

A Cross-Sectional Study Investigating the Impact of Three-Dimensional Animated Videos on Caregiver Craniosynostosis Education

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BACKGROUND

- Craniosynostosis is a congenital condition in which the sutures of a newborn's skull fuse prematurely
- Complex and early surgical intervention is required to minimize complications and improve aesthetics
- Surgeons use verbal discussion, patient CT scans, and 2D drawings to explain the diagnosis and treatment options
- Caregivers prefer 3D models over 2D diagrams in learning about craniosynostosis

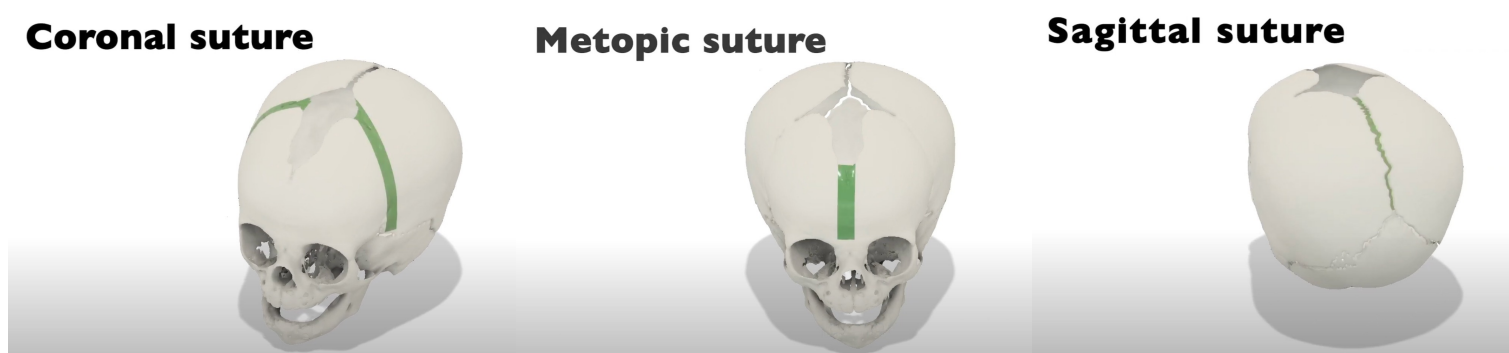
OBJECTIVE

Characterize the impact of 3D animated craniosynostosis skull model videos on caregiver understanding and knowledge

METHODS

Video Development

Obtained preoperative CT scans of patients with craniosynostosis. Converted CT scans into 3D STL meshes using Inobitec; post-processed in Fusion 360. Animations were created in Fusion 360. Video was edited in iMovie.



Survey Development

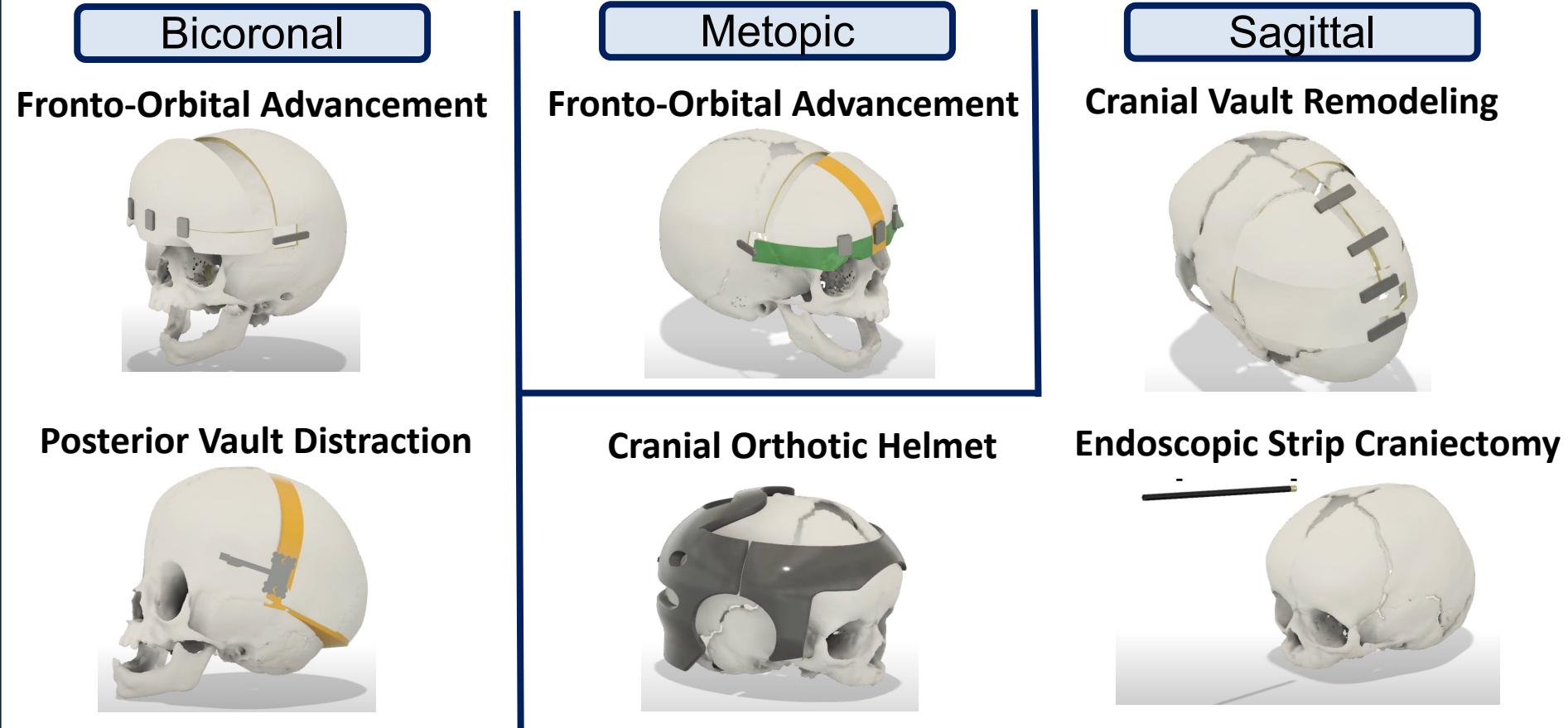
Built survey instrument through Qualtrics. Survey was distributed through Facebook craniosynostosis support groups from September 2 to October 24, 2022.

Four-part survey:

1. Demographics
2. Understanding and Knowledge Questions (pre)
3. 3D animated video
4. Understanding and Knowledge Questions (post)

Respondents were prompted to select the type of diagnosis that best fit their patient – they were shown the relevant video for diagnosis selected.

Results were analyzed using STATA. Paired T-tests with a significance level of $p < 0.05$ were used.



RESULTS

Figure 1. Number of included and excluded responses

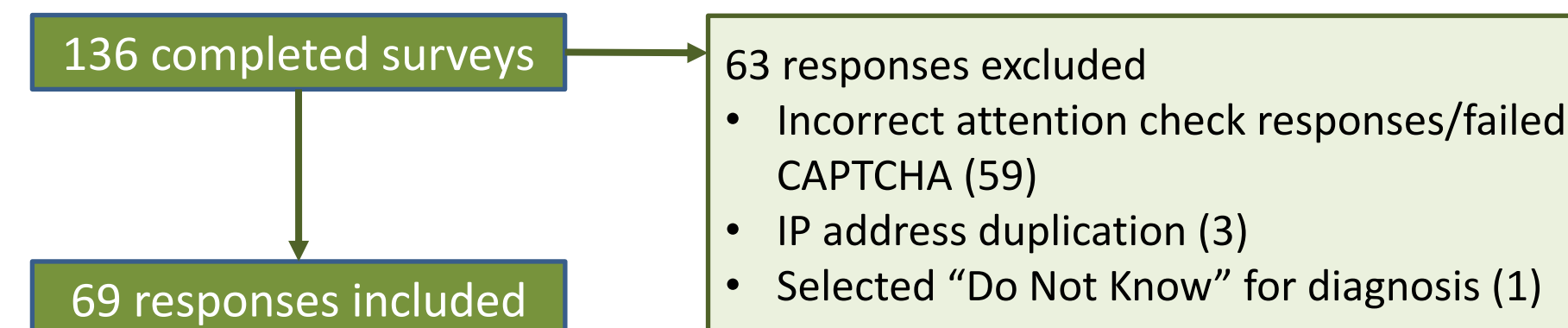


Table 1. Respondent demographics

Respondent Demographics (n=69)	n (%)
Age (Mean ± SD)	34.7 ± 7.9
White	50 (72.4)
Female	44 (63.7)
At least a 4-year college degree	39 (56.5)
Parent	40 (57.9)
Have had medical/health professional training	47 (68.1)

Table 2. Caregiver selected diagnosis

Patient Synostosis Type	n (%)
Bicoronal	25 (36.2)
Metopic	16 (23.2)
Sagittal	28 (40.6)

Figure 2a. Pre- and post-video self-rated understanding, $*p < 0.05$

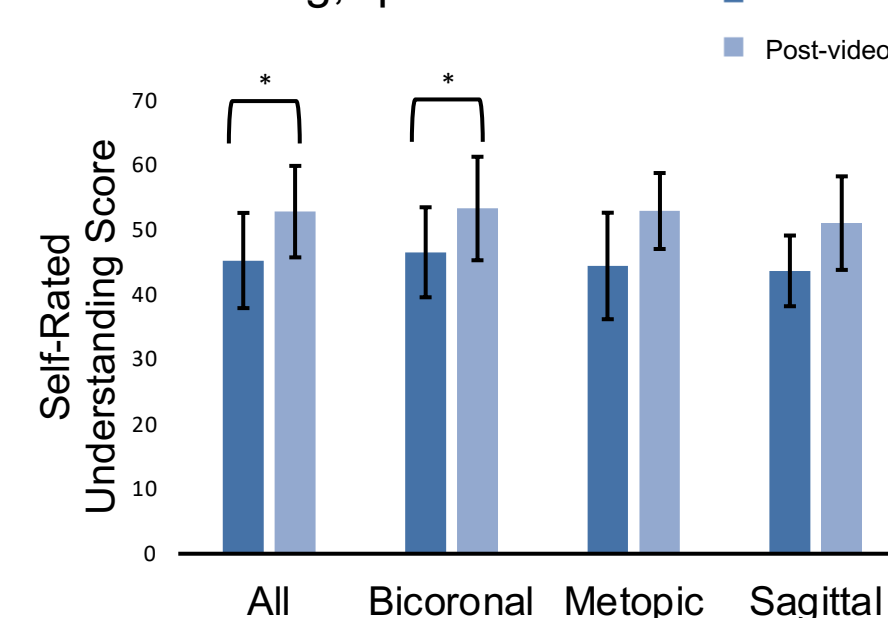
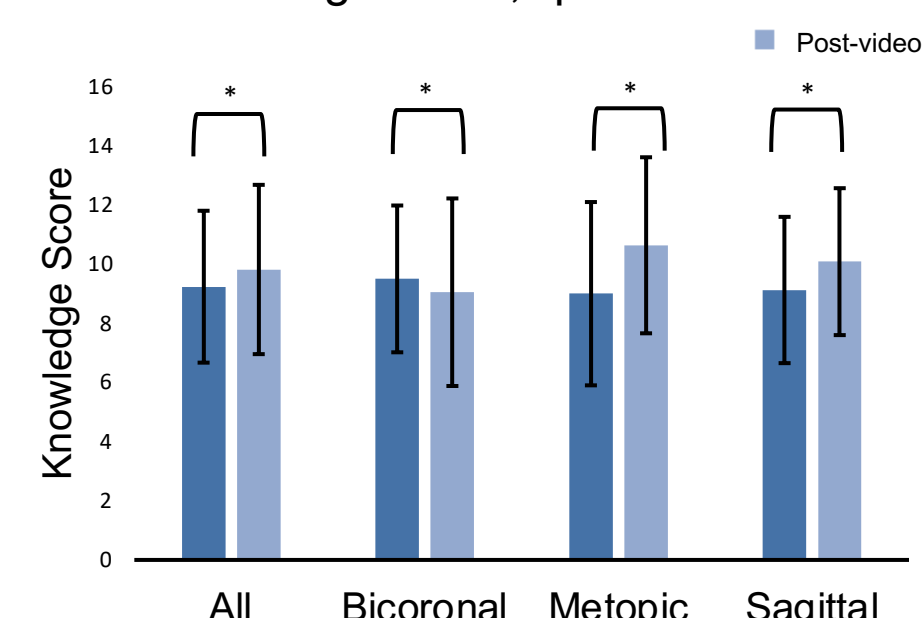


Figure 2b. Pre- and post-video knowledge score, $*p < 0.05$



CONCLUSION

- Caregivers rated their level of understanding of craniosynostosis as higher
- Caregivers scored higher on knowledge questions about craniosynostosis
- Improvement in knowledge was significant, regardless of craniosynostosis diagnosis

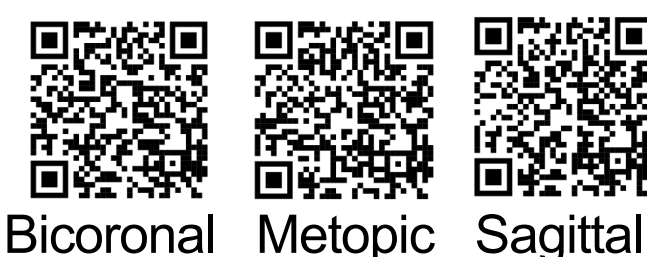
LIMITATIONS

- The survey only included the three most common craniosynostosis diagnosis
- The videos only covered 2 types of surgeries for bicoronal, 1 for metopic, and 2 for sagittal
- We could not ensure that the entire video was watched by participants

FUTURE STEPS

- Further studies with more diverse patient diagnoses and treatments
- Personalized videos for each patient's unique diagnosis and treatment plan

LINK TO VIDEOS



Bicoronal Metopic Sagittal