NORMAL DEVELOPMENT REVIEW

FAMILY MEDICINE LECTURE SERIES

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CONFLICT OF INTEREST STATEMENT

- NO RELATIONSHIPS WITH COMMERCIAL INTERESTS

OBJECTIVES

- OVERVIEW OF NORMAL DEVELOPMENT
- REVIEW NORMAL VARIATION
- DISCUSS COMMON PRESENTING CONCERNS USING CASES

AREAS OF DEVELOPMENT

- GROSS MOTOR SKILLS
- FINE MOTOR SKILLS
- COGNITIVE SKILLS
- LANGUAGE
- SOCIAL-EMOTIONAL DEVELOPMENT

GENERAL PRINCIPLES

- DEVELOPMENT PROCEEDS CEPHALIC → CAUDAL
- SEQUENCE IS PREDICTABLE, WITH INDIVIDUAL VARIATION RELATED TO GENETICS, ENVIRONMENT, AND HEALTH
- MILESTONES GENERALLY REPRESENT THE 50TH PERCENTILE
- AREAS OF DEVELOPMENT ARE HIGHLY INTERDEPENDENT
- REGRESSION IS ALWAYS A RED FLAG

MOTOR DEVELOPMENT

GROSS MOTOR:

- WORKING TOWARDS INDEPENDENT, VOLITIONAL MOVEMENT
- MUST OVERCOME PRIMITIVE REFLEXES
- POSTURAL REACTIONS/PROTECTIVE REFLEXES DEVELOP SHORTLY AFTER BIRTH
- EQUILIBRIUM RESPONSES DEVELOP AS MOBILITY ACHIEVED

MOTOR DEVELOPMENT

POP QUIZ!

WHICH SKILL IS THE LEAST IMPORTANT?

a) ROLLING FRONT TO BACK

b) CRAWLING

c) TRANSITIONING FROM SUPINE TO SITTING

d) PULLING TO STAND

MOTOR DEVELOPMENT

FINE MOTOR:

- ARMS/HANDS FIRST ENGAGED IN BALANCE AND MOBILITY
- AS STABILITY ACHIEVED, HANDS FREE TO EXPLORE
- AS GRASP REFLEX DIMINISHES, GRASP PATTERNS DEVELOP AND MATURE
- MASTERY OF REACH/GRASP/RELEASE ALLOWS CHILDREN TO START USING OBJECTS AS TOOLS → FINE MOTOR BECOMES MORE CLOSELY ASSOCIATED WITH COGNITIVE/ADAPTIVE

MOTOR DEVELOPMENT

POP QUIZ!

WHAT IS THE THIRD AREA OF MOTOR DEVELOPMENT TO CONSIDER?

DEVELOPMENTAL MILESTONES

	Gross Motor	Fine motor-cognitive	Language	Social
4 mo	No head lag midline behaviour, rolls	Reaches for near objects	Vowel sounds	Aware, social smiles
6 mo	Sits	Transfers, bangs	Babbles	
9 mo	Crawls	Pincer grasp starts Object permanence	mama dada	Peek a boo, social games stranger reserve
1 year	Walks	Cause effect concepts, in-out	First 'words'	Finger feeds, cup listens stories, gestures
18 mo	'Runs' climbs	Stack blocks , scribbles	5 -10 words at least, vocab burst Understands up to 200 words	Representational play

DEVELOPMENTAL MILESTONES

	Gross motor	Fine motor-cognitive	Language	social
2 years	Walks stairs jumps	Copies lines, simple puzzles	Phrases and sentences	Independence Parallel play
3 years	Tricycle	Mature grasp crayon, copy circles,	Asks and answers questions ,speech 75% intelligible	Interactive play, imaginary play toilet trained
5 years	Skips	Print name, person with body, letters, counts	Relates events well, describes, tells stories, early reading	Ready for school independent for ADL

RED FLAGS

- 4 MONTHS: POOR HEAD CONTROL
- 9 MONTHS: NOT SITTING
- 18 MONTHS: NOT WALKING
- EARLY HAND DOMINANCE (PROMINENT PRIOR TO 12-18 MONTHS)

COGNITIVE/ADAPTIVE DEVELOPMENT

- "INTELLIGENCE"; PROBLEM-SOLVING; SELF-HELP SKILLS
- FOUNDATIONAL SKILLS INCLUDE MEMORY, ABSTRACT THINKING, ATTENTION, AND PROCESSING SPEED
- INFANTS ACTIVELY OBSERVE AND MODIFY THEIR ENVIRONMENT IN ORDER TO LEARN
- FUNDAMENTAL CONCEPTS:
  - OBJECT PERMANENCE
  - CAUSALITY
  - SYMBOLIC THINKING

COGNITIVE/ADAPTIVE DEVELOPMENT

POP QUIZ!

WHICH DEVELOPMENTAL DOMAIN BEST APPROXIMATES INTELLIGENCE?

a) FINE MOTOR

b) GROSS MOTOR

c) LANGUAGE

d) SOCIAL-EMOTIONAL

LANGUAGE DEVELOPMENT

- LANGUAGE AND SPEECH ARE NOT THE SAME
- RECEPTIVE ABILITIES PRECEDE EXPRESSIVE ABILITIES
- CONSIDER NONVERBAL COMMUNICATION SKILLS:
  - EYE CONTACT
  - GESTURES
  - FACIAL EXPRESSIONS
- EXPOSURE TO LANGUAGE IS HUGELY IMPORTANT- AND THIS MEANS FROM ACTUAL PEOPLE (NOT SCREENS)
- MOTIVATION CAN BE A BIG FACTOR (SOCIAL OR OTHERWISE)

LANGUAGE DEVELOPMENT

POP QUIZ!

WHICH OF THESE FACTORS CAN CAUSE LANGUAGE DELAY?

a) EXPOSURE TO MULTIPLE LANGUAGES IN THE HOME

b) HAVING AN OLDER SIBLING

c) HAVING A Y CHROMOSOME

d) HEARING IMPAIRMENT

RED FLAGS

- 2 MONTHS: NOT FIXING
- 4 MONTHS: NOT FOLLOWING
- 6 MONTHS: NOT TURNING TO SOUND/VOICE
- 9 MONTHS: NOT BABBLING (REPEATED CONSONANTS)
- 24 MONTHS: NO SINGLE WORDS

SOCIAL/EMOTIONAL DEVELOPMENT

- CHILDREN BORN WITH AN INHERENT DRIVE TO CONNECT AND SHARE WITH OTHERS
- AS INFANT REACTS AND PARENT RESPONDS, ATTACHMENT DEVELOPS
- JOINT ATTENTION IS THE QUINTESSENTIAL SKILL: INFANT SHARES AN EXPERIENCE AND RECOGNIZES THAT IT IS SHARED
- PLAY SKILLS PROCEED FROM EXPLORATION TO FUNCTIONAL PLAY TO SYMBOLIC PLAY; FROM SOLITARY PLAY TO PARALLEL PLAY TO COOPERATIVE PLAY
- CHILDREN BEGIN WITH JOY/ANGER/FEAR → WIDER RANGE OF EMOTIONS → ABILITY TO MASK AND MANIPULATE EMOTIONS

SOCIAL/EMOTIONAL DEVELOPMENT

POP QUIZ!

WHICH OF THESE IS AN EXAMPLE OF FUNCTIONAL PLAY?

a) OPENING AND CLOSING CUPBOARD DOORS

b) SORTING DINOSAURS BY SIZE

c) BANGING POTS TOGETHER TO MAKE NOISE

d) PUSHING A CAR

SOCIAL EMOTIONAL RED FLAGS

Age	Red flag
6 months	Lack of smiling or engagement
9 months	Lack of social vocalizations, facial imitations, expressions
12 months	Failure to respond to name Absent babbling Lack of gestures; waving, pointing
15 months	Lack of proto-declerative pointing or lack of single words
18 months	Lack of pretend play Lack of spoken language / gestures combinations
24 months	Lack of 2 word spontaneous meaningful phrases
At any age	Loss of previously acquired skills

NORMAL VARIATION-GENETICS

- GENETIC POTENTIAL
  - WHAT MATERIAL ARE YOU WORKING WITH?
- PHYSICAL CHARACTERISTICS
  - EG. SIZE
- INHERITED PATTERNS
  - EG. FAMILIAL LATE TALKING
- TEMPERAMENT
  - WILLINGNESS TO TAKE RISKS, FRUSTRATION TOLERANCE, ETC.

NORMAL VARIAITON-ENVIRONMENT

- STIMULATION
  - UP TO 32 MILLION WORD DIFFERENTIAL BY KINDERGARTEN DEPENDING ON SES
- EXPOSURE
  - LATER ROLLING SINCE BACK TO SLEEP CAMPAIGN
- CULTURE
  - SOME FAMILIES PREFER TO FEED AND DRESS THEIR CHILDREN
- PARENTAL STYLE
  - EG. EARLY VS LATER TOILET-TRAINING

NORMAL VARIATION-HEALTH

- CHRONIC ILLNESS
  - MULTIPLE HOSPITALIZATIONS, POOR SLEEP
- SENSORY IMPAIRMENTS
- EPILEPSY
- MEDICATIONS
- NUTRITION
  - IRON DEFICIENCY, LEAD POISONING
- MENTAL HEALTH
  - ADHD, ANXIETY

DEVELOPMENTAL SCREENING

- INDICATED WHENEVER A PROBLEM IS IDENTIFIED DURING DEVELOPMENTAL SURVEILLANCE OR WHEN CONCERNS ARE RAISED BY CAREGIVERS, OR CHILD HEALTH PROFESSIONALS.
- STANDARDIZED ASSESSMENTS OF CHILDREN'S DEVELOPMENTAL STATUS ARE MORE ACCURATE THAN CLINICAL IMPRESSIONS.
- ONTARIO HAS ENHANCED 18 MO VISIT TO INCLUDE DEVELOPMENTAL SCREEN.
- CPS ENDORSES MORE SURVEILLANCE MODEL
- AAP RECOMMENDS ADMINISTRATION OF STANDARDIZED SCREENING TOOLS AT 9, 18, 24 OR 30 MONTHS TO ENHANCE THE PRECISION OF DEVELOPMENTAL SURVEILLANCE.

- AGES AND STAGES QUESTIONNAIRE – ASQ-3
  - WWW.AGESANDSTAGES.COM
  - COMPREHENSIVE DEVELOPMENTAL SCREEN
  - COMMUNICATION, GROSS MOTOR, FINE MOTOR, PROBLEM SOLVING, PERSONAL SOCIAL
  - AGES 1-66 MONTHS
  - GOOD VALIDITY AND RELIABILITY; TAKES LONGER TO COMPLETE
  - USED IN MANY AREAS BY PHN

- M-CHAT-R/F
  - WWW.MCHATSCREEN.COM
  - CHILDREN 16-30 MONTHS
  - PRIMARY GOAL IS TO MAXIMIZE SENSITIVITY, DETECT AS MANY CASES OF ASD AS POSSIBLE, SO THERE ARE A NUMBER OF FALSE POSITIVES
  - NOT ALL CHILDREN WITH POSITIVE SCORES HAVE ASD
  - FOLLOW UP QUESTIONS TO DECREASE FALSE POSITIVES

THE DEVELOPMENTAL HISTORY

- GET A SENSE OF WHERE THEY ARE CURRENTLY IN THEIR DOMAINS
  - IF THERE ARE CONCERNS THEN FIND OUT ABOUT EARLIER MILESTONES
- FIND OUT IF ANY SIGNIFICANT CONCERNS WITH DEVELOPMENT OR BEHAVIOUR
- MAKE APPROPRIATE REFERRALS (CDC, THERAPY SERVICES, SW)
- IF OLDER, FIND OUT HOW SCHOOL IS GOING/H.E.A.D.S.S.

COMMON CONCERNS

CASE 1: LANGUAGE DELAY

- NEVAEH IS A 2 YEAR OLD GIRL WHO IS BROUGHT IN BECAUSE SHE IS NONVERBAL. HER MOM DOESN'T HAVE ANY OTHER CONCERNS, AND THINKS SHE UNDERSTANDS EVERYTHING.

CASE 1: LANGUAGE DELAY

- WHAT DO WE NEED TO KNOW?
- WHAT DO WE NEED TO ASSESS?
- WHAT CAN WE RECOMMEND?

CASE 2: LATE WALKING

- GEORGE IS A 20-MONTH-OLD BOY WHO IS BROUGHT IN BECAUSE HE IS NOT YET WALKING. HIS GROSS MOTOR MILESTONES HAVE ALWAYS BEEN A BIT BEHIND, AND HE ONLY SAYS “MAMA”.

CASE 2: LATE WALKING

- WHAT DO WE NEED TO KNOW?
- WHAT DO WE NEED TO ASSESS?
- WHAT CAN WE RECOMMEND?

CASE 3: OPPOSITIONAL BEHAVIOUR

- SILAS IS A 4 YEAR OLD BOY WHO IS BROUGHT IN WITH TANTRUMS, AGGRESSION, AND NOT FOLLOWING INSTRUCTIONS. HE DOESN'T GET ALONG WELL WITH OTHER CHILDREN AT DAYCARE AND PREFERS TO PLAY ON HIS OWN.

CASE 3: OPPOSITIONAL BEHAVIOUR

- WHAT DO WE NEED TO KNOW?
- WHAT DO WE NEED TO ASSESS?
- WHAT CAN WE RECOMMEND?

- YOU ARE SEEING A 6 MO OLD BOY FOR A HEALTH SUPERVISION VISIT. HE IS BREAST FED AND IS HEALTHY. HIS GROWTH PARAMETERS ARE AT THE 25%. ON PE HE BABBLES, REACHES FOR THE STETHOSCOPE, AND PULLS TO SIT WITHOUT HEAD LAG. OF THE FOLLOWING HE CAN MOST LIKELY ALSO:
  - A. FINGER FEED HIMSELF
  - B. IMITATE SOUNDS
  - C. PULL TO STAND
  - D. TRANSFER OBJECTS FROM HAND TO HAND
  - E. USE AS SCISSOR GRASP TO OBTAIN A PIECE OF CEREAL

A three-year-old child is brought for a well-child visit. The family speaks French and some English. The child is in a bilingual daycare. The parent lists speech as a developmental concern. The child can walk up steps with alternating feet, draws a circle, but not a person, uses 2 word phrases, shares toys and plays with other toddlers at the day care. She is not fully toilet-trained and does not follow a 2-step command. What is the best assessment of this child's development for age?

a. She has a cognitive delay
b. She has a language delay
c. She has an expected speech delay from learning 2 languages
d. She is developmentally appropriate for age
e. She is globally developmentally delayed

- WHEN YOU ENTER THE ROOM TO PERFORM A ROUTINE WELL CHILD VISIT A FEMALE CHILD IS SITTING ON HER MOTHER'S LAP. SHE EXHIBITS MILD ANXIETY AND LOOKS AT HER MOM AS YOU APPROACH. AFTER A FEW MINUTES OF CONVERSATION WITH THE CHILD'S MOTHER, YOU ENGAGE THE CHILD IN A GAME OF PEEK-A-BOO. BY REPORT THE CHILD IS ABLE TO PULL TO STAND AND HAD STARTED CRUISING AROUND THE FURNITURE BUT IS NOT WALKING WITH HER HANDS HELD. YOU WITNESS HER PICK UP A SMALL OBJECT WITH A 3 FINGER GRASP AND TRANSFER THE OBJECT BETWEEN HER HANDS. SHE DROPS THE OBJECT AND LOOKS FOR IT BUT DOES NOT POINT AT IT. BY REPORT SHE SAYS "MAMA" NONSPECIFICALLY. THESE MILESTONES ARE MOST TYPICAL OF A
- A. 6 MONTHS
- B. 7MONTHS
- C. 9 MONTHS
- D. 11 MONTHS
- E. 12 MONTHS

REFERENCES

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- WWW.AGESANDSTAGES.COM
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