ORTHOSES FOR SPECIAL CASES

FUNCTIONAL ELECTRICAL STIMULATION

- Functional neuromuscular electrical stimulation (FES) is also used as an orthotic option with paraplegic individuals.
- It can be used as an orthosis to provide trains of electrical stimulation to selected paralyzed muscles and peripheral nerves to produce muscle contractions in a pattern that allows ambulation.
- It consists of a belt or pocket-held microcomputer and electrical stimulation unit, push-button switches located on the handles of a walker to input commands to the computer, and four or six pairs of adhesive surface electrodes with lead wires from the stimulator

- Pairs of stimulating electrodes are placed on both legs over the quadriceps to stimulate knee extension, over the common peroneal nerve to stimulate flexion and stepping, and over the paraspinal or gluteal muscles to stimulate trunk/hip extension and pelvic stability.
- Others have developed FES orthoses for paraplegia that use implanted electrodes rather than surface electrodes.

- the physical effort involved in standing and walking with a FES system alone is estimated as at least six times that of normal walking by an unimpaired individual,
- stimulation of the leg muscles during walking improves venous return and stroke volume, which are reduced in paraplegic individuals due to pooling of blood in the legs as a result of loss of the muscle pump.
- FES-stimulation builds some muscle mass in paralyzed atrophied muscles

ORTHOSES USED WITH DEVELOPMENTAL DYSPLASIA OF THE HIP DEVELOPMENTAL DYSPLASIA OF THE HIP

- (DDH) covers a spectrum of congenital conditions including hip dislocation, subluxation, and hip instability (a located hip that is dislocatable).
- These abnormalities result from an abnormal relationship between the developing femoral head and acetabulum.
- Without adequate contact between these two skeletal components of the hip, neither develops properly.
- When hip instability is discovered in children younger than 6 months of age, treatment usually includes bracing that holds the hip in flexion and abduction, because this position maximizes and normalizes contact between the acetabulum and femoral head.

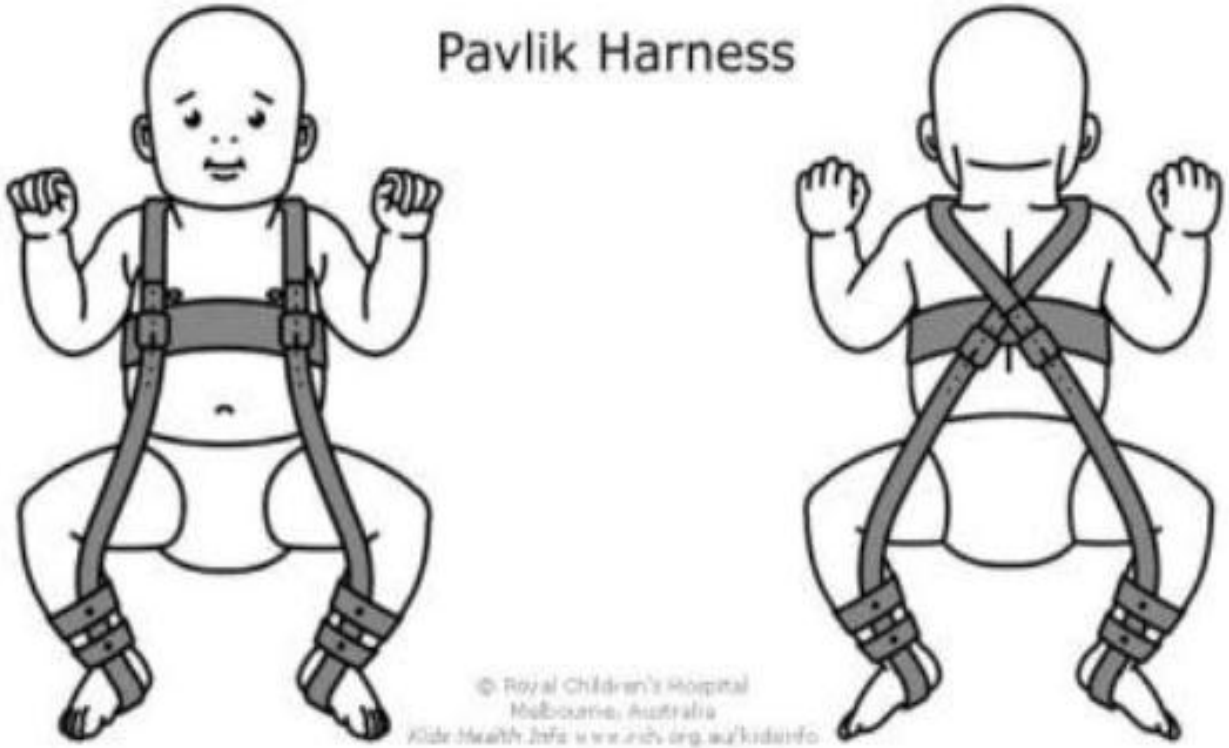
THE PAVLIK HARNESS

- It is a device made of canvas or another washable fabric with straps that run from the chest to the feet to produce the desired hip positioning.
- The anterior straps located at the mid-axillary line set the hips at 100° to 110° hip flexion. Too much flexion can produce femoral nerve compression or inferior dislocations.
- The posterior straps are located at the level of the child's scapulae and allow for comfortable hip abduction. This strap prevents adduction and dislocation, but excessive abduction should be avoided to pre-vent the development of avascular necrosis.

RHINO CRUISER

- Ambulatory children between the ages of approximately 9 to 24 months who require fixed abduction positioning of their hips may be fit with a "Rhino Cruiser,"
- a rigid plastic orthosis that holds the hips in the desired abduction position without limiting movements of the active toddler

Pavlik Harness



ORTHOSES USED WITH LEGG-CALVE-PERTHES DISEASE

- Legg-Calve-Perthes disease consists of a sequence of stages that starts with the temporary loss of blood supply to the femoral head in a growing child (usually between the ages of 4 to 10 years), resulting in avascular necrosis of the femoral head.
- The etiology of this loss of blood supply is usually unknown.
- the condition is usually self-limiting and is followed by revascularization and new bone formation.
- During the period of avascular necrosis, the femoral head may collapse and flatten.
- If the head ossifies with a flattened shape that is incongruent with the acetabulum, it may lead to early degenerative joint disease of the hip as the child grows into adulthood.

THE ATLANTA HIP ORTHOSIS

- consists of a pelvic band and movable hip joints that are connected to abducted thigh cuffs.
- For larger children, the orthosis is constructed with a bar between the thigh cuffs to reinforce the abducted position.
- This abduction bar is attached to the thigh cuffs with a special joint that does not prevent reciprocal flexion and extension movements of the legs.

PETRIE CAST

- are long leg devices with abduction bars between the legs to hold the femurs in a position of abduction and internal rotation to maximize femoral head containment in the acetabulum.
- Children are permitted full weight-bearing and ambulation using these appliances.