



## PAEDIATRIC NEURAL MILESTONES

### DR KAREN SINGH

a neurological kids guide to help raise a happier,  
healthier and holier family.

*nurture. inspire. grow.*

# 0 – 6 MONTHS

## SENSORY PROCESSING

- Recognizes scent of mother's breast milk
- Hearing is mature
- Tracks objects with eyes
- Looks at own hands
- Responds to sounds and voice
- Reaches for nearby objects
- Actively coordinates suck, swallow, breath sequence, tongue is cupped, forward rhythmical movements of the tongue, and jaw consistently moves up and down in a coordinated pattern
- Sleeps 4-10 hour intervals
- Cries to communicate hunger, fear, discomfort

## FINE MOTOR

- Reflexive grasp (at birth)
- Global ineffective reach for objects (3 months)
- Voluntary grasp (3 months)
- 2 handed palmar grasp (3 months)
- 1 handed palmar grasp (5 months)
- Controlled reach (6 months)

## GROSS MOTOR

- Rolls over front to back and back to front
- Sits with support and then independently

# 0 – 6 MONTHS

## SOCIAL DEVELOPMENT

- Recognizes scent of mother's breast milk
- Hearing is mature
- Tracks objects with eyes
- Looks at own hands
- Responds to sounds and voice
- Reaches for nearby objects
- Actively coordinates suck, swallow, breath sequence, tongue is cupped, forward rhythmical movements of the tongue, and jaw consistently moves up and down in a coordinated pattern
- Sleeps 4-10 hour intervals
- Cries to communicate hunger, fear, discomfort

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulty with breastfeeding
- May have difficulties settling to sleep
- May cry often
- Poor muscle development and control
- Delayed ability to play independently
- Delayed sensory development due to delayed interaction with toys and other sensory objects
- Poor muscle development for locomotion
- Delayed ability to play independently
- May lead to poor muscle development
- May lead to a delayed ability to play independently
- May lead to delayed sensory development due to delayed interaction with toys and other sensory objects
- May lead to poor emotional development (e.g. may cry easily)
- Poor muscle development for locomotion
- Delayed ability to play independently
- May lead to poor muscle development
- May lead to a delayed ability to play independently
- May lead to delayed sensory development due to delayed interaction with toys and other sensory objects
- May lead to poor emotional development (e.g. may cry easily)

# 6 – 12 MONTHS

## SENSORY PROCESSING

- Plays 2-3 minutes with a single toy
- Imitates gestures
- Uses tongue to move food around mouth
- Opens mouth to be fed
- Sleeps 10-12 hours with only 1 awakening
- Tolerates a range of different textured foods
- Drinks from a cup

## FINE MOTOR

- Reaches, grasps, puts object in mouth
- Controlled release of objects
- Static Pincer grasp (thumb and one finger)
- Picks things up with pincer grasp (thumb and one finger)
- Transfers objects from one hand to another
- Drops and picks up toys

## GROSS MOTOR

- Crawls forwards on belly
- Assumes a seated position unaided
- Creeps on hands and knees
- Transitions into different positions: sitting, all fours, lying on tummy
- Pulls self to stand
- Walks while holding onto furniture
- Takes 2-3 steps without support
- Rolls a ball in imitation of an adult

# 6 – 12 MONTHS

## SOCIAL DEVELOPMENT

- Plays peek-a-boo
- Participates in clapping when prompted
- Lifts arms to parent
- Responds to facial expressions
- Extends toys to others
- Manipulates and explores objects
- Imitates an adult's actions
- Places doll with head upright and vertical to the ground
- Imaginative play actions are absent or random

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulty tolerating different textured foods
- May have difficulties settling and may wake often during the night
- May have difficulties socialising with parents and joint attention
- May struggle to copy and learn from others due to poor understanding and attention
- Poor development of hand and finger strength
- Poor manipulation of objects resulting in delayed play skills
- Delayed sensory development due to lack of sensory play experiences
- Delayed sensory development due to decreased ability to explore the environment
- Poor muscle development
- Delayed play skills
- May lead to delayed sensory development due to lack of sensory play experiences
- May lead to delayed fine motor skills due to lack of practice manipulating toys and objects
- May have difficulties socialising with parents and joint attention
- May struggle to copy and learn from others due to poor understanding and attention

# 1 – 2 YEARS

## SENSORY PROCESSING

- Bothered by soiled nappy
- Distinguishes between edible and inedible objects (18 months)
- Understands common dangers of hot objects, stairs, glass
- Enjoys messy play
- Reacts to extremes in temperature
- Copies sounds that you make
- Looks for an object he/she watched fall out of sight (such as a spoon that fell under the table)
- Follow simple 1 step instructions
- Solves problems with trial and error

## FINE MOTOR

- Builds tower of three small blocks
- Puts four rings on stick
- Places five pegs in pegboard
- Turns pages two or three of a book at a time
- Scribbles
- Turns knobs
- Paints with whole arm movement, shifts hands, makes strokes
- Self-feeds with minimal assistance
- Able to use signing to communicate
- Brings spoon to mouth
- Holds and drinks from cup independently

## GROSS MOTOR

- Sits, crawls, walks
- Still has wide gait but walking/running is less clumsy
- Pushes against a ball (does not actually kick it)
- Walks smoothly and turns corners
- Begins running
- Is able to pull or carry a toy while walking
- Climbs onto/down from furniture without assistance
- Walks up and down steps with support
- Picks up toys from the floor without falling over

# 1 – 2 YEARS

## SOCIAL DEVELOPMENT

- Has a strong sense of ownership
- May begin cooperative play
- Treats doll or teddy as if it is alive
- Plays alongside others but will not play together with them
- Begins to use symbols in their play such as a stick becoming a sword
- Play themes reflect less frequently experienced life events (e.g. visiting the doctor)
- Play actions are detailed and logical with “No”
- Uses or plans story-line
- Has an awareness of a parent’s approval or disapproval of their actions
- Will express emotions
- Will verbalise their desires/feelings (e.g. “I want a drink”)
- Begins to obey and respect simple rules

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulties socialising with parents and joint attention
- May struggle to copy and learn from others due to poor understanding and attention
- May have delayed play skills (e.g. show little interest in toys)
- May have difficulty tolerating different textured foods
- May have difficulties settling and may wake often during the night
- Poor development of hand and finger strength
- Delayed independent play skills
- Delayed development of self-care skills (such as eating)
- Delayed manipulation skills
- Delayed play skills
- Difficulty interacting with the environment due to delayed ability to mobilise effectively
- Poor muscle development
- Poor muscle development for running and jumping
- Delayed ability to play independently and interact with the environment
- Decreased ability to interact socially
- May lead to delayed fine motor skills due to lack of practice manipulating toys and objects
- May have difficulties socialising with parents and joint attention
- May struggle to copy and learn from others due to poor understanding and attention

# 2 – 3 YEARS

## SENSORY PROCESSING

- Uses toilet with assistance and has daytime control
- Sits to look at books independently
- Pays attention for 3 minutes
- Begins to be able to take turns
- Explores surroundings
- Points to 5-6 parts of a doll when asked
- Matches circles and squares

## FINE MOTOR

- Strings four large beads
- Turns single pages of a book
- Snips with scissors
- Holds crayon with thumb and fingers (not fist)
- Uses one hand consistently in most activities
- Imitates circular, vertical, and horizontal strokes
- Paints with some wrist action, makes dots, lines, circular strokes
- Rolls, pounds, squeezes, and pulls playdough
- Eats without assistance

## GROSS MOTOR

- Imitates standing on one foot
- Imitates simple bilateral movements of limbs (e.g. arms up together)
- Climbs jungle gym and ladders
- Pedals a tricycle
- Walks up/down stairs alternating feet
- Jumps in place with two feet together
- Able to walk on tiptoes
- Catches using body



# 2 – 3 YEARS

## SOCIAL DEVELOPMENT

- Plays alongside others but will not play together with them
- Begins to use symbols in their play such as a stick becoming a sword
- Play themes reflect less frequently experienced life events (e.g. visiting the doctor)
- Play actions are detailed and logical with “No”
- Uses or plans story-line
- Has an awareness of a parent’s approval or disapproval of their actions
- Will express emotions
- Will verbalise their desires/feelings (e.g. “I want a drink”)
- Begins to obey and respect simple rules

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have trouble socialising with peers and joint attention
- May struggle to copy and learn from others due to poor understanding and attention
- May have difficulties following instructions at home/child care
- May demonstrate delayed play skills
- May demonstrate difficulties with toilet training
- May have difficulty tolerating different textured foods (e.g. picky eater)
- Delayed self-care skills (such as eating)
- Delayed pre-writing skill development
- Delayed manipulation of small objects such as toys, pencils and scissors
- Frustration when manipulating small toys and objects
- Decreased opportunities for social interaction
- Poor development of body awareness and movement planning skills
- Difficulties using playground equipment
- May have difficulties socialising with peers and joint attention
- May struggle to copy and learn from others due to poor understanding and attention
- May lead to delayed fine motor skills due to lack of practice manipulating toys and objects
- May lead to delayed manipulation of small objects such as toys, pencils and scissors
- May result in frustration when manipulating small toys and objects

# 3 – 4 YEARS

## SENSORY PROCESSING

- Can count 1-5
- Knows most colours
- Can differentiate between real and pretend world
- Takes turns
- Able to completely clothe self, only requiring assistance with laces, buttons, and other fasteners in awkward places
- Feeds self without difficulty
- Social encounters are acted out through play activities

## FINE MOTOR

- Builds tower of nine small blocks
- Copies circle
- Imitates cross
- Manipulates clay material (rolls balls, makes snakes, cookies)
- Uses non-dominant hand to assist and stabilise the use of objects
- Snips paper using scissors

## GROSS MOTOR

- Stands on one foot for up to 5 seconds
- Kicks a ball forwards
- Throws a ball overarm
- Catches a ball that has been bounced
- Runs around obstacles
- Able to walk on a line
- Able to hop on one t
- Jumps over an object and lands with both feet together
- Difficulties or lack of confidence interacting with other children in active environments (e.g. play cafes, playgrounds)
- Lack of confidence in movement based activities
- Difficulties using playground equipment
- Difficulties or lack of confidence interacting with other children in active environments (e.g. play cafes, playgrounds)

# 3 – 4 YEARS

## SOCIAL DEVELOPMENT

- Plays with mechanical toys
- Takes turns with other children
- Plays with 2 or 3 children in a group
- Play themes expand beyond personal experience (e.g. fireman rescuing people)
- Talks about their feelings
- Feels shame when caught doing the wrong thing

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulties socialising with peers
- May struggle to copy and learn from others due to poor understanding and attention
- May have difficulties following instructions at home, childcare, kindergarten, pre-school
- May have difficulties expressing wants, needs, thoughts and ideas
- May have difficulty tolerating different textured foods (e.g. picky eater)
- Delayed pre-writing skill development
- Frustration and/or avoidance of pencil based tasks
- Poor pencil grasp and pencil control
- Poor self-care skills (such as eating)
- Delayed drawing skills
- May have difficulties socialising with peers
- May struggle to copy and learn from others due to poor understanding and attention
- May have difficulties expressing wants, needs, thoughts and ideas
- May display frustration when manipulating small toys and objects

# 4 – 5 YEARS

## SENSORY PROCESSING

- Can count 1-10
- Knows shapes
- Develops friendships
- Expresses emotions
- Able to follow rules
- Able to sit and pay attention (e.g. mat time)

## FINE MOTOR

- Cuts on line continuously
- Copies cross
- Copies square
- Writes name
- Writes numbers 1-5
- Copies letters
- Handedness is well established
- Dresses and undresses independently

## GROSS MOTOR

- Able to walk upstairs while holding an object
- Walks backward toe-heel
- Jumps forward 10 times without falling
- Skips forwards after demonstration
- Hangs from a bar for at least 5 seconds
- Steps forward with leg on same side as throwing arm when throwing a ball
- Catches a small ball using hands only

# 4 – 5 YEARS

## SOCIAL DEVELOPMENT

- Begins taking turns and negotiating
- Plays together with shared aims of play with others
- Usually prefers playing with other children than playing by themselves
- Plays imaginatively (e.g. playing in the home-corner, dressing up, cooking)
- Enjoys playing games with simple rules (e.g. hide and seek)
- May change the rules of a game as the activity progresses

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulties socialising
- May struggle to copy and learn from others due to poor understanding and attention
- May have difficulties following instructions at home or kindergarten
- May have difficulties expressing wants, needs, thoughts and ideas
- May have difficulties sitting still
- May have difficulty tolerating different textured foods (e.g. picky eater)
- Difficulties holding and manipulating a pencil
- Difficulties learning to write name and other letters of the alphabet
- Dependence on caregivers for everyday activities such as dressing
- Frustration and/or avoidance of pencil based tasks

# 5 – 6 YEARS

## SENSORY PROCESSING

- 20/20 vision
- Able to write numbers and letters
- Begins to be able to write simple sentences
- Begins to recognise others perspectives
- Knows left and right
- Begins to reason and argue; uses words like why and because
- Can categorize objects: "These are toys; These are books"
- Understand concepts like yesterday, today, and tomorrow
- Can copy complex shapes, such as a diamond
- Should be sounding out simple words like "hang", "neat", "jump" and "sank"
- Can sit at a desk , follow teacher instructions, and independently do simple in-class assignments

## FINE MOTOR

- Cuts out simple shapes
- Copies triangle
- Colours within lines
- Uses a 3 fingered grasp of pencil and uses fingers to generate movement
- Pastes and glues appropriately
- Can draw basic pictures

## GROSS MOTOR

- Runs lightly on toes
- Able to walk on a balance beam
- Able to skip using a skipping rope

# 5 – 6 YEARS

## SOCIAL DEVELOPMENT

- Play themes include themes never personally experienced (e.g. going to space)
- Plays and negotiates with others during play
- Play is well organised

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulties socialising
- May have poor attention and concentration
- May have difficulties following instructions at home, school
- May have difficulties retelling events
- May have difficulties following routines
- May have difficulties expressing thoughts and ideas verbally and in written form
- May be easily distracted and have difficulty sitting still
- May have difficulty tolerating different textured foods (e.g. picky eater)
- Difficulties learning to form letters and numbers correctly
- Poor handwriting
- Difficulties demonstrating academic ability on paper
- Fatigue during pencil based tasks
- Frustration and/or avoidance of pencil based tasks
- May result in poor self-esteem when comparing self to peers
- Lack of confidence in movement based activities
- Difficulties participating in sporting activities
- Difficulties playing with moving toys such as bikes and scooters
- May have difficulties socialising
- May have difficulties retelling events
- May have difficulties following routines
- May have difficulties expressing thoughts and ideas verbally and in written form
- May lead to poor self-esteem due to difficulties interacting with other children

# 6 – 7 YEARS

## SENSORY PROCESSING

- Forms numbers and letters correctly
- Recognises others perspective
- Develops a longer attention span
- Are willing to take on more responsibility (i.e. chores)
- Understands fractions and the concept of space
- Understands money
- Can tell time
- Can name months and days of the week in order
- Enjoys reading a book on their own

## FINE MOTOR

- Forms most letters and numbers correctly
- Writes consistently on the lines
- Demonstrates controlled pencil movement
- Good endurance for writing
- Can build Lego, K'nex and other blocks independently
- Ties shoelaces independently

## GROSS MOTOR

- Can cover 2 metres when hopping
- Demonstrates mature throwing and catching patterns
- Mature (refined) jumping skills



# 6 – 7 YEARS

## SOCIAL DEVELOPMENT

- Enjoys playing in small groups and making up their own games with rules
- Enjoys playing co-operative games but has difficulties coping with losing
- Likes to play with other children of their own gender
- Enjoys using and understanding rules in play

## IMPLICATIONS IF MILESTONES NOT ACHIEVED

- May have difficulties socialising
- May have poor attention and concentration
- May have difficulties following instructions at home, school
- May have difficulties retelling events
- May have difficulties expressing thoughts and ideas verbally and in written form
- May have difficulties responding appropriately to questions
- May have difficulty tolerating different textured foods (e.g. picky eater)
- Difficulties getting ideas down on paper
- Experiences fatigue during handwriting tasks
- Difficulty keeping up in class due to slow handwriting speed
- Poor legibility of handwriting
- May impact on self-esteem when comparing work to peers
- Possible frustration and/or behaviour difficulties due to avoidance of pencil based tasks
- May have difficulties socialising
- May have difficulties following instructions at home and at school
- May have difficulties retelling events
- May have difficulties expressing thoughts and ideas verbally and in written form
- May lead to poor self-esteem due to difficulties interacting with other children