

DATE 6/6/2022

Name of Principal Investigator: Selina Poon

Study title: Pedicle Screw Placement with a 3D Deformity Model

Name of award: POSNA Directed Research Grant

Year in which the grant/award was funded: 2019

Study Aims:

1. To investigate whether a 3D spinal deformity model can increase resident confidence, satisfaction in training, and perception of operating room safety.
2. To investigate whether a 3D deformity training model of the spine is similar to currently available teaching models for resident education.

Research findings:

Thirty-three trainees from 2 institutions participated in the training sessions. Twenty-five of them completed both training and testing sessions.

Aim 1:

Trainees were placed into 3 cohorts (cadaver, 3D and sawbones). Initially, all groups were queried about their confidence levels, satisfaction in training, and perception of safety using a Likert scale (0-10) in placing pedicle screws. Next, Group 1 (n=6) was taught the traditional method of screw insertion on adult cadavers with straight spines. Group 2 (n=12) was taught screw insertion on 3D-printed scoliotic spines. Group 3 (n=7) was taught using a commercially available Sawbone model. Trainees were then queried regarding their confidence levels, satisfaction in training, and perception of safety using a Likert scale (0-10). The change in confidence levels were calculated for each group.

Change from pre-testing to post-testing				
	Cadaver	Sawbones	3D Print	p-value (Between groups)
<i>I am satisfied with my AIS training so far</i>	1.17	0.22	1.34	0.95
<i>I have a good understanding of the patient anatomy of AIS surgery</i>	1.45	1.11	1.14	0.99
<i>I have a good understanding of the critical aspects of AIS surgery</i>	1.21	1.44	1.55	0.78
<i>My surgical technique is adequate for assisting in AIS surgery</i>	1.47	1.11	2.24	0.01
<i>I feel that my current training will prevent me from making intra-operative errors</i>	1.6	1.45	1.7	0.58
<i>I feel safe in assisting in AIS surgery in the operating room</i>	0.91	0.45	1.35	0.58
<i>I feel prepared to step into an operating room and engage in AIS surgery</i>	0.53	1	2.34	0.76

Aim 2:

Trainees were placed into 3 cohorts. Group 1 (n=6) was taught screw insertion on traditional cadavers with straight spines. Group 2 (n=12) was taught screw insertion on 3D-printed scoliotic spines. Group 3 (n=7) was taught using a commercially available Sawbone model. The number of breeches were tabulated for each group. An additional testing session 2-3 weeks post training, the trainees were then tested on their screw insertion accuracy. The number of breeches were once again tabulated and compared to the initial training session

Results:

Pre	Std	Post	Std	Diff	Teaching Method

1	1.22	1	1.06	0	3D
5	2.07	0	2.04	-5	Cadaver
4	2.37	0	2.37	-4	Sawbone

In addition, the trainees were queried on their evaluation of the 3D model:

Would you choose to learn on a Sawbone or the 3D AIS model?

- 84% - 3D Model

How did you like the feel of the 3D AIS Spine Model

- 4.5 (0-5)

How close in comparison is the feel of the 3D model to the real spine/bone?

- 3.9 (0-5)

Overall, would you recommend the use of the 3D model in your residency program?

- 4.7 (0-5)

Expenditures: see submitted expense report

Presentations: Preliminary results were not accepted by various meetings

Publications: Pending

Further grant obtained as result of POSNA funding: None