

Physical Therapy in McPherson County Schools

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ABSTRACT

Services in the area of physical therapy are available from two sources, the district offices and the McKids program based out of Hope Preschool in McPherson. In the school districts, the physical therapist and her paraprofessional serve all the schools in McPherson county. These services, for kids in kindergarten through high school, are composed of 2-3 treatments per week and an annual evaluation required by the IEP (Individualized Education Program). A series of exercises with a therapy ball and stretches are administered as needed to each child. The IEP states the needs of each child as they progress through the program. McKids (McPherson County Kansas, Infant Development Services) is a program based on individual and family needs that is provided at no cost and delivered to each home. The team consists of a physical therapist, an occupational therapist, a speech pathologist, and an early childhood special educator (teacher). The home visits are done once a month according to an IFSP (Individualized Family Service Plan). This plan states the needs of the child as well as the needs of the family to provide a sufficient living environment for the child. If this program had greater financial resources, several aspects could be improved. Each student should have 5 sessions each week in which a professional and a paraprofessional would be present to insure the most effective treatment possible. Also, the size of facilities as well as the amount of equipment available, should be increased. However, the program has proven to be effective with the resources now available.

INTRODUCTION

A child's first few years of motor development can determine his physical capabilities for the rest of his life. Obviously, the child's family is responsible for what accomplishments he makes during this early time. The family can only teach correctly if the family is educated as to what normal development is. McKids (McPherson County Kansas, Infant Development Services) provides services in the areas of fine and gross motor skills, cognitive development, self-help capabilities, and social-emotional levels to families in need, with children birth to three years of age. The McKids staff consists of a physical therapist, an occupational therapist, a speech pathologist, and two teachers. They are based out of Hope Preschool in McPherson and as the name suggests, they serve the entire county.

RESULTS and DISCUSSION

Effectiveness of the Exercises

The focus of this paper is the physical therapist's part of the program. Like any education-based program, it is continuously changing. One change that increased the effectiveness of the program was the types of exercises used for therapy. Seven years ago, the phrase "no pain, no gain" was the theme behind the therapy. All the stretches and exercises used were considered ineffective unless the child was hollering or sore afterwards. After all, how can the exercises be helping if the kids can't feel them? Three years ago, when Sandy (the P.T.) started working in the county's schools, the activities changed. It took a while before the teachers and parents were convinced that the new techniques were effective, because their kids weren't

coming back to the classroom and back home with complaints. One must keep in mind who is being treated, the kids! Sandy made the exercises fun. The concept of fun therapy had never crossed anyone's mind before. Without going into great detail, a therapy ball is now used for the kids' treatments. Appendix A describes the exercises and their benefits. Not only is this method fun for the kids, but also for the therapist.

Eligibility and the Initial Evaluation

To be eligible for services, the child must have a 25% delay factor or score in the 7th percentile or below on a standardized gross motor test. This is determined after an initial evaluation. Table 1 shows the distribution of syndromes and conditions of the kids currently enrolled in this program. Appendix B gives a brief description of each condition. The kids, which range from birth to 21 years old, come from low-income familial situations, where parental involvement may be limited or non-existent, as well as from homes in which loving parents are able and willing to provide their child with constant attention.

Several different standardized tests are used. The preferred test for infants to two years old, is the Bayley II. For three to seven year olds, the Battelle Developmental Inventory is used. The Bayley consists of two scales, mental and motor. The Mental Scale (163 items) measures (1) sensory-perceptual acuities and discrimination; (2) early accomplishment of object constancy and memory, learning, and problem-solving ability; (3) vocalizations and the beginning of verbal communication; and (4) early indication of the ability to form generalizations and classifications. The Motor Scale (81 items) measures the degree of coordination

and control of the large muscles, and finer manipulatory abilities of the hands and fingers (Rossetti, pg. 207). The Battelle Inventory is designed to identify the areas in which children are handicapped and delayed. The test includes 341 test items grouped into five domains; personal-social, adaptive, motor, communication, and cognitive (Rossetti, pg. 206). These domains are broken down into components. For example, the gross motor domain includes muscle control, body coordination, and locomotion. The fine motor domain includes fine muscle and perceptual motor. The sub-domains are evaluated and scored. Appendix C is a time-line of the developmental accomplishments for the average child.

Once the child is admitted into the program, the physical therapist examines several different effecting factors. The history of the child's life is reviewed. This includes any genetic links or hereditary characteristics the parents may have passed on to the child. The health condition of the parents is also crucial. Syndromes caused by alcohol or drugs ingested by the mother or father are prevalent in kids today.

In the initial evaluation, the team tries to come to a consensus on a diagnosis of the child. A diagnosis helps the team decide on a plan for the treatment program. It may also add confusion. The relationship between the diagnosis and the developmental level is usually a "chicken and egg" correlation. One doesn't know if the condition has caused a lowered level of functioning, or if the delayed development has created physiological and chemical imbalances which have resulted in the condition. Because the damage has already been done, the only thing remaining to do is to prevent the condition from worsening by administering physical and cognitive stimulation as needed.

When examining the physical condition of the child, several factors are considered. The muscle tone of the child greatly influences the diagnosis. For example, severely multiply handicapped (SMH), autistic, and seizure disorder children are considered to have hypertonic musculature, or muscles with high tonicity. These kids are in flexed positions most of the time and may not be individually capable of mobile activity. They require lots of stretching and massaging of their muscles during treatment. Such techniques increase the range of motion of internal and external rotation and extension. The hypotonic child, such as a Down's syndrome child, has decreased muscle tone. He doesn't have the stretch in his muscles, but the flexibility allows for increased range of motion. A Down's child should not be allowed to do tumbling activities without supervision, because he is at great risk for injury with his lack of strength. Some kids can fluctuate between hypotonicity and hypertonicity, or their bodies aren't symmetrically toned. For example, a child with Cerebral Palsy may have normal tonicity on one side, while the other side, which is seldom, if

ever, used, has a large amount of flexor tone in it.

A child's motor skills development relies primarily on the sensory experiences which initiate and guide his movements. Because of short-circuiting in the nervous system, the dysfunction in movement seen in the cerebral palsied child is not a result of paralysis of muscles, but of abnormal coordination, of abnormal patterning of muscle tone throughout the affected parts (Fiorentino, pg. 7). During maturation, the normal child gradually develops basic patterns of movement and postural control by adapting to position changes.

Physical Development and the Reflexes

After the first three years, the child uses what he has learned to accomplish more intricate and complex activities. Since the cerebral palsied child's sensorimotor experiences have always been abnormal, his development is that far behind. Keep in mind that each child, whether normal or abnormal, will develop at different rates and also that each new task is dependent on what was previously accomplished. However, the persistence of primitive reflexes is shown to be an influence in delaying motor development (Fiorentino, pg. 43).

A reflex enables one to do things that don't require a lot of thought, such as alternating feet when ascending or descending a staircase. Activities like hopping on one foot or jumping rope require techniques that have already been introduced to the nervous system in the form of reflexes. For example, a three year old spastic diplegic can hold a position on his hands and knees, but reciprocal creeping (crawling) is not possible for him. Appendix D describes normal primary reflexes and the ages at which they are present.

Children with dysfunctional nervous systems and musculoskeletal systems have limited use of three reflexes; balance, equilibrium, and righting. A hypotonic child may not be mobile because he lacks these reflexes. Muscles contract and release in various combinations and degrees, enabling one to maintain stability or more individualized body parts (Pueschel, pg. 184). If a hypotonic child were upright and began to fall, he would be injured while trying to catch himself. The ability to catch oneself from a fall combines all three of the reflexes. If present, balance may be able to prevent the fall. If one could not regain his balance, he would then try to catch himself in a harmless way. This is referred to as righting, a combination of balance and strength. Equilibrium involves the vestibular system, the three semicircular canals of the membranous labyrinth in the inner ear. The sacculus, utriculus, and semicircular ducts are receptors that monitor the position of the head in space, whether at rest (in static equilibrium) or in motion (in dynamic equilibrium). Information from these organs is utilized by skeletal muscles to maintain

a moment-to-moment posture of the body (Kent, pg. 602).

Children sometimes have to be reminded to correct a sitting or standing position. For example, a child who begins walking on her toes is susceptible to a weakened lower back because of an arched posture. Walking flat-footed allows the spine to extend, which decreases pressure on the lower back. W sitting is a position in which the child's hips are turned in and the legs bent back towards the buttocks, giving the legs a w-shaped appearance. This position limits the twisting of the trunk and limits hand play. In addition, the internal rotation of the hips can lead to pigeon-toed walking and limited back strength, as well as hip, knee, and ankle pain in later years.

Importance of Stretching

Stretching is used mostly for the SMH kids as well as other children with a limited range of motion (ROM). Of the six SMH kids at Roosevelt Elementary, three of them are capable of self-motility. The other three kids are in wheelchairs that they can't move themselves. These kids have a tremendous amount of flexor tone in their muscles. They are stretched for 15-20 minutes and are put either in a prone-stander or in a walker for a certain amount of time each day. The prone-stander supports the child in a standing position to put some weight on the legs. The only way muscle and bone get stronger and grow is to use them or to put stress on them. One of these non-motile kids has walked before. Unfortunately, she had hip surgery and wasn't able to walk for a long enough time that she lost the strength needed to support herself without the walker. Even with the walker, she is very stubborn. In order to get her to take steps, we have to ignore her for awhile and she'll take a few steps.

The stretching techniques used combine the stretch with a massage of the tight muscle areas. The massaging warms the muscle up so that it releases some tension. To stretch, the child is placed on the mat on the floor. Not following any particular sequence, the child's fingers, hands, arms, shoulders, hips, legs, and torso are stretched. The hands of these kids are in a fist all day long. To stretch, the hand is opened and the palm and heel of the hand are gently, but firmly massaged. The thumb and fingers are pressed to extension and held. The arms are usually flexed at the elbow and drawn in close to the body. We extend and stretch the arms across the body and up beside the ear. This straightens the arm and stretches the muscles of the shoulder. By using a gentle, but quick shaking motion, the flexor tone can be broken up and the limb can extend with less effort. The hamstrings, heel cords, and calf muscles are stretched by extending the knee and flexing the ankle. Because of the position in which the child sits all day, the hip doesn't receive internal rotation. Placing a hand right above the knee and rotating the hip joint in,

helps increase the internal rotation range of motion. Since these children can't talk, we determine the boundary of flexibility by watching the facial expression and listening to the tone of the voice.

For the mobile children, the stretches are used to increase the range of motion of certain muscle groups. Unlike a chiropractor, who adjusts the arrangement of the skeleton, these stretches adjust the soft tissues. Because muscle tissue surrounds and supports the skeleton, changes in the amount of flexor tone in the body can change the arrangement of the bones. Besides the stretching, activities are used throughout the day that would be fun and physically beneficial to the child. For example, the SMH kids go swimming, and if able, ride stationary and mobile bicycles. Those that are motile can also participate in adaptive P.E. activities.

The mainstreamed kids that qualify for treatment are evaluated by physical and written reviews. A skill test, the Bruninicks-Oseretsky Test of Motor Proficiency, allows the P.T. to observe and record the progress of the child. This specific test involves the successful completion of the following activities:

- walk on balance beam heel to toe
- walk on line (heel to toe)
- standing long jump
- hit a target throwing a tennis ball with one arm
- catch a tennis ball with one hand
- jump rope
- hold a ball (supine flexion)
- hold ATNR/STNR inhibiting posture
(turn head to right while on all fours, place right hand on
waist, extend left leg, switch)
- skipping
- hopping on one foot

Areas such as agility, balance, bilateral coordination, strength, upper limb coordination, speed and dexterity, response speed and visual motor control are evaluated as the child completes those activities. The evaluation must take place at least once every three years to determine if the child is still eligible for services. However, an evaluation is required for the IEP (Individualized Education Program) which is reviewed once a year.

Individualized Programs and Evaluations

An IEP is a document stating the names and titles of the team members, the identified student needs, long-term goals, short-term goals, mainstream modifications and the descriptions of services to be provided for a child who is three to 21 years old (Ysseldyke, pg. 54). This document is signed by the parent or guardian and by the designer or principal. The program is designed to be in effect for one year and then reevaluated at the end of that year.

Another document, the IFSP (Individualized Family Service Plan) is designed for a child from birth to age two. This plan is set up to state the child's present levels of cognitive, social speech and language, and self-help abilities. Other information on the IFSP includes the strengths and weaknesses of the family, the expected outcomes of the child and his family, a description of the techniques to be used for measuring progress, the frequency and intensity of services required of the case manager, and a plan for preschool preparation (Ysseldyke, pg. 59).

Evaluations can be done at any time to determine the progress of the child. The P.T. may evaluate a student who has been working hard and find that he has successfully accomplished the required activities. At this time, the child may be discontinued or graduated from the program. Because of the attachment to the therapist, discontinuing treatment cold turkey can be hard for the child. In this case the child becomes a coach for the remaining students in the program. This is fun for the coach and the student.

CONCLUSION

Although this program has been very effective, like any program, there is room for improvement. The kids receive only 2-3 days of treatment each week. The conditions of each child would make greater progress if the child were allowed treatment five days each week. Also, if at each session, the child was supervised by one professional and one paraprofessional, each session would be carefully monitored for improvements or weaknesses in the child's performance. Four hands are always better than two. There is always room for improvement in the amount of equipment needed and the updating of equipment available. The amount of space available at each school for the treatments is minimal. In some schools, the sessions take place on the opposite side of a speech room or in a narrow hallway. Unfortunately, all of these improvements require money. I feel the available resources have been used adequately and have made this program very successful.

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APPENDIX A: EXERCISES AND THEIR BENEFITS

1. Front kicks
 - hands stay on waist
 - base foot is planted straight forward
 - torso is upright and straight
 - Benefits:
 1. strengthens quadriceps
 2. balance
2. Side kicks
 - hands stay on waist
 - base foot is planted straight forward
 - torso is upright and straight
 - Benefits:
 1. strengthens inner thigh
 2. balance
 3. crossing over midline
3. Throws
 - arms don't bend, but come straight down
 - keep torso straight up
 - keep both feet planted straight forward
 - Benefits:
 1. strengthens triceps and deltoids
4. Pushes
 - legs are straight and together

- feet off floor
- feet and knees together
- head up
- Benefits:
 1. strengthens back, legs, and arms

5. Kicks on back
- legs are bent and off the floor
 - hands flat on floor to sides
 - ball's motion is at an angle
 - Benefits:
 1. strengthens abdominals
 2. strengthens quadriceps
6. Frogs
- hands are flat on floor when pushing
 - head up
 - both hands and feet push off floor
 - Benefits:
 1. wrist extension
 2. strengthens neck and back
7. Back bends
- hands push off floor
 - hands flat and fingers point to ball
 - knees together
 - Benefits:
 1. increase ROM in back and abdominals

8. Sit-ups
- arms are crossed over chest
 - knees and feet stay together
 - small of back stays on floor
 - Benefits:
 1. strengthens abdominals

9. Bridges
- hands are flat on floor
 - legs are straight and together
 - hips lifted high
 - Benefits:
 1. strengthens lower back

10. Sit on ball
- a) side to side
 - b) front to back
 - c) circles (both)
 - d) bouncing
 - e) opposites
- feet are planted straight forward
 - arms stay crossed over chest
 - Benefits:
 1. balance
 2. strengthens legs and trunk

11. Opposites
- fingers pointed forward
 - hands flat

- back and extended leg parallel to floor
- base leg straight back, not crossed inward
- Benefits:
 1. balance
 2. helps with ATNR/STNR reflexes

APPENDIX B: CONDITIONS AND THEIR CHARACTERISTICS

Attention Deficit Disorder (ADD)--hyperactivity, limited attention span, lack of concentration
Cause: too high/low levels of neurotransmitters, severe illnesses, toxic substances, injuries early in life

Characteristics: hyperactivity (in ADHD), impulsivity, distractibility, disorders of speech or hearing, clumsiness, perceptual difficulties, have sleep disturbances, difficult to discipline, low frustration tolerance, poor peer relationships, immature

Cerebral Palsy--disorder of muscle control of coordination

Cause: brain injury in early development (fetal stroke, lack of oxygen at birth, intracranial hemorrhage or meningitis during infancy)

Characteristics: spasticity, dyskinesia (unwanted movement)

Cytomegalovirus (CMV)--congenital infection similar to mononucleosis

Cause: teratogens, infections

Characteristics: hearing loss at later age, small blood spots on the skin, jaundice, microcephaly, delayed development, mental retardation

Developmental Delay--below-average functioning

Cause: chemical imbalances, or dysfunctional wiring of nerves

Characteristics: inadequate primitive reflexes, floppy or spastic muscle tone, lack of visual and auditory response motor delays--sitting, walking

Down's Syndrome--presence of extra chromosome in each cell of the body

Cause: genetic imbalance because of extra chromosome, older mother or father

Characteristics: congenital heart disease, mental retardation, small stature, hypotonia, hyperflexibility of joints, speckling of iris, upward slant to eyes, epicanthal folds, small oral cavity with protruding tongue, short, broad hands with simian crease, wide gap between first and second toes

Duchenne Muscular Dystrophy--progressive pelvic muscle weakness and atrophy, enlargement of thigh muscles, tight heel cords

Cause: mutation in dystrophingene on X

chromosome

Characteristics: progressive respiratory difficulty, heart failure, mild mental retardation, abnormal gait, scoliosis

Failure to Thrive--weight is significantly below average, as is weight gain during infancy or early childhood

Cause: poverty, ignorance, malnutrition, parental neglect, poor parent-child relationships, CNS abnormalities, structural or neuromotor abnormalities of alimentary tract, gastro-intestinal diseases, congenital heart disease, endocrine disorders, chromosome defects, kidney disease, chronic infections, malignancies, FAS

Characteristics: weight, height, and head size measurements are more than two SD's below normal

Hydrocephalus--imbalance in the production and absorption of CSF in the body that leads to enlargement of fluid-filled spaces in the brain

Cause: blockage in normal cerebrospinal fluid circulation, overproduction of cerebrospinal fluid

Characteristics: large head, seizures, mental retardation, eyes look downward so the whites are prominent (setting-sun sign), irritable, listless, slow developing headaches, vomiting and coma

Limb-girdle Muscular Dystrophy--predominant weakness in pelvic musculature

Cause: inheritance is autosomal recessive

Characteristics: (same as DMD)

Mental Retardation--significantly below average general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the development period

Cause: infection, prematurity, brain malformations, neurocutaneous syndrome, chromosomal abnormalities, teratogens, fetal malnutrition, metabolic abnormalities, trauma, lack of oxygen

Characteristics: delays in reaching developmental milestones, low IQ scoring, abnormal face features, skin pigment or urine odor

Microcephalus--poor growth of entire brain

Cause: recessive inheritance, chromosomal abnormalities, teratogens, interuterine infections, anoxia at birth, severe malnutrition

Characteristics: small head (2-3 SD's below average), lower score on IQ, decreased language and visual-motor skills

Neurofibromatosis (Elephant Man Disease)--nerve tumors (neurofibromas) on body and on skin

Cause: mutation, inheritance on chromosome #17

Characteristics: normal intelligence, birthmarks on

one side of body

Polymicrogyria--excess folds in brain

Cause: (no information found)

Characteristics: (no information found)

Prematurity--gestational period of less than 37 weeks

Cause: maternal trauma, teen pregnancy, poor prenatal care, drug abuse, hemorrhaging, malnutrition, jaundice, apnea (prolonged pause in breathing), necrotizing enterocolitis (NEC-inflaming of intestinal wall), patent ductus arteriosus (failure of closure of vessel)

Retro Virus--DNA virus involved in gene transfer therapy (causative agent of AIDS)

Cause: failure in "gene-repair" system

Characteristics: AIDS

Seizure Disorder--involuntary motor activity or change in consciousness or behavior, bursts of unorganized electrical impulses interfere with normal brain functioning

Cause: heredity, brain injury, scar tissue on brain, meningitis or encephalitis, rubella, cerebral palsy, hydrocephalus and metabolic disorders

Characteristics: normal or abnormal EEG test results, seizures

Spina Bifida--midline defect of the skin, spinal column, and spinal cord; nerves don't have connection to brain or spinal cord

Cause: not known

Characteristics: hydrocephalus, mental retardation, limited control of legs, bowels, bladder, sensation in skin, scoliosis

Trisomy 8--trisomy of chromosome 8, usually an early lethal disorder

Cause: the majority are mosaics, extra 8th chromosome

Characteristics: poor coordination, prominent forehead, deep-set eyes, full-lips, high arched palate, limited extension of joints, deep creases in hands and feet, long and slender trunk, narrow pelvis, widely spaced nipples, prominent ears, and camptodactyly

APPENDIX C: TIME-LINE OF DEVELOPMENTAL ACCOMPLISHMENTS

3 months:

- different cries for hunger, pain, pleasure
- smiles and vocalizes when talked to
- pushes up on arms while on stomach
- looks at faces with eye contact
- searches with eyes for a sound
- mouths hand-held toys

- hands usually open
 - gurgles and coos
 - sits with support
- 6 months:**
- reaches for, grasps and manipulates objects
 - sits for 5 seconds unsupported
 - babbling more than 2 sounds
 - rolls from back to stomach
 - turns when hears own name
 - recognizes familiar people
 - looks for dropped object
 - smiles at mirror image
 - plays peek-a-boo
 - holds own bottle
- 9 months:**
- gets into hands and knees position
 - transfers object from hand to hand
 - sits independently for 10 minutes
 - plays pat-a-cake, so-big, bye-bye
 - jargon--long string of babbling
 - uncovers toy seen hidden
 - rolls over both directions
 - shows likes/dislikes
 - finger feeds self
 - crawls
- 12 months**
- says "dada" or "mama" specifically
 - enjoys looking at pictures in books
 - bangs two objects together
 - walks with one hand held
 - gives toy on request
 - uses first true words
 - marks with pencil
 - gives affection
- 15 months:**
- recognizes some pictures when named
 - likes to do things without help
 - brings objects on request
 - identifies self in mirror
 - imitates simple actions
 - feeds self with spoon
 - walks without support
 - uses 4 to 5 words
 - stacks 2 blocks
 - gives kisses
 - scribbles
- 18 months:**
- names or points to familiar pictures in books
 - carries and pulls toy while walking
 - remembers where objects belong
 - listens to rhymes/songs 2-3 minutes
 - tries to imitate adults
 - does one-piece puzzles
- uses 5 or more words
 - stacks 3-4 blocks
 - removes socks
 - runs
- 24 months:**
- imitates vertical line, circular scribble, and horizontal line
 - enjoys being read to
 - listens for meanings of words
 - jumps with two feet together
 - says and understands "no"
 - walks up and down steps
 - follows simple directions
 - identifies 6-8 body parts
 - uses 2-3 words together
 - refers to self by name
- 30 months:**
- matches shapes (circle, triangle, square)
 - helps put things away
 - walks on line
 - completes 3-4 piece puzzle
 - unbuttons large buttons
 - uses words to tell needs
 - stacks 6 blocks
 - plays with doll
 - tells full name
- 36 months:**
- pedals tricycle
 - knows several colors
 - toilet trained--few accidents
 - talks clearly most of the time
 - stacks rings in correct order
 - uses 3-4 word sentences
 - identifies big and small
 - begins to dress self
 - asks questions
- APPENDIX D: NORMAL REFLEXES**
- Six-day-old:
- Rooting Reflex**--If the corner of the baby's mouth is stroked outwards, the lower lip drops at that corner and the tongue moves toward stimulus as the head also turns to the stimulus. (persists 3-4 mos., 7 mos. while asleep)
- Sucking Reflex**--If a finger is placed on baby's lips, he immediately starts sucking. (persists 3-4 mos.)
- Galant (Incurvatum) Reflex**--If the baby's skin is stroked between the twelfth rib and the iliac crest, there is lateral flexion of the trunk toward the stimulus. (persists 2 mos.)
- Crossed Extension Reflex**--If one of the baby's legs is held in extension and the sole of the foot stroked, there is flexion, followed by extension and

adduction of contralateral leg with extension and fanning of the toes. (persists 1 mo.)

Withdrawal reflex--If the soles of the baby's feet are stimulated while his leg is extended, then his toes will extend, his feet will go into dorsiflexion and his legs will flex. (persists 6-8 wks.)

Moro Reflex--If the baby's head and shoulders are raised off the ground, allowing the head to drop back, then his arms and fingers are abducted, extended, and externally rotated. (persists 0-4 mos.)

Automatic Sitting--If pressure is applied to the baby's thighs and his head is flexed, then he will right himself to a sitting position. (persists 6-8 wks.)

Primary Righting Action--If the baby's feet are pressured, ankles kneaded or nape of neck tickled while he is squatting with feet flat on a firm surface, he will extend his legs, trunk, and momentarily his head. (persists 6-8 wks.)

Primary Walking--If the baby is held in a standing position, supported under his arms and inclined forward, he will take rhythmical steps, touching his heel to the ground first. If he reaches an obstacle, he will automatically step over the object. (persists for several wks.)

Grasp Reflex--If pressure is applied to the baby's palm from the ulnar side, he will flex his fingers, grabbing the object. (persists 3-4 mos.)

Six-week-old:

- Strongly dominated by flexor tone in all positions
- Asymmetrical Tonic Neck Reflex
- Prone head raising to 45 degrees
- Neck-righting to side-lying

Three-month-old:

- Flexor tone continues and extensor tone increases
- Can extend head in prone position and stay on elbows
- Has voluntary positioning for hand function
- Has voluntary neck righting
- Can function at midline

Five-month-old:

- Landau Reaction (airplane) is increasing the extensor tone
- Preparing to crawl with rocking movements
- High level of flexion and extension integration

Six-month-old:

- All primitive reflexes are now absent
- Has protective extensor reaction, which is used for weight-bearing
- Can sit with minimal support
- Can right his head past midposition in supine and lateral positions
- Can crawl forwards or backwards on abdomen

--Has reciprocal movements

--Can stand with support

Eight-month-old:

- Righting, protective, and equilibrium reactions are automatically available
- Can do some reciprocal creeping
- Can sit independently
- Can pull to standing
- Can walk with support
- Uses pincer grasp (grab with index finger and thumb)

Fourteen-month-old:

- Assumes partial rotation to sitting position
- Can stand and walk independently
- Has supination and opposition