

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

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The image features three anatomical illustrations on the left side. At the top is a hand skeleton. Below it is a foot skeleton. At the bottom is a wireframe illustration of a human torso, showing the ribcage and spine. The background is dark with a light grid pattern.

Indications for Orthopedic Surgery

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

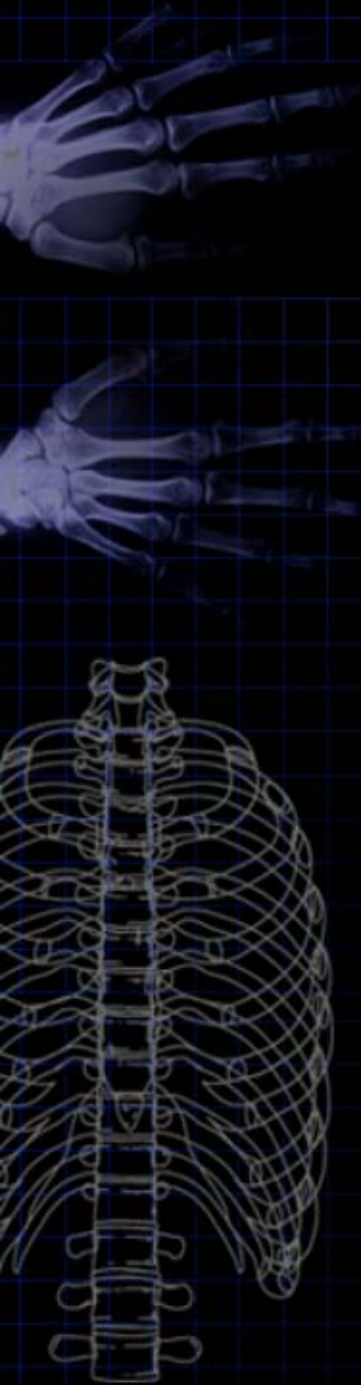
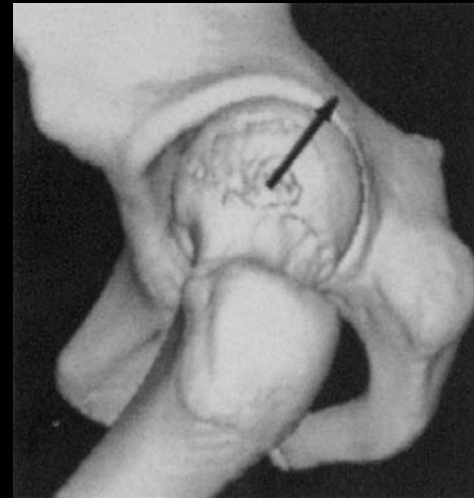


Planning for surgery

- 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



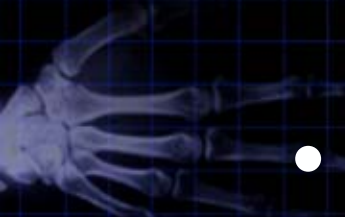
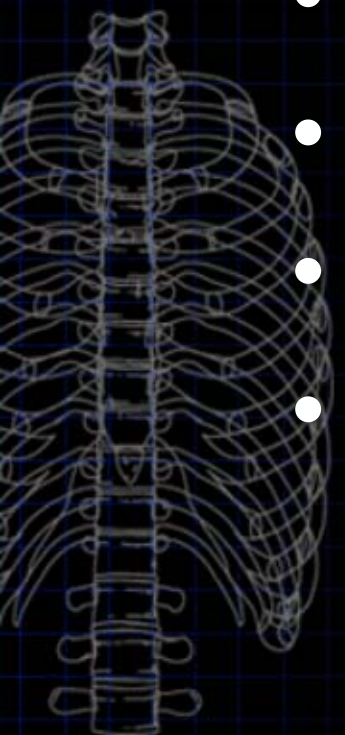
Gait Analysis

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



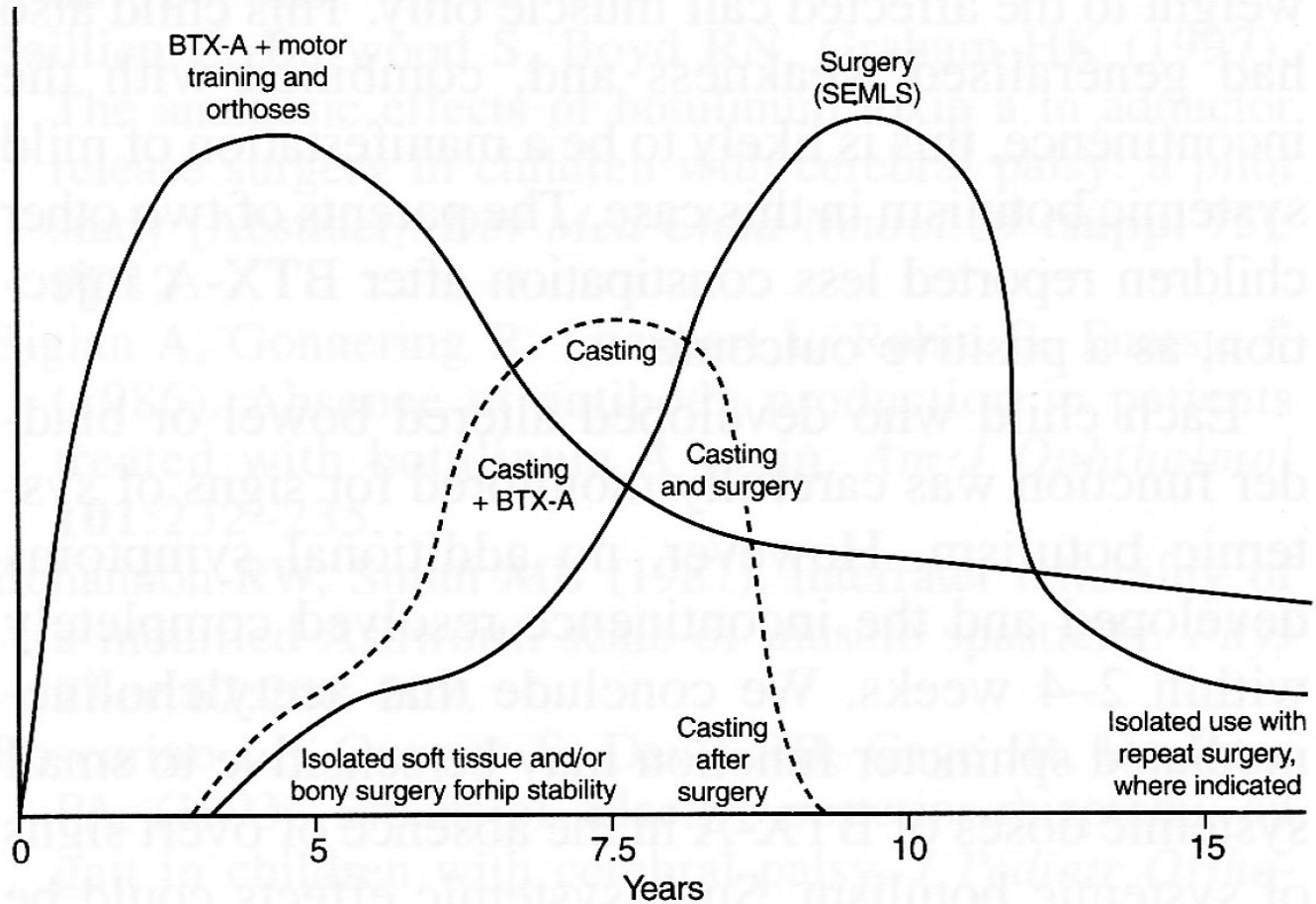


Timing of the Surgery

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- 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



The slide features three anatomical illustrations on the left side. At the top, there is a detailed 3D model of a human hand skeleton. Below it is a similar 3D model of a hand skeleton, but with a different perspective or lighting. At the bottom is a wireframe illustration of a human ribcage and spine, showing the skeletal structure in a light blue color.

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

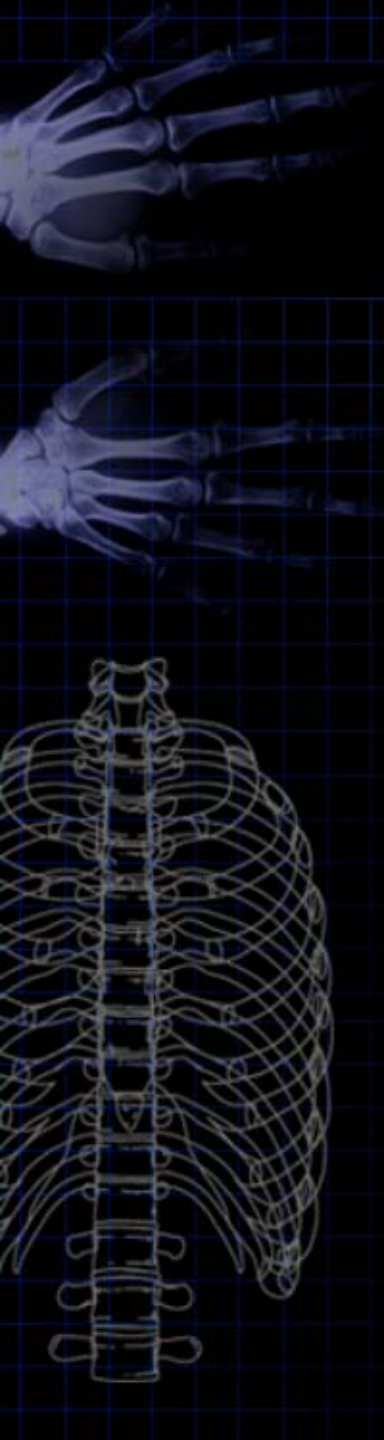
- Series of operations done one year apart so that child is either in the hospital or in recovery at all times



The background features three anatomical illustrations in a light blue color. At the top left, there is a detailed view of a hand and forearm skeleton. Below it, another view of a hand and forearm is shown from a different angle. On the left side, there is a wireframe illustration of a human ribcage and spine.

To improve muscular problems

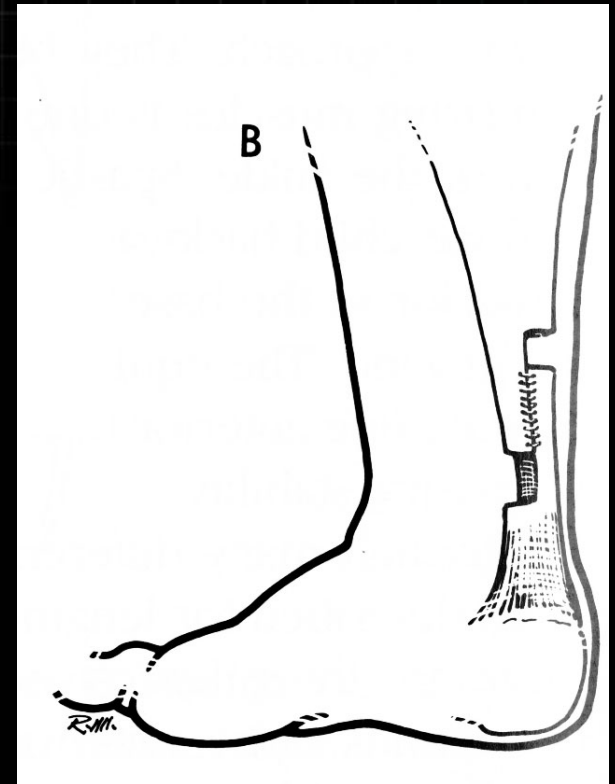
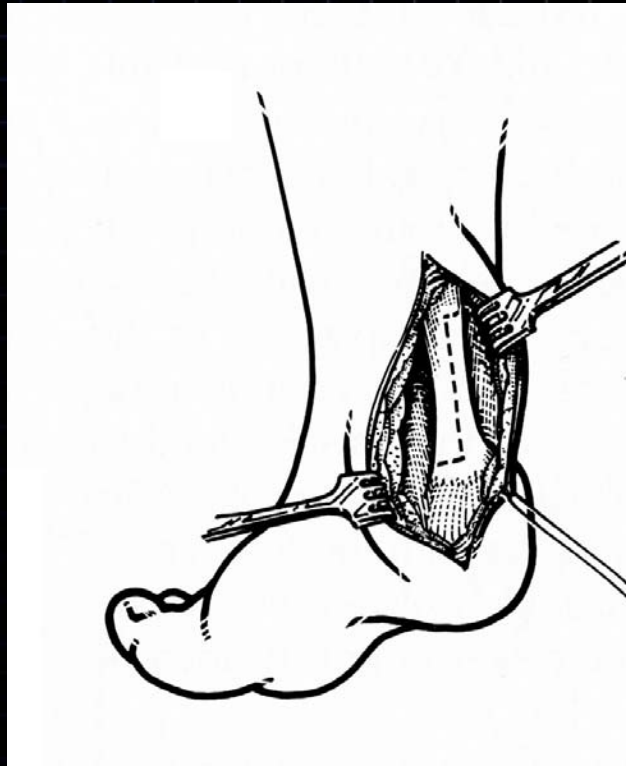
- Tendon Lengthening
- Intramuscular Lengthening
- Muscle release
- Tendon Transfer
- Neurectomy

The background features three anatomical illustrations in a light blue color. At the top left is a hand skeleton. Below it is another hand skeleton, possibly showing a different view or a different part of the hand. At the bottom left is a wireframe illustration of a human ribcage and spine.

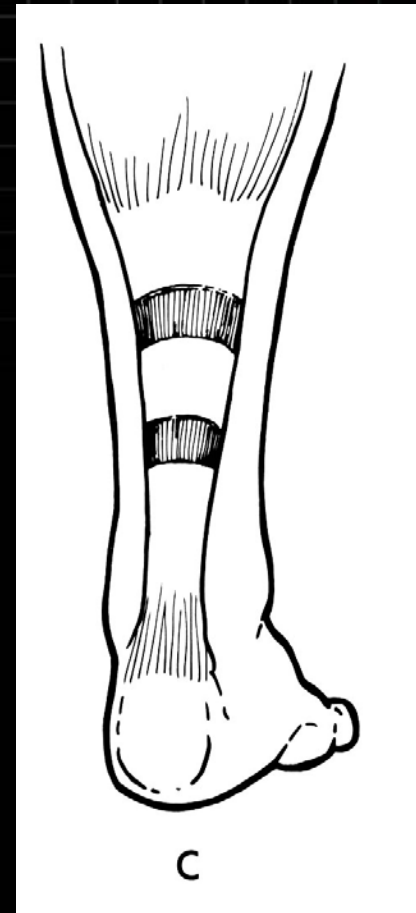
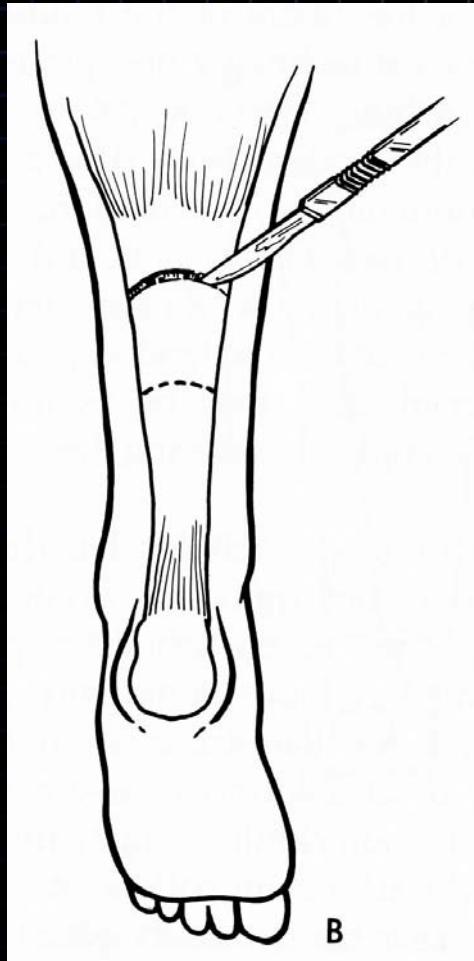
Effect of Lengthening on Muscle

- May reset the Golgi tendon complex
- Affects the muscle spindle
- Resets the feedback for the stretch reflex

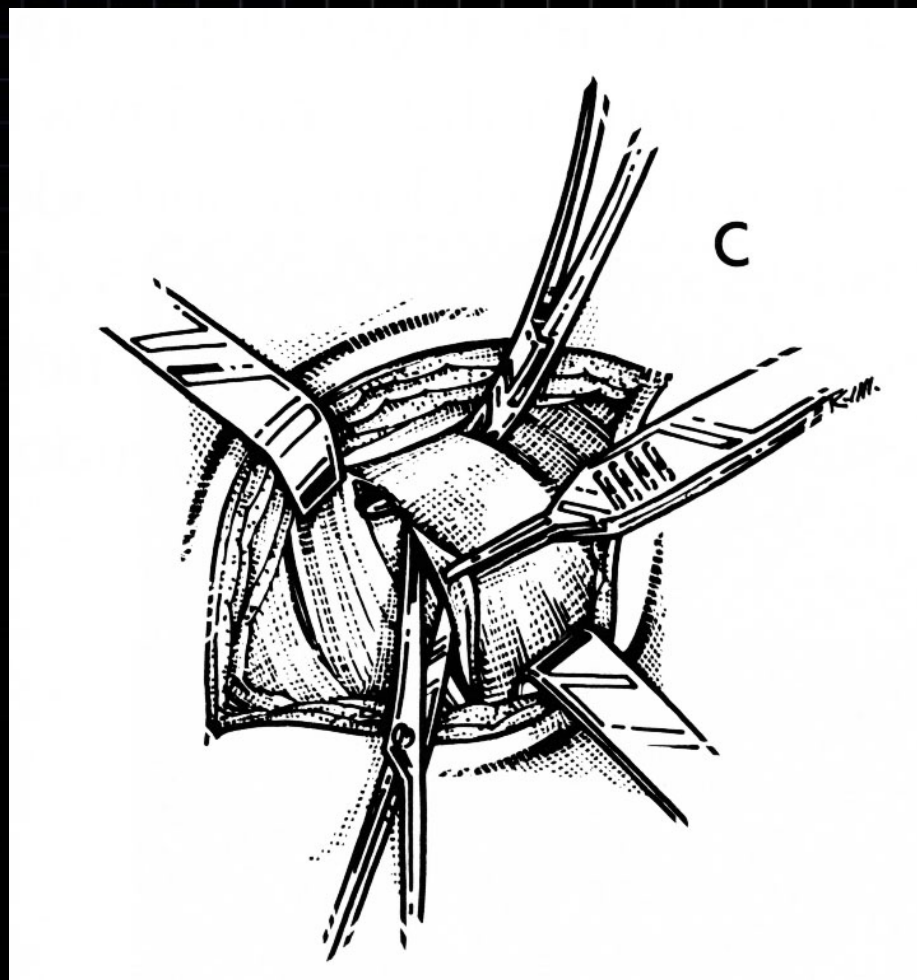
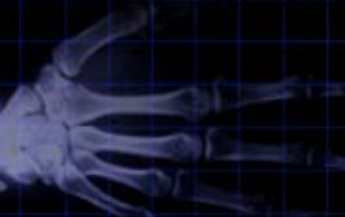
Tendon Lengthening



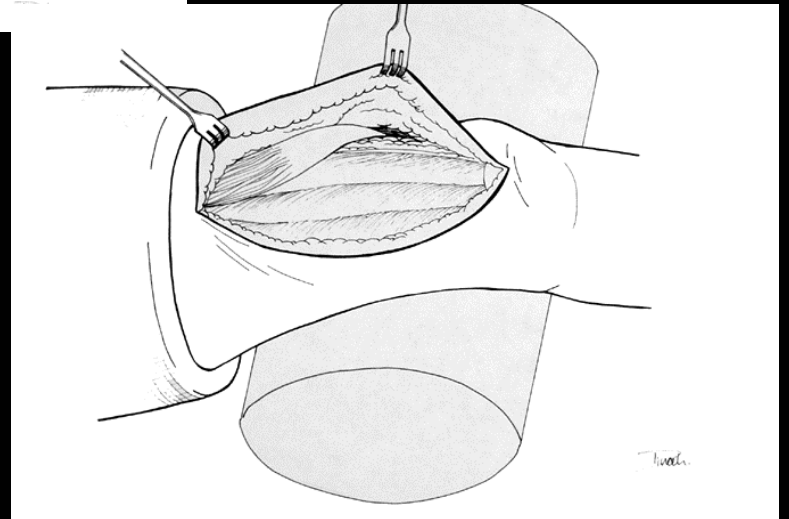
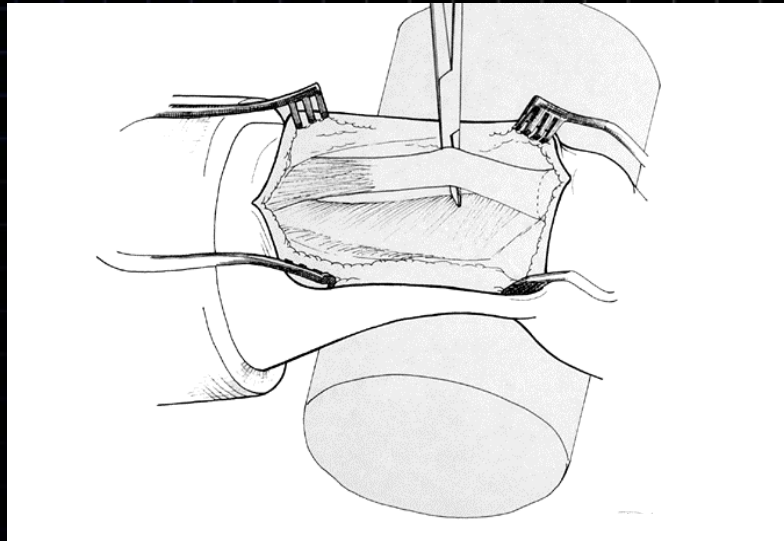
Fascial Lengthening



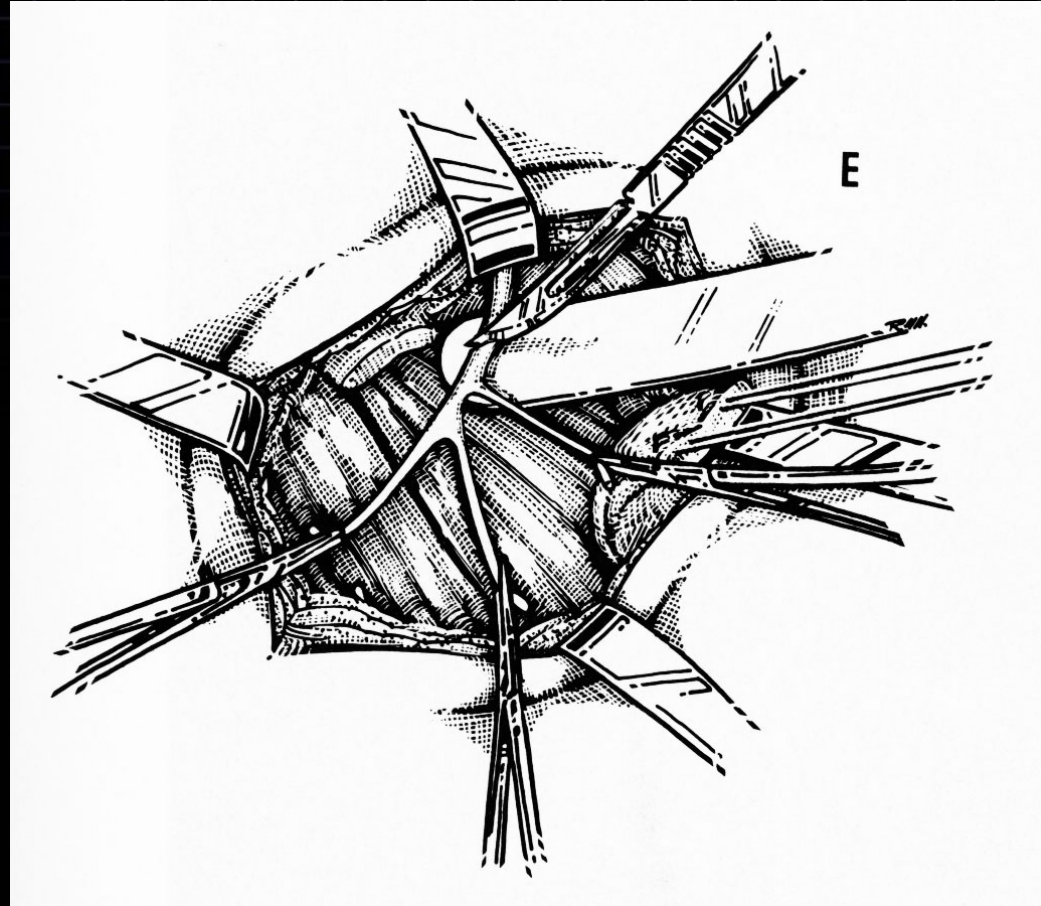
Muscle Release



Tendon Transfer



Neurectomy





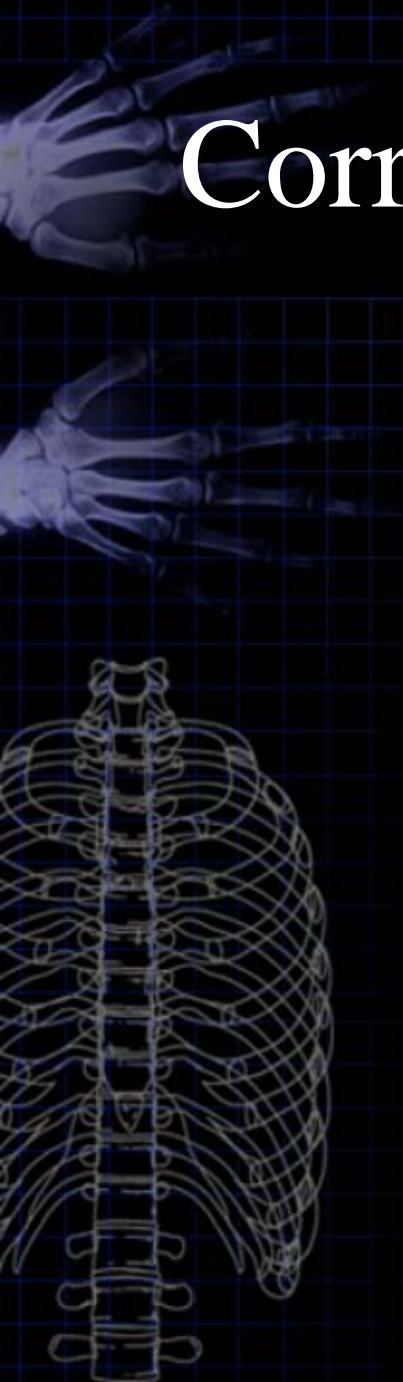
To improve static problems

- Reduce subluxated or dislocated joints
- Correction of bony abnormalities and rotational problems
- Fuse joints to provide stability
- Excision of heterotopic bone

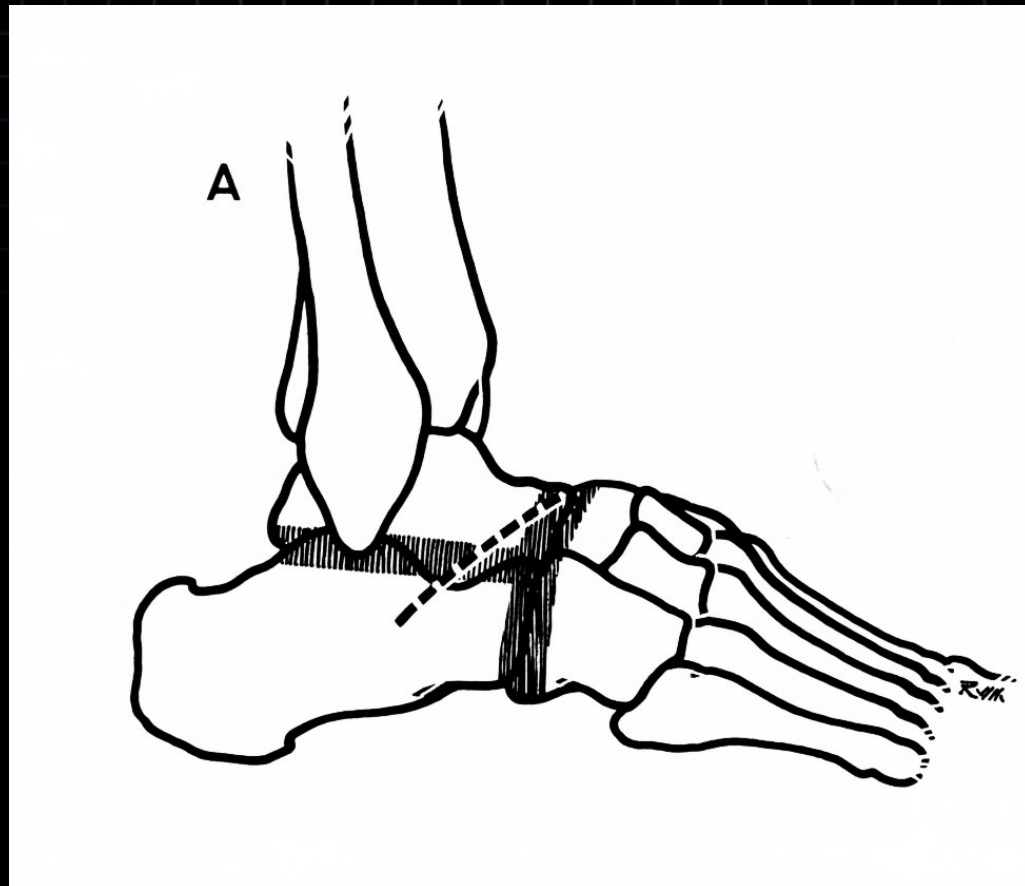
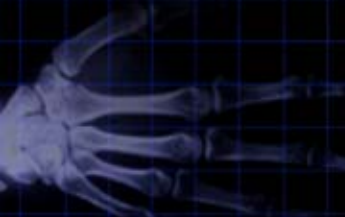
Reduce subluxated or dislocated joints



Correct Rotational Abnormalities



Fuse Joints for Stability

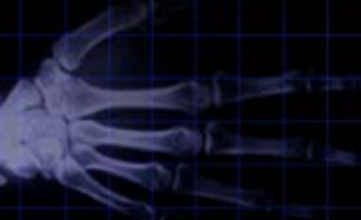


Orthopedic Surgical Interventions: Spine

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



Excise Heterotopic Bone in Head Injured Patients



The slide features three anatomical illustrations on the left side. At the top is a skeletal view of a hand. Below it is a skeletal view of a hand with a blue cast on the wrist. At the bottom is a wireframe illustration of a human torso, showing the ribcage and spine.

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

The image features three anatomical illustrations on the left side. At the top is a hand skeleton, showing the metacarpals and phalanges. Below it is a foot skeleton, showing the tarsals, metatarsals, and phalanges. At the bottom is a wireframe illustration of a human torso, showing the ribcage, spine, and pelvis. The background is a dark blue grid.

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

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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