The Role of Orthopedic Surgery in the Management of Children with Cerebral Palsy

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Indications for Orthopedic Surgery

- Fixed contracture affecting function
- Joint dislocations
- Rotational Abnormalities
- Shoe wear problems
- Pain
- Perineal hygiene problems
Planning for surgery

- Nutritional assessment
- Stability of neurologic state
- Do you expect the patient to improve over time?
Radiographic Assessment

- Plain Radiographs of joints
  - Anterior-posterior
  - Lateral
- Computed Tomography
- Three dimensional Computed Tomography
Gait Analysis

- To assess the walking ability of the child and to determine the cause of the walking abnormality
- Observational
- Three dimensional Motion Analysis
Timing of the Surgery

- Stroke: after at least 6 months
- Closed Head Injury: at least 9 months
- Spinal Cord Injury: at least 12 months
- Anoxia: at least 12 months
- Cerebral Palsy: delay until 6-8 years
Timing in Cerebral Palsy

Relative frequency of treatment type in cerebral palsy management programme

- BTX-A + motor training and orthoses
- Surgery (SEMLS)
- Isolated soft tissue and/or bony surgery for hip stability
- Casting and surgery
- Isolated use with repeat surgery, where indicated

Years

0 5 7.5 10 15
Principles of Orthopedic Surgery

• Single event, multilevel surgery
• Delay surgery as long as possible (> 6 years)
• Use spasticity management as adjunct to surgery
Avoid the Birthday Cake and Diving Syndrome

• Series of operations done one year apart so that child is either in the hospital or in recovery at all times
To improve muscular problems

- Tendon Lengthening
- Intramuscular Lengthening
- Muscle release
- Tendon Transfer
- Neurectomy
Effect of Lengthening on Muscle

- May reset the Golgi tendon complex
- Affects the muscle spindle
- Resets the feedback for the stretch reflex
Tendon Lengthening
Fascial Lengthening
Muscle Release
Tendon Transfer
Neurectomy
To improve static problems

• Reduce subluxated or dislocated joints
• Correction of bony abnormalities and rotational problems
• Fuse joints to provide stability
• Excision of heterotopic bone
Reduce subluxated or dislocated joints
Correct Rotational Abnormalities
Fuse Joints for Stability
Orthopedic Surgical Interventions: Spine

- Intervention to correct
  - Scoliosis
  - Spondylolisthesis
  - Hyperkyphosis
  - Hyperlordosis

Excise Heterotopic Bone in Head Injured Patients
Postoperative Care

• Postoperative Pain Management with
  – Epidural blocks
  – Caudal blocks
  – Local Nerve blocks
  – Local Anesthetic at the incision site

• Manage Spasticity with Oral Medication such as diazepam

• Short term or no casting postoperatively
Rehabilitation

• Most important part of orthopedic surgery
• Usually provide a 6-8 week period of intensive therapy (2-3 times/week)
• Work on strengthening as soon as possible
• Immobilize as little as possible
Role of Orthotics and Braces

- Rarely use full leg braces in ambulatory patients
- Role of Serial Casting
- Can use hip abduction brace to maintain hips in acetabulum
- Use articulated or hinged Ankle-foot Orthoses (AFO) in ambulatory patients
- Orthotics rarely work in children with valgus flat feet.
So What does Orthopedic Surgery have to Offer?

- Lengthen tendons
- Transfer tendons
- Relocate joints
- Rotate bones
- Fuse joints
- Cut nerves