



The Bandwagon I jumped on an then off...

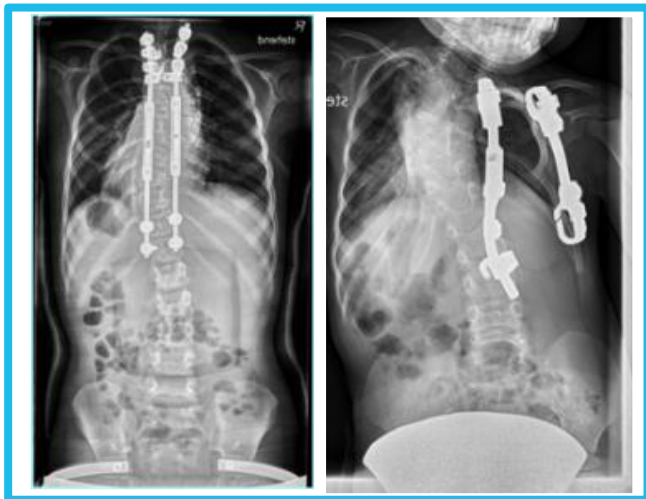
ICEOS Lisbon 2018

Carol Hasler Basel / Switzerland

Disclosure information

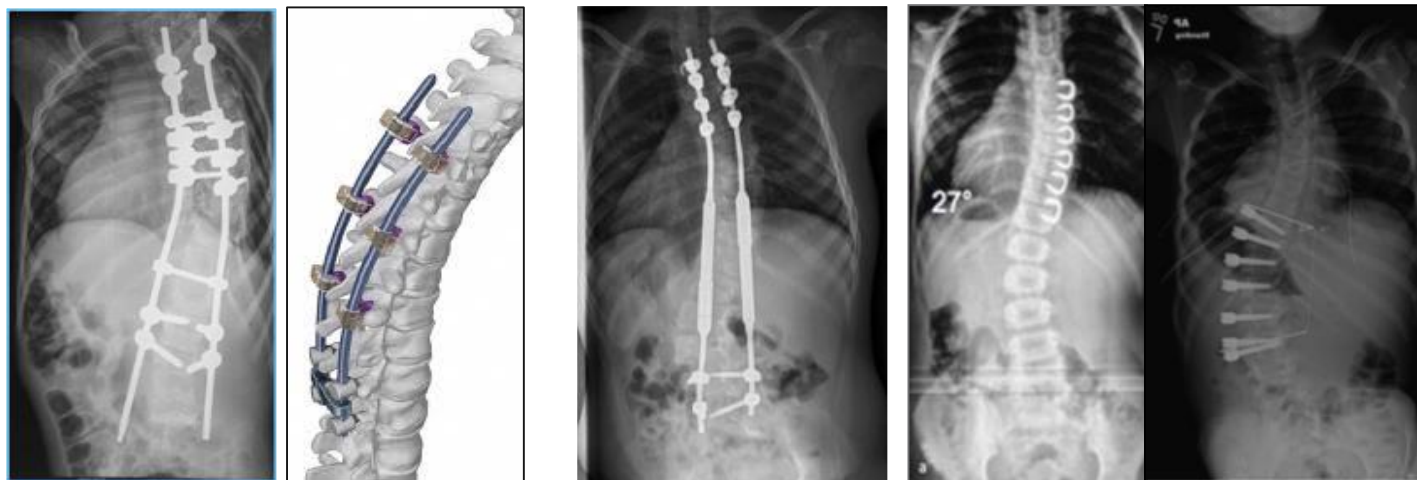
I disclose the following financial relationships with commercial entities that produce health-care related products or services

Consultant for DePuySynthes, Switzerland



Considerable variability in expert's opinions & decision making

Vitale 2010 CORR



EOS strategy 2018

Casting/bracing if no TIS (thoracic insufficiency syndrome) «**buy time**»

Growth modulating surgery $>60^\circ$ Cobb <10 years

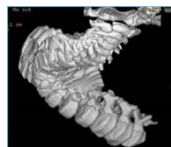
- **VEPTR if TIS**
- **Bilateral MAGEC growing rod construct if possible&affordable**
- Conventional growing rods
- Growth guiding systems e.g. Shilla, modern trolleys
- Convex staples
- Convex tethers promising alternative to preserve function

VEPTR & Thoracoplasty

Vertical Expandable Prosthetic Titanium Rib Chest cage enlargement & stabilization

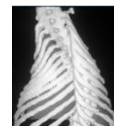
Thoracic Volume-Depletion Deformities

I absent ribs

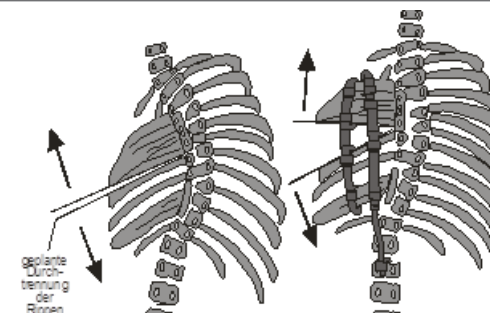


II fused ribs

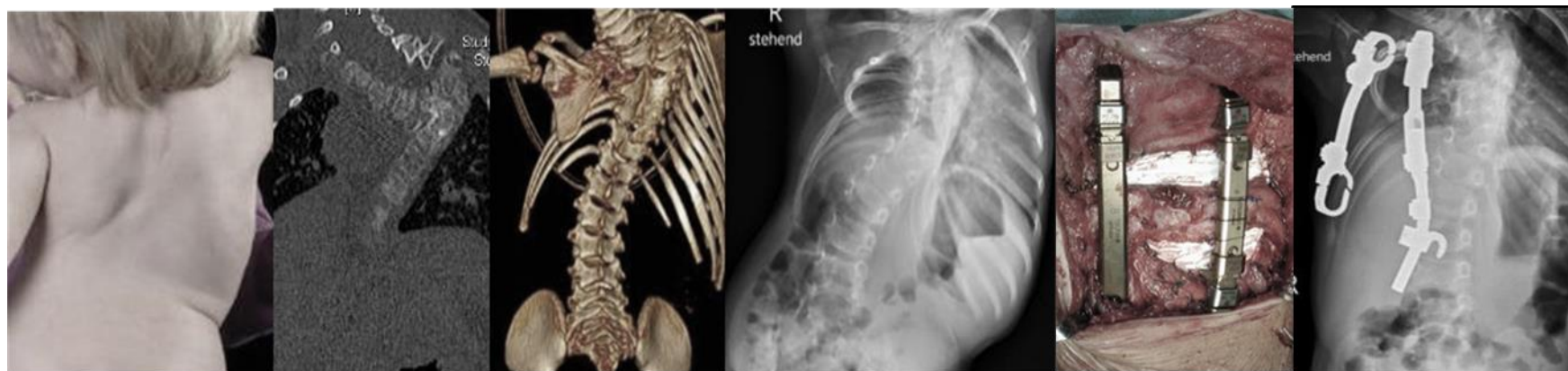
IIIa foreshortened thorax e.g. Jarcho-Levine



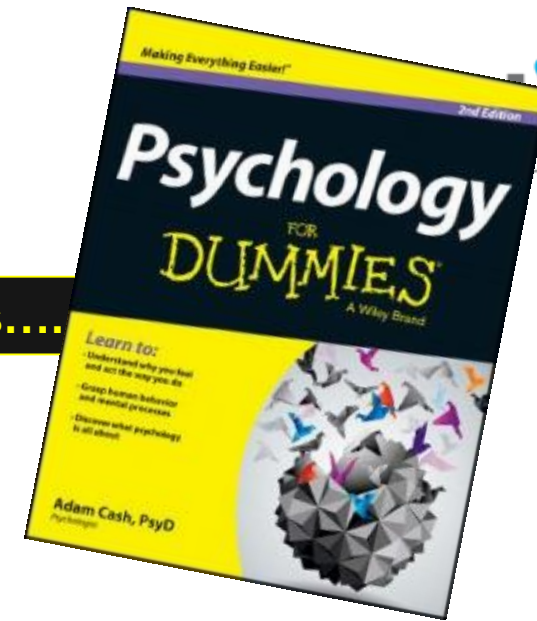
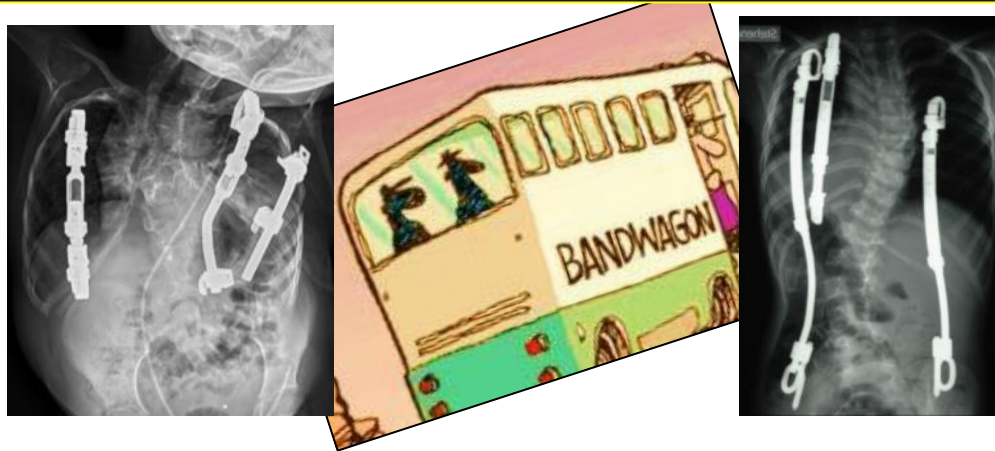
IVb transverse constriction e.g. Jeune Syndrome



Campbell RM 2004 JBJS-AM



Good for complex cases is even better for simpler ones....



No fixation on the spine, minimized neuro risk

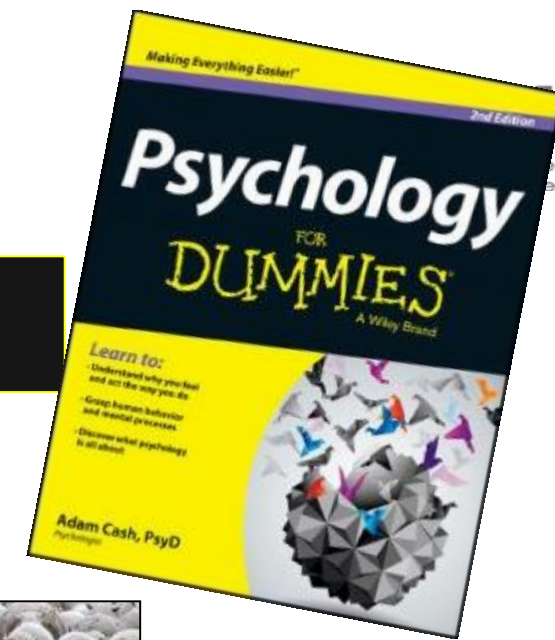
Polyaxial anchors, spine flexibility, no spontaneous fusion

Lung growth, function

True correction (growth modulation)

Anchor points intact for definitive fusion

Understand why you feel and act the way you do....
Why do we jump on bandwagons ?



Human beings are gregarious by nature



We are **dogma-prone** from our mother's womb.

Human psychological **predilection for certainties**



1673 French polemist Simon Foucher
Dissertation on the Search for Truth

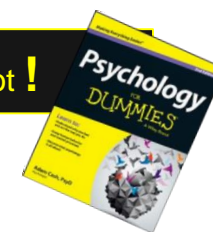
Experience is what you get, when you get what you don't want...



| |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Eur Spine J (2010) 19:400–408 DOI 10.1007/s00586-009-1253-9</p> <p>ORIGINAL ARTICLE</p> <p>Efficacy and safety of VEPTR instrumentation for progressive spine deformities in young children without rib fusions</p> <p>Carol-Claudius Hasler · Arne Mehrkens · Fritz Hefti</p> |
| <p>J Child Orthop (2014) 8:237–244 DOI 10.1007/s11832-014-0585-0</p> <p>ORIGINAL CLINICAL ARTICLE</p> <p>Extraspinal ossifications after implantation of vertical expandable prosthetic titanium ribs (VEPTRs)</p> <p>Vanja Zivkovic · Philippe Büchler · Dror Ovadia · Rolf Riise · Ralf Stuecker · Carol Hasler</p> |



Certainty what I do is great ! **Uncertainty** may be not ? **Certainty** for sure not !



Quality indicators – What made me jump off ?

Registries / Databases

- Surgeon based
- Department based
- Hospital based
- National
- International networks
- Societies e.g. SRS Morbidity&Mortality database

Correction rate
Sag&cor balance

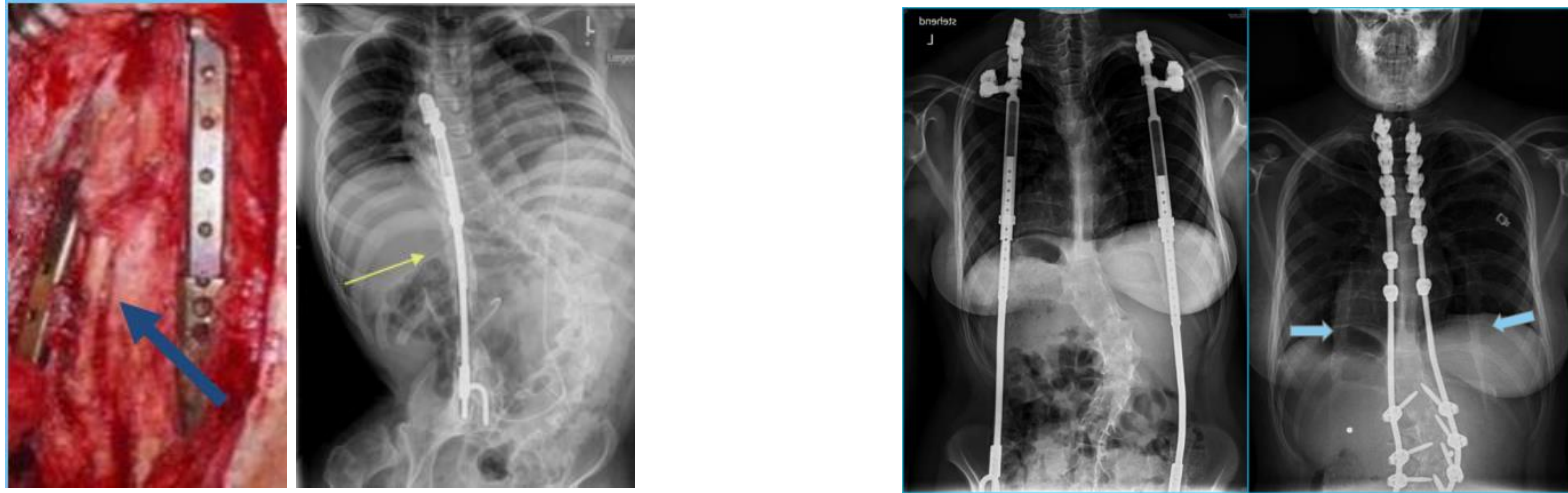
TABLE 1. Complications Associated With the Surgical Treatment of Scoliosis in 19,360 Pediatric Patients

| N | Total 19,360 | Idiopathic 11,227 | Congenital 2012 | Neuromuscular 4637 | Other* 1464 |
|----------------------------------|-----------------|----------------------|--------------------|-----------------------|----------------|
| Total complications† | 10.2% (1971) | 6.3% (710) | 10.6% (213) | 17.9% (835) | 14.5% (213) |
| New neurological deficit† | 1.0% (199) | 0.8% (86) | 2.0% (41) | 1.1% (49) | 1.6% (23) |
| Death† | 0.1% (26) | 0.02% (2) | 0.3% (6) | 0.3% (16) | 0.1% (2) |
| Superficial wound infection† | 1.0% (184) | 0.5% (61) | 1.3% (27) | 1.7% (79) | 1.2% (17) |
| Deep wound infection† | 1.7% (321) | 0.8% (95) | 0.9% (18) | 3.8% (177) | 2.1% (31) |
| Pulmonary (not embolism)† | 1.0% (202) | 0.6% (63) | 1.1% (23) | 1.9% (90) | 1.8% (26) |
| Non-fatal hematologic† | 0.5% (93) | 0.2% (25) | 0.1% (3) | 1.2% (57) | 0.5% (8) |
| Durotomy† | 0.4% (76) | 0.2% (22) | 0.4% (8) | 0.9% (42) | 0.3% (4) |
| Implant related† | 1.5% (296) | 1.1% (120) | 1.5% (31) | 2.1% (100) | 3.1% (45) |
| Deep venous thrombosis‡ | 0.01% (2) | <0.01% (1) | 0.05% (1) | 0% (0) | 0% (0) |
| Pulmonary embolus‡ | 0.04% (7) | 0.04% (5) | 0% (0) | 0.04% (2) | 0% (0) |
| Epidural hematoma‡ | 0.02% (3) | <0.01% (1) | 0% (0) | 0.02% (1) | 0.1% (1) |
| Vision deficit‡ | <0.01% (1) | 0% (0) | 0% (0) | 0.02% (1) | 0% (0) |
| Peripheral nerve/plexus deficit§ | 0.5% (89) | 0.5% (53) | 0.8% (17) | 0.3% (15) | 0.3% (4) |
| SIADH‡ | 0.3% (48) | 0.2% (23) | 0.15% (3) | 0.3% (14) | 0.5% (8) |
| Other complications† | 2.2% (424) | 1.4% (153) | 1.7% (35) | 4.1% (192) | 3.0% (44) |

Complications

Neuro deficit
Infection rate
Revision rate

VEPTR in non-TIS patients



Hasler C et al 2010 Eur Spine J

less coronal correction and 3D control than GR in non-congenital deformities

Zivkovic V et al 2014 J Child Orthop

27/66 **41% ossifications, iatrogenic rib fusions** mostly around VEPTR implant

Dede O et al 2014 JBJS-Am

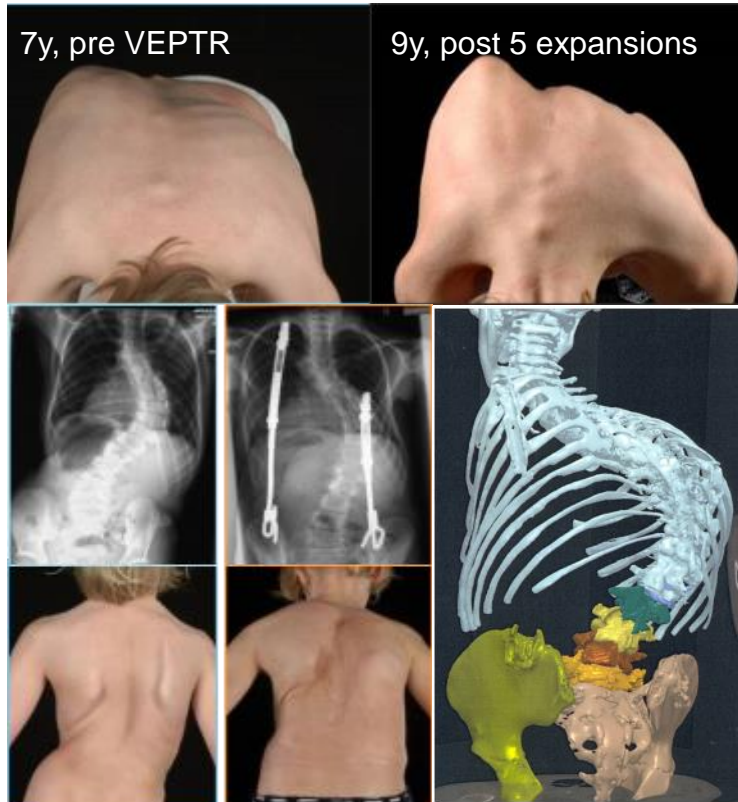
Neg effect on **chest cage compliance** and pulmonary fct ? N=21 TIS/VEPTR patients 6y f/up

Decrease of predicted FCV and increase of chest wall stiffness

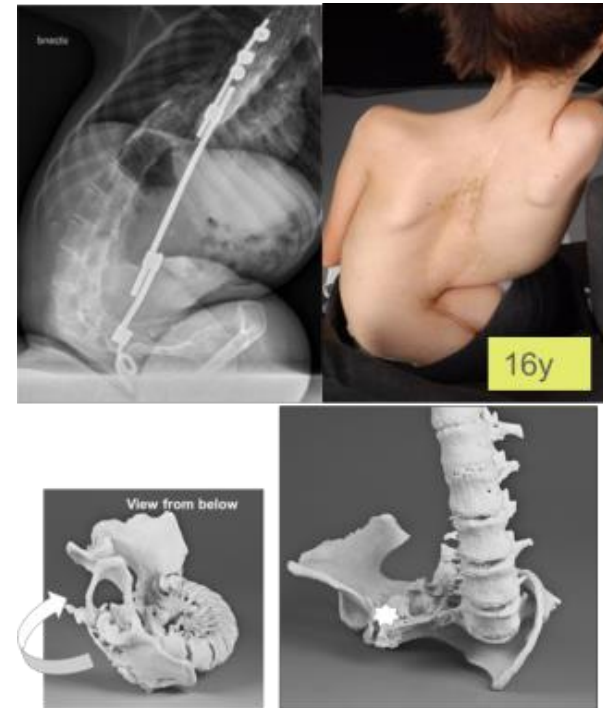
Uncontrolled rotation, crankshafting

Sotos Syndrom

cerebral gigantism – f, 6 years VEPTTR



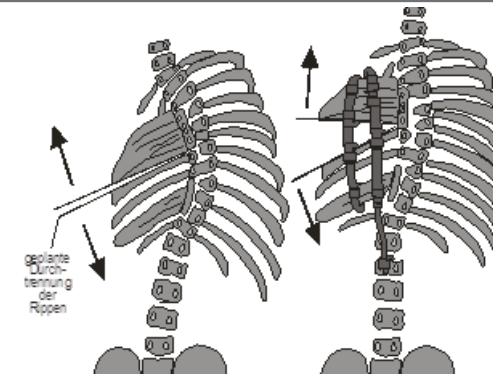
Arthrogryposis



Indications for VEPTR

Thoracic Volume-Depletion Deformities

- I absent ribs
- II fused ribs
- IIIa foreshortened thorax *e.g. Jarcho-Levine*
- IVb transverse constriction *e.g. Jeune Syndrome*

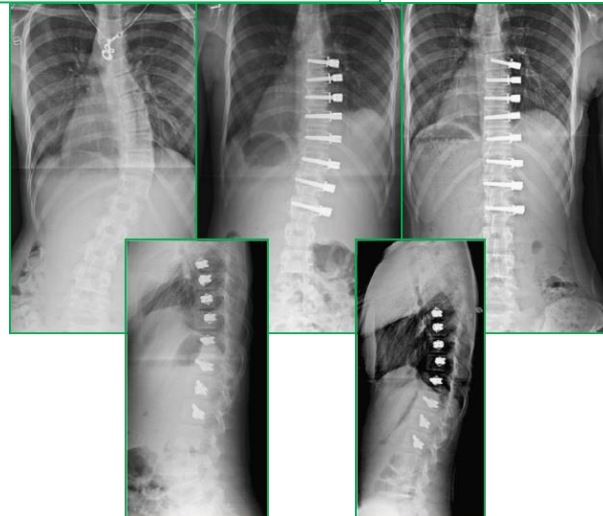




**MAYBE I'LL JUST JUMP ON THE
NEXT BANDWAGON. I'M SURE ANOTHER ONE
WILL BE PASSING SOON.**

Anterior Convex FlexibleTethers

From Samdani AF ESJ 2015



Progressive 3D correction

Discs, facets, muscles not touched

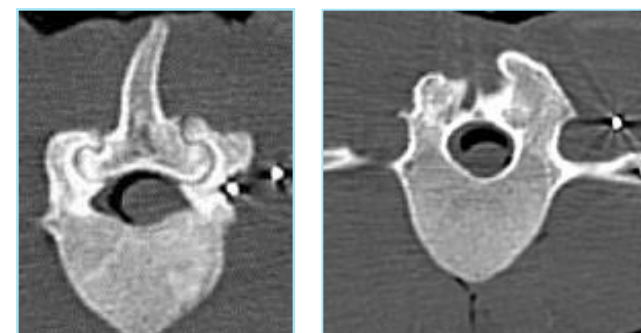
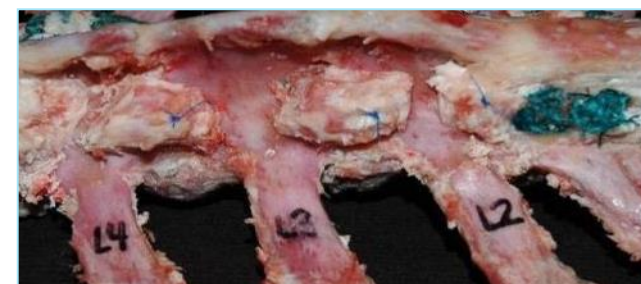
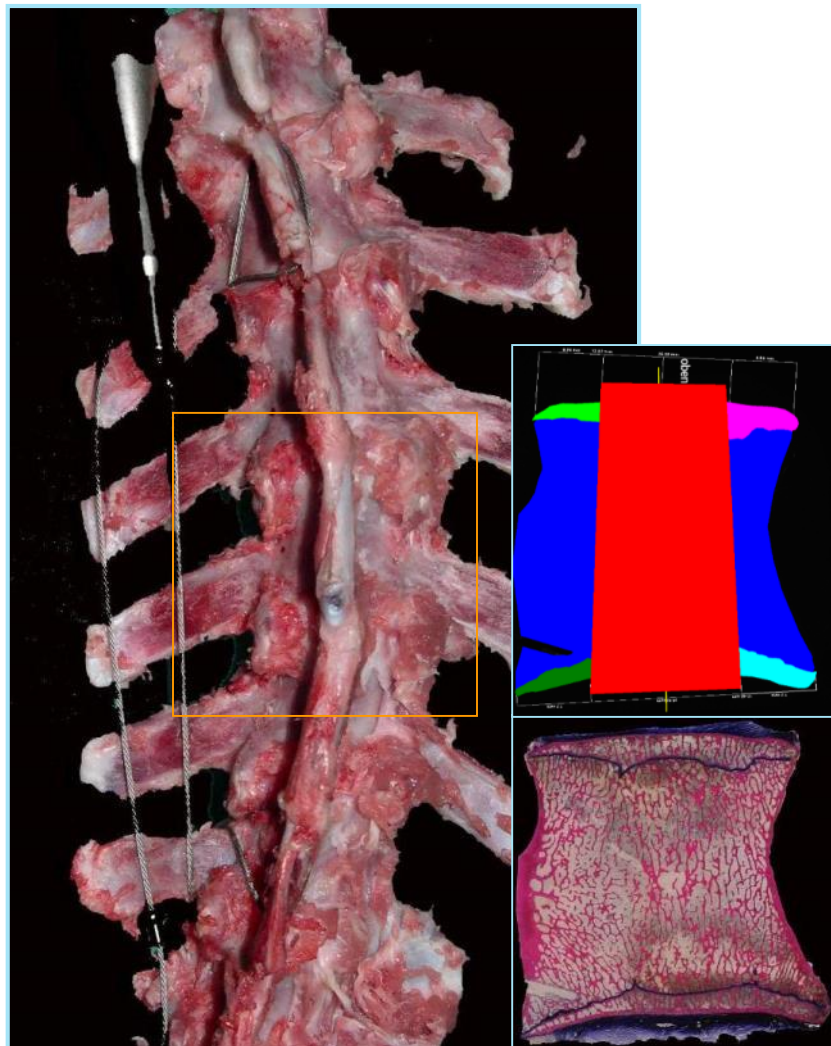
Motion preservation

No repetitive surgery

Newton PO 2018 JBJS-AM; 2011&2008 Spine

Crawford CH 2010 JBJS-Am

Samdani 2015 Eur Spine J



Experimental lumbar scoliosis in growing sheep induced by a flexible concave tether: Spontaneous bilateral facet fusions

C. Hasler - Unpublished results

Concave lumbar vs convex thoracic tethering

Sheep

constraint lumbar facet joints, high pressure when tethering

Human scoliosis

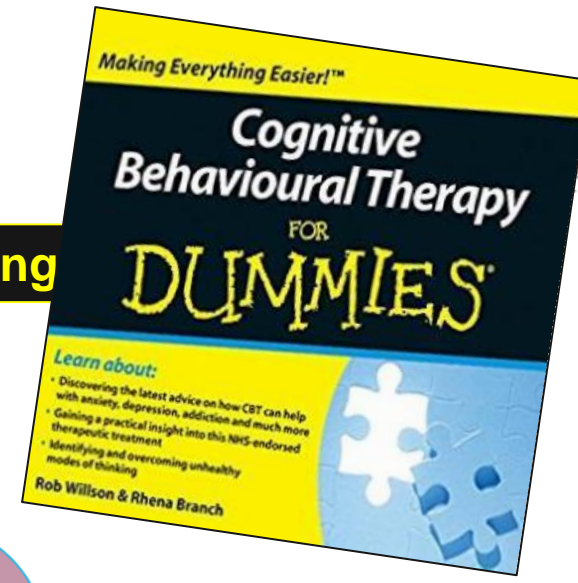
subluxed, convex th facet joints; reduction w/ tethering

thorax less mobile than lumbar spine

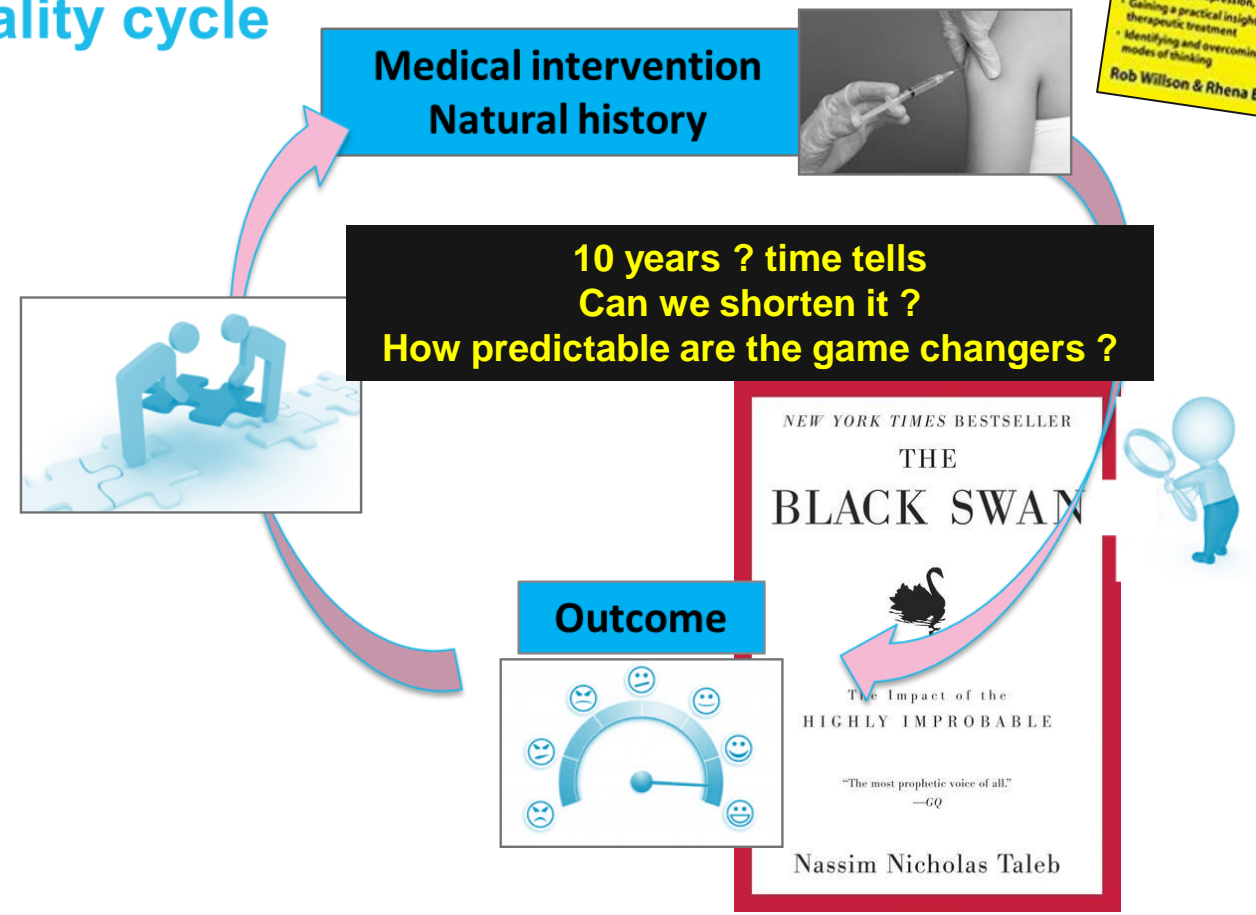
more axial load in humans

Simple models & orthopaedic thoughts for complex biologic systems

Identifying and overcoming unhealthy modes of thinking



Quality cycle



More bandwagons «*band-ufos*» to come Artificial intelligence and neuronal networks

