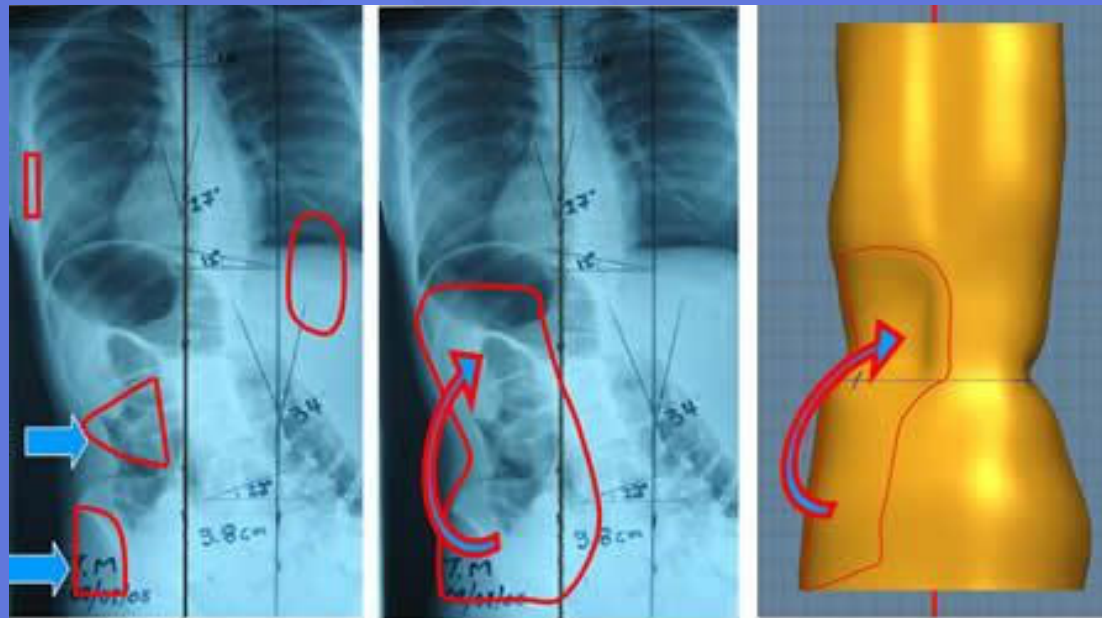


Use of and 3D asymmetrical (GOSS) Brace for infantile and juvenile scoliosis – Early results and failures



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Background

- Options for Infantile and Juvenile scoliosis
 - Casting
 - Growing Rods/VEPTR
 - Shilla
 - Bracing
- Casting
 - Labor intensive, expensive
 - Multiple visits to OR and anesthetics
- VEPTR/Growing Rod
 - Diminishing returns with multiple lengthenings
 - Multiple visits to OR and anesthetics

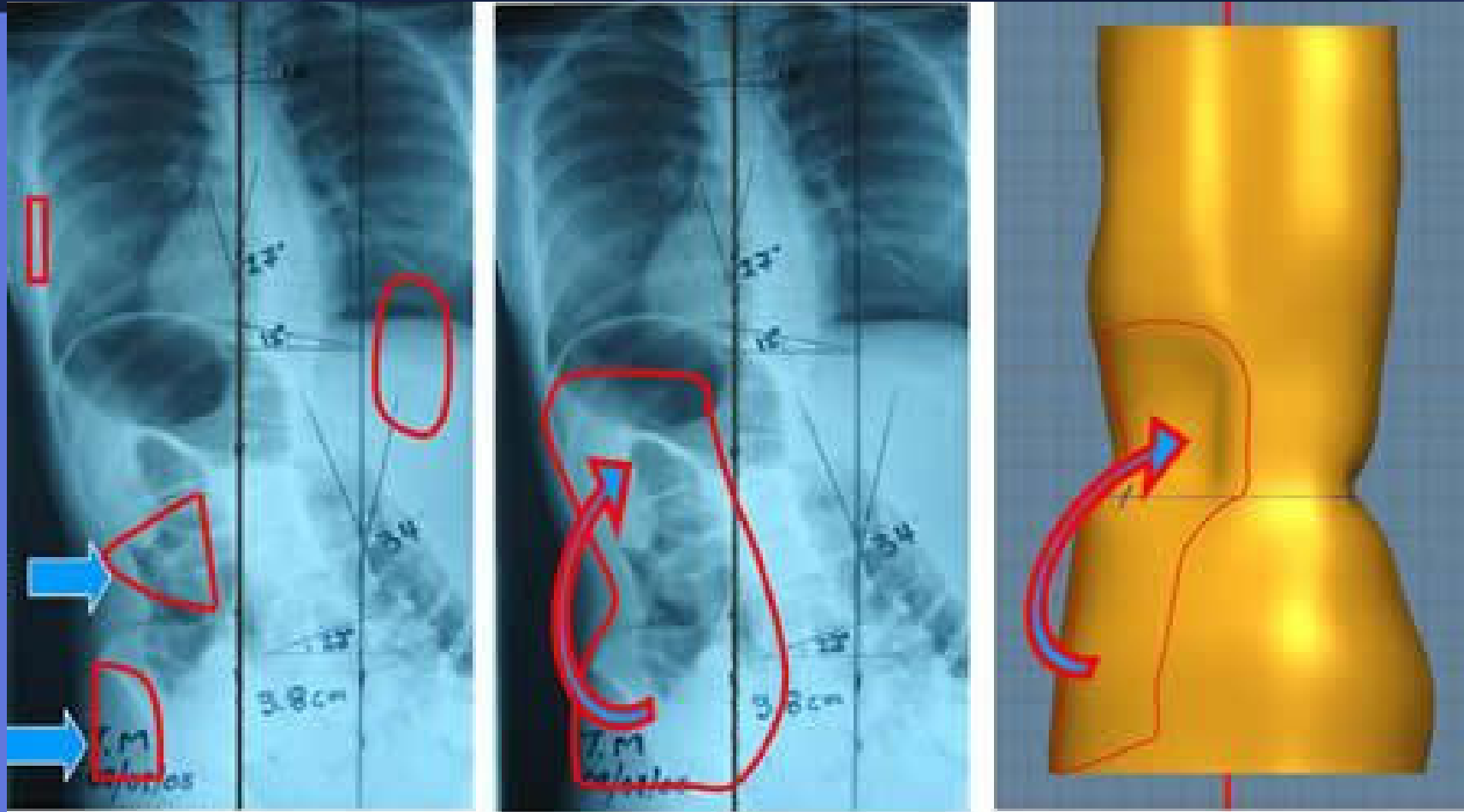
Materials and Methods

- All patients treated by a single surgeon and orthotist since 2010 with an asymmetrical brace as primary treatment for infantile and juvenile scoliosis
- Groups
 - Infantile: ≤ 3 yo (5pts)
 - Juvenile: $>3 < 10$ yo (6 pts)

Gomez Orthotic Spine System GOSS Brace

- GOSS
 - 3D Bracing system based on restoring **sagittal** balance, **derotating** the segments of the spine and then **coronal** bending moments.
 - Similar concepts to Mehta casting
 - Orthotists takes 25 measurements from patients
 - These measurements as well as x-ray, and clinical data are used to create a cad cam file
 - The brace is then made from cad cam design emphasizing derotation and restoration of balance

GOSS System



3 point of Forces

3D moments including derotation

Infantile group - Improved Surgery

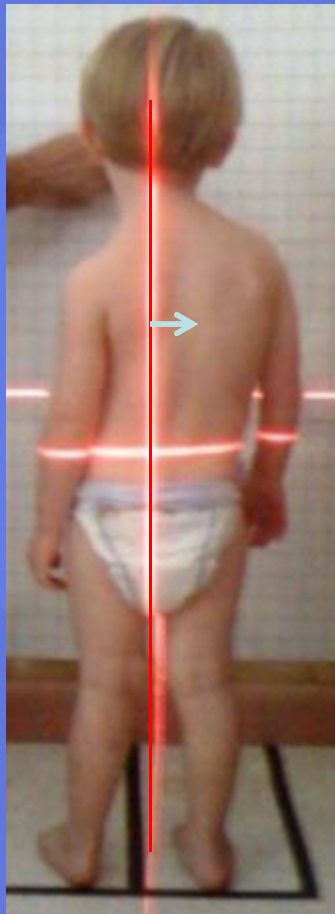
| | Age (mo) | Phenotype* | # of braces | f/u (mo) | Pre Brace | | In Brace | |
|---|----------|------------------|-------------|----------|-----------|------|----------|-------------|
| | | | | | Cobb | RVAD | Cobb | Curent cobb |
| 1 | 13 | slender | 5 | 34 | 47 | 44 | 29 | 60 |
| 2 | 33 | sturdy | 3 | 35 | 40 | 16 | 24 | 35 |
| 3 | 11 | unknown syndrome | 3 | 17 | 48 | 41 | 29 | 58 |
| 4 | 26 | syndromic | 3 | 28 | 44 | 18 | 23 | 28 |
| 5 | 25 | unknown syndrome | 4 | 32 | 30 | 13 | 30 | 100 |

* After Mehta ^{5,6}

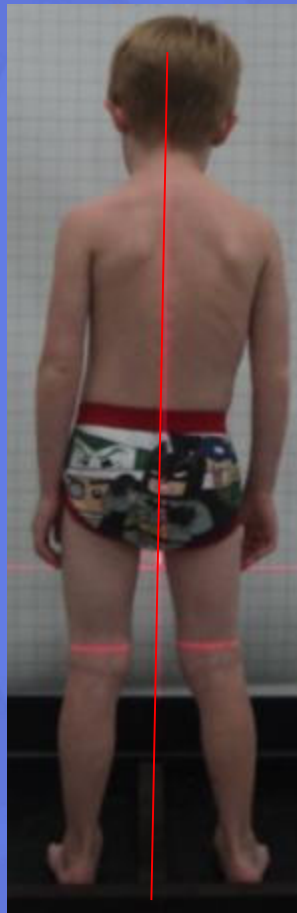
Juvenile Group – Improved Cobb

| Age (mo) at 1st Brace | | # of braces | time in brace | Pre Brace Cobb | In Brace Cobb | Current Cobb |
|--------------------------|---|-------------|------------------|-------------------|------------------|-----------------|
| 75 | idiopathic | 2 | 11 mo | 42 | 20 | 46 |
| 47 | idiopathic | 4 | 2 yr 10 mo | 56 | 18 | 55 |
| 89 | Neuromuscular | 1 | 9 mo | 47 | 37 | 55 |
| 50 | idiopathic previously treated with casting | 4 | 3 yr 4 mo | 18 | 0 | 3 |
| 64 | Neuromuscular | 4 | 3 yr 6 mo | 41 | 7 | 34 |
| 89 | idiopathic | 2 | 1 yr 6 mo | 55 | 21 | 37 |

OM Coronal Alignment / Balance



7-20-2010



09-05-2012



09-20-13 3D
Corrective Shape

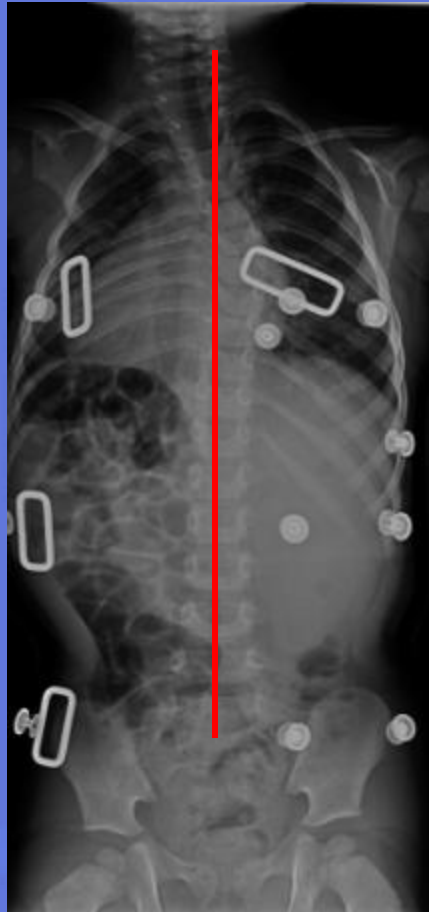


09-20-13

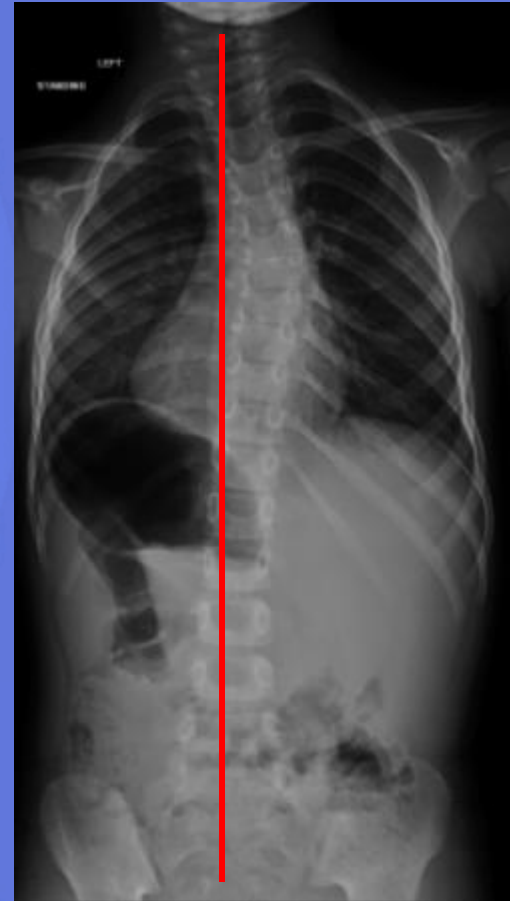
OM X-rays Vs Alignment / balance



2010 -33 mo
Cobb – 40



Cobb – 24



2013 – cobb -35

Results/Observations

- Infantile group
 - 2 with improved Cobb angle
 - 2 patients with progression but no surgical intervention
 - 1 surgical intervention (stiff curve with no initial improvement in brace)
- Juvenile group
 - 3/6 with improved Cobb
 - 3/6 Cobb stable (within measurement error)
 - No surgical intervention

Discussion

- Overall results of infantile group promising as a delay tactic although a smaller percentage of patients with improved Cobb as previous studies⁷
- Juvenile group
 - Encouraging results with several patients treated for 3 years with no progression
- We believe viable option for treatment of infantile and juvenile scoliosis

References

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