

# THE ONTOGENY OF HUMAN NEUROLOGIC BRAIN FUNCTIONS



Active Healing

Brain Stage	1	2	3	4	5	6	7	8	9	10	11	12
Average Time Frame	Birth	Birth to 3 months	3-6 months	6-9 months	9-12 months	12-18 months	18-24 months	2-3 years	3-4 years	4-5 years	5-6 years	6 years to peer level
Vision	Pupillary reflex	Biocular outline perception	Seeing gross detail, Unified ocular movement	Appreciation of fine detail	Initial Binocularity	Complete convergence, Identifying simple abstracts	Reading several words, Identifying complex symbols	Reading phrases, Reading many words	Reading sentences	Reading initial books	Reading books	Skills equal to or above peers and consistent with dominant hemisphere
Auditory	Startle reflex	Response to threatening sounds, Initial perception of sounds	Localization of sound	Appreciation of environmental sounds	Understands several single words	Understands many words and phrases	Understands basic directions	Conception of worldly information leading to concept of time & space	Conception of gramatical and idiomatic language	Conception of sophisticated and abstract language	Sophisticated concept of time & space	Skills equal to or above peers and consistent with dominant hemisphere
Tactile	Babinski reflex	Awareness of temp & discomfort, Early proprioception, Vital tactile	Localization of touch	Proprioceptive ability as related to balance and space, Gnosis	Awareness of third dimension	Initial stereognosis	Concepts of texture	Concepts of size	Concepts of shape	Concepts of solidity	Sophisticated stereognosis, Sophisticated proprioception	Skills equal to or above peers and consistent with dominant hemisphere
Highest Level of Skill	RECEPTION	PERCEPTION		APPRECIATION	CONCEPTION							
	MEDULLA & CORD	PONS		MIDBRAIN	CORTEX							
	REFLEX	VITAL		MEANINGFUL	UNIQUELY HUMAN PHYSICAL AND INTELLECTUAL SKILLS							
Mobility	Complete movement of extremities	Initial crawling	Functional crawling culminating in a cross pattern	Initial creeping, Assume and maintain quadruped	Functional creeping culminating in a cross pattern, Pull to stand	Walk with arms in primitive balance role, Free standing, Crusing	Walk and run with arms down without pattern	Initial running in cross pattern	Initial walking in cross pattern	Run and walk in complete cross pattern	Hop, skip, jump and other sophisticated skills	Skills equal to or above peers and consistent with dominant hemisphere
Language	Birth cry	Vital sounds	Experimental use of sounds	Range of expressive and meaningful sounds	Word-like sounds	Several meaningful words however pronounced	Initial phrases, Many new words	Initial sentences, Many phrases	Structured sentences, Advancing vocabulary	Ability to participate in an organized conversation, Proper articulation	Sophisticated ability to express an abstract thought	Skills equal to or above peers and consistent with dominant hemisphere
Manual	Bilateral grasp reflex	Bilateral vital release	Initial prehensile grasp	Mature bilateral prehensile grasp	Bilateral cortical opposition, Unilateral cortical opposition	Primitive use of tools, Initial bimanual function	Bilateral and simultaneous cortical opposition	Sophisticated bimanual skills	Reproducing symbols and words	Spontaneous writing of several words	Spontaneous writing of many words	Skills equal to or above peers and consistent with dominant hemisphere

Afferent Sensory Pathways

Efferent Motor Pathways

Source: Sandler & Brown, 1980 Second ed.