Evaluation of the Rigo classification system for brace design

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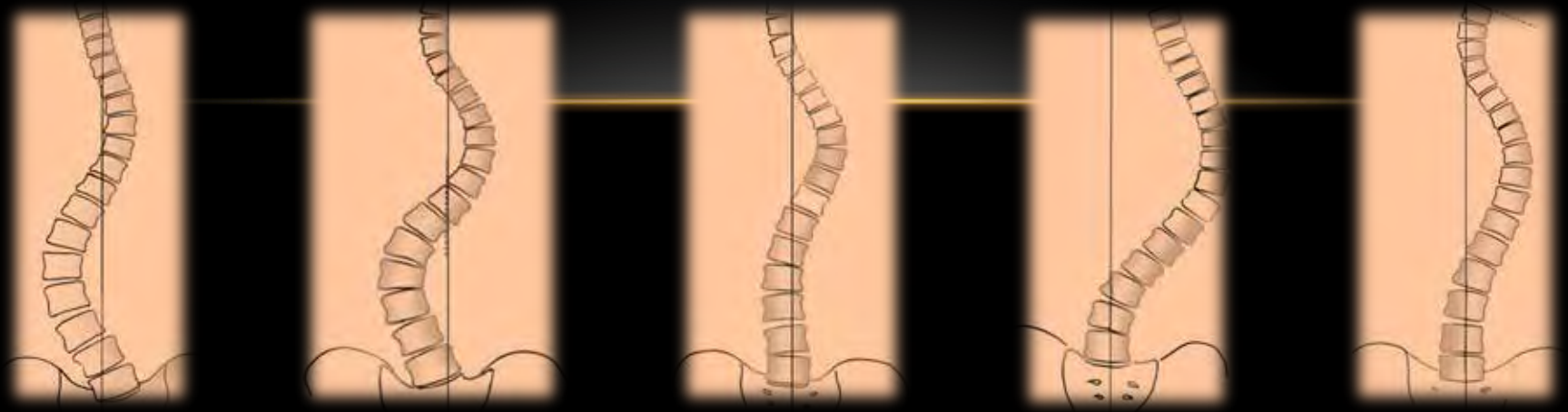
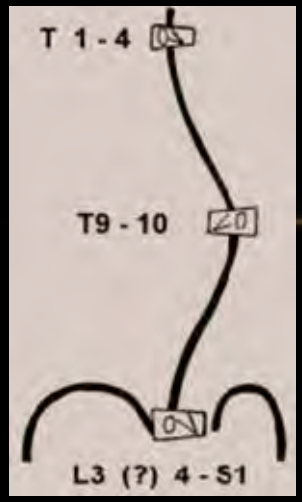
BACKGROUND

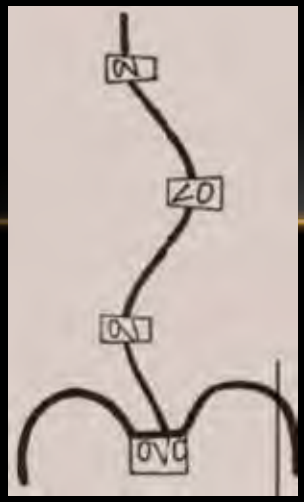
King classification system

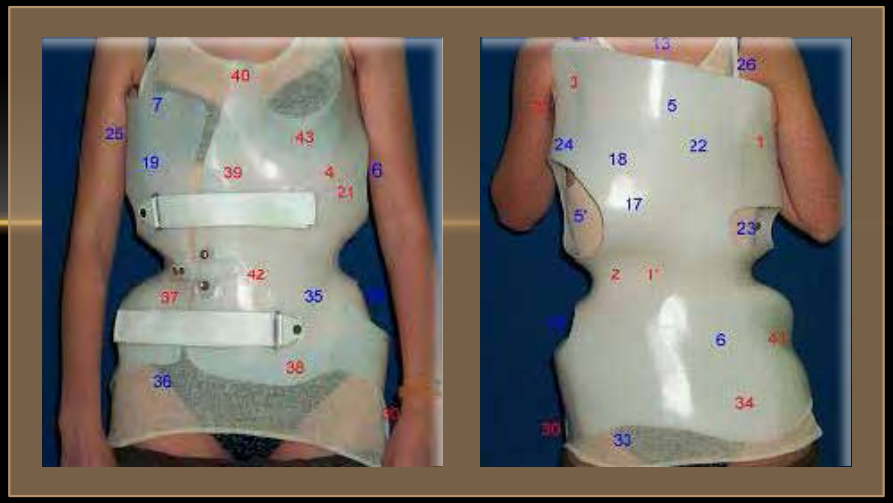


Type I Type II Type III Type IV Type V

Cheneau brace Concepts



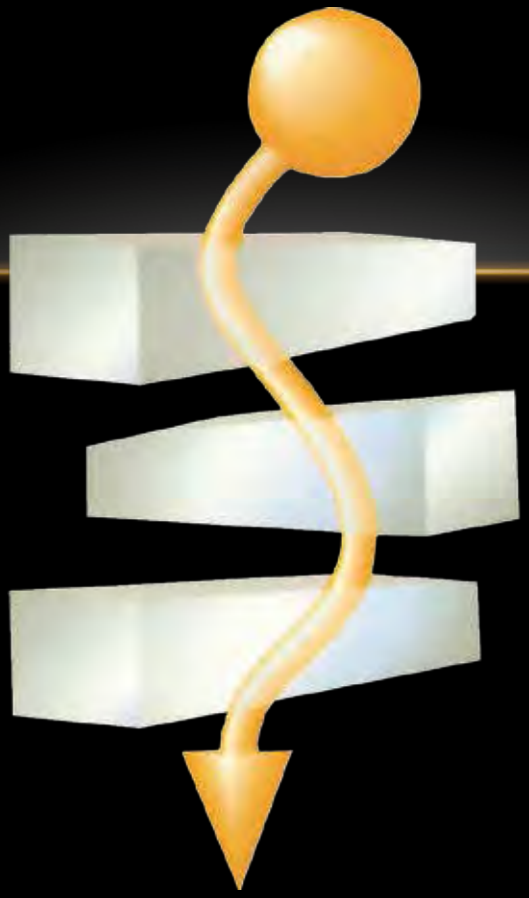




Lehnert – Schroth classification

3c

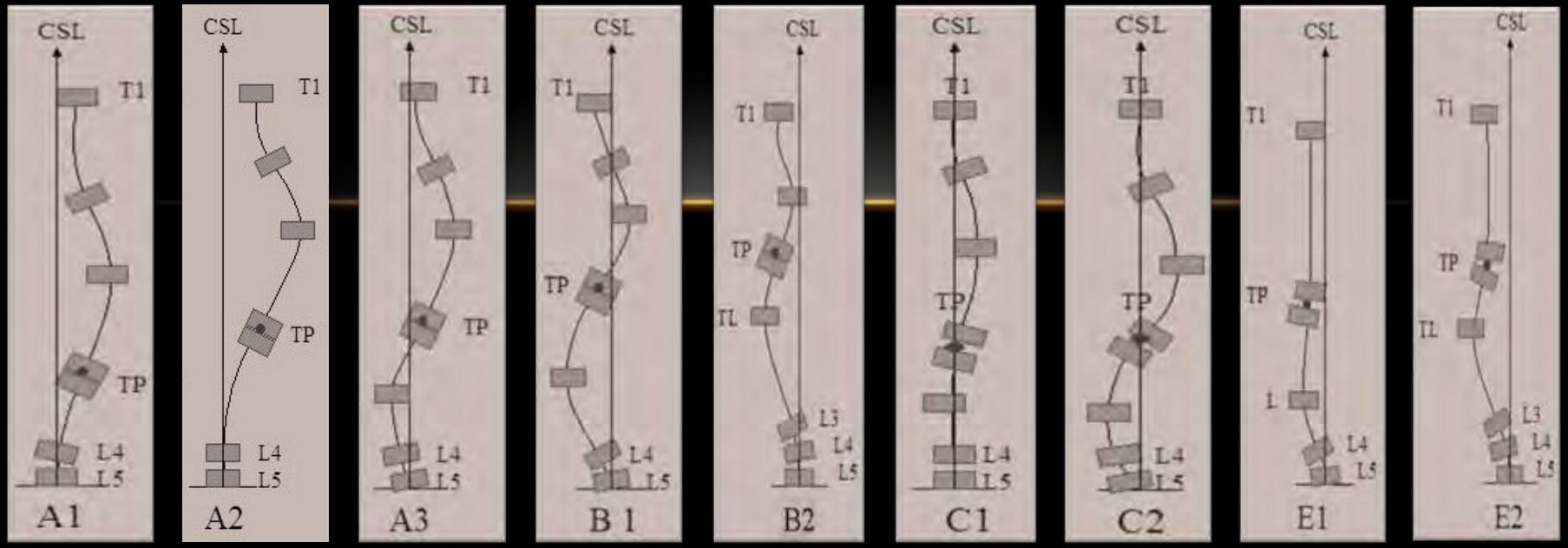
4c

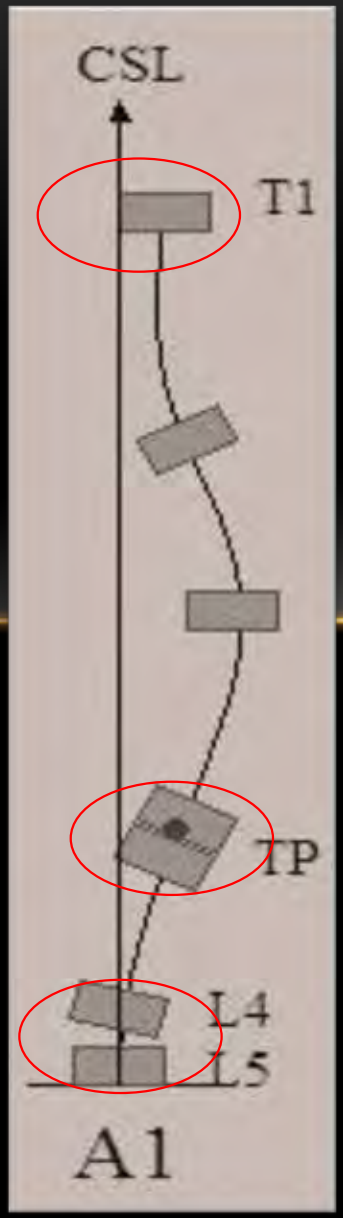


3cp

4cp

Rigo classification




CSL
T1
TP
L4
L5
A1

AIM

Evaluation of the Rigo Classification for fabrication of braces for Scoliosis

DESIGN

Duration

27 months

July 2011 - October 2013

243

patients with AIS

220 Females

23 Males

AGE

5y – 17y average 13.3y

Cobb angle

Thoracic average 35° (15° - 78°)

Lumbar average 29° (12° - 71°)

Treatment Plan

Rigo – Cheneau Brace 21/24h

+

exercises (Schroth + SEAS)

METHODS

Inter and Intra observer reliability

- In every case individually
- For the total of the cases

EVALUATION TEAM

1 - Orthopaedic surgeon (also CPO certified)

2 - Physiotherapist (Schroth and SEAS certified).

Evaluation methods

- Patient Examination every 3 months
  - Posture and Cobb angle by Formetric 4D
  - Brace adjustments
  - Posterior-anterior pictures for aesthetic evaluation
- One in – brace X-ray

RESULTS

Patients Classification

A1 13 patients

A2 9 patients

A3 41 patients

B1 66 patients

B2 28 patients

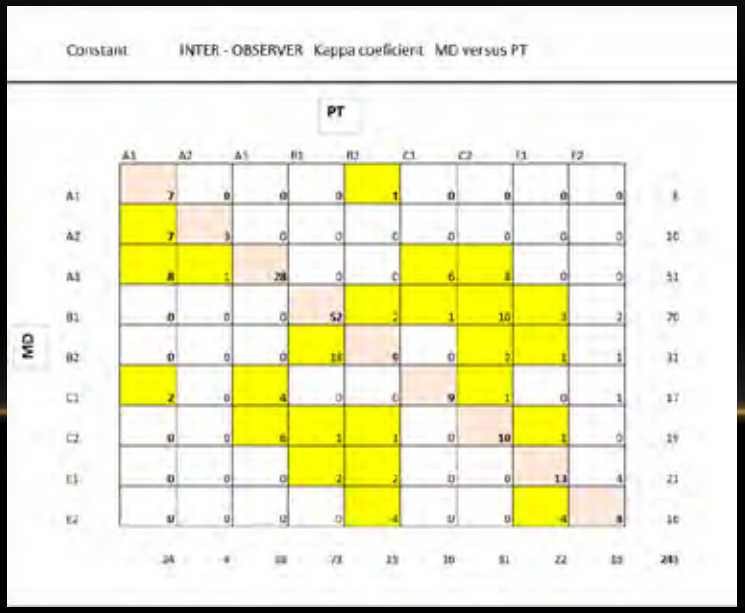
C1 20 patients

C2 26 patients

E1 22 patients

E2 18 patients

Constant Inter-observer evaluation before construction. MD versus PT



Kappa coefficient:

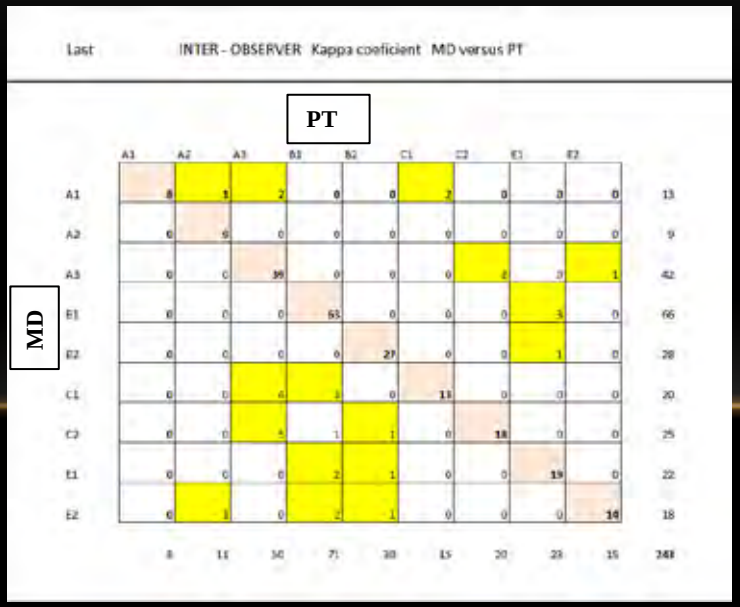
0.4904

$$Pc = \frac{0{,}7901 + 0{,}1646 + 7{,}9753 + 21{,}0288 + 2{,}4238 + 1{,}1193 + 2{,}4238 + 1{,}9012 + 1{,}0534 + 38{,}8803}{243} \quad (=) 0{,}1600$$

$$Po = \frac{7+3+28+52+9+9+10+13+8}{243} \quad 139 \quad (=) 0{,}5720$$

$$K = \frac{Po - Pc}{1 - Pc} \quad \frac{0{,}4120}{0{,}8400} \quad (=) 0{,}4904$$

Last Inter-observer evaluation. MD versus PT



Kappa coefficient:

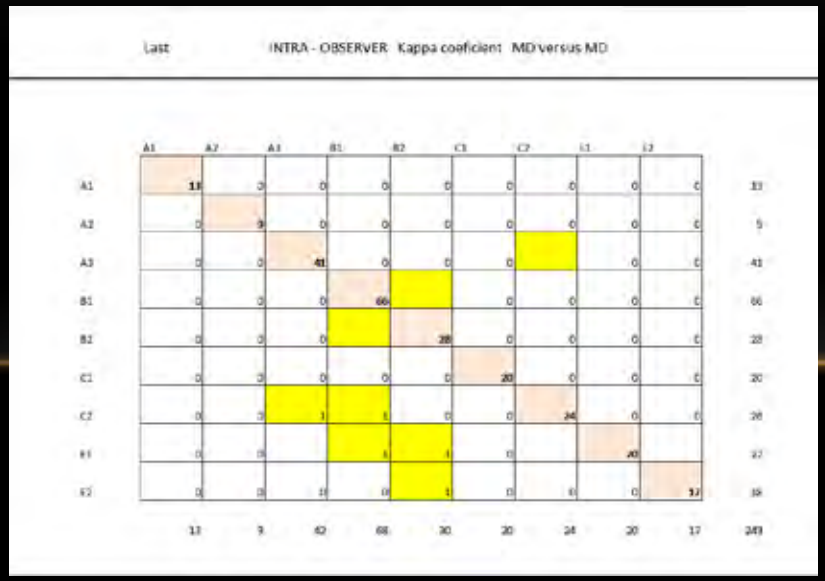
0.8408

Pc= (0,4279 + 0,4074 + 8,6419 + 19,2839 + 3,4567 + 1,2345 + 2,0576 + 2,0823 + 1,1111 + 38,7033) / 243 (=) 0,1592

Po = (8+9+39+63+27+13+18+19+14) / 243 = 210 / 243 (=) 0,8641

K= (Po - Pc) / (1 - Pc) = 0,7049 / 0,8408 (=)0,8312

Last Intra-observer evaluation. MD versus MD



Kappa coefficient:

0.9756

Pc= (0,6954 + 0,3333 + 7,0864 + 18,1893 + 3,4567 + 1,6460 + 2,5679 + 1,8106 + 1,2592 + 37,0448) / 243 (=) 0,1524

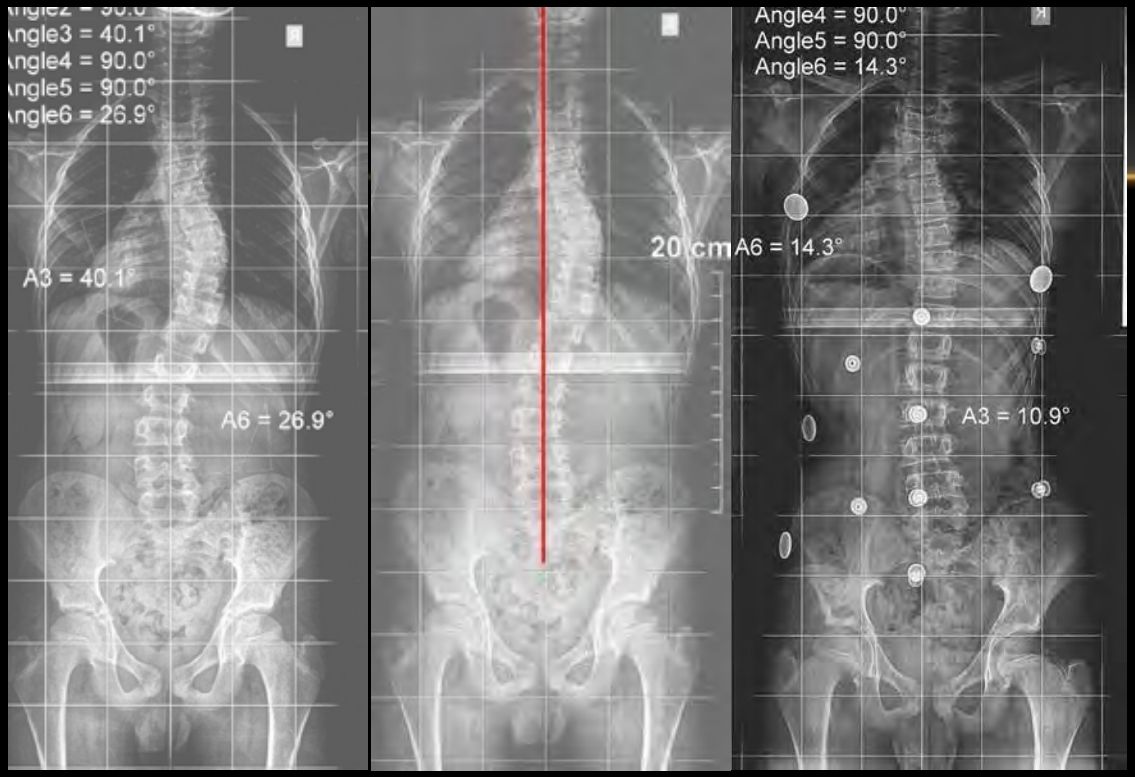
Po = (13+9+41+66+28+20+24+20+17) / 243 = 238 (=)0,9794

K= (Po - Pc) / (1 - Pc) = (0,9794 - 0,1524) / (1 - 0,1524) = 0,8270 (=) 0,9756 / 0,8476

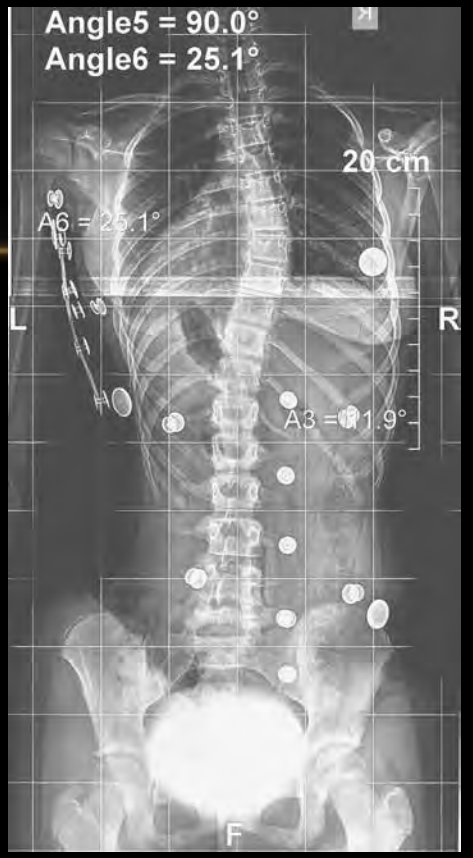
Cobb in brace Correction

Thoracic correction average 39 %

Thoracic maximum of correction 65 %



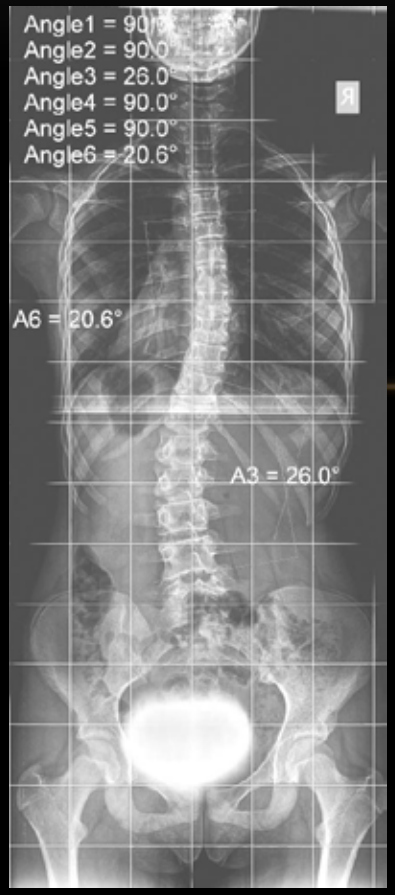
Thoracolumbar maximum of correction even 78 %

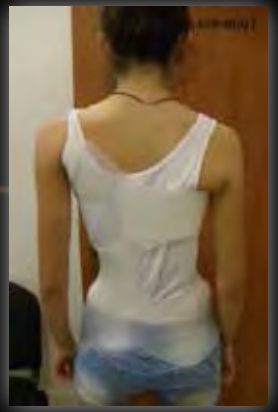


Cobb in brace Correction

Lumbar correction average 46 %

Lumbar Maximum of correction 91 %

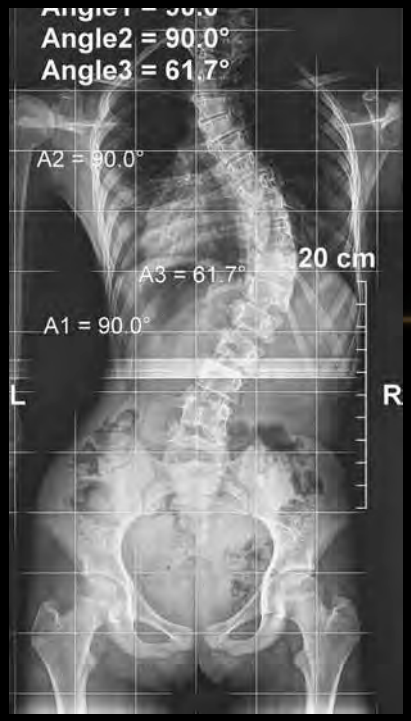




Aesthetic evaluation

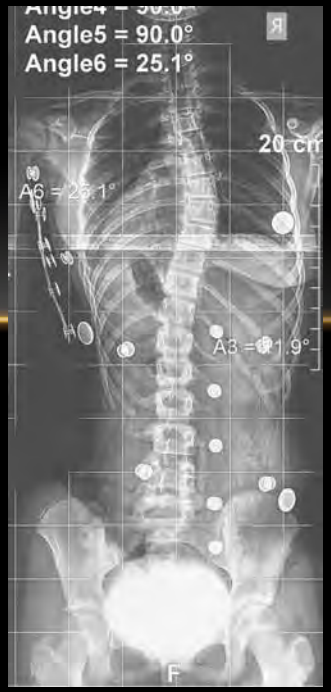
TRACE

- Shoulders asymmetry
- Scapulae asymmetry
- Hump and hemi thorax asymmetry
- Waist asymmetry (pelvis inclination, rotation and deviation)



53 % in Brace correction

11 months after

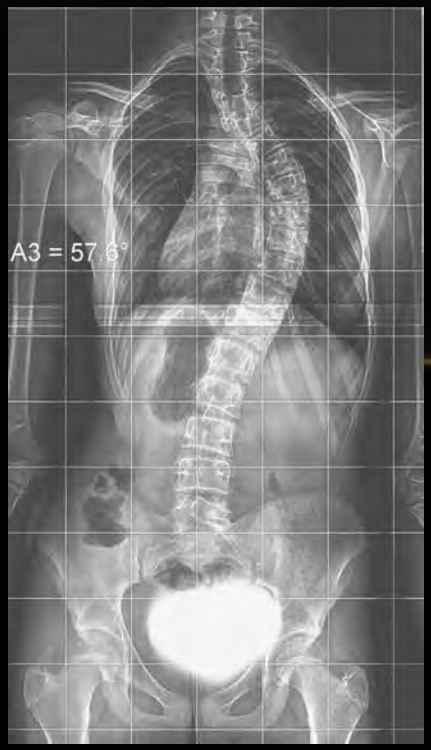


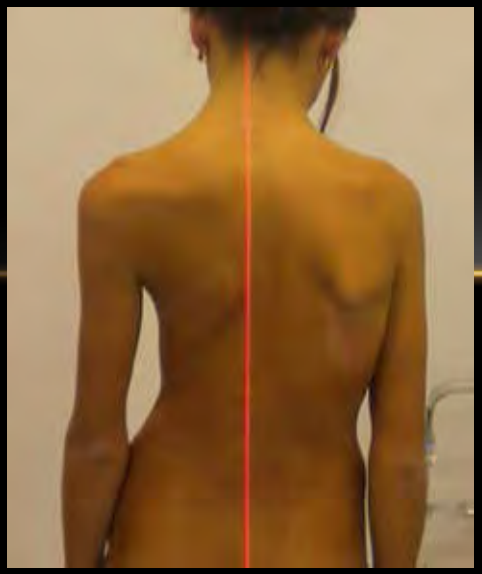
76 % in Brace correction

27 months after

17 months after
58 % Out of the
Brace correction

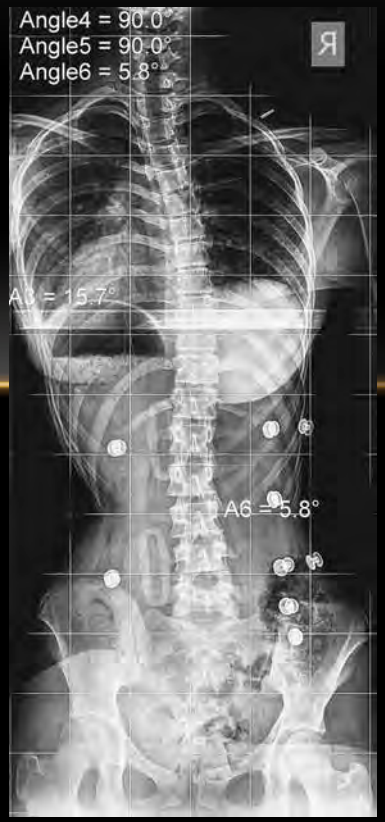
17 months after



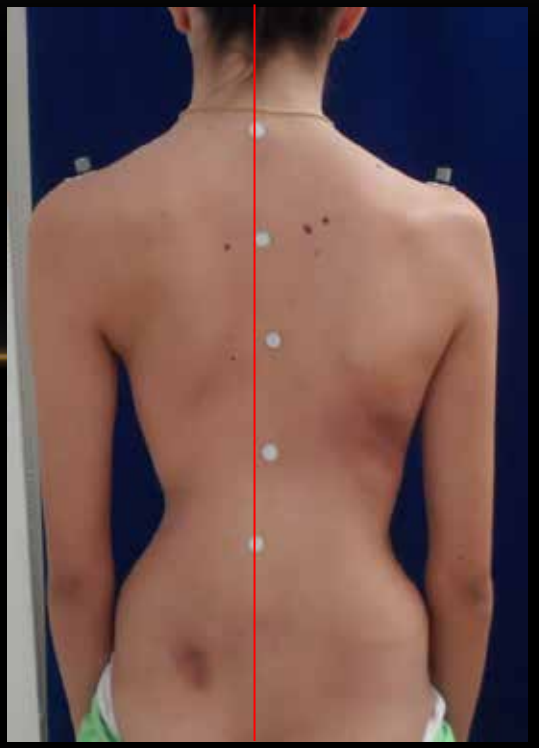


49 % In brace correction

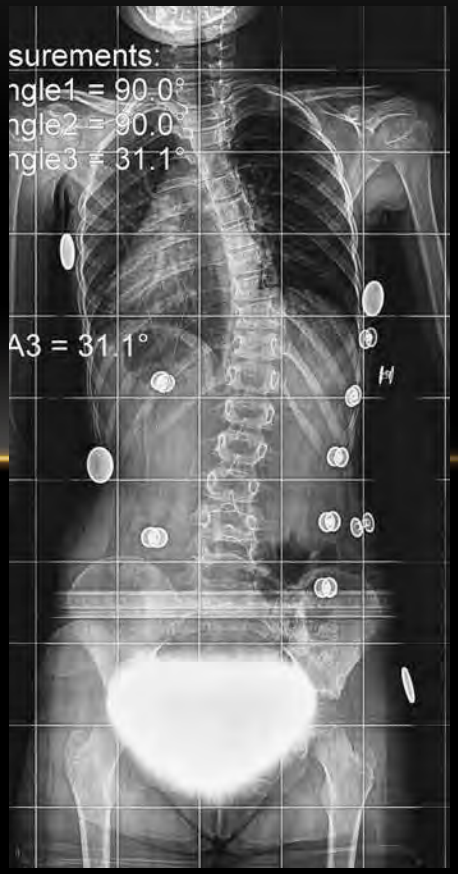
7 months after



48 % in Brace correction



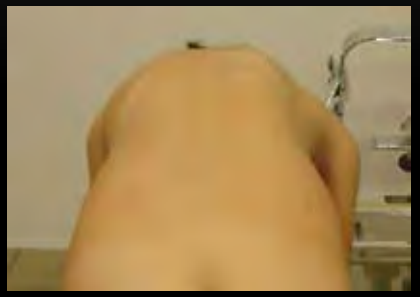
12 months after



1 week later
43 % in Brace correction

18 months after
69% Out of brace

33 months after



33 months after

33 months after

All the patients out of the brace had a better appearance, balance and aesthetics

The percent of correction and the aesthetic appearance was depended not only from the brace

- the skeletal maturity
- the patient's compliance
- the performance of exercises

CONCLUSION

The Rigo classification system was verified

in our opinion

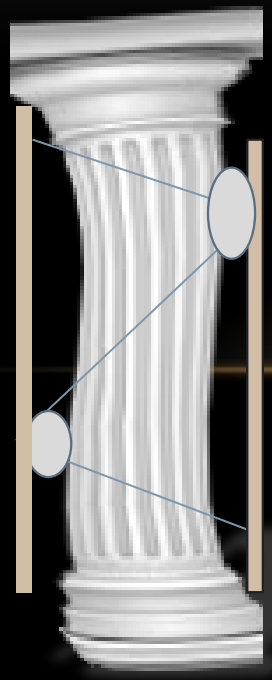
to be excellent for RSB brace fabrication
and
consequently for a successful treatment of scoliosis

Which was verified not only
in the in - brace results

But also in the
out of the brace results

We don’t know if it will be the same excellent for other brace types

such as Boston, Sforzesco etc. as they used other techniques and principles



Thank you