Brain Development & Hearing Loss

Hearing typically starts at 4 months gestation. It contributes to the early foundation of development of neurons - the basis of language and future learning.

- **Human Brain Development**
  - Neural Connections for Different Functions Develop Sequentially

  - Hearing
  - Language
  - Higher Cognitive Function

  ![Graph showing the development of different brain functions](http://developingchild.harvard.edu/index.php/resources/briefs/inbrief_series/inbrief_the_science_of_ecd)

- **Due to prenatal development, each neuron in the brain has approximately 2,500 synapses, or connections.**
- **Consider the auditory / visual cortex as early roots in a spring garden, ready to grow.**

- **As a result of constant sensory stimulation and experiences, the number of synapses grows to 15,000 synapses per neuron by the time a child is 2-3 years old.**
- **Think of this stimulation as rain, nutrients, sunshine - all needed for a garden to grow.**
- **Consistent amplification wear, meaningful communication, experiences grow the brain.**

- **At age 2-3 “synaptic pruning” starts to happen.** The weaker synaptic contacts are eliminated while stronger connections are kept and strengthened.
- **A baby’s experiences determine which connections in the brain will be strengthened and which will be pruned away.** The ineffective, unused or weaker auditory connections are “pruned” away.
- **Sensory cortex matures by age 6.** Our ‘window’

- **The best predictors of verbal language skill development are**
  - the child’s age when full time hearing aid use started
  - the degree of the child’s hearing loss
  - the amount of his/her exposure to meaningful listening experiences.
- **Using technology, hearing ability must be provided as close to the typical hearing level as possible if the family wants the child to learn to listen and use spoken language.”**

Karen L. Anderson, PhD  Supporting Success for Children with Hearing Loss; http://successforkidswithhearingloss.com