Essentials of Effective Scoliosis Management

How do you manage Scoliosis Cases?

Presented by Paul Fisher DC, MS

Lecture:
Essentials of Effective Scoliosis Management
Sponsored by: Gold Coast Chiropractic

ACKNOWLEDGEMENTS

The content and cases in this presentation are provided courtesy of ScoliCare

Special thanks to the patients who have given permission to use their cases for education and research

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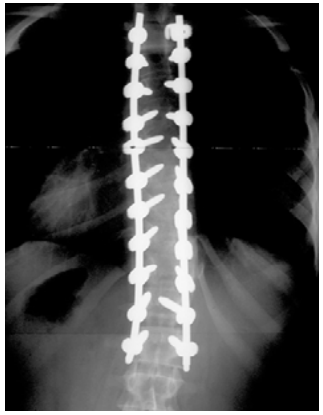
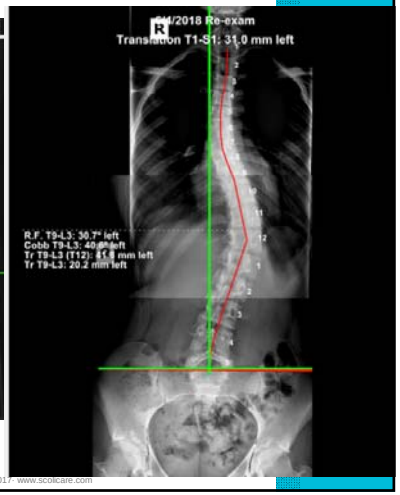
ACCURATE DIAGNOSIS & MANAGEMENT OF SCOLIOSIS

- Early and accurate detection leading to appropriate treatment …
- …can be the difference between a fused or non fused spine
- Even in adults the earlier appropriate treatment is started the better



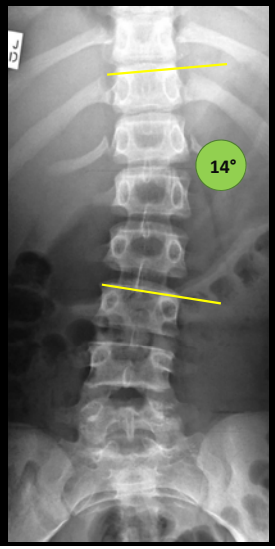
Time is of the essence. ~10 degrees in a 6 months



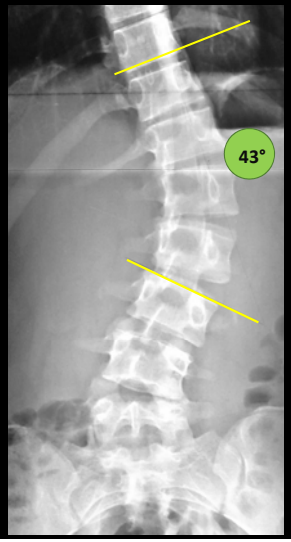
These are all different forms of scoliosis .. do you know the difference?



Would you consider this AIS?



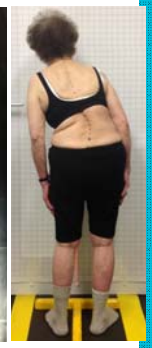
AIS presents in many forms



Scoliosis is common and its effects are under recognised

The prevalence of Scoliosis increases with age ....

- 0.3% – 0.5% in children
- 2% – 4% above the age of 18 years
- 9% in over 40 year olds
- 30%+ in over 60 year olds
- 50%+ in over 90 year olds

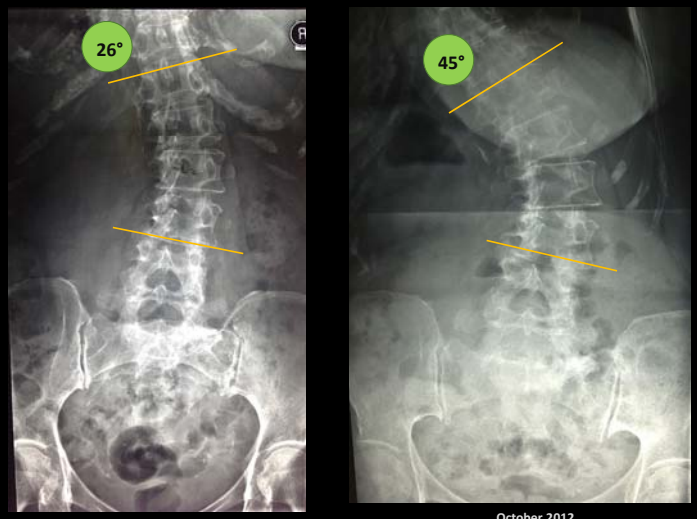
2010 Journal of Bone and Joint Surgery - British Volume, Vol 92-B, Issue 7, 980-983 Spine 2011 Apr 20;36(9):731-6.

Did you know adults can develop scoliosis?

50 yr old woman minor LBP

5 years later developed DDS

Older adults with scoliosis can rapidly deteriorate



July 2011

October 2012

PAIN AND SCOLIOSIS

It is a misconception that scoliosis does <u>not</u> cause pain!

- In Adults chronic low back pain is common especially in patients with lumbar and thoracolumbar curves.
- In children <u>mild</u> pain is often associated with scoliosis particularly around the apex of the curve.

But obviously pain isn't the only reason…

Format: Abstract ▾ Send to ▾

Eur Spine J. 2015 Jan;24(1):3-11. doi: 10.1007/s00586-014-3542-1. Epub 2014 Sep 14.

Impact on health related quality of life of adult spinal deformity (ASD) compared with other chronic conditions.

Perisé F[1], Vila-Casademunt A, Ferrer M, Domingo-Sàbat M, Bagó J, Pérez-Grueso FJ, Alanay A, Mannion AF, Acaroglu E, European Spine Study Group, ESSG

⊞ Author information

Abstract

PURPOSE: Medical and health policy providers should be aware of the impact of adult spinal deformity (ASD) on health-related quality of life (HRQL). The purpose of this study was to compare the relative burden of four chronic conditions with that of ASD.

METHODS: The International Quality of Life Assessment project gathered data from 24,936 people and published the SF-36 scores of patients with self-reported arthritis, chronic lung disease, diabetes and congestive heart failure from 8 industrialized countries (3 continents) Alonso et al. (Qual Life Res Int J Qual Life Asp Treat Care Rehabil 13:283-298, 2004). We compared these with the SF-36 baseline data of consecutive patients with ASD enrolled in a prospective multicentre international database with the following inclusion criteria: age >18 years and scoliosis >20°, sagittal vertical axis >5 cm, pelvic tilt >25° or thoracic kyphosis >60°. Four ASD groups were considered: all ASD patients, surgical candidates (preop HRQL scores), and non-surgical candidates with and without previous surgery. Adjusted estimates of the impact of chronic disease were calculated using separate multivariate linear regression models. Individuals without chronic conditions were used as the reference group. Coefficients for each chronic condition and ASD represent the difference compared with this healthy group.

RESULTS: 766 patients (mean age 45.8 years) met the inclusion criteria for ASD. The scores on all SF-36 domains were lower in ASD patients than in any other chronic condition. Differences between ASD and the other chronic conditions were always greater than the reported minimal clinically important differences. When compared with individuals reporting no medical conditions, SF-36 scores from the population with self-reported chronic conditions ranged from -2.5 to -14.1. Comparable scores for patients with ASD ranged from -10.9 to -45.0. Physical function, role physical and pain domains showed the worst scores. Surgical candidates with ASD displayed the worst HRQL scores (-17.4 to -45.0) and patients previously operated the best (-10.9 to -33.3); however, even the latter remained worse than any scores for the other self-reported chronic conditions.

CONCLUSIONS: The global burden of ASD was huge compared with other self-reported chronic conditions in the general population of eight industrialized countries. The impact of ASD on HRQL warrants the same research and health policy attention as other important chronic diseases.

REVIEW ARTICLE

Degenerative Scoliosis: A Review

Suhel Kotwal, MD · Matthias Pumberger, MD · Alex Hughes, MD · Federico Girardi, MD

HSS Journal, 2011

Abstract:

Clinical presentation **is frequently associated with axial back pain** and neurogenic claudication.

Indications for treatment include pain, neurogenic symptoms, and progressive cosmetic deformity.

Non-operative treatment includes physical conditioning and exercise, pharmacological agents for pain control, **and use of orthotics** and invasive modalities like epidural and facet injections.

REVIEW ARTICLE

Degenerative Scoliosis: A Review

Suhel Kotwal, MD · Matthias Pumberger, MD · Alex Hughes, MD · Federico Girardi, MD

HSS Journal, 2011

Abstract:

Operative treatment should be contemplated after multi-factorial and multidisciplinary evaluation of the risks and the benefits. Options include decompression, instrumented stabilization with posterior or anterior fusion, correction of deformity, or a combination of these that are tailored to each patient.

Incidence of perioperative complications is substantial and must be considered when deciding appropriate operative treatment.

The primary goal of surgical treatment <u>is to provide pain relief</u> and to improve the quality of life with minimum risk of complications.

A role for bracing even in Adults!

Archives of
Physical Medicine and Rehabilitation

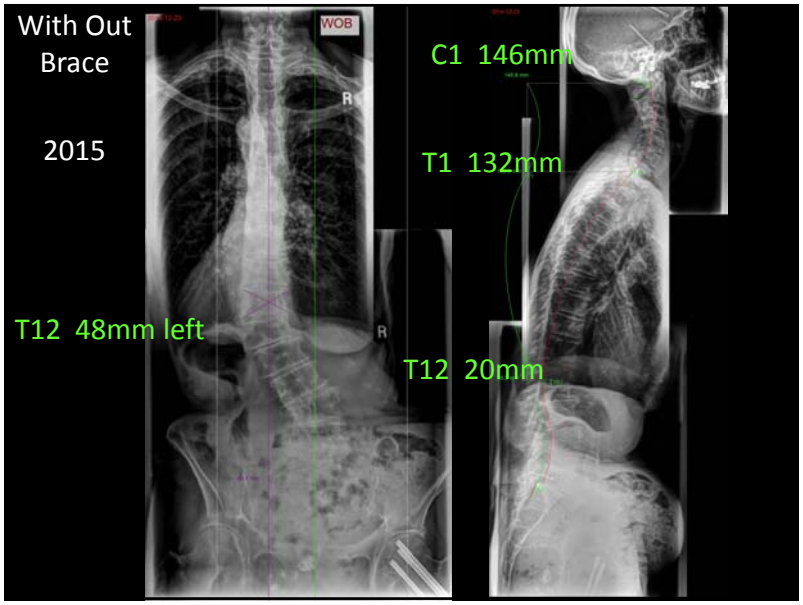
Article in Press

Effects of Bracing in Adult With Scoliosis: A Retrospective Study

Clémence Palazzo, MD, PhD, Jean-Paul Montigny, MD, Frédéric Barbot, MD, Bernard Bussel, MD, PhD, Isabelle Vaugier, MD, Didier Fort, MD, Isabelle Courtois, MD, Catherine Marty-Poumarat, MD

- Custom lumbar-sacral orthoses could be effective in slowing down the progression rate of adult scoliosis.
- Tolerance of the brace was good.
- Bracing represents an interesting treatment option and an alternative to surgery

2015


With Out
Brace
2015
C1 146mm
T1 132mm
T12 48mm left
T12 20mm
WOB


2015


2015

Spine — Wolters Kluwer

Back Pain Prevalence is Associated with Curve-type and Severity in Adolescents with Idiopathic Scoliosis: A Cross-sectional Study.

Théroux, Jean; Le May, Sylvie; Hebert, Jeffrey J; Labelle, Hubert
Post Acceptance: November 18, 2016

RESULTS

.. 500 patients (85% female) with mean age of 14.2 years. Means of thoracic and lumbar Cobb angle respectively were 25° and 24°. **Spinal pain prevalence was 68%** (95% CI: 64.5-72.4) with a mean intensity of 1.63.

Spinal pain intensity was positively associated with scoliosis severity in the main thoracic (p = 0.003) and lumbar (p = 0.001) regions. The mean disability score was 1.73. Disability was positively associated with scoliosis severity in the proximal thoracic (p = 0.035), main thoracic (p = 0.000), and lumbar (p = 0.000) regions.

Spinal bracing was associated with lower spinal pain intensity in the thoracic (p = 0.000) and lumbar regions (p = 0.009). Bracing was also related with lower disability for all spinal areas (p < 0.045).

Spine — Wolters Kluwer

Back Pain Prevalence is Associated with Curve-type and Severity in Adolescents with Idiopathic Scoliosis: A Cross-sectional Study.

Théroux, Jean; Le May, Sylvie; Hebert, Jeffrey J; Labelle, Hubert
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CONCLUSION

Spinal pain is common among patients with AIS, and greater spinal deformity was associated higher pain intensity. These findings should inform clinical decision-making when caring for patients with AIS.

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Quality & Safety
Position Statements
Screening for the Early

Screening for the Early Detection for Idiopathic Scoliosis in Adolescents

- High quality studies have *(now)* established that non-operative treatment with bracing or scoliosis specific exercises may reduce the number of patients progressing to a surgical level.
- To be effective, these treatments need to be applied to smaller curves prior to skeletal maturity
- This places emphasis on the need for earlier detection of scoliosis

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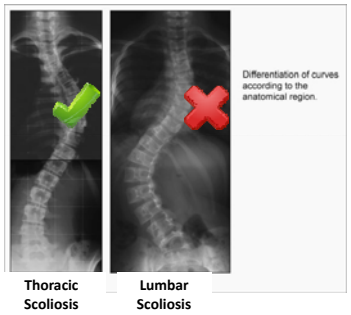
Quality & Safety
Position Statements
Screening for the Early

Screening for the Early Detection for Idiopathic Scoliosis in Adolescents

- The forward bend Adams test with the use of a scoliometer….. with five to seven degrees of deformity as a threshold for positive screening
- the task force recommended that screening be performed twice for females at age 10 and 12 years in order to capture variation in maturity. Males could be screened once at age 13 to 14 years.

SCREENING FOR SCOLIOSIS

- Rotation is almost always associated with structural scoliosis
- In the lumbar spine this can be difficult to see

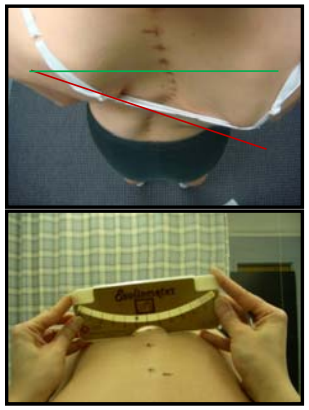


Thoracic Scoliosis | Lumbar Scoliosis

SCREENING ASSESSMENT

Scoliometer Assessment & Adams Test

- In the thoracic spine it indicates a major thoracic curve with secondary rib cage deformity
- In the thoracic Spine >5 degrees is a positive finding



SCREENING ASSESSMENT

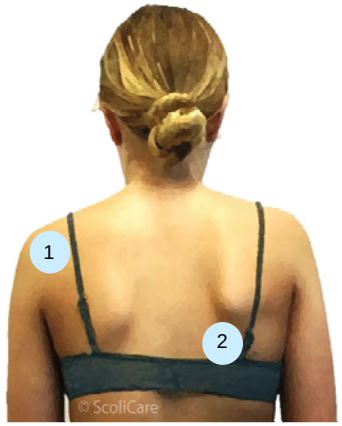
Scoliometer Assessment & Adams Test

- In the lumbar spine it indicates a true lumbar scoliosis but the value is underestimated when the patient also has a short leg on the convex side.
- In the lumbar Spine >4 degrees is a positive finding

SCREENING ASSESSMENT

Standing Assessment

1. Shoulders uneven
2. Prominent shoulder blade

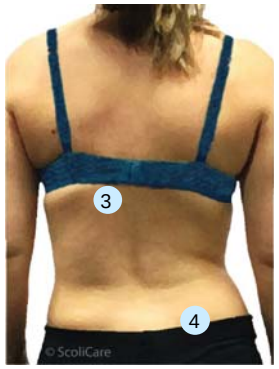


SCREENING ASSESSMENT

Standing Assessment

3 Visible curve

4 Hips uneven



SCREENING ASSESSMENT

Standing Assessment

5 Waist asymmetrical

SCREENING ASSESSMENT

1 Thoracic rib hump

Forward Bending Assessment

- Have the child bend forward with feet together and knees straight
- Let arms dangle with palms together and fingers pointing down
- Any rib or lower back hump or bump can be a sign of scoliosis

SCREENING ASSESSMENT

Forward Bending Assessment

1 Lumbar bump

- Have the child bend further forward
- Any lower back hump or bump (an asymmetry on one side) can be a sign of scoliosis

As the curve develops, the posture becomes altered according to the pattern of the curve.

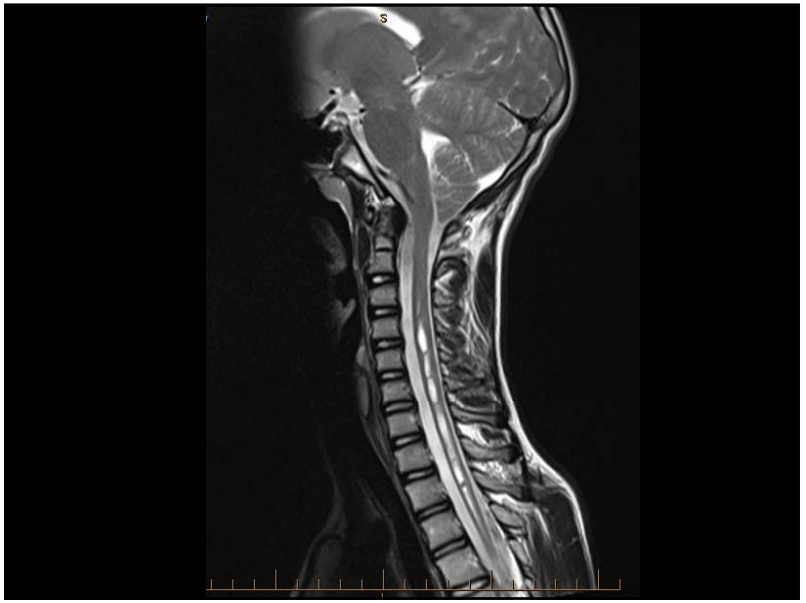
POSTURAL SCOLIOSIS

No rotation on the x-ray

No rib hump

Scoliosis **Red** Flags

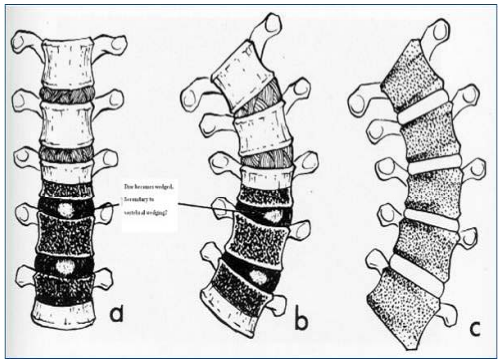
- Primary Left thoracic and right lumbar curves
- Acute pain is not common in scoliosis in teenagers
- Night pain
- Scoliosis is less common in boys and more often associated with pathology
- Early onset presentation has higher pathology and progression risk
- Positive Neurologic findings (Babinski, Absent Abdominal Reflex, etc)
- If in doubt MRI



SCOLIOSIS IS DEFORMITY!

Hueter Volkmann Principle

Regardless of the initial trigger, once deformity unbalances the growing spine (>20 °), the **Hueter Volkmann Principle** worsens and promotes further deformity.



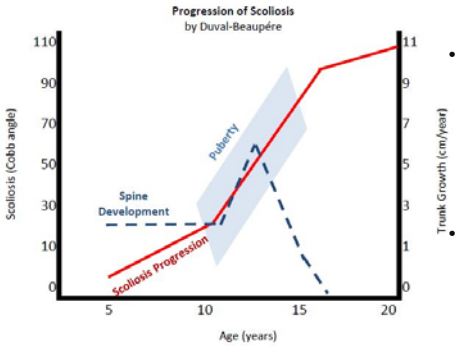
The timing of the deformity development is critical

Long-Term Follow-Up of Patients with Untreated Scoliosis A Study of Mortality, Causes of Death, and Symptoms
Pehrsson, Kerstin MD; Larsson, Sven MD; Oden, Anders PhD; Nachemson, Alf MD

The mortality and causes of death in 115 patients (80 women), born 1902-1937, with untreated scoliosis were compared to the expected according to official Swedish statistics. Fifty-five patients had died; 21 of respiratory failure and 17 of cardiovascular diseases.

.." The mortality was significantly increased in infantile (P < 0.001) and juvenile (P < 0.01) scoliosis but not in adolescent scoliosis. "

There is a limited window of opportunity for effective treatment



GROWTH AND PROGRESSION

- Period of maximal risk for AIS:
  - GIRLS: 10-12 years
  - BOYS: 11-13 years
- Curve must be sufficiently diminished before the start of the growth spurt

Chiropractic Treatment of Scoliosis, A Systematic Review of The Scientific Literature:

Oral presentation: The Spine Society of Australia Perth 2013
Jeb McAviney.

Conclusions: Spinal manipulation is not evidenced as an effective treatment for stabilising nor correcting scoliosis.

…these interventions should not be recommended over treatments that have demonstrated evidence such as bracing and scoliosis specific rehabilitation programs, particularly for patients at risk of progression.

Medscape Medical News > Neurology

Bracing Avoids Surgery for Young Patients With Scoliosis

Pauline Anderson

September 19, 2013

3 comments Print

EDITORS' RECOMMENDATIONS

Benefit of Intraop Neuromonitoring May Not Outweigh Costs

New CNS/AANS Guidelines Discourage Steroids in Spinal Injury

Spinal Disorders News & Perspectives

RELATED DRUGS & DISEASES

Neuromuscular Scoliosis

Neurosurgery for Hydrocephalus

Neurosurgery for Cauda Equina Syndrome

Bracing in high-risk patients with adolescent idiopathic scoliosis (AIS) is associated with a significantly greater likelihood of reaching skeletal maturity with a curve of less than 50 degrees, the degree at which surgery is normally indicated, a new study shows.

Researchers found that the longer children wore the brace, the better the outcome. Those who had it on at least 13 hours a day had upwards of a 90% chance of avoiding surgery.

The study was halted early, in January of this year, because of the overwhelming evidence of the superiority of the brace, said lead author Stuart L. Weinstein, Ignacio V. Ponseti Chair and professor, orthopedic surgery and professor, pediatrics, University of Iowa, Iowa City.

"The reason I did this study was that the jury was still out as to whether braces work or not because the evidence wasn't really of the highest level, and now I think it's pretty clear that the jury is in, and that braces work," he told *Medscape Medical News*.

CURRENT SCOLIOSIS BRACING CHALLENGES

- A good outcome with TLSO/Boston braces relies heavily on the skill of the practitioner making the brace.
- Traditional braces are **not effective** in large or stiff curves.
- Cosmetic improvements are moderate.
- Traditional TLSO/Boston braces are difficult for patients to use and compliance is in part dependant on patient ease of use!

Thoracolumbosacral Orthosis (TLSO) "Boston brace"

- A Symmetrical Brace
- Static stabilisation of a curve (like treating a fracture)
- Rear opening
- Not 3 Dimensional
- Causes a loss of the lumbar lordosis
- Mostly made using inconsistent approaches with a high variability in brace quality

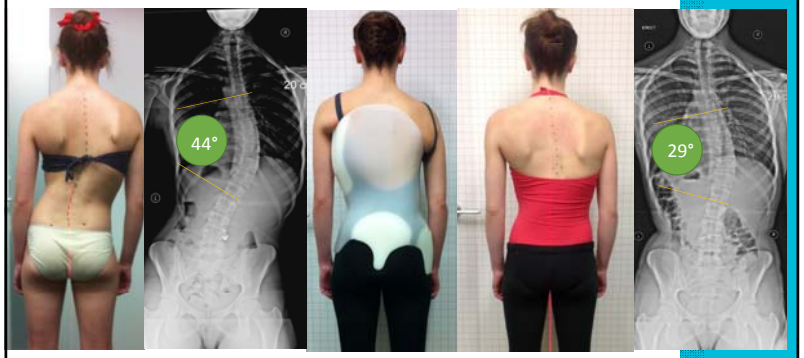
Poor Bracing = Poor Results

An example of a **traditional** TLSO holding the Scoliosis "in place".
This approach to bracing has **NO** chance of success

J Pediatr Orthop. 2007 Jun;27(4):369-74.
A comparison of the thoracolumbosacral orthoses and Providence orthosis in the treatment of adolescent idiopathic scoliosis: results using the new SRS inclusion and assessment criteria for bracing studies.
Janicki JA[1], Poe-Kochert C, Armstrong DG, Thompson GH.

RESULTS 25º - 40º	
	TLSO[(1)]
Scoliosis curve	48 At 2 years follow-up
Progression ≤ 5º	7 (15%)
Progression ≥ 6º	41 (85%)
Progression ≥ 45º	30 (56%)
Progression to surgery	38 **(79%)**
Withdrawals	N/R

then why do we see corrective results in some cases?



Young Adult Patient Before treatment

With ScoliBrace

After 12 months of treatment with ScoliBrace

Idiopathic scoliosis patients with curves more than 45 Cobb degrees refusing surgery can be effectively treated through bracing with curve improvements

The Spine Journal, Volume 11, Issue 5, May 2011

Stefano Negrini MD[a], Francesco Negrini[a], Claudia Fusco MD[a] and Fabio Zaina MD[a]

Patients who utterly refused surgery with a scoliosis of more than 45°.

Patient sample
At the start of treatment, the age was 14.2±1.8 years and **Cobb degrees in the curve were 49.4°** (range, 45°–58°). Subgroups considered were gender, bone age, type of scoliosis, treatment used, and previous failed treatment.

Results
Reported compliance was 94%. **Two patients (7%) remained above 50° Cobb but six patients (21%) finished between 30° and 35° Cobb and 12 patients (43%) finished between 36° and 40° Cobb.**

Improvements have been found in **71% of patients** and a 5° Cobb progression in one patient.

How do we explain the different results!

- 79% progression to surgery, *JPO 2007*.
- 72% stabilisation and up to 90% avoidance of surgery; *NEJM 2013*
- 71% of curves 45°-60° correcting post brace to under 45°; *The Spine Journal 2011*

■ INSTRUCTIONAL REVIEW: SPINE

The current status of bracing for patients with adolescent idiopathic scoliosis

Bone Joint J 2013;95-B:1308–16.

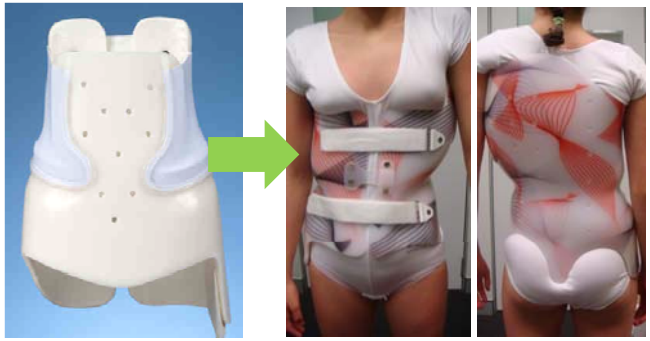
Conclusion:
In conclusion, the weight of evidence is in favour of bracing over observation. However, the quality of this evidence needs to be improved.

The Hueter–Volkmann principle holds true for bracing in AIS. ***If a brace does not correct a curve on application,*** then either the brace has not been designed, manufactured or fitted correctly, or the curve cannot be braced.

Bad Brace = Bad Outcome

Another example of a brace holding the Scoliosis "in place".
Again this approach to brace has **NO** chance of success

MODERN CORRECTIVE BRACING IN ACTION

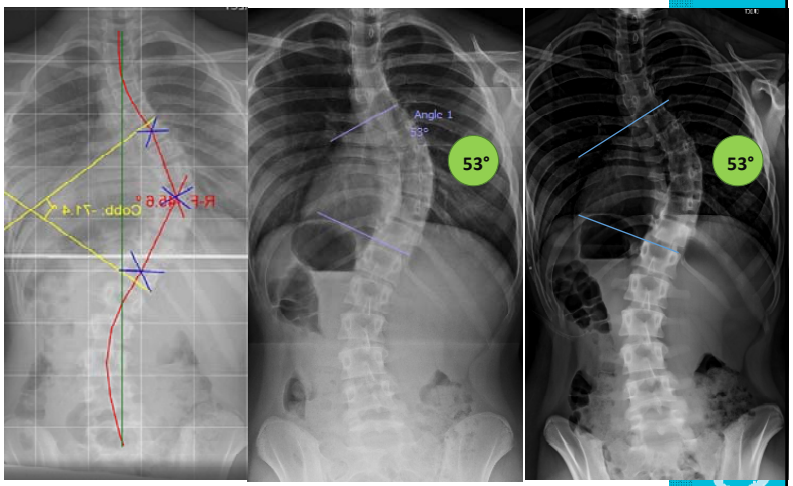


Asymmetrical over-correction of posture in the brace

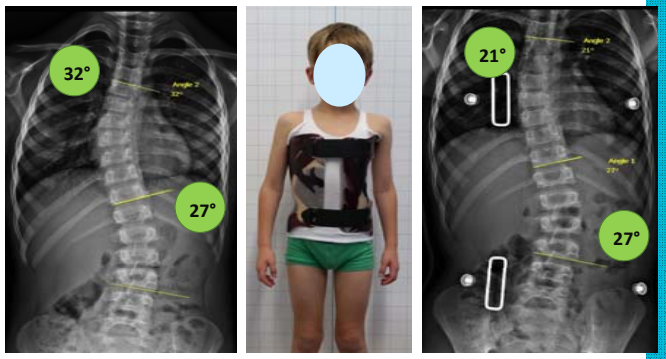
Before treatment

After 2 years of treatment - 6 months out of brace

After 2 years of treatment - 2 years out of brace



Not all braces are the same



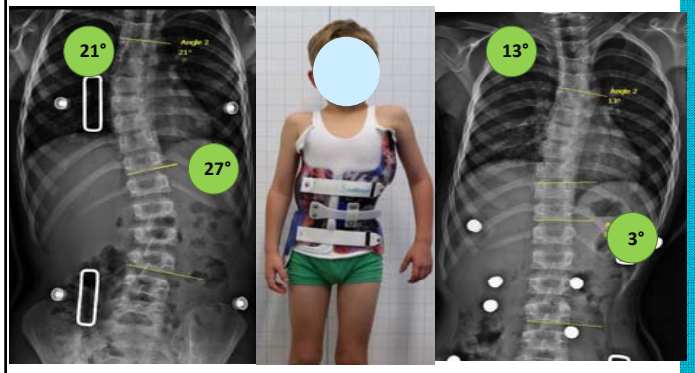
Pre Brace x-ray

Hospital made TLSO

In brace TLSO correction

Traditional 3 point pressure TLSO – “Minimal Correction”

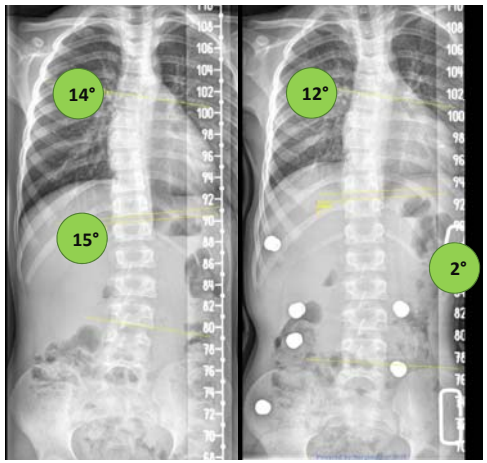
Some braces can correct



In brace TLSO correction **ScoliBrace** **In ScoliBrace correction**

*Thoracic curve 8 ° and lumbar curve **24 ° better in ScoliBrace** compared to TLSO!*

After 3 years



Braces can be patient friendly

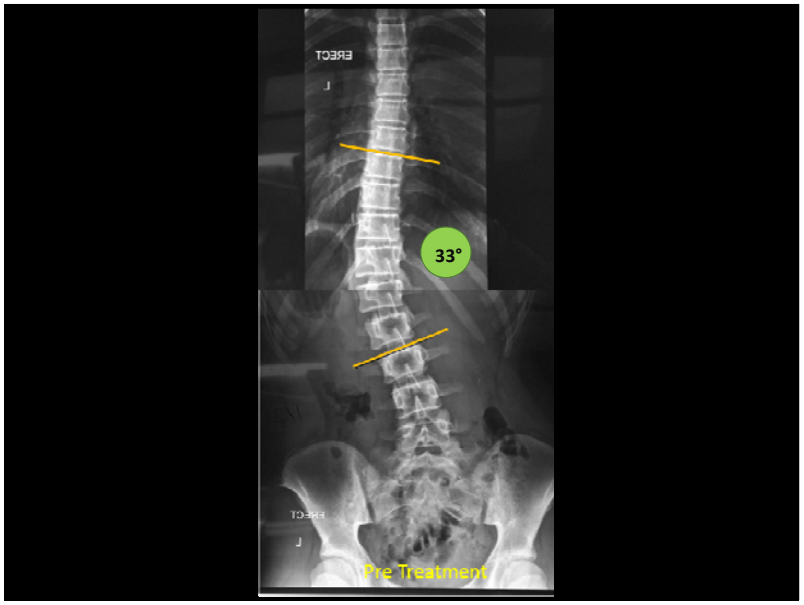
Treatment Guide by Curvature

Curves < 10°	→	Observation
Curves 10° to 25°	→	ScoliNight Brace
Curves 20° to 30°	→	ScoliBrace (Part Time)
Thoracic Curves 30° to 60° Lumbar Curves > 30° to 50°	→	ScoliBrace (Full Time)
Thoracic Curves > 60° Lumbar Curves > 50°	→	Surgical Management

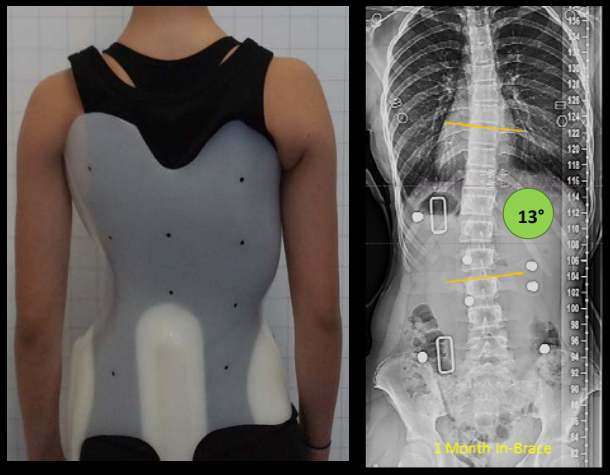
ScoliCare © ScoliCare 2014 For advice and treatment options contact Scolicare: ☎ 1300 883 884 support@scolicare.com.au www.scolicare.com.au

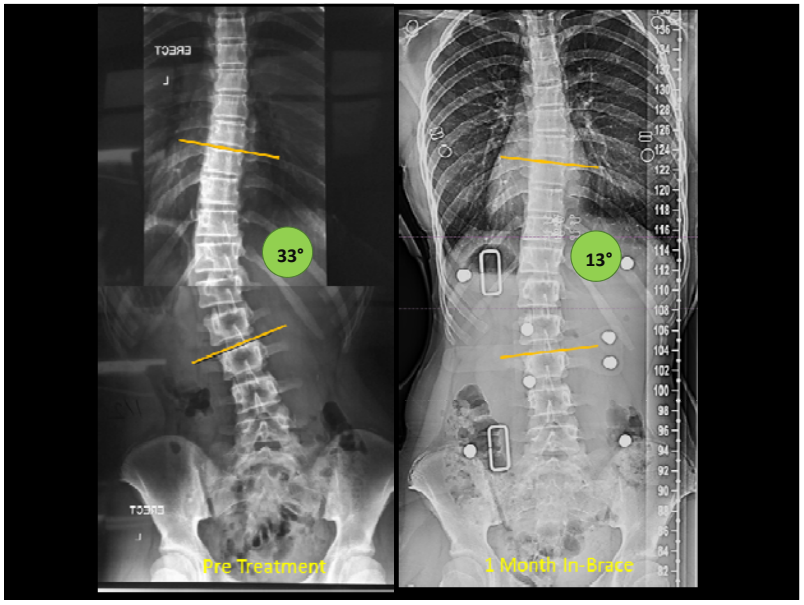
Note: Cobb Angle measurement determines degree of curve

CASE STUDY: ScoliBrace in Thoracolumbar AIS

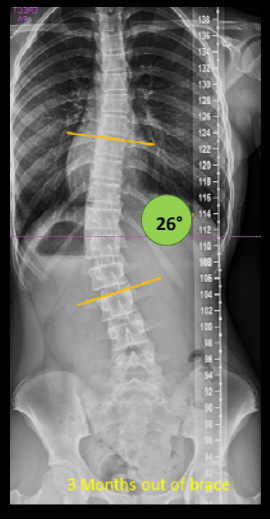


ScoliBrace in Thoracolumbar AIS

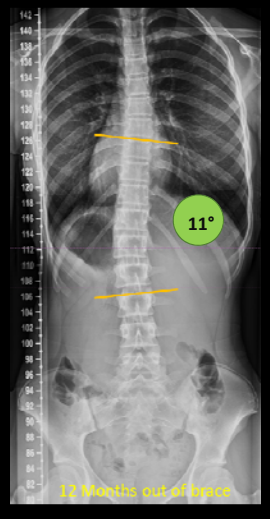


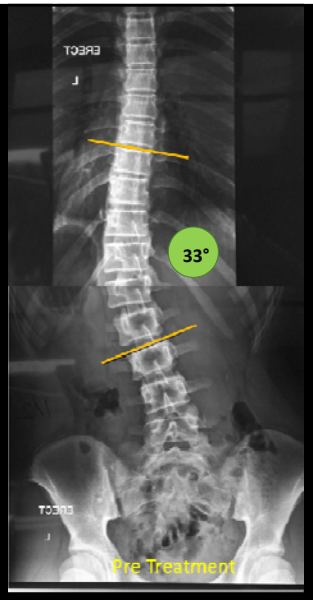


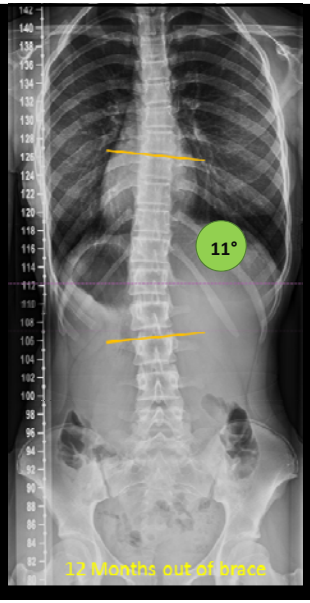
ScoliBrace in Thoracolumbar AIS



ScoliBrace in Thoracolumbar AIS

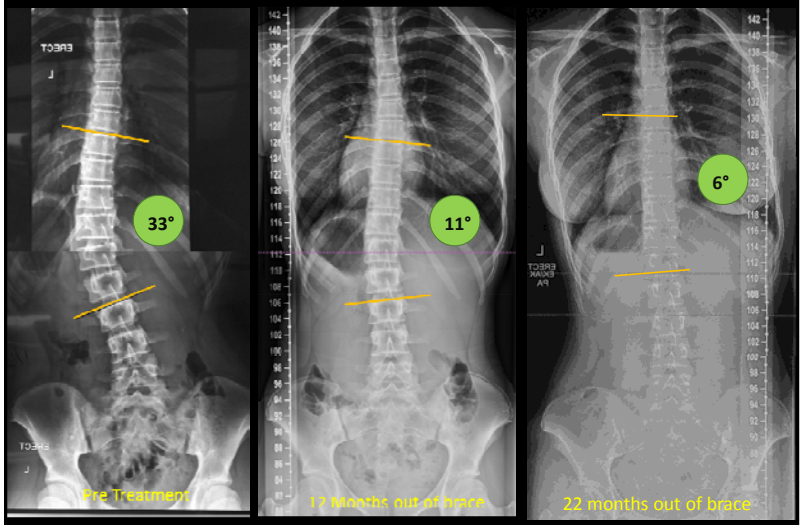




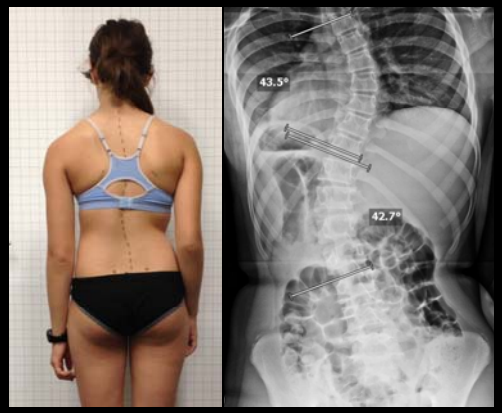


ScoliBrace in Thoracolumbar AIS

ScoliBrace in Thoracolumbar AIS



ScoliRoll and ScoliBrace Case Study



25/01/2013

One Month in brace

After 4 months of ScoliBrace and ScoliRoll Rehab.

After 4 months of ScoliBrace and ScoliRoll Rehab.

After 26 months of ScoliBrace and ScoliRoll Rehab.

Switched to night wearing only.

21/03/2015

After 26 months of ScoliBrace and ScoliRoll Rehab.

21/03/2015

14/11/2015

After 34 total months of ScoliBrace and ScoliRoll Rehab

14/11/2015

14/11/2015

Thank you!

Any questions, please email

Paul Fisher
info@goldcoastchiropractic.com
Or contact: Gold Coast Chiropractic
312-988-9655