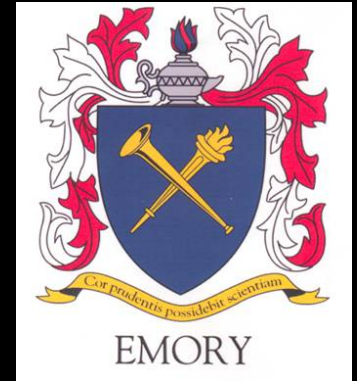


Pectus Excavatum - Nuss Procedure



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Pectus Excavatum



- Congenital deformity of the anterior chest wall
 - Abnormal musculoskeletal growth displaces the sternum posterior
 - “Sunken chest”
 - “Funnel chest”







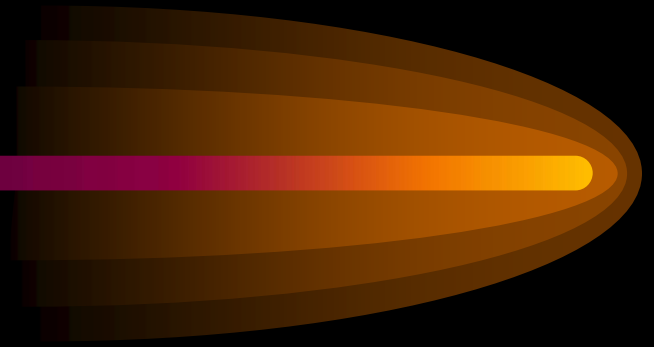
Etiology

- Mechanism for abnormal growth is unknown
- Multifactorial
 - Mechanical factors during growth
 - Metabolic factors
 - Genetic
 - Familial incidence
 - Association with Marfans syndrome and Polands syndrome





Presentation



- Birth
 - >90% diagnosed within first year of life
- Teenage years
 - Worsening of appearance
 - Onset of symptoms
 - Shortness of breath
 - Pain
 - Self-esteem and body-image perception





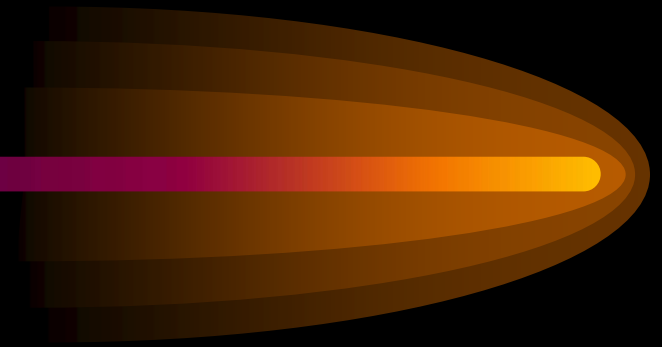
Evaluation

- History and physical
- Chest xray
- CT scan
- Echocardiography
- Pulmonary function testing





History



- Symptoms
 - Shortness of breath
 - Chest pain
 - Self esteem
- Progression
 - Better, worse, same

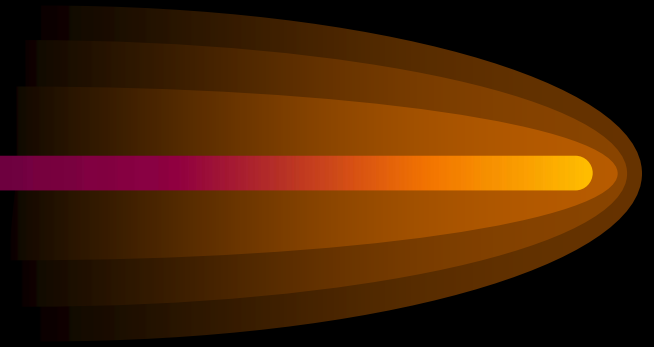
(subjective)





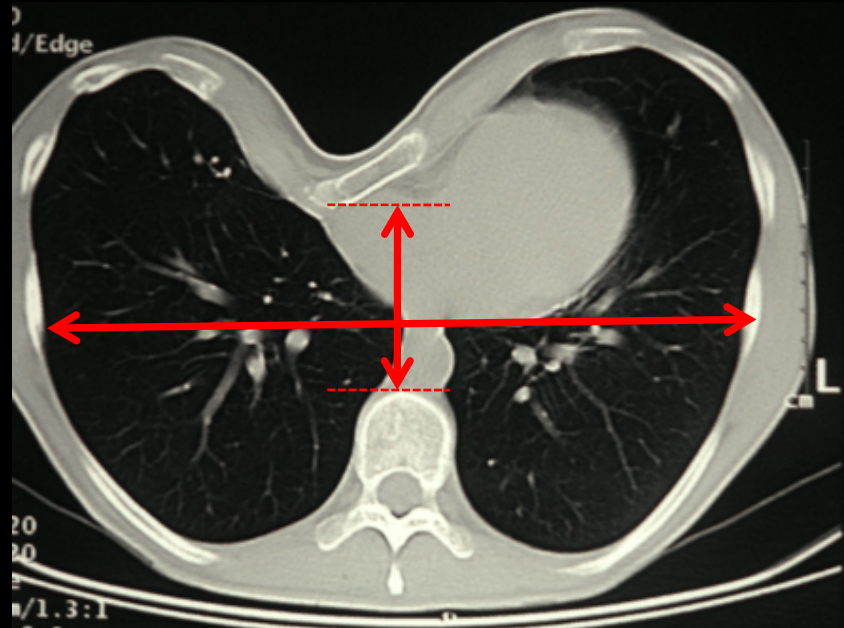
Imaging

- CXR



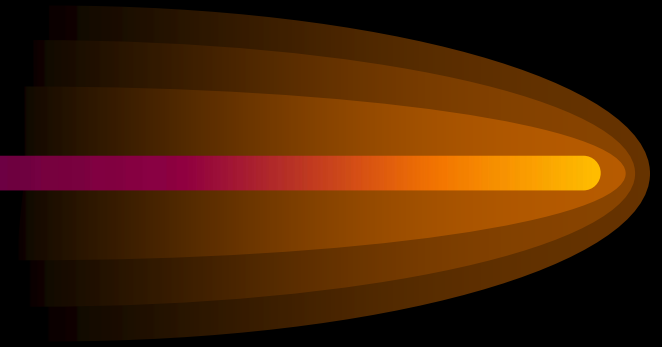
Imaging

- CT scan
 - Haller Index
 - Dividing transverse diameter by anterior-posterior diameter





Echocardiogram



- Cardiac compression
 - Right ventricular outflow tract obstruction
 - Valve regurgitation





Pulmonary function tests

- Measures pulmonary volumes, ventilation, and exercise tolerance





Indications for surgery

- Cosmetic
- Medical
 - Presence of symptoms
 - Defect worsening over time
 - Haller Index > 3.2
 - Cardiopulmonary impairment
 - Abnormal echocardiogram
 - Abnormal pulmonary function tests





Treatment

- Physical therapy / postural exercises
- Orthopedic devices
- (largely ineffective – inability to alter skeletal growth)





Treatment

- Surgical
- Ravitch procedure (1949)
 - Anterior chest wall exposure
 - Creation of muscle/skin flaps
 - Cartilage resection
 - Sternal osteotomy





Treatment

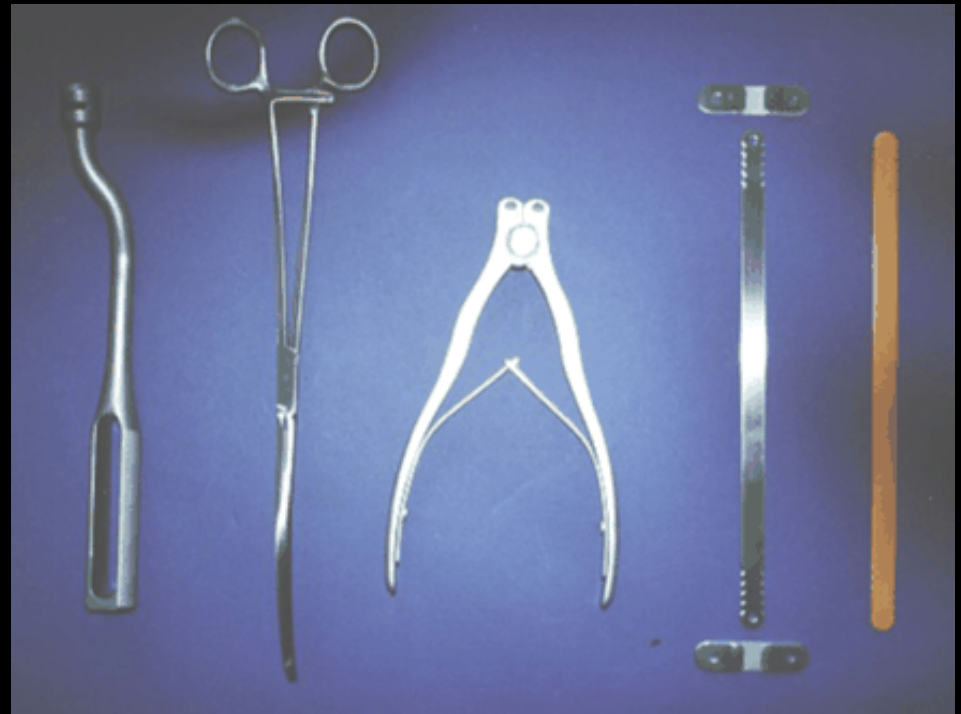
- Surgical
- Nuss procedure (1987)
 - Placement of retrosternal bar

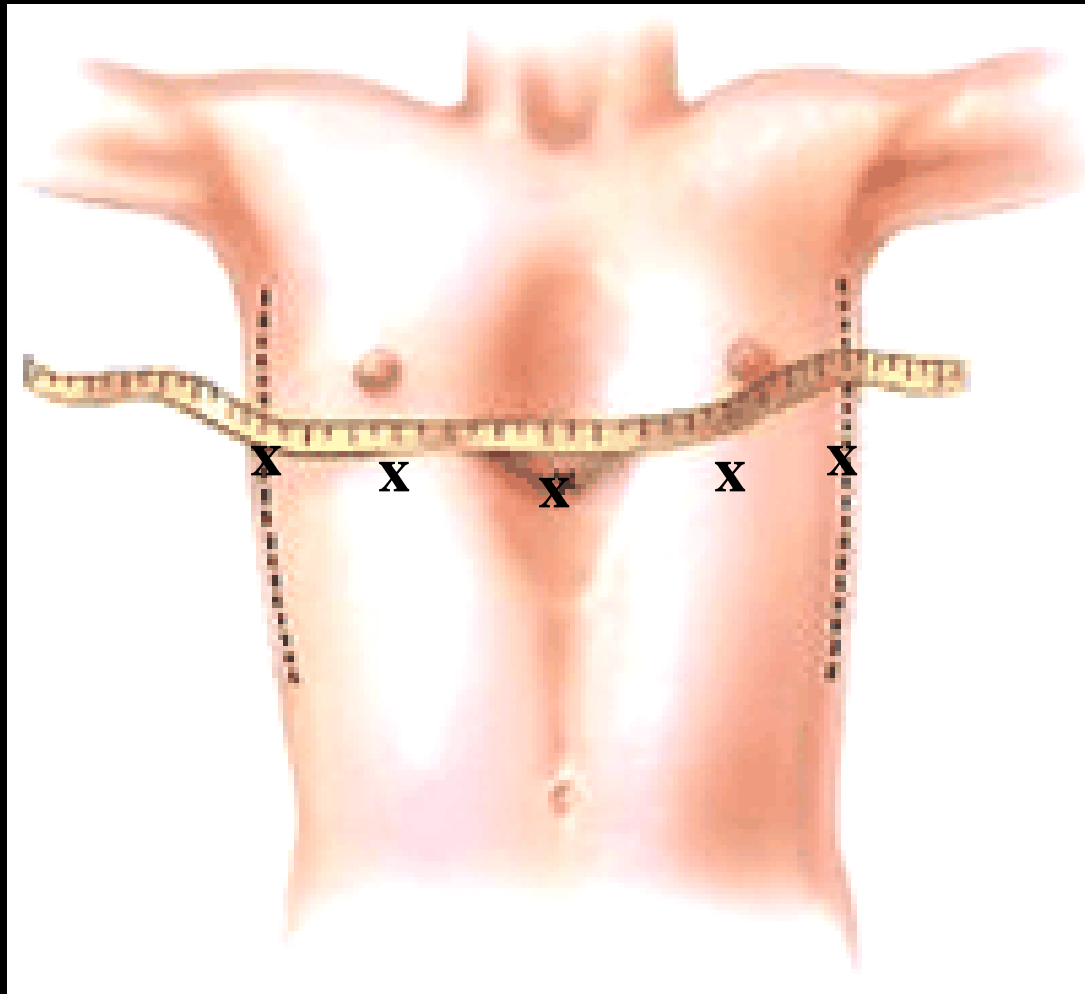




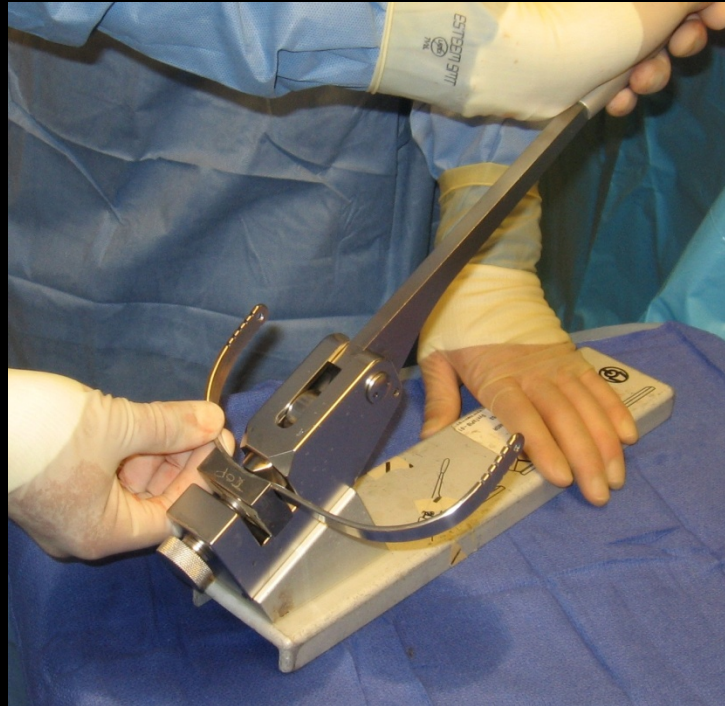
Instruments

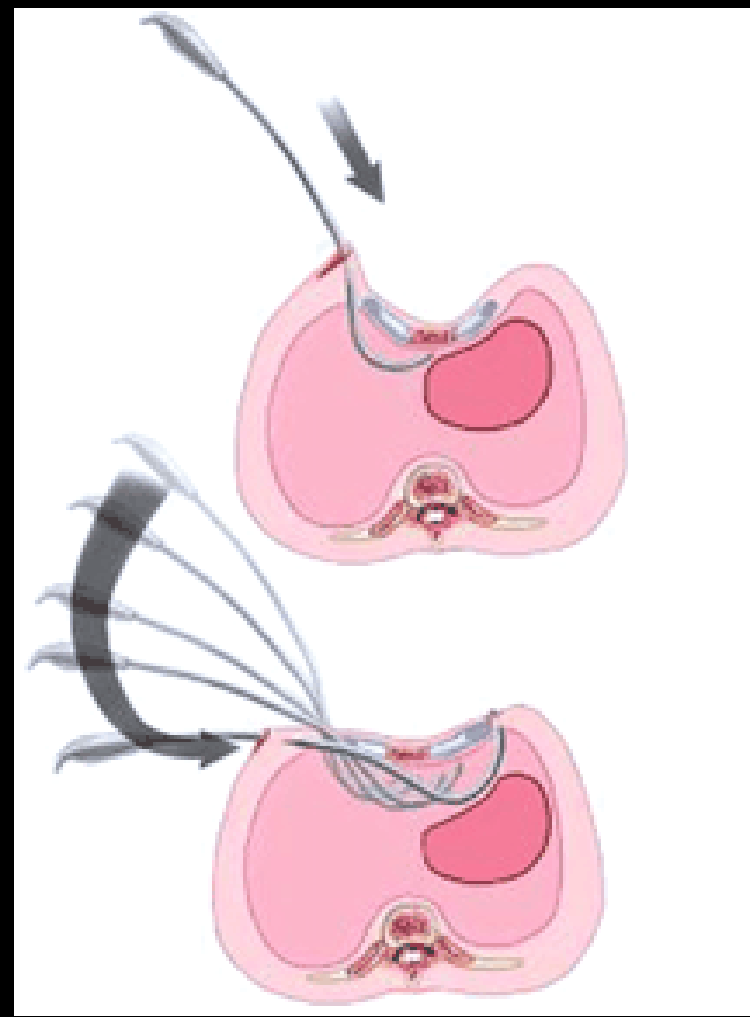
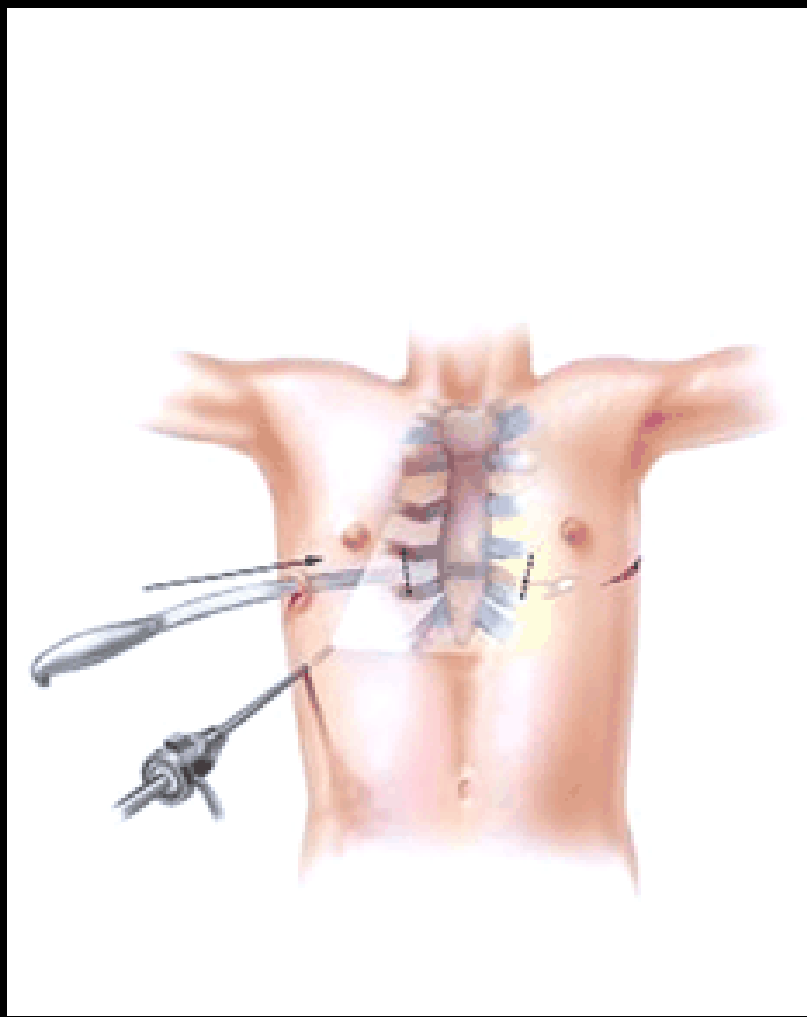
- Flipper
- Tunneler
- Bender
- Nuss Bar / Stabilizer
- Template bar

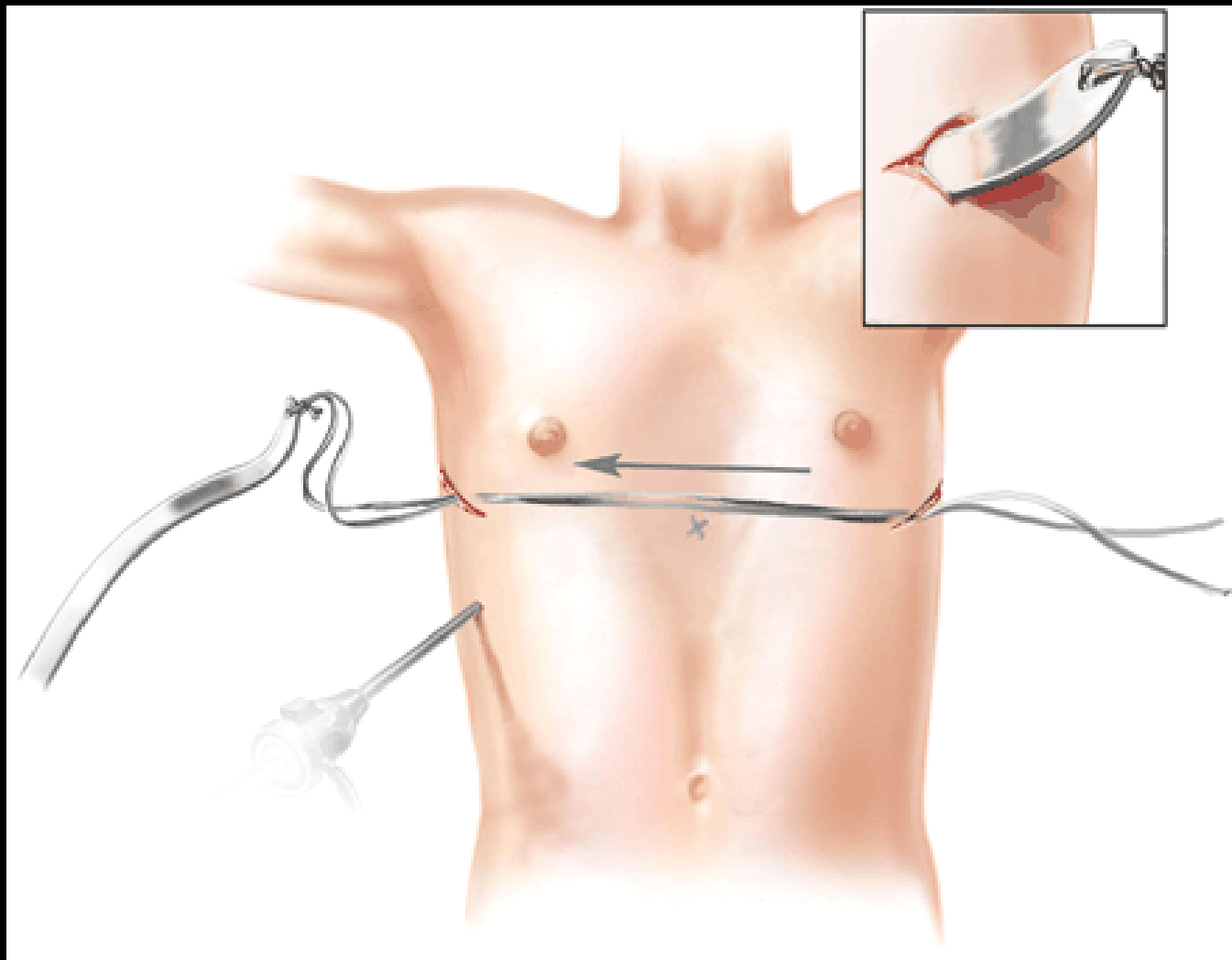




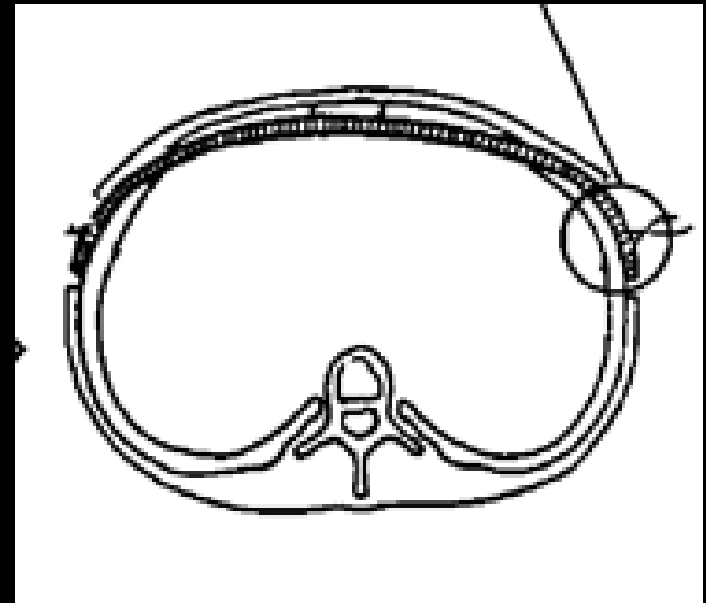
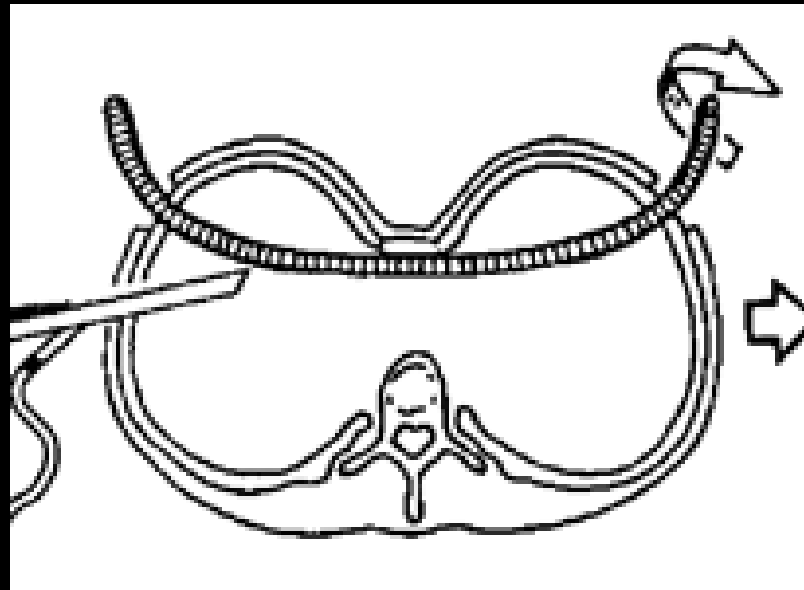




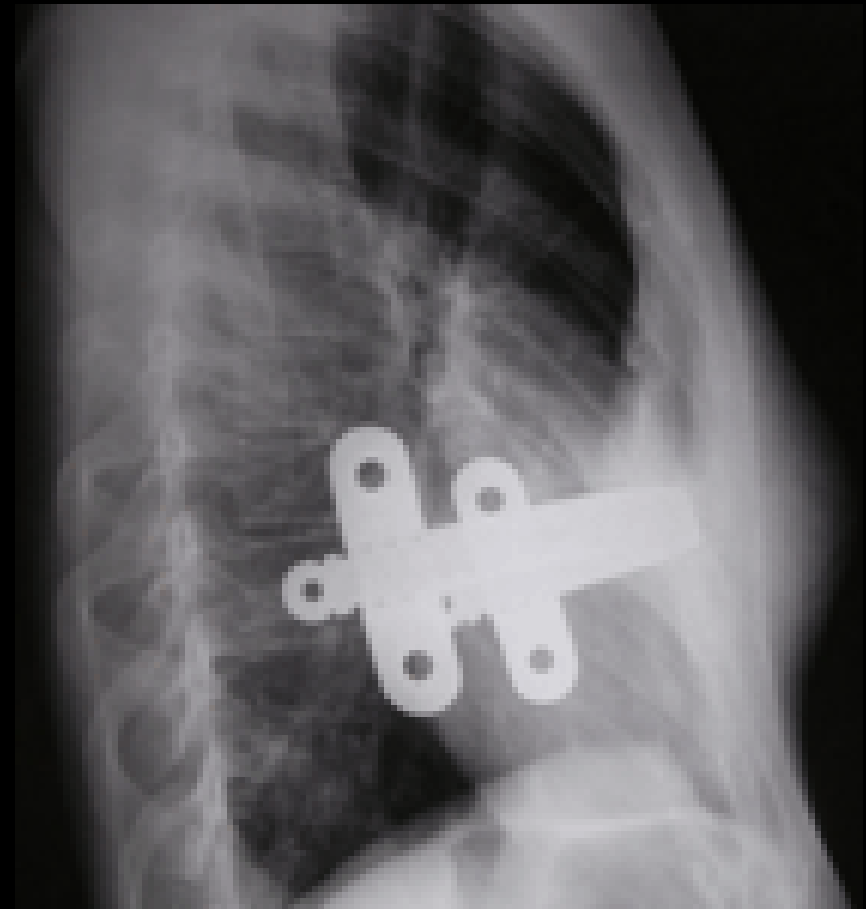
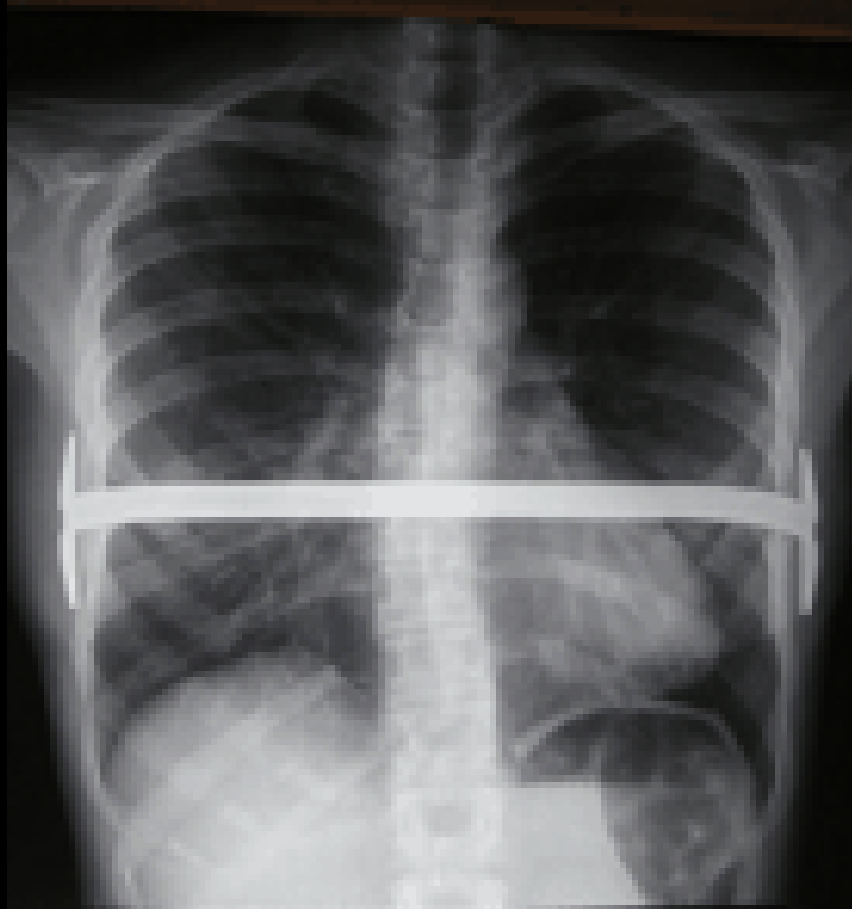




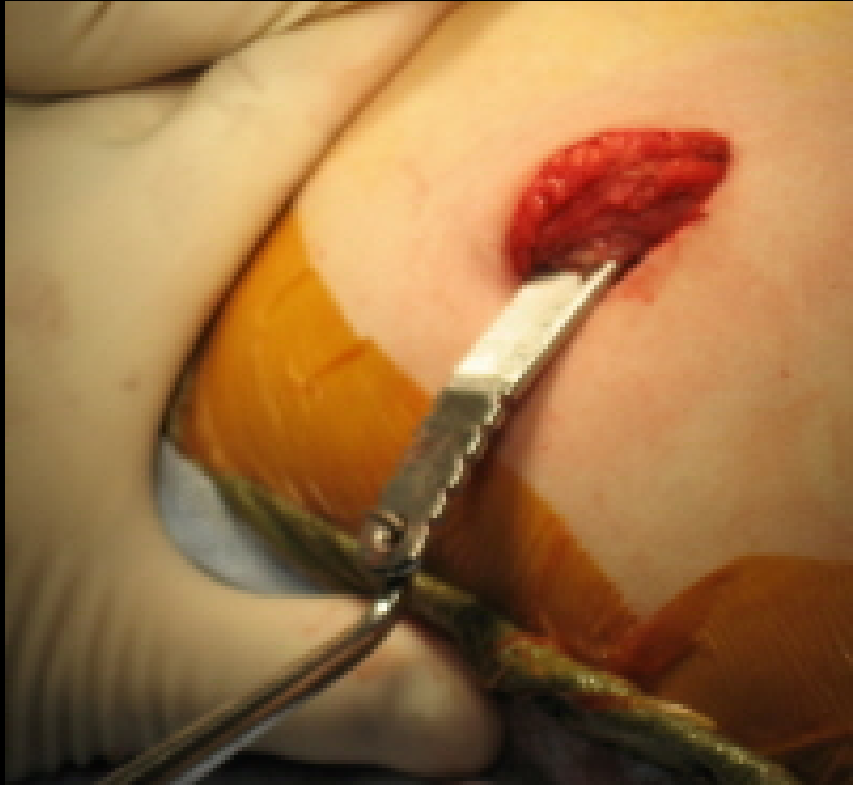














Initial results

(344 patients)

Satisfaction

Excellent	291/344	84.6%
Good	52/344	15.1%
Failed	1/344	0.3%





Long-term results

(79 patients, 23%)

Time post-bar removal

>5 years	(n=24)	30.4%
1–5 years	(n=18)	22.8%
<1 year	(n=37)	46.8%

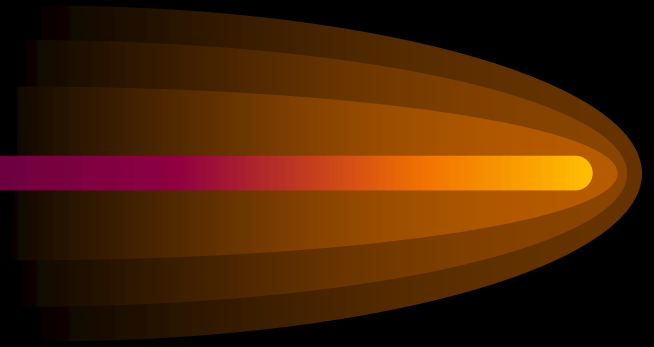
Satisfaction

Excellent	56/79	70.9%
Good	15/79	19.0%
Failed	8/79	10.1%



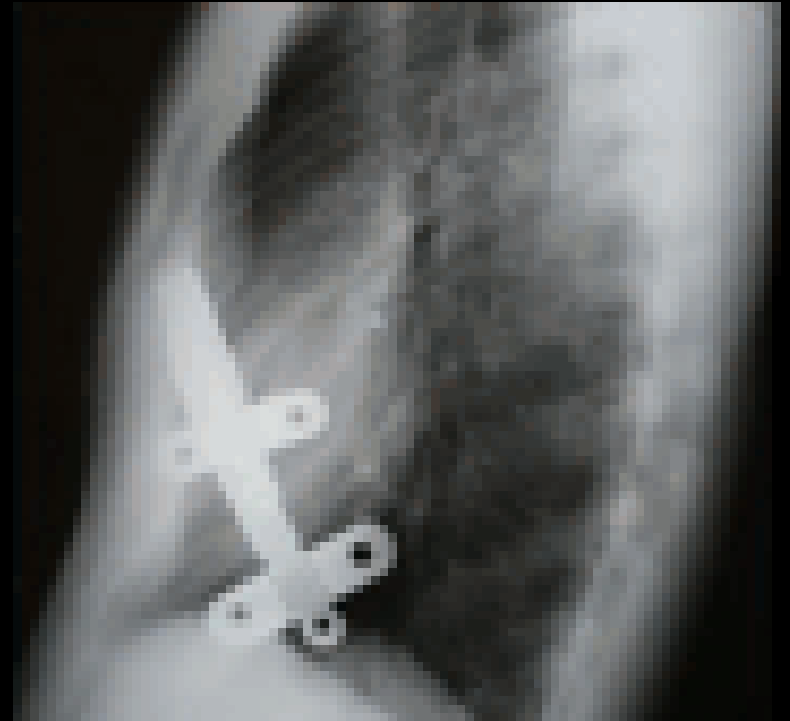
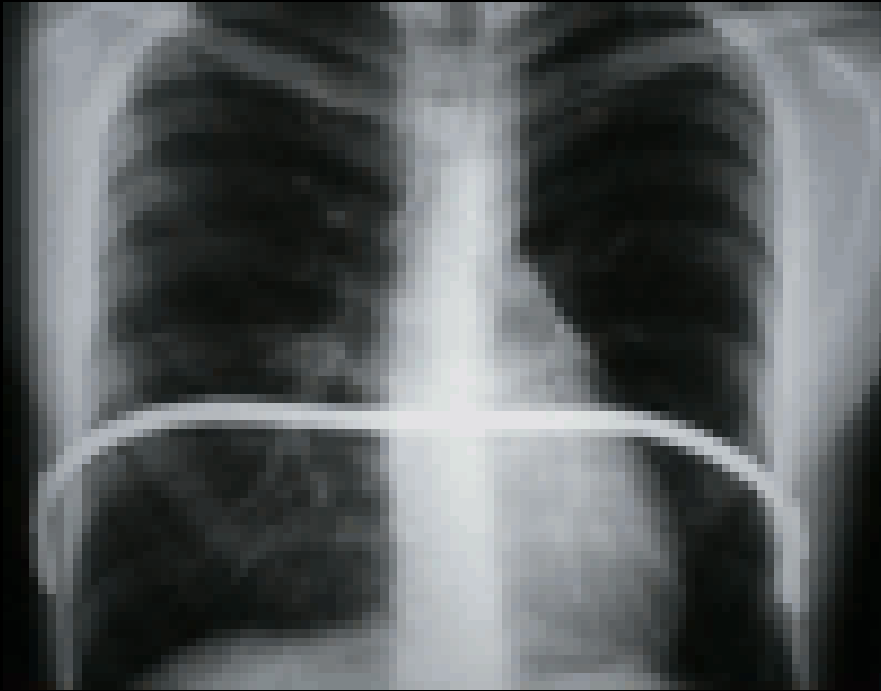


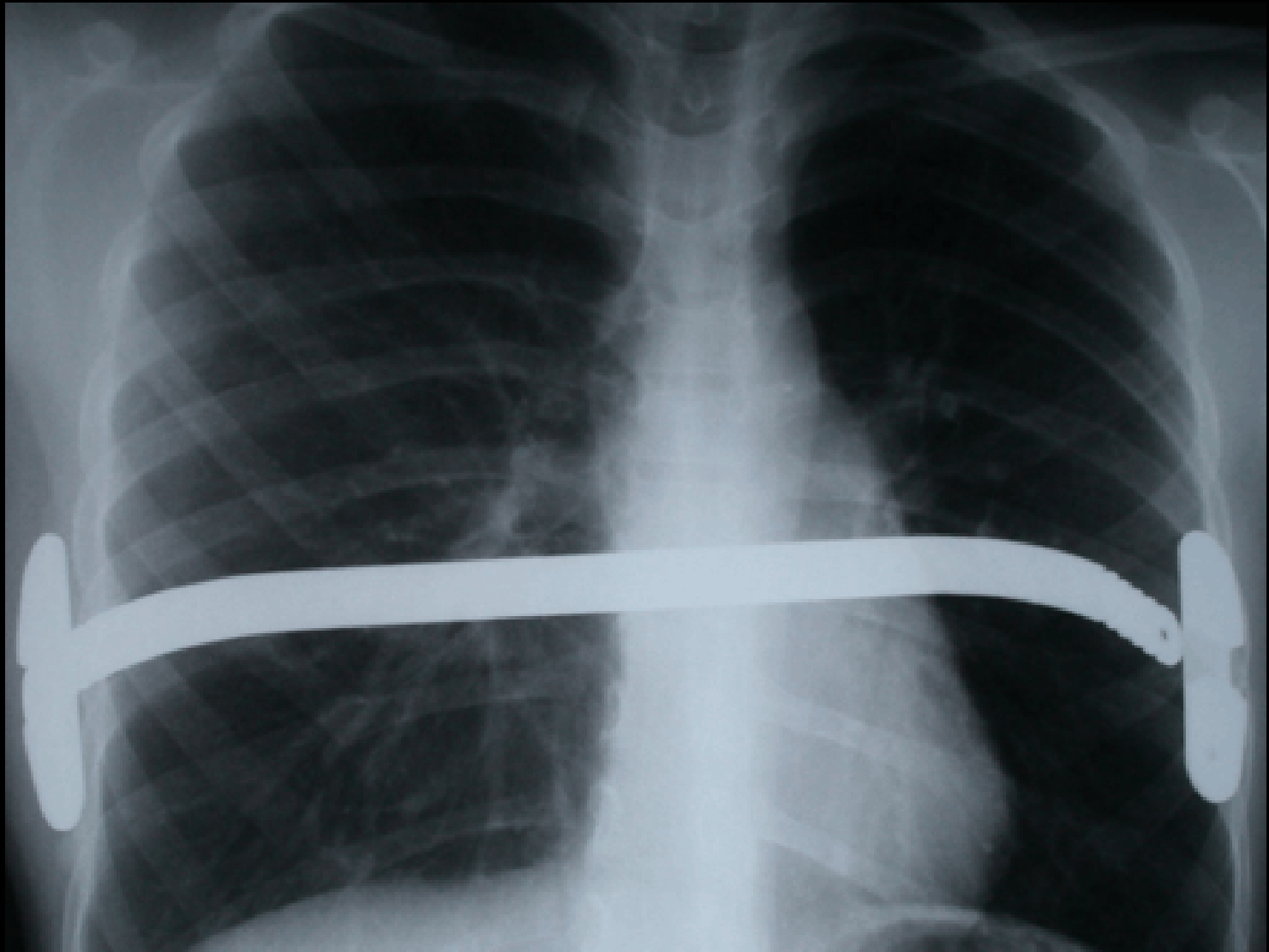
Complications



- Intraoperative
 - Pneumothorax
 - Massive hemorrhage
- Postoperative
 - Bar migration or displacement
 - Persistent pain
 - Recurrence









Conclusion

- Ravitch and Nuss provide excellent results
 - Nuss procedure
 - Decreased operative time
 - Decreased hospital stay
 - Lower cost of hospitalization
 - Increased complications
 - Increased recurrence/dissatisfaction
- Surgeon experience and attention to technical operative details are essential for success



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