

# THE RELATIONSHIP BETWEEN **SPINAL ROTATION** AND **LUNG FUNCTION** IN PATIENTS WITH SCOLIOSIS



**Georgina Frere, Scoliosis SOS Clinic (UK)**

Charlotte Kydd, Scoliosis SOS Clinic (UK)

Jason Black, Scoliosis SOS Clinic (UK)

Erika Maude, Scoliosis SOS Clinic (UK)

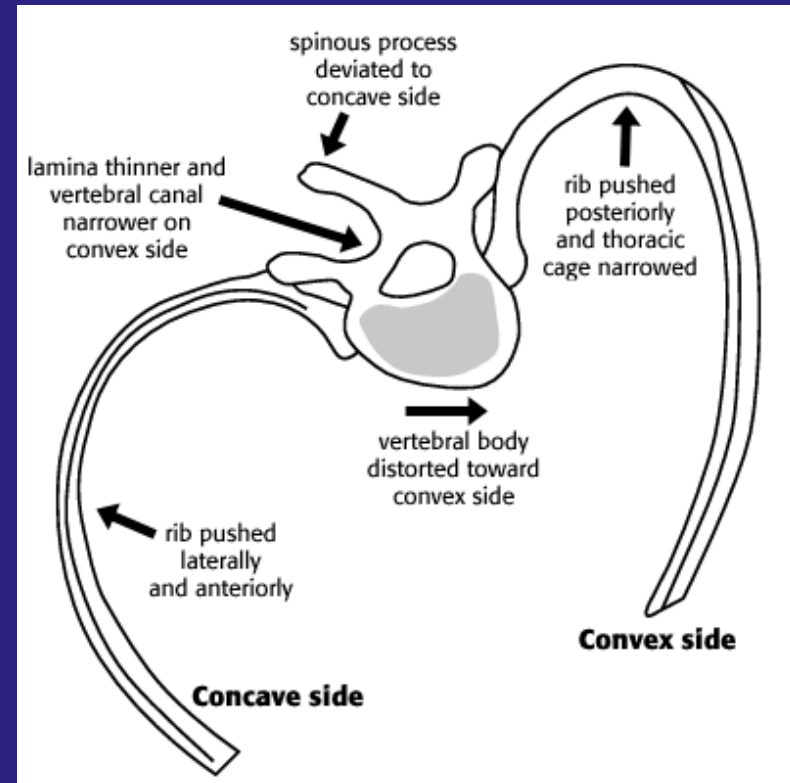
David Glynn, Independent Statistician (UK)

# Introduction

- Scoliosis is a **3-dimensional** condition of the spine
- Spinal rotation → windswept thorax → **restrictive lung disease** (extrinsically)
- As far as we are aware, there are **no studies** that have been completed that assess the **relationship between Angle of Trunk Rotation (ATR) and pulmonary function** in patients with scoliosis

The **aim** of this **retrospective, cohort** design study was:

To investigate the relationship between thoracic spinal rotation as measured by thoracic ATR and lung function in patients with scoliosis.



# Method

- 179 healthy patients with scoliosis.
- Routine data collection (retrospectively) between January 2015 and August 2016 as routine assessment of all patients.
- Patients with single thoracic curvature or a double curvature included.
- Thoracic ATR – Scoliometer
- FVC – CareFusion Spirometry PC Software
- Cobb Angle
- Collation: To establish the predicted FVC for each patient in the study → reference values and formula developed by Falaschetti et al .

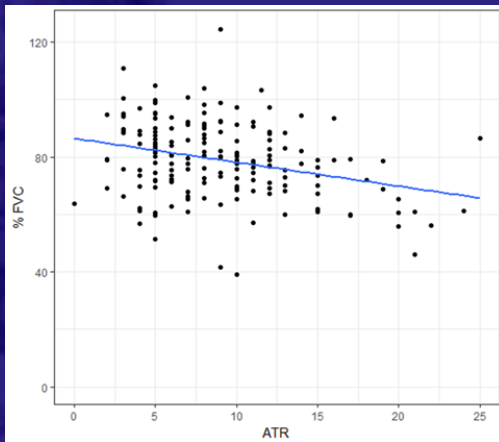
	b0	b1	b2	b3
In FVC L	Intercept	A	A <sup>2</sup>	ln(H)
Males (R <sup>2</sup> =0.52; σ=0.14)				
Mean				
Age ≤25	-11.45146	0.09895	-0.00216	2.32222
Age >25	-10.36706	0.00434	-0.00011	2.32222
Lower Limit of Normal				
Age ≤25	-11.63230	0.09795	-0.00217	2.32222
Age >25	-10.54790	0.00334	-0.00012	2.32222
Females (R <sup>2</sup> =0.62; σ=0.15)				
Mean				
Age ≤25	-9.66999	0.00837	-0.00017	2.14118
Age >25	-9.84941	0.00772	-0.00018	2.14118
Lower Limit of Normal				

- Statistical analysis: paired t-test and ANOVA method of model comparison

# Results

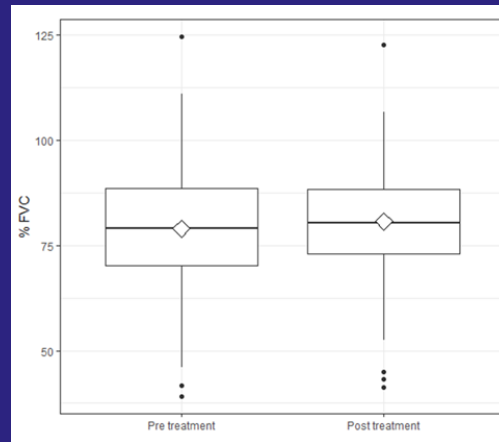
Patients	Cobb Angle	Curve type	Pre-Treatment	Post-Treatment
N = 179	<50 degrees (51.4%)	Single thoracic (21%)	Thoracic ATR: 9.07 degrees (SD = 4.75)	Thoracic ATR: 7.42 degrees (SD = 4.42)
Age range: 7 - 75 (Mean: 21.4; Median: 16)	>50 degrees (43.73%)	Double curvature (79%)	% of Predicted FVC: 78.96% (SD = 13.03)	% of Predicted FVC: 80.63% (SD = 12.82)
Female: 150 (83.8%)	Unknown (5.59%)			
Males: 29 (16.2%)	Mean: 45.58 (SD = 15.96)			

**Thoracic ATR vs % of Predicted FVC (Pre-Treatment)**



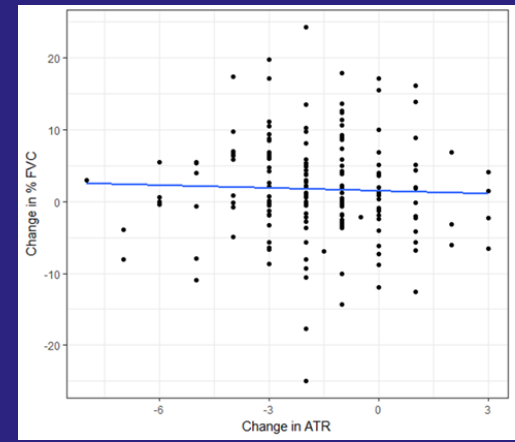
1° increase ATR = 0.83% decrease in % pred. FVC (p<0.05)

**Effect of Treatment on % of Predicted FVC**



1.67% increase in % of pred. FVC (p<0.05)  
?Clinical significance

**Change in Thoracic ATR vs Change in % of Predicted FVC**



(p>0.05)  
Suggests other factors contribute to improved % of pred. FVC

# Conclusion

- Prior to treatment, there was a **strong relationship between thoracic ATR and % of predicted FVC** in patients - those who presented with an increased thoracic ATR tended to have lower percentage of predicted FVC compared to the general population.
- The % of **predicted FVC was shown to be improved** with the ScolioGold treatment programme; however, these improvements **cannot be fully attributed to decreasing the thoracic ATR.**