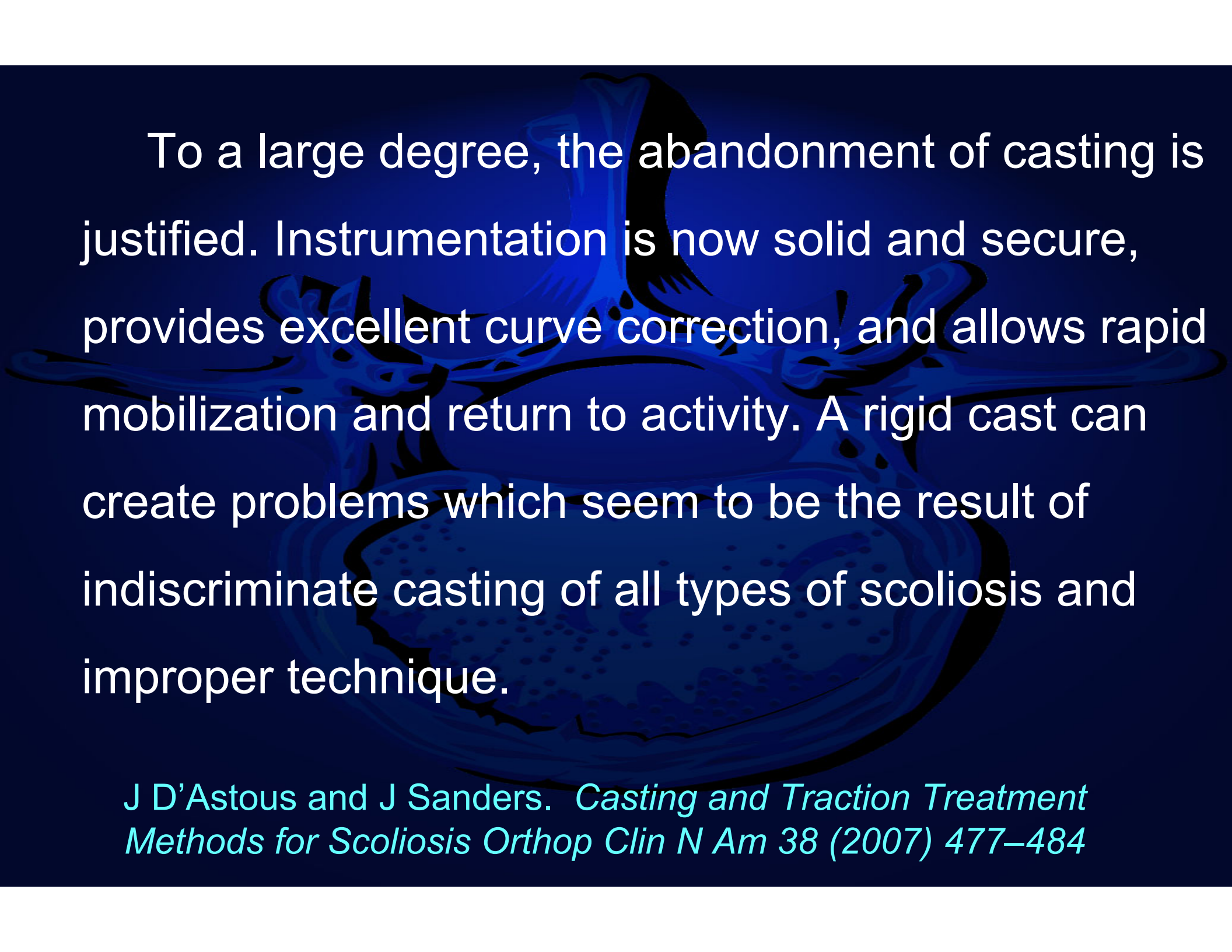




Complications Of Non-operative Management

Hazem B Elsebaie FRCS MD

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To a large degree, the abandonment of casting is justified. Instrumentation is now solid and secure, provides excellent curve correction, and allows rapid mobilization and return to activity. A rigid cast can create problems which seem to be the result of indiscriminate casting of all types of scoliosis and improper technique.

J D'Astous and J Sanders. *Casting and Traction Treatment Methods for Scoliosis Orthop Clin N Am* 38 (2007) 477–484

Value of Conservative treatment

- Definitive Treatment :
 - Casts in infantile idiopathic scoliosis
- Delaying Tactic:
 - Casts / Braces in EOS
- Adjunctive to Operative treatment:
 - Preoperative traction
 - Post operative casts or braces
- Others ??:
 - Electrical stimulation
 - Exercise
 - Manual therapy

Historical Background

- Axial traction in Hindu epics (3500 BC to 1800 BC).
- Details of traction by Hippocrates (460 BC to 377 BC)
- First brace by the French Ambrose Pare' (1510–1590)
- Sayre combined plaster cast and traction and Gymnastic exercises (1874-1892).
- Full-time Turnbuckle cast by Lovett and Brewster (1924)



Types of conservative treatment

- Types of Casts
(progressive infantile)

- *Turnbuckle

- *Risser Localizer

- *EDF (elongation derotacion flexion)
Cotrel/Morel modified by Mehta

Elongation: unwind the curve

Derotate: the chest manually

Flexion of the hips: to control the lumbar spine



Turn buckle Brace

Types of conservative treatment

Types of Braces

(older age group)

*CTLSO (Milwaukee)

*TLSO (Boston) full time

*Night time overcorrecting brace
(Charleston, Providence)

*Dynamic braces (Spine Cor, Tria C...)



Night time brace

Types of conservative treatment

- Types of Traction

- *Halo Femoral

- *Halo Pelvic

- *Halo Gravity:

- Halo Walker,

- Halo Wheelchair,

- Reverse Trendelenberg...



Halo Wheelchair

Casts (Limitations / Prerequisites)

Patients:

- Age: less than 3 years
- Size: of curve smaller (up to moderate)
- Single curve
- Type : Idiopathic / Idiopathic like
- Phenotypes

Parents:

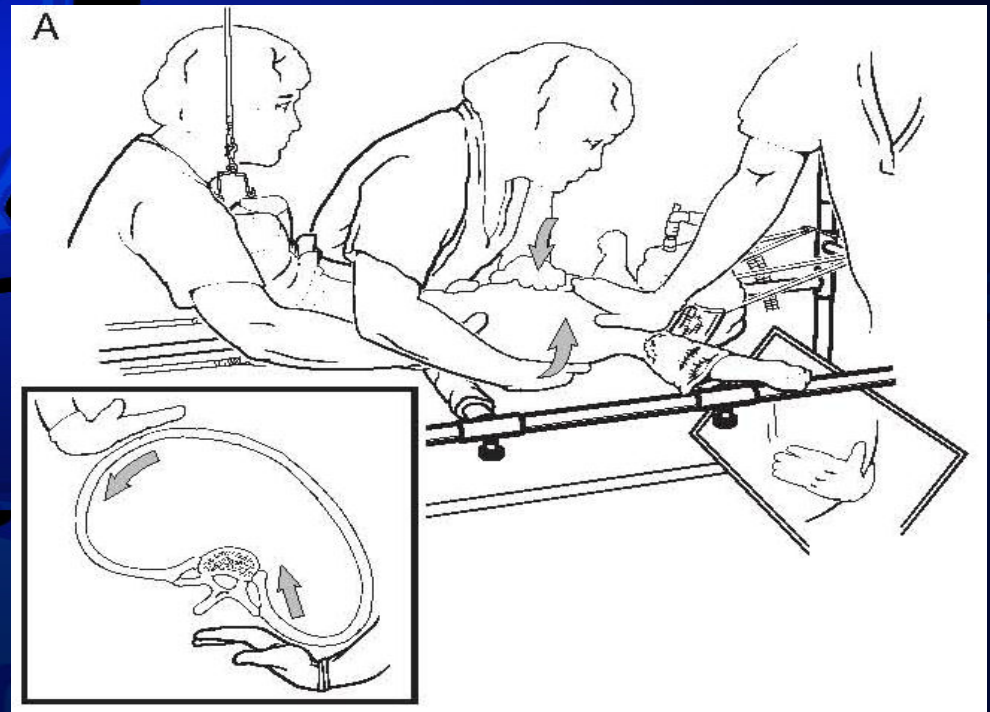
- Commitment
- Understanding



Casts (Limitations / Prerequisites)

Physician:

- Interested !
- Dedicated Team
- Training
- Patience
- Never takes failures personal !
- Knows when to convert to surgical treatment



Derotational Casting for Progressive Infantile Scoliosis
James O. Sanders, MD et al; J Pediatr Orthop 2009

Casts (Disadvantages)



Patients:

- Annoying
- General Anesthesia every 2-3 months for years
- Radiation exposure

Physician: (impression)

- Time consuming !
- Difficult !
- Results unpredictable
- Special set up

Casts (Complications & Prevention)

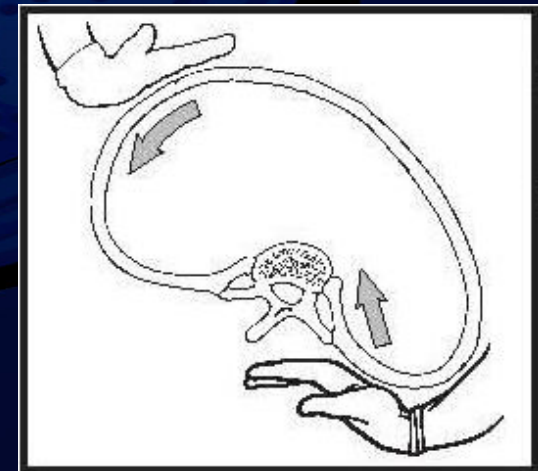
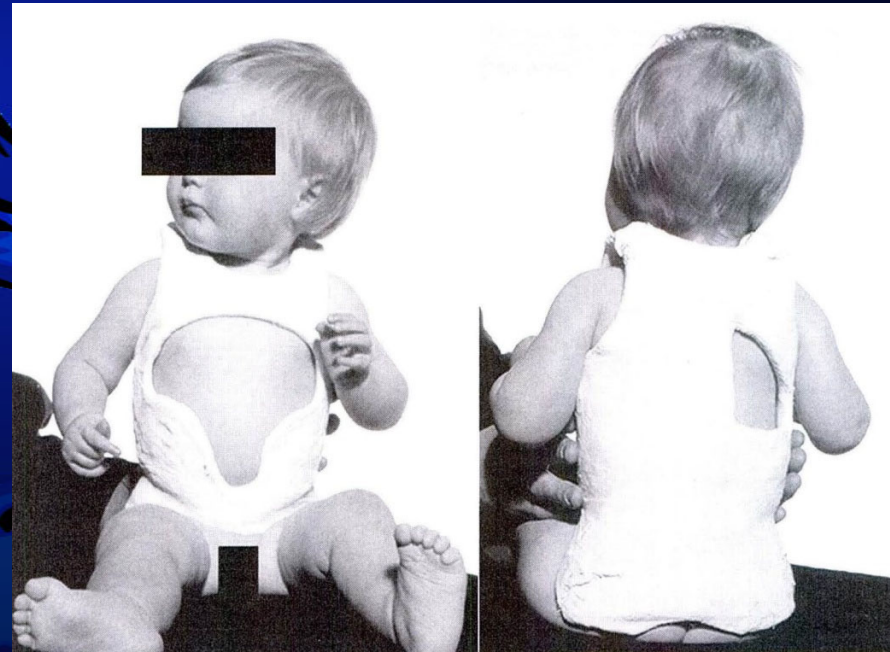
- Skin irritation: proper material and technique.
- Pressure sore:
 - Use heel of the hand in molding (fingers up)
 - No extra padding rather a uniform thin layer
 - Extra felt on bony prominence (mainly Iliac crest)
- Slippage and failure to support the curve: pelvic portion well molded.



Casting and Traction Treatment Methods for Scoliosis
D'Astous J and Sanders J Orthop Clin N Am 38 (2007)

Casts (Complications & Prevention)

- Rib cage deformity:
A big anterior window is made to relieve the chest and a V shaped lower part to prevent the lower ribs from rotating.
- Chest constriction: no rib pushing toward the spine rather derotation
- Ventilation problems during molding :
General anesthesia with intubation



Casts (Complications & Prevention)

- Psychological impact: counseling!
- Progression of curve and loosing the opportunity of a satisfactory surgical treatment: timely response to progression and initiation of surgical treatment
- Superior mesenteric artery syndrome!



Casts

- Training
- Meticulous techniques
- Proper judgment

Brace (Limitations and Disadvantages)

- Effectiveness in progressive early onset scoliosis ?
- Noncompliance: outright refusal, premature discontinuation, to less than fulltime use: reduced wearing times
- Emotional difficulties: counseling
- Unacceptable appearance, fear of ridicule: lower profile, modern materials.

Brace (Complications)

- Discomfort from chin and throat contact or from the pelvic portion of the brace: newer versions.
- Orthognathic deformities from the chin rest (a fixed mandibular and occipital assembly) in Milwaukee brace: changed to a throat pad or TLSO.



Brace (Complications)

- Distortion of the rib cage and reduction of pulmonary function: less circumferential fit





Brace

Modern materials

Lower profiles

Reduced wearing times

Traction (complications & prevention)

- Pin Placement:
 - avoid the anterior frontal sinus with the most medial pin.
 - too medial can cause supraorbital or supratrochlear nerve damage.
 - too laterally (behind the hairline) leads to skull penetration and difficulty with mastication.
- Ring size:
 - allows 1 to 2 cm of clearance between the skin and halo, this alleviates problems caused by edema and facilitates proper pin care.



Traction (complications & prevention)

- Skull penetration and brain or epidural abscess:
 - pins retightened at 24 hours after halo application.
 - further tightening can lead to penetration.
- Pin tract infections, pin loosening:
 - meticulous daily attention
 - remove all encrusted
 - the pins are cleansed once a day .
 - the hair and scalp should be washed at least once a week.



Traction (complications & prevention)

An anatomical illustration of a human skull and upper cervical spine. A blue cervical collar is shown around the neck, with a vertical blue strap extending upwards. At the top of the strap, there is a black hook and a black weight. The skull is shown in a slightly elevated perspective, with the brain and facial structures visible. The background is a dark blue gradient.

- Cranial nerve palsy
(abducens, oculomotor, glossopharyngeal, hypoglossal)
 - ask about double vision, difficulty swallowing, voice hoarseness, and tongue weakness.
- Paraplegia, paraparesis:
 - document the patient's weight and note all increases in weight.
 - neurologic examination and repeat at 2, 4, and 8 hours after increasing the traction weights

Traction (complications & prevention)



- pain and weakness of neck musculature: shorter period
- avascular necrosis of the odontoid



Traction

- Proper Application
 - Care
- Monitoring and anticipation

Conclusion

- Conservative treatment is old fashion however it can be very effective and sometimes the only treatment option available.
- Understanding, training and meticulous approach can reduce the rate of complication significantly.
- Revisiting and improving these techniques is important for the overall outcome of our patients.



Thank You