15 mo 2 words 21 mo Pronouns indiscrim 2 y Tells stories 4 years, 100% intelligible
---	---	---

Normal Language Development

<ul style="list-style-type: none"> • Receptive – Infant Alerts to voice 1 mo Regards speaker 3 mo Listen then vocalizes 5 mo Enjoys gesture games 9 mo Orients to name 10 mo Understands "no" 11 mo Command, with gesture 12mo 	<ul style="list-style-type: none"> • Receptive – Toddler 1 step command without gesture 14 mo 1 body part 15 mo Fetches on command 16 mo Points to picture 18 mo 6 body parts 20 mo 2 step command 24 mo
--	---

Language delay

- Developmental Language Disorder 5-10%
- ID 3%
- Hearing Impairment .5-1%
- Autism .6-1%




RED FLAG




- All children with language delay should be referred for hearing assessment.

Infants who are deaf may have normal pre-linguistic expressive language until 6-9 months of age.



RED FLAG



- Normal Pattern is for RL>EL.
- Expressive language that significantly exceeds receptive language is deviant.

THINK:

1. AUTISM, with echolalia
2. Syndromes with “cocktail personalities”
3. Parent mis-interpretation



Red Flags of Autism Spectrum Disorders and Developmental Delays in the Second Year of Life



<p>ASD Red Flags</p> <ul style="list-style-type: none"> Lack of showing Lack of coordination of nonverbal communication Lack of sharing interest or enjoyment Repetitive movements with objects Lack of appropriate gaze Lack of response to name Lack of warm, joyful expressions Unusual prosody Repetitive movements or posturing of body 	<p>ASD & DD Red Flags</p> <ul style="list-style-type: none"> Lack of pointing Lack of playing with a variety of toys Lack of response to contextual cues Lack of communicative vocalizations with consonants
--	---

www.firstsigns.com

Joint Attention Skills*

	TYPICAL	ASD
8-10 months	Gaze monitoring	No eye contact
10-12 months	Following a point	Does not respond to request "oh look!"
12-14 months	PIP	Develops advanced self help skills
14-16 months	PDP	* Consistently absent
14-18 months	Show and tell	Often brings to parent to obtain repeated action

*Joint attention deficits appear to be specific to ASD and reliably differentiate children with ASD from other developmental disabilities.

RED FLAG

A BIFID UVULA is evidence of a submucous cleft in the palate and warrants evaluation if associated with recurrent OM, speech delay, or VPI.

CONSIDER VCFS (del 22q.11)




Problem solving

- Problem solving milestones are evidence of cognitive abilities, or intelligence, without the use of language.

...Patterns.....


- Normal PS=RL>EL...COMMON, often resolves
- Normal PS>RL>EL...less common, often LD
- Low PS, Low RL, Low EL = ID



Normal development

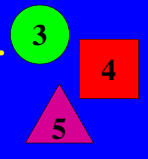
- Blocks
 - Regards 3 mo
 - Attains 6 mo
 - Takes 2nd 7-8 mo
 - Releases into cup 12 mo
 - Takes a 3rd 14 mo
 - Builds a tower of 2 15 months
 - Builds a tower of 4 18 months
 - Builds a tower of 6 24 months
 - Train 30 months





Normal development

- Pencil
 - Imitates scribble 15 mo
 - Scribbles spontaneously 18 mo
 - Imitates vertical line 24 mo
 - Imitates horizontal line 28 mo
 - Circle 3 yr
 - Square 4 yr
 - Triangle 5 yr
 - Goodenough-Harris DAP see HLH





RED FLAG

- Early Handedness


Children with handedness before age 15 months usually have an abnormally weak upper extremity on the other side.





"Global developmental delay"


- A significant delay in 2 or more streams
- NOT a diagnosis
- NOT regression or loss of skills
- Can't be used for services after age 6-9.



Intellectual Disabilities (Mental retardation)

- 2-3% of population
- Male 1.6 : Female 1
- 85% of ID is MILD category


Most common genetic cause: Down Syndrome
Most common inherited cause: Fragile X
Most common preventable cause: Fetal alcohol



MR =
ID =


Cognitive /Adaptive Disability

- Significantly sub-average general intellectual functioning (IQ <70-75)
- Limited adaptive functioning in at least 2 of 10 skill areas
- Onset before 18 years of age




Levels of ID (CAD)

- Mild (Intermittent Support) IQ~ 55-69
 - Vast majority 85%
 - More common in boys
- Moderate (Limited Support) IQ ~ 40-54
- Severe (Extensive Support) IQ~ 25-39
 - Rare .5%
 - Ratio of boys to girls is equal
 - Think about Rett Syndrome in girls
- Profound (Pervasive Support) IQ < 24



Intellectual Disability: Known causes

<ul style="list-style-type: none"> ■ <u>Prenatal (60-75%)</u> <ul style="list-style-type: none"> - CNS malformation - Chromosomal abnormality - Syndrome - Genetic - Toxins - Infection - Neurocutaneous syndrome - Malnutrition ■ <u>Perinatal (10%)</u> <ul style="list-style-type: none"> - Hypoxia - Neonatal seizures 	<ul style="list-style-type: none"> ■ <u>Postnatal (1-10%)</u> <ul style="list-style-type: none"> - CNS infection - Stroke/Hemorrhage - Trauma/Abuse - Hypoxia - Degenerative - Epileptic encephalopathy - Metabolic - Complications of prematurity
--	--



ID: The Search

*The more severe the ID,
the more likely to find etiology.*

- Chromosomes or CGH (40% + in SEVERE)
- DNA for Fragile X (2-6% +)
- ± Neuro-imaging (MRI study of choice)
 - IQ <50, micro/macrocephaly, abnormal neuro exam, seizures, loss of milestones
- ± Metabolic Studies

Head Circumference

- Rule of 3's and 9's

- Birth: 35 cm
- 3 mo: 40 cm
- 9 mo: 45 cm
- 3 yrs: 50 cm
- 9 yrs: 55 cm

Pits and tags



- 1/100 –common!
- ALL need Hearing
- Renal US if:
 - Other malformation
 - FHx of deafness, ear or kidney issue
 - Gestational DM

Single umbilical artery

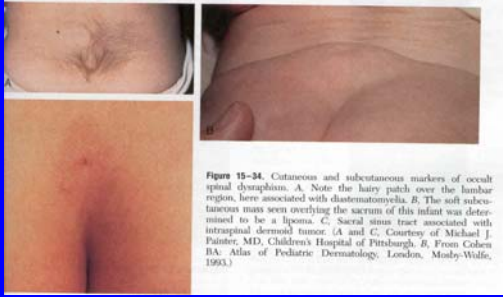
- 6/1000
- More common in twins
- If exam normal, and mother did not have oligo/polyhydramnios, **no further work up.**
- Exam should r/o GI, renal, cardiac and CNS findings



A single umbilical artery with velamentous insertion of the cord. Most infants with SUA who survive do not need an extensive workup.

AJ Schuman, *Contemporary Peds*, Dec, 1991

Sacral lesions



Sacral lesions



- **Dimple – need sacral neuro-imaging (US) if:**
 - > 5 mm in size
 - > 2 cm away from anus
 - Associated with any other back lesion
 - Hemangioma, hairy patch, tail, masses
- **All hemangiomas, hairy patches, masses, tails need US (36% +)**



"Find the ability in disability"
