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Two Adolescent Idiopathic Scoliosis (AIS) Cases, Two Surgeons, One Operating Room, One Day. The Results of a Quality Improvement Initiative

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Disclosures

- None

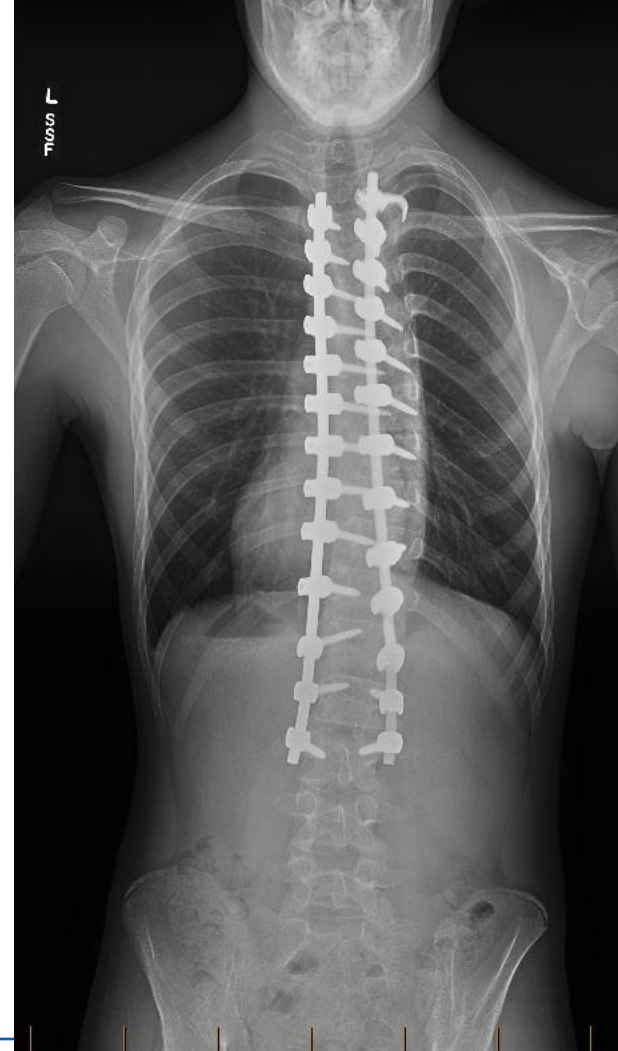
Preop PA



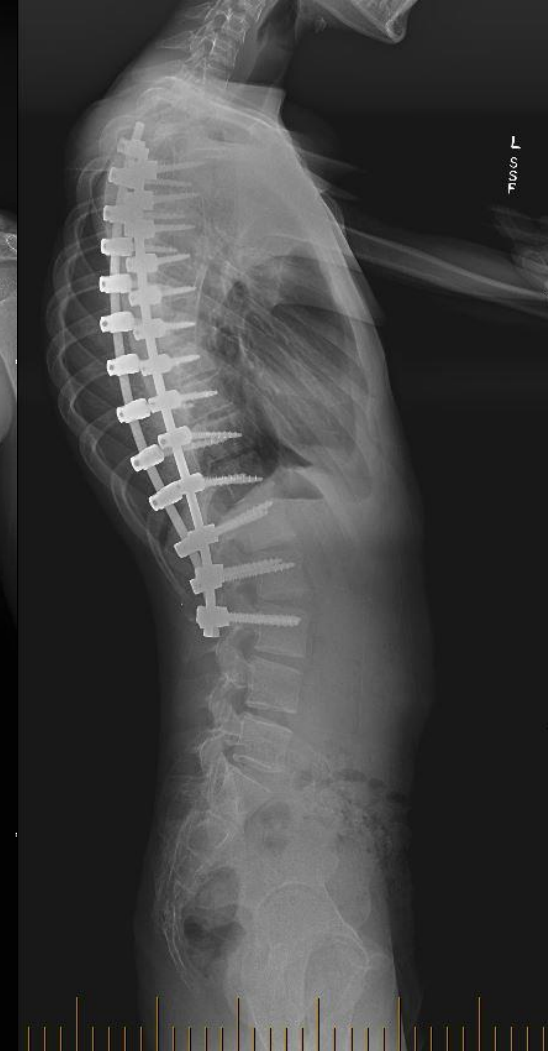
Preop Lateral



Postop PA



Postop Lateral



Background

- Posterior spinal instrumentation and fusion (PSIF) for AIS may last 4 to >6 hours on average
- Increased surgery time is a risk factor for numerous complications in spine surgery¹⁻⁴



Obtained from Spine⁵



Obtained from Cureus⁶



Figure 1: Right eye of patient showing tense swollen lids with chemosis, proptosis and corneal oedema.

Obtained from Deli Journal of Ophthalmology⁷

Background

- To reduce OR times, several tactics have been employed.
 - Performing multiple surgeries per day with one surgeon
 - Performing these cases with a fellow surgeon
 - Overlapping the cases.⁸⁻¹¹
- Most surgeons would prefer not to have two AIS cases run concurrently.
- Employing a dual surgeon team or a dedicated AIS operative team has been used to improve efficiency.⁸⁻¹³
 - There is mixed data on whether operative times vary between morning and afternoon cases.^{11, 12, 14}
- With two surgeons in one case, operative times tend to be shorter with less blood loss when two surgeons work concurrently.^{9, 10, 13}
 - The rates of successful fusion with one vs two surgeons does not vary long-term.^{11, 12}

Purpose

- To increase value, we created a quality improvement initiative
 - Two surgeons working simultaneously
 - Perform two AIS cases on the same day
 - One operating room.
 - Our purpose is to describe the results of this initiative and determine whether performing two AIS cases in a day with two surgeons results in shorter OR times and lower blood loss.
-

Methods

- 2017-2023
- Review of prospectively collected data on patients aged 10-18 years.
- AIS undergoing primary PSIF on the “Two Spine Tuesdays.”
- Operative times (total in room time and surgical time (incision to dressing)), # levels fused, blood loss, and transfusion requirements were collected.
- Data was evaluated:
 - 1. Comparing the first case of the day to the second (First/Second Case groups).
 - 2. Comparing the first 50% of cases to the subsequent 50% (Chronologic groups).

Statistical Methods

- All data analyzed using SPSS software
- Significance set at 5%.
- Descriptive statistics used to assess frequencies and percentages as well as continuous variables (median with range when abnormally distributed and mean \pm standard deviation when normally distributed).
- All data underwent normality testing with Shapiro-Wilk test
- Abnormally distributed data underwent testing with nonparametric tests
- Normally distributed data underwent testing with F-test for variance before independent sample t-tests.
- Chi-square was used to observe any differences between categorical variables

Results - Demographics

- 56 patients
- 73% female
- Average age
 - 15.2 ± 1.8 years



Results

First/Second Cases Comparison

Variable	First case n=28	Second case n=28	p-value
Sex, n(% Female)	20 (57.7%)	21 (61.4%)	0.79
Age, mean	15.4 ± 1.9	15.1 ± 1.8	0.62
Preoperative Cobb angle	57.7 ± 8.7	61.6 ± 16	0.26
Number of levels fused	10.3 ± 2.9	10.7 ± 1.3	0.45
In room to incision time	68.4 ± 10.5	60.8 ± 7.5	0.003
First incision to end of exposure	65.7 ± 14.6	60.3 ± 12.6	0.14
First implant to last implant	54.2 ± 17.9	48.4 ± 18.3	0.23
Last implant to last rod	45.2 ± 14.5	45.9 ± 11.6	0.83
Rods in to bone graft	15.2 ± 8.8	15.9 ± 6.7	0.75
Start closure to dressing on	29.6 ± 10.2	27.1 ± 5.4	0.26
Surgery stop to out of OR	17.1 ± 7.0	16.6 ± 5.3	0.76
Surgery time, mean	214.9 ± 49.3	201.6 ± 30.8	0.23
Total OR time, mean	295.5 ± 41.8	282.1 ± 53.1	0.30
Estimated blood loss mL	400 (100-1000)	400 (155-1700)	0.87
Percent blood loss	10.27 (2.8-23.2)	10.78 (3.5-55.1)	0.74
Cell saver	77.5 (0-230)	77.5 (20-470)	0.50
Transfusion	0 (0-0)	0 (0-320)	0.7

Results

Chronologic Cases Comparison

Variable	First half n=28	Second half n=28	p-value
Sex, n(% Female)	24 (86%)	17 (61%)	0.052
Age, mean	15.4 ± 1.8	15.1 ± 1.8	0.51
Preoperative Cobb angle	55.2 ± 8.4	64.1 ± 15.2	0.009
Number of levels fused	10.6 ± 2.1	10.4 ± 2.4	0.68
In room to incision time	62.9 ± 9.0	66.3 ± 10.4	0.19
First incision to end of exposure	65.6 ± 14.2	60.3 ± 13.1	0.15
First implant to last implant	47.4 ± 19.4	55.1 ± 16.4	0.11
Last implant to last rod	50.5 ± 12.3	40.6 ± 12.1	0.004
Rods in to bone graft	18.2 ± 6.2	12.9 ± 8.4	0.01
Start closure to dressing on	29.8 ± 9.4	27 ± 6.6	0.21
Surgery stop to out of OR	18.1 ± 6.7	22.8 ± 39.0	0.53
Surgery time, mean	219.4 ± 44.5	197.1 ± 35.0	0.042
Total OR time, mean	292.5 ± 40.0	285.1 ± 55.0	0.57
Estimated blood loss mL	400 (100-1000)	400 (155-1700)	0.87
Percent blood loss	10.27 (2.8-23)	10.8 (3.5-55.1)	0.74
Cell saver	77.5 (0-230)	77.5 (20-470)	0.50
Transfusion	0 (0-0)	0 (0-320)	0.08

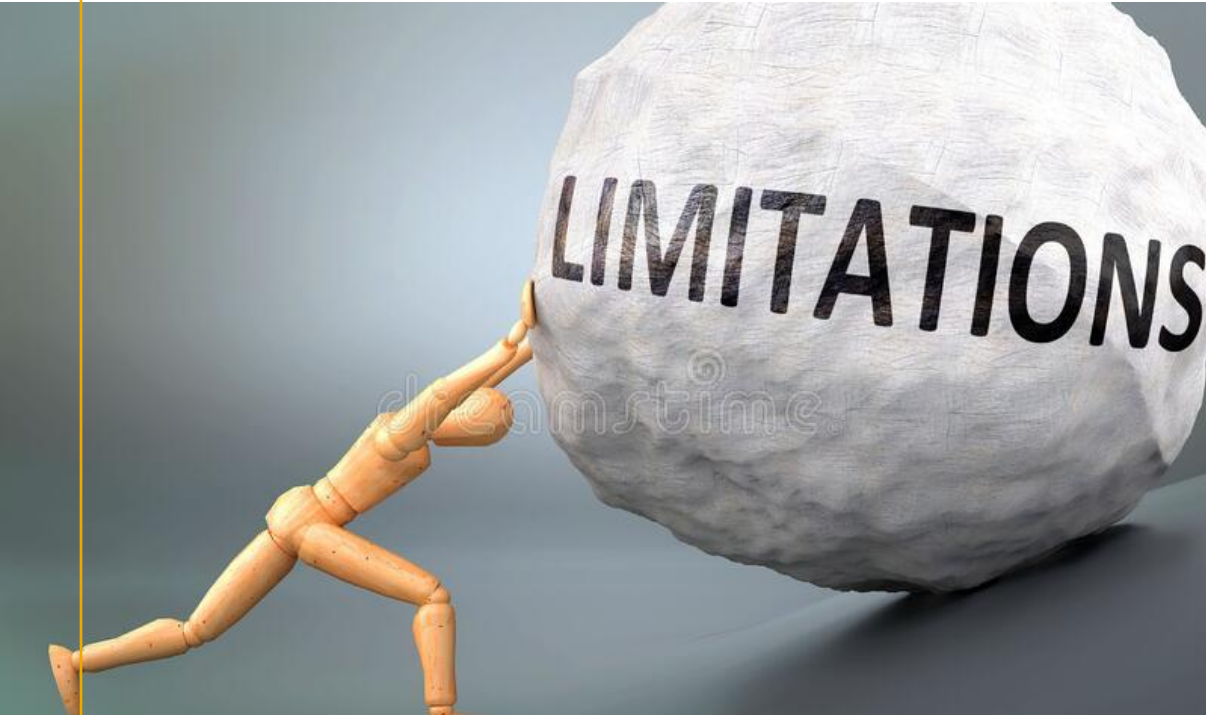


Image retrieved from [dreamstime.com/illustration](https://www.dreamstime.com/illustration)

Limitations

- This is a retrospective study with prospective data collection.
- We will need long term data assessing patient reported outcomes, infection, readmissions, and need for revision to show this is safer for the patient.
- Cost analysis will be needed to see if two surgeons operating will result in cost savings to the patient and hospital.

Conclusions

- Case complexity increased with time (significant increase in average Cobb angles and screw insertion times in the second half of the case series).
- Despite increasing case complexity, surgical times decreased during the second half of the study and blood loss remained unchanged.
- Reducing OR times (in OR time and surgical time) and blood loss may reduce over complications and has potential for meaningful cost savings.

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