

Fulcrum bending radiographs give superior results to lateral bending radiographs for surgical planning in adolescent idiopathic scoliosis

B Barkham, B Ajayi, K Kelly, R Williams, D Lui, T Bishop, J Bernard

Aim

To assess if the introduction of a fulcrum bending radiograph is a superior investigation for the assessment of spine flexibility for adolescent idiopathic scoliosis compared to lateral bending radiographs

Why do we do lateral bending or fulcrum X-rays?

- Allows assessment of spine flexibility for surgical planning
- AP radiograph to eliminate scoliosis curve using lateral bending or fulcrum cushion
- Cobb angle used to give degree of curvature

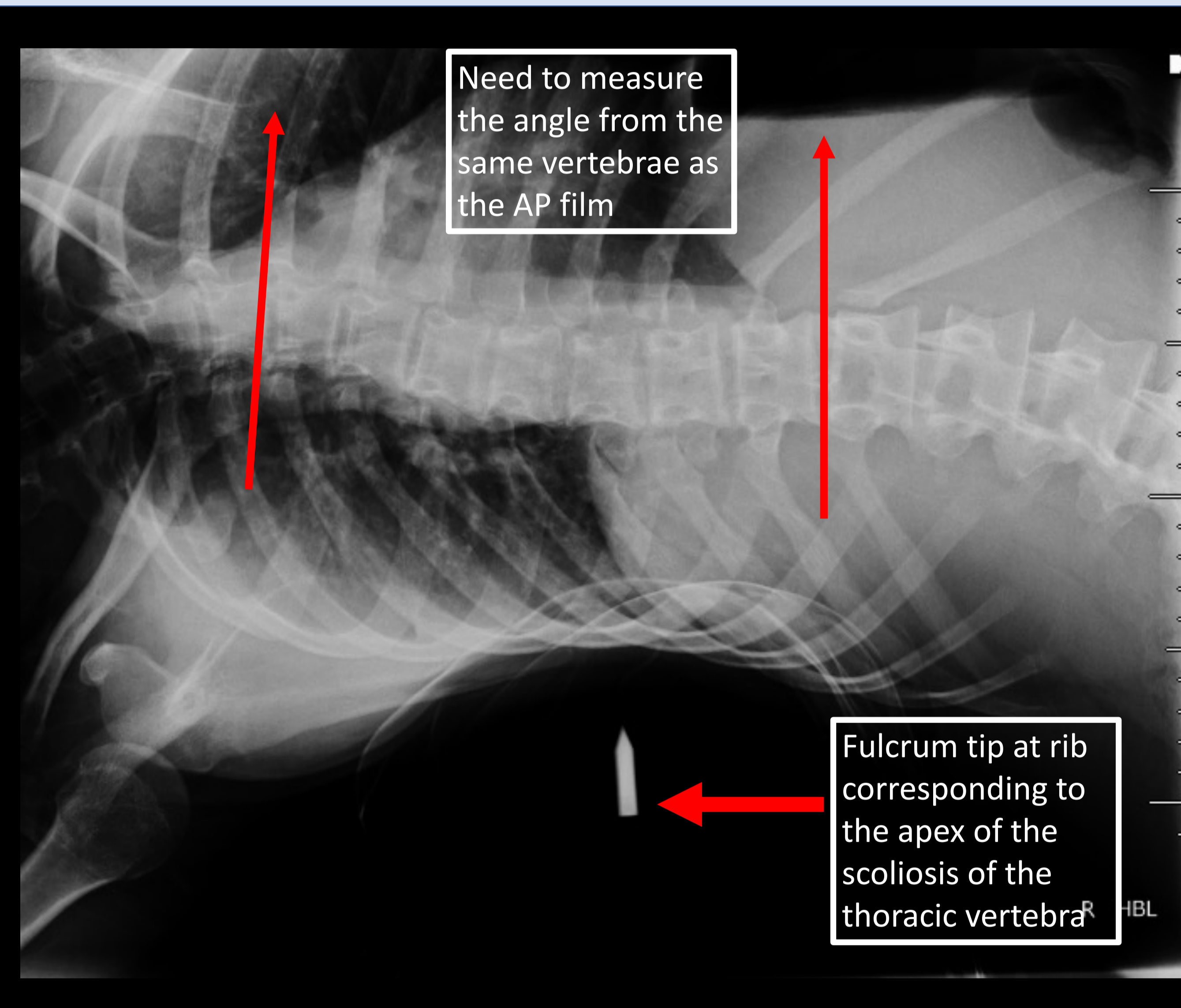
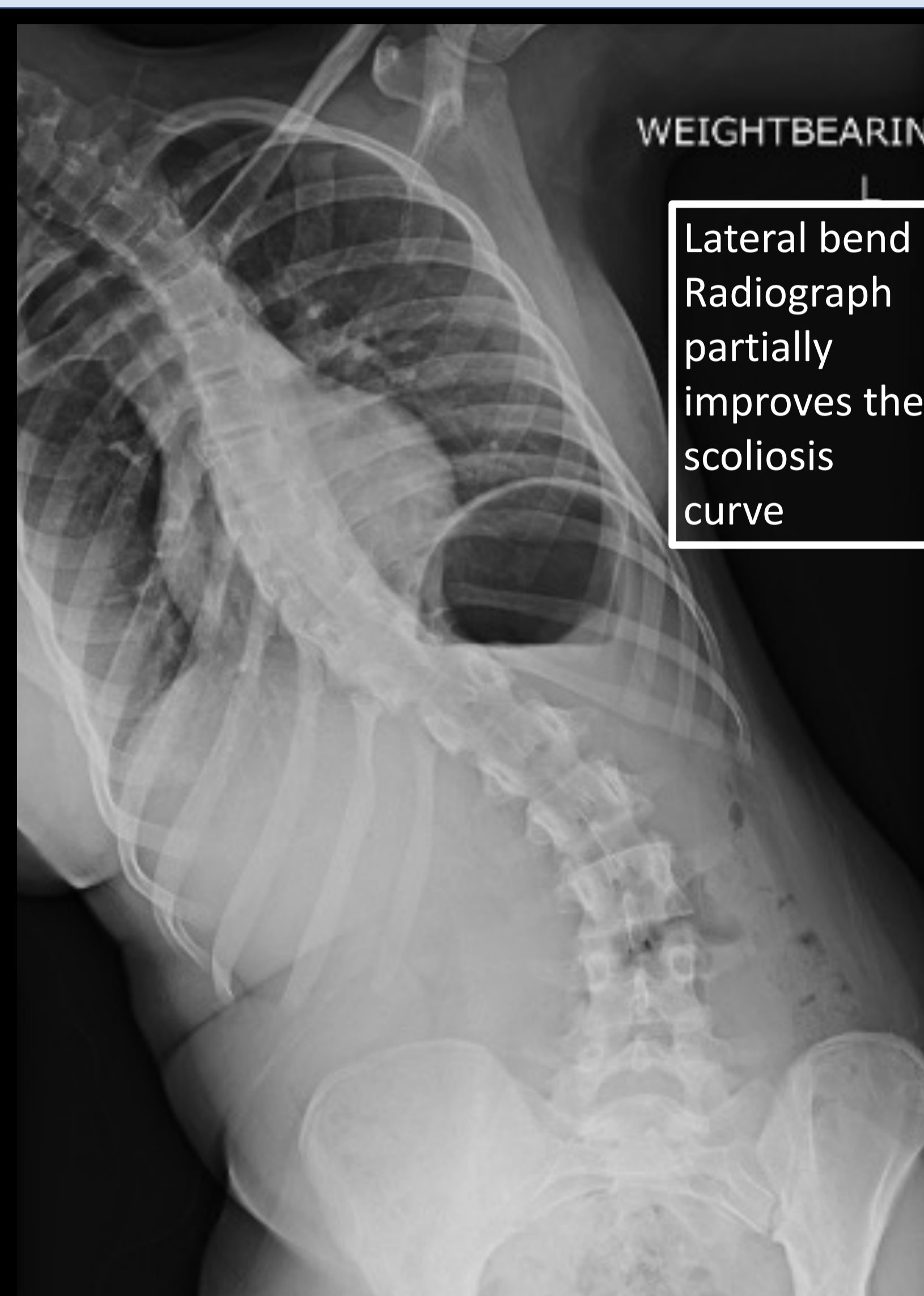
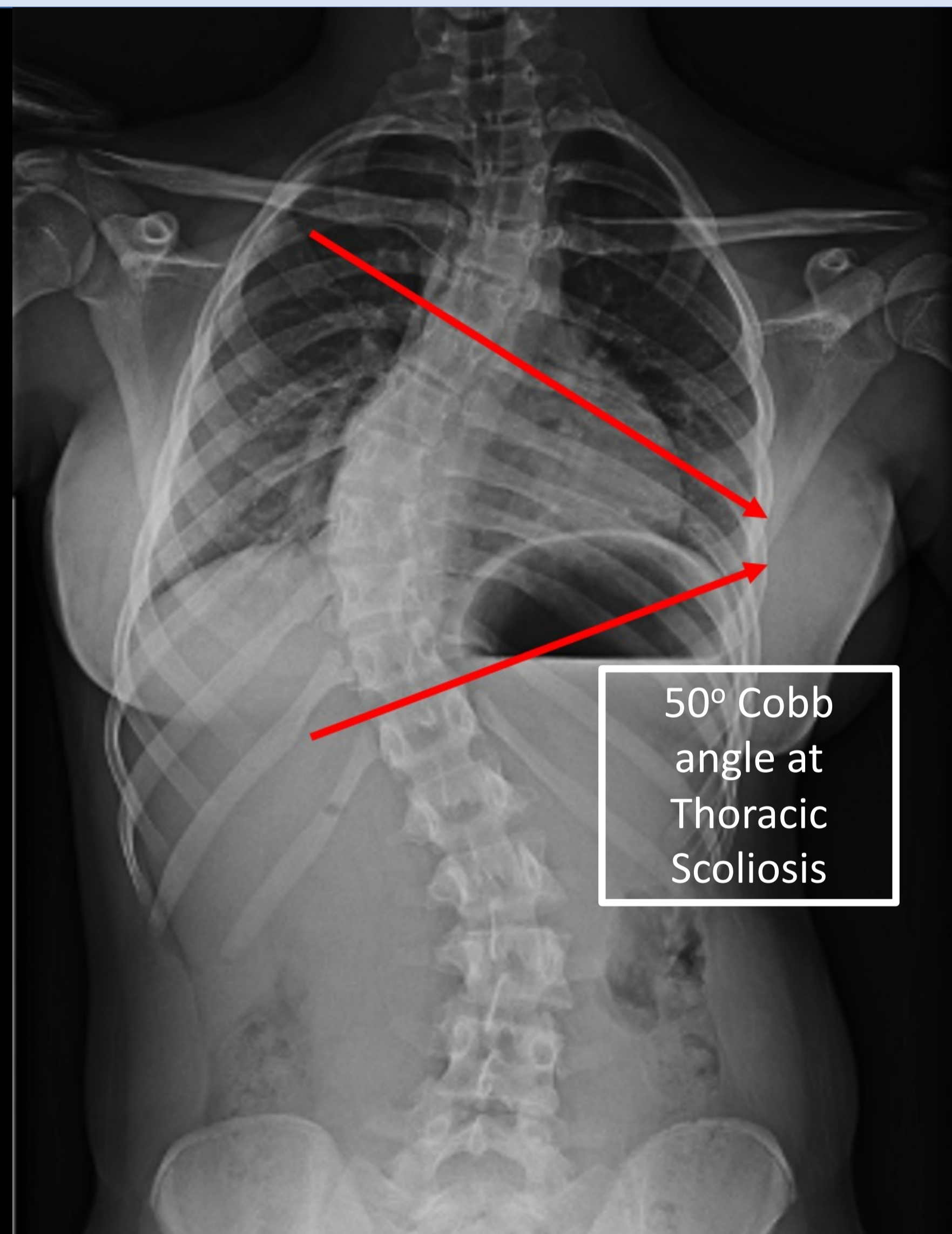
Method

- All radiographs of patients who had correction surgery for adolescent scoliosis between 2012 and 2020 were included
- Fulcrum radiographs were introduced in 2017 in our institution
- Comparison of Cobb angle between standing AP with either the lateral bending radiograph or Fulcrum bend radiographs pre and post 2017

AP standing Radiograph

Lateral Bend Radiograph

Fulcrum Bend Radiograph



Results

- On average 21° greater spine alignment with fulcrum radiograph than Lateral bend Radiograph
- 125 patients between 2012 & 2017
 - 73 AP and lateral radiographs
 - AP Cobb average 62°
 - Lateral bend average 52°
- 107 patients between 2017 and 2020
 - 42 AP and fulcrum bend radiograph
 - AP Cobb angle average 59°
 - Fulcrum bend average 31°
- 47 Fulcrum bend radiographs performed incorrectly. Demonstrating a learning curve for radiographers.

Previous evidence

- Study of 30 patients showed Fulcrum bending radiographs to be superior in predicting spine flexibility than Standing lateral bending radiographs.¹
- Comparison of standing/supine lateral bending radiographs and fulcrum bending Radiographs in 46 patients showed the fulcrum radiographs to superiorly demonstrate spine flexibility.²
- Fulcrum bend Radiographs can be used to check flexibility at selected levels allowing for more predictive surgical outcomes.³

Conclusion

When assessing flexibility of adolescent idiopathic scoliosis, the fulcrum bend radiograph is the superior investigation when compared with the lateral bend radiograph.

References

1. Prediction of Correction of Scoliosis with Use of the Fulcrum Bending Radiograph, Cheung et al. JBJS. 1997
2. Prospective Comparison of Flexibility Radiographs in Adolescent Idiopathic Scoliosis. Klepps, S et al. Spine. 2001
3. Segmental flexibility in adolescent idiopathic scoliosis assessed using the fulcrum-bending radiography method. Kawasaki, S et al. Clinical spine surgery. 2020