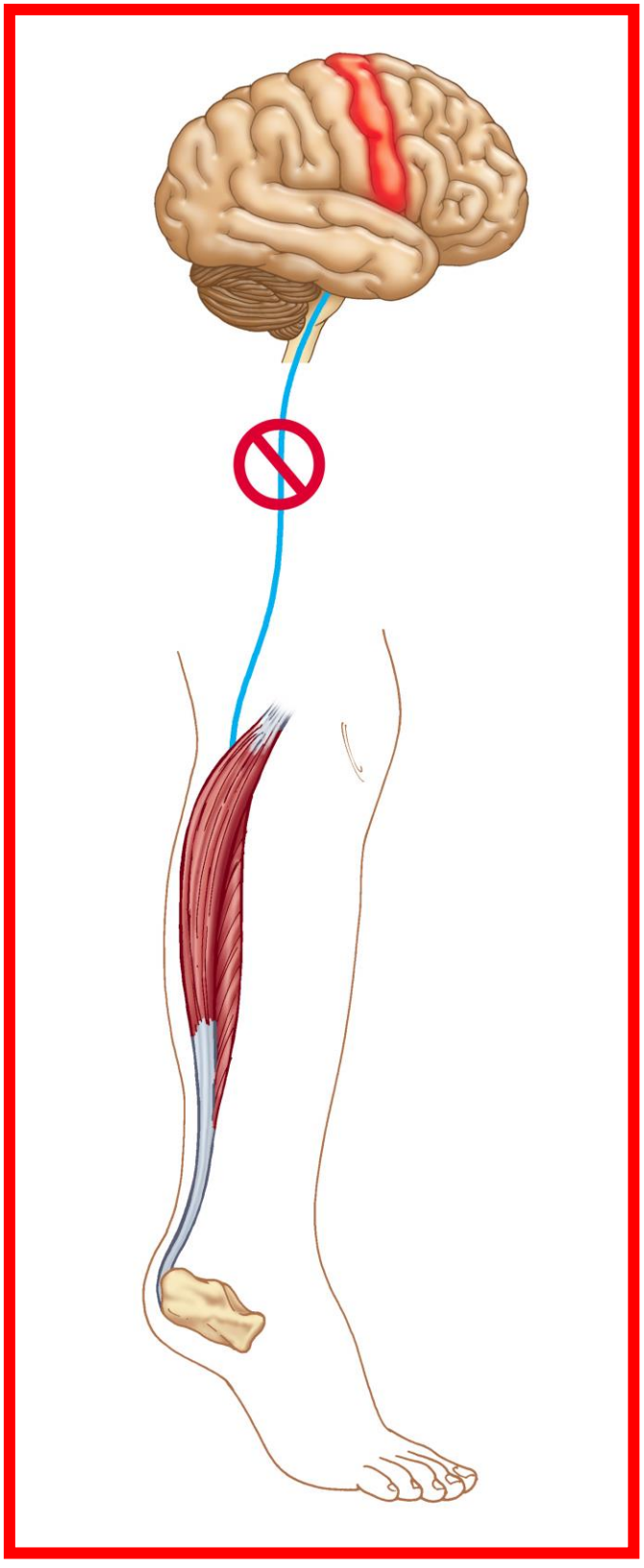
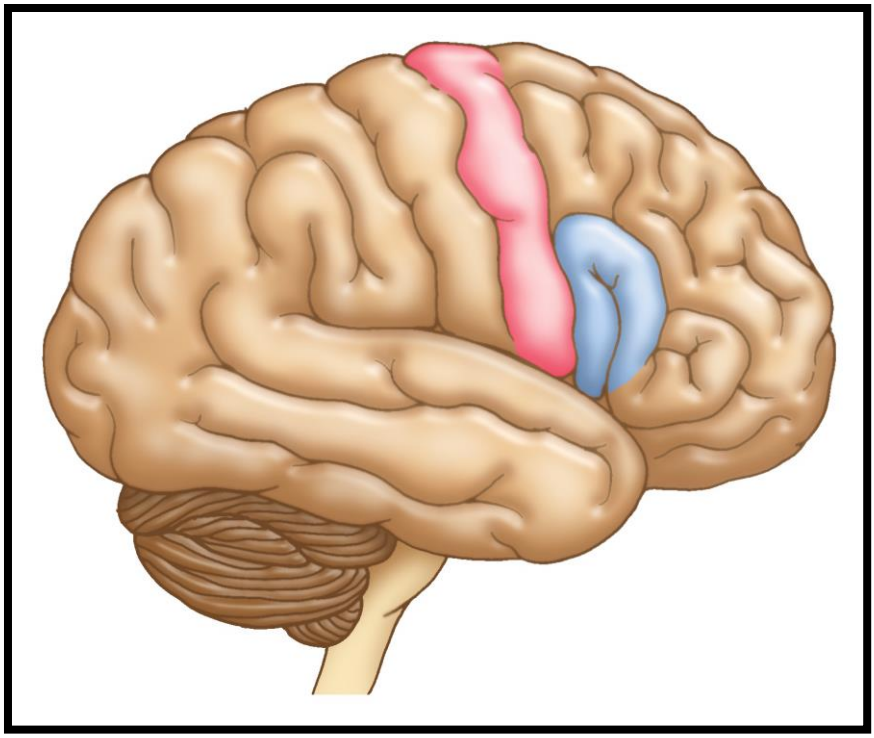
Cerebral Palsy



Cerebral palsy (CP) is a complex condition caused by injury to the brain early in life. The injury may be caused by many different things and may occur before, during or shortly after birth. Some common causes of brain injury which result in CP are: prematurity, bleeding in the brain, low birth weight, infection and head injury.



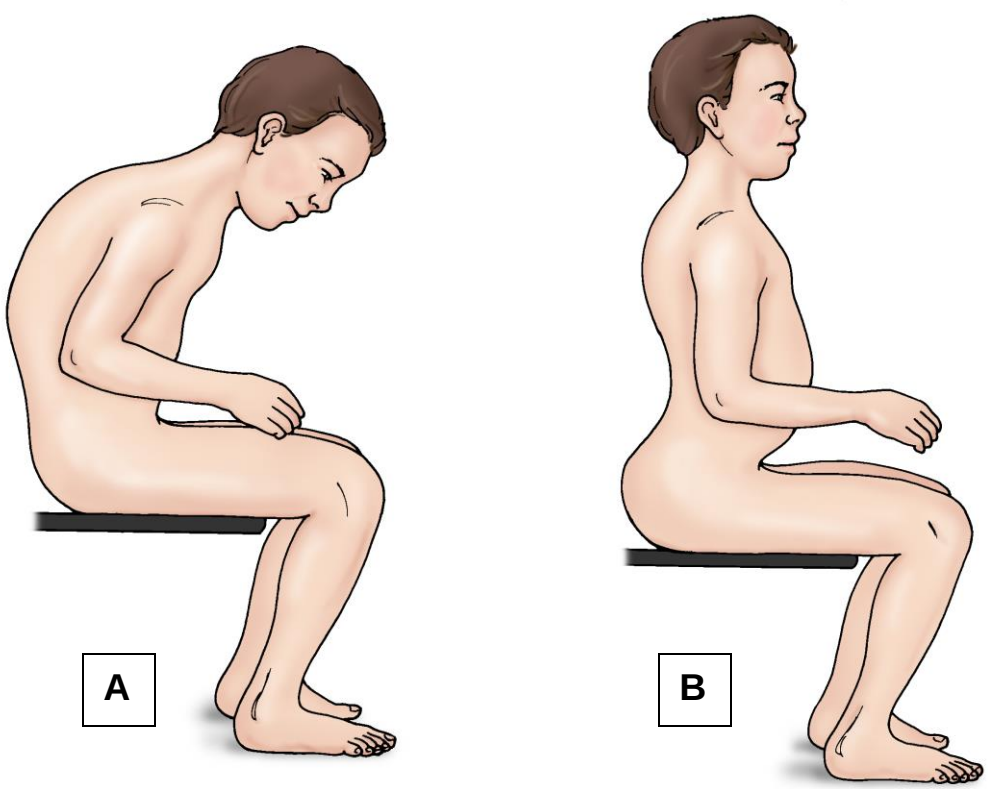
The word “cerebral” means having to do with the brain and “palsy” describes an abnormality of movement and posture.

There is no specific test for cerebral palsy. Instead, the diagnosis is based on observation of a child’s motor development and movement patterns. A child may appear perfectly normal as an infant but as the expected developmental milestones become more challenging, abnormalities may become more obvious.

Faulty development or injury to the motor areas in the brain interferes with the brain’s ability to fully control muscle function, causing impaired muscle movement and posture. As a result, the child may

have poor coordination, poor balance, or abnormal movement patterns.
Normal developmental milestones, such as reaching for toys (3-4 months), sitting unassisted (6-7 months), and walking (10-18 months) are based on normal motor function and balance. A child may be suspected to have cerebral palsy if he is slow to develop these skills or demonstrates abnormal muscle tone, abnormal movements, or persistence of infantile reflexes. Usually an inability to achieve earlier milestones means that more advanced development skills will not develop. For example, if a child does not have good sitting balance, he is unlikely to learn to walk independently.

Figure A demonstrates a child who has only fair head control and poor truncal balance
Figure B demonstrates the normal sitting posture. Normal sitting balance must be present before a child can learn to walk independently.



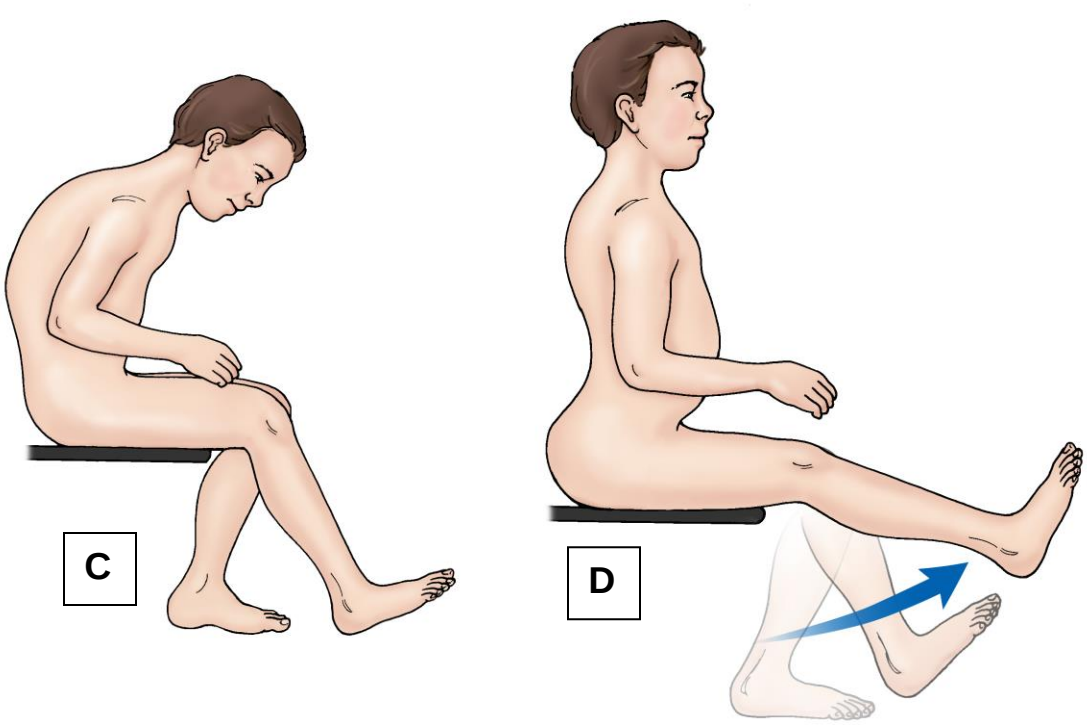
Early diagnosis, especially before the child's first birthday is not always easy. Diagnosing cerebral palsy usually involves waiting for definite and permanent appearance of specific motor problems. Referral to a pediatric neurologist may be made to confirm or diagnose the motor disorder.

The neurologist may obtain an MRI, CT or Ultrasound of the child's brain as well as request blood tests to aid in the diagnosis. They may select a term such as periventricular leukomalacia (PVL), intraventricular hemorrhage (IVH), stroke, hydrocephalus or neuronal migration abnormality to describe the condition, all of which indicates a permanent injury to the growing brain.

The injury itself is "static"; it does not progress or worsen with time. However, secondary conditions such as muscle spasticity and shortening can develop which may get better over time, get worse, or remain the same. Children with CP may also have problems with vision, speech, hearing, swallowing and nutrition. Some also have seizures, mental impairment, developmental delay, and/or learning difficulties. Although cerebral palsy is not curable, there are interventions that may be offered to help the child improve function, maximize independence and allow them to reach their full individual potential.

The hallmark of CP is the abnormal stiffness and weakness found in certain muscles and progressive shortening or contractures that develop and result in unique walking patterns. Also, there is a lack of selectivity or voluntary control of certain weak muscle groups. Because of the extreme variability of the injury to the immature developing brain every child is different.

Figure C demonstrates a child who is unable to straighten the knee when seated. This means that there is severe weakness in the thigh muscles and that this child will probably need canes or a walker to ambulate.
Figure D demonstrates a child who can fully extend the knee and may be able to ambulate with only braces around the ankle



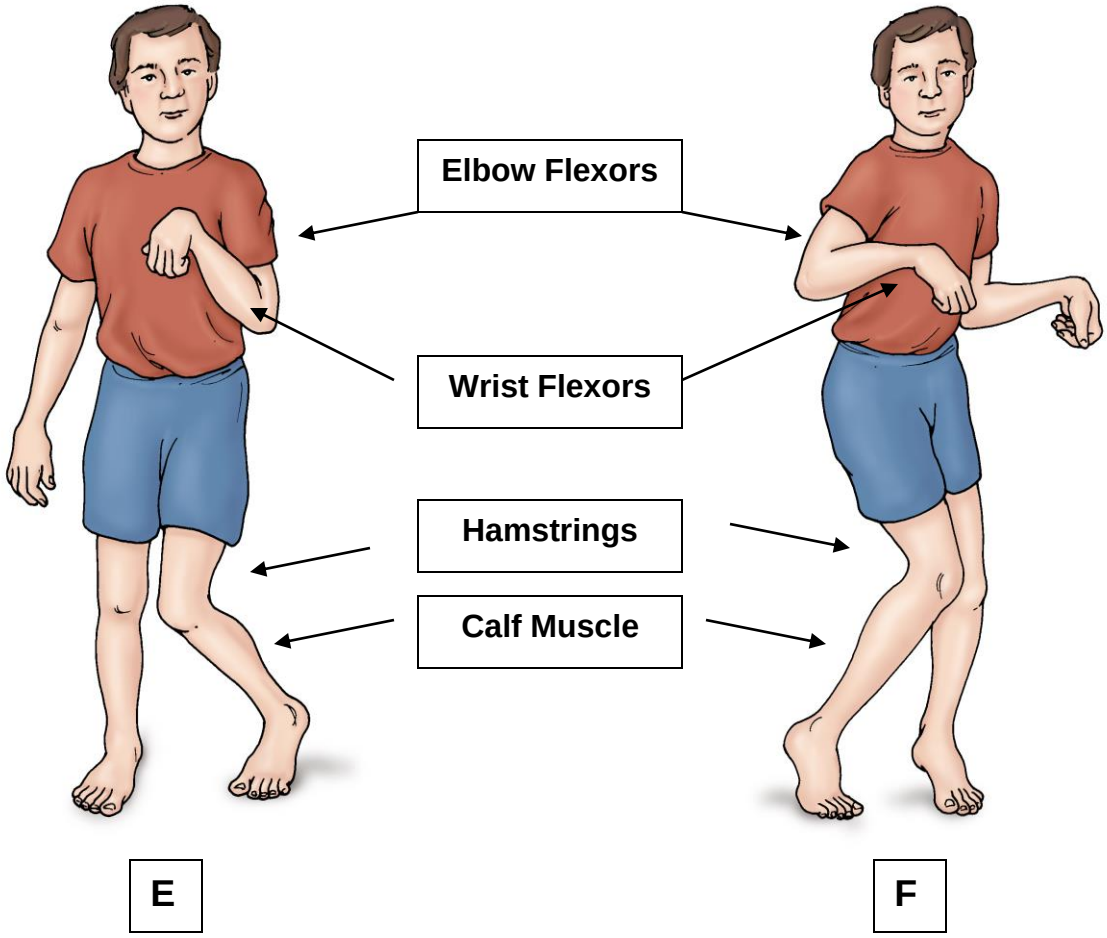
Cerebral palsy is a general term that includes a wide variety of physical impairments. This large group can be divided into smaller subgroups based on the way the child's movement is altered (spastic, athetoid, ataxic, hypotonic and mixed) or by the body parts involved (arm, leg, arm & leg). This grouping of patients guides the physician in prescribing and recommending specific therapy and surgical options for each child.
Movement Type
Spasticity: increased muscle tone/ tightness, the inability of the muscle to relax
Athetosis: low muscle tone/looseness, uncontrolled "writhing" movements of the entire body
Ataxia: problems with balance and coordination of muscle movement
Hypotonia: floppy, low muscle tone

Mixed: Evidence of two or more types, such as spastic and athetoid with stiffness and involuntary movements

Body Type
Monoplegia; one limb affected, usually arm
Hemiplegia: arm and leg on same side involved, arm usually more than leg
Diplegia: both legs involved
Triplegia: Both sides of body, but usually just one arm
Quadriplegia: Total Involvement of all four extremities

Figure E demonstrates a left hemiplegic pattern with spasticity of the wrist flexors, elbow flexors, hamstrings, and calf muscle

Figure F demonstrates a total body involvement pattern of both arms and legs



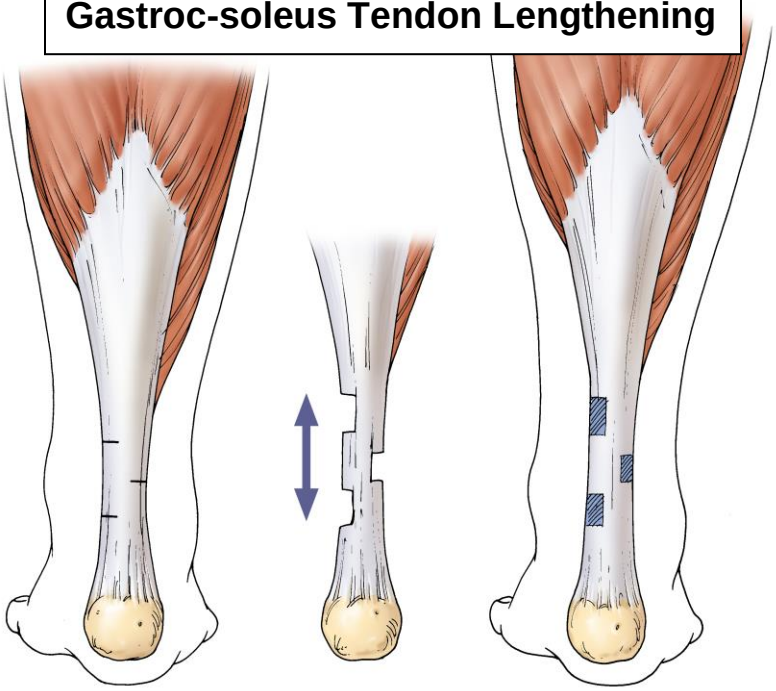
Treatments for cerebral palsy include:

- Physical and Occupational Therapy to help your child learn skills such as sitting, walking, eating, dressing, and writing; improve muscle movement, strength, balance and coordination; and to assist with stretching exercise to slow down or help prevent contractures.
- Speech Therapy to improve communication
- Orthotics (braces/splints) to help improve joint mobility and stability, prevent or slow down the development of contractures. Improve hand or leg function.

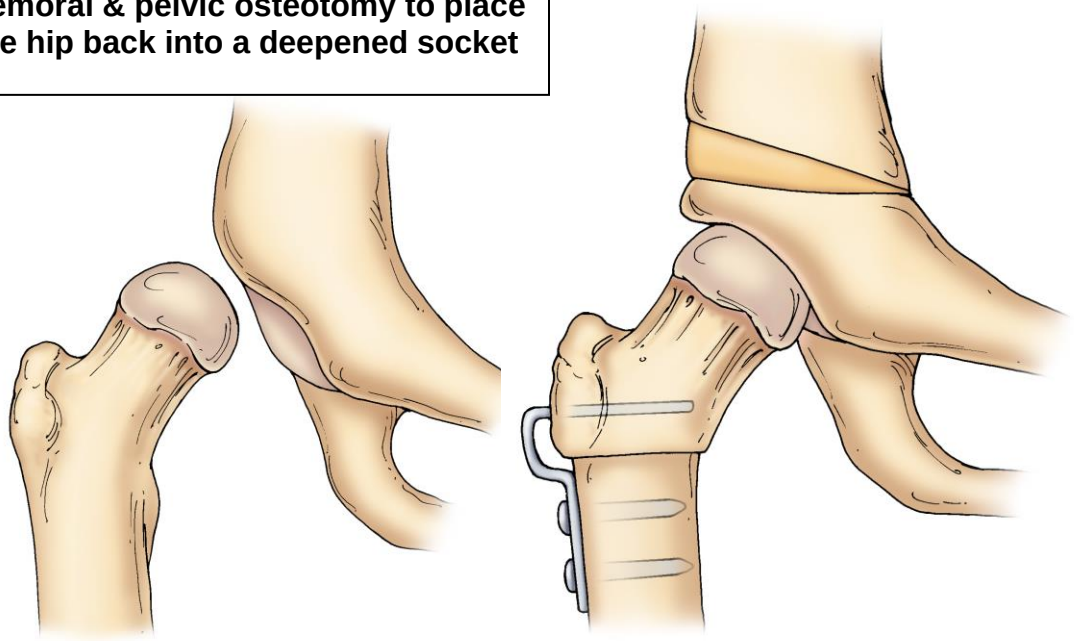
Solid Ankle – Foot Orthosis (AFO)

- Surgery to lengthen affected muscles, correct bony deformity or dislocation, and to correctly position their arms and legs for better use/function.

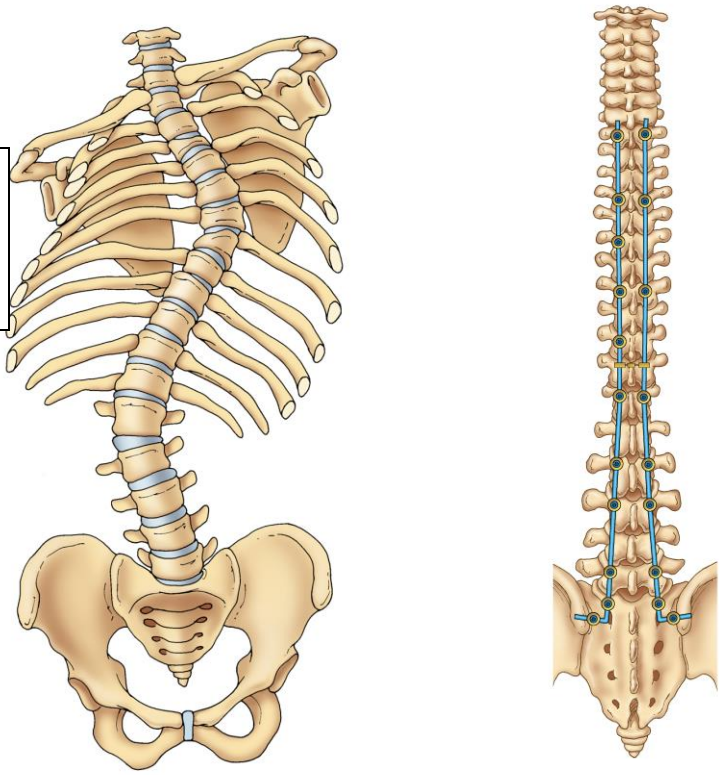
Gastroc-soleus Tendon Lengthening



Femoral & pelvic osteotomy to place the hip back into a deepened socket



Progressive scoliosis is treated with a spinal fusion to restore sitting balance



- Medication to prevent or control seizures or muscle spasm, diminish spasticity or reduce abnormal movements.

- Durable Medical Equipment or mechanical aids such as walkers, canes, wheelchairs, standers and computerized communication devices to help the child overcome the impairment.

Predicting what a young child with cerebral palsy will be like and what he will or will not be able to do is very difficult before the age of two years.

Some children may require the expertise of a multi-disciplinary team of professionals including a pediatrician, pediatric orthopaedist, neurologist, neurosurgeon, gastroenterologist, physical therapist, occupational therapist, nurses, orthotist, and social workers, while others may need only minimal intervention.

Our goal is to provide you, the family, with as much information about your child's condition as possible along with appropriate and realistic treatment options to help your child function at his or her maximum ability.

Love and encourage your child. Family support and personal determination are important factors in achieving long term goals.

OK™ Orthopaedics for Kids