

Effect of Virtual Reality Distraction on Children's Anxiety and Pain Perceptions During Cast and Pin Removal

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Project Purpose

- To decrease children's perceptions of pain and anxiety during percutaneous bone pin and/or cast removal
- To develop a Virtual Reality (VR) protocol, implement the VR intervention, and evaluate its effectiveness

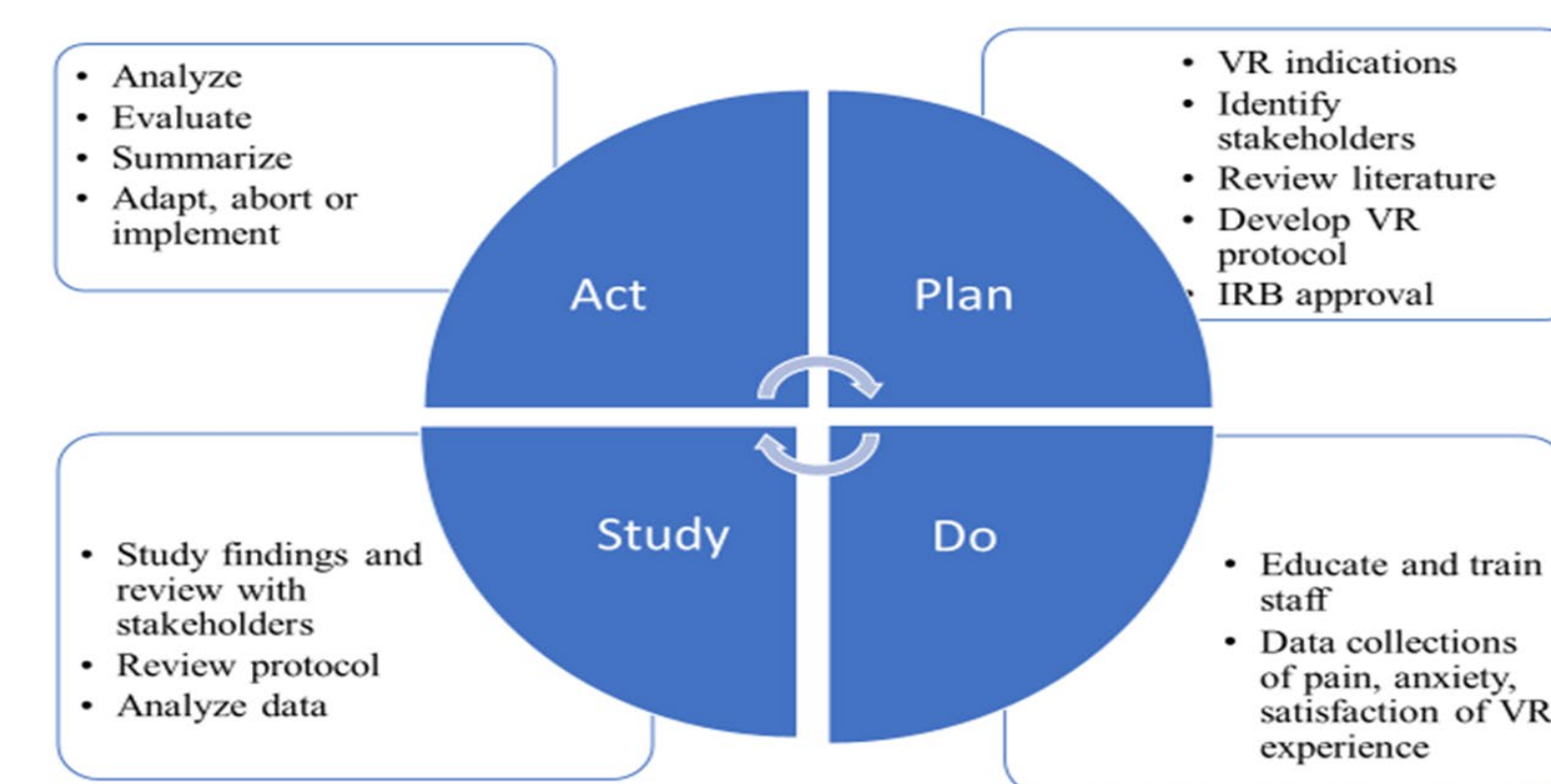
Background

- Annually, approximately 1,000 pediatric fractures are seen at the project site
- Cast and percutaneous bone pin removal are frequent procedures performed
- Children may report these procedures as being traumatic
- Virtual reality technology is an upcoming distraction technique

Literature Review

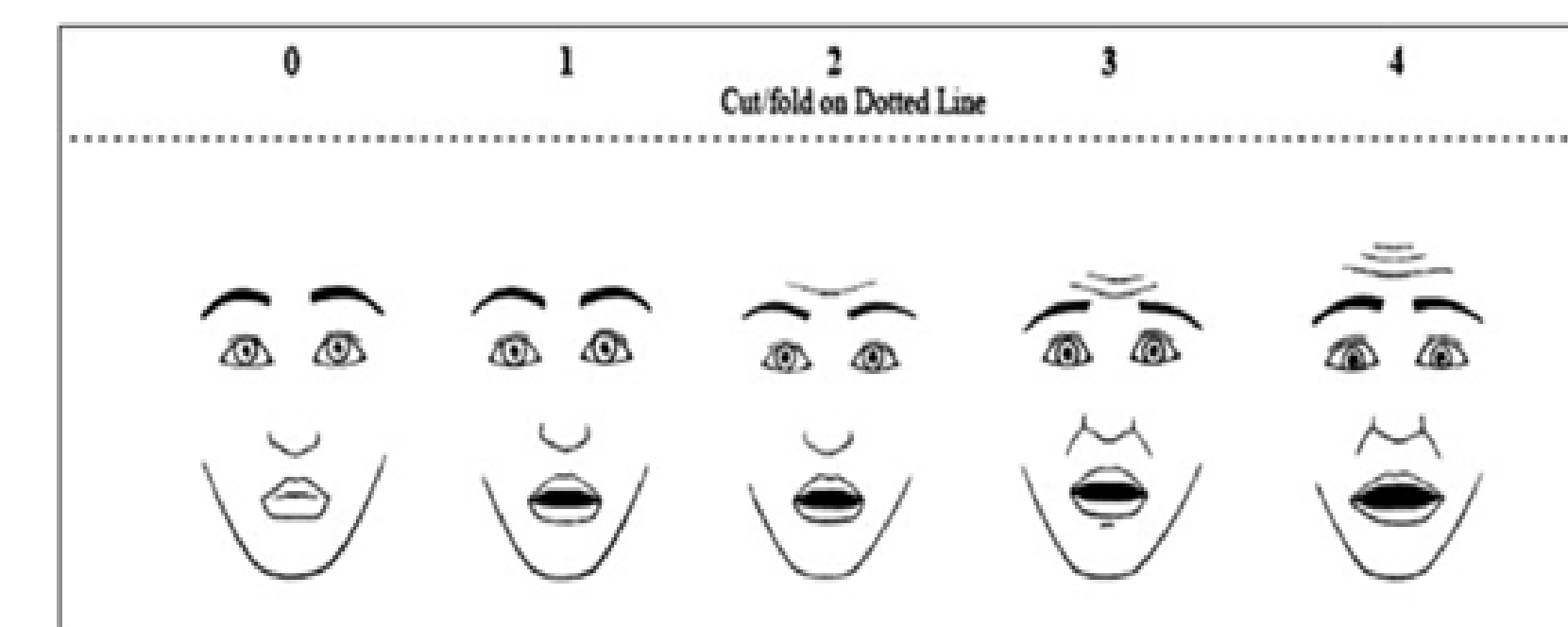
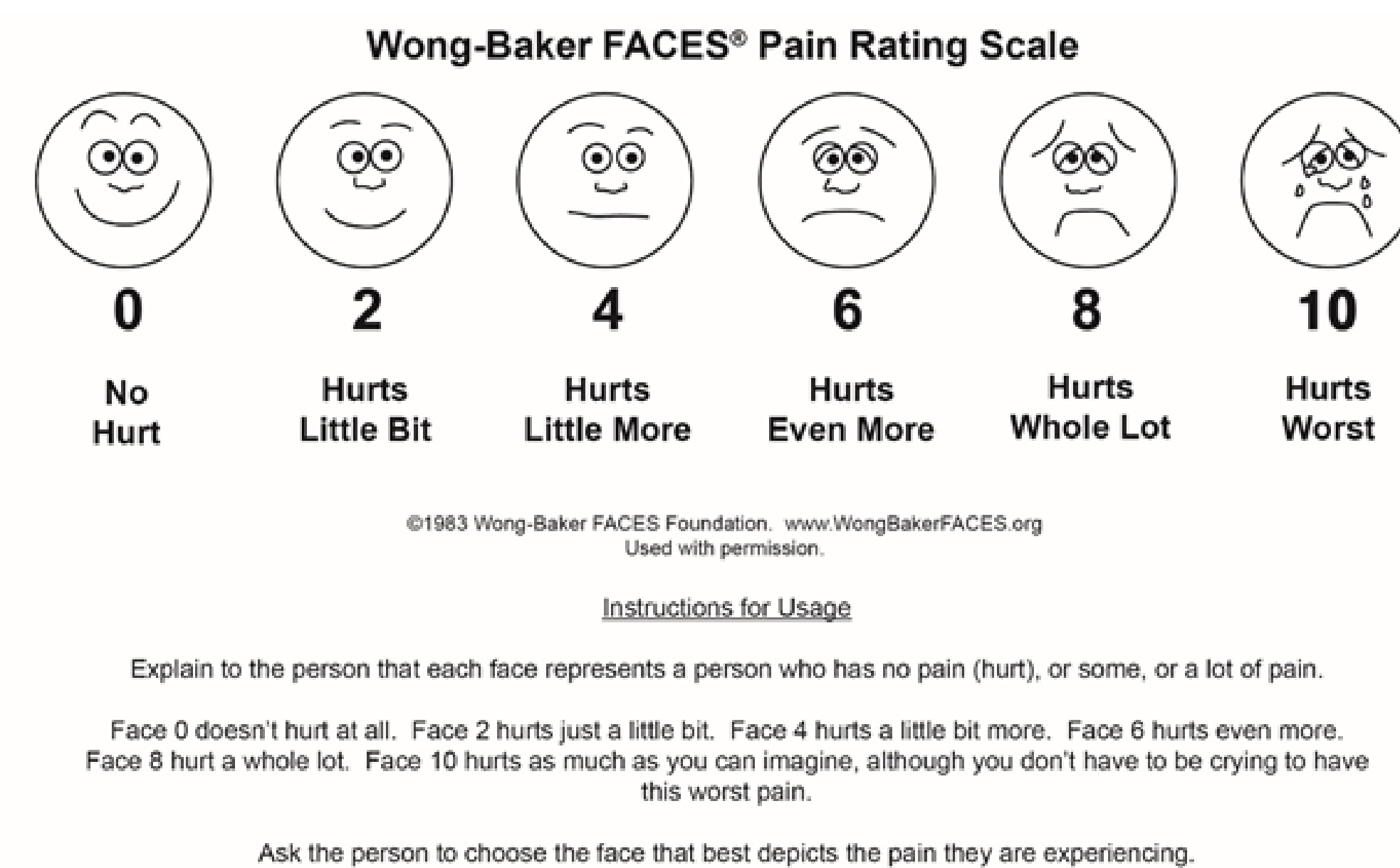
- Significant reduction in pain and anxiety with VR as a distraction technique in portacatheter access (Gerceker et al., 2021)
- High level of child and parent satisfaction with significant reduction in anxiety in cast removal (Jivraj et al., 2020)
- Significant pain and anxiety reduction with high level child and parent satisfaction during blood draws (Gold & Maher, 2018).

Framework



Design, Methods and Tools

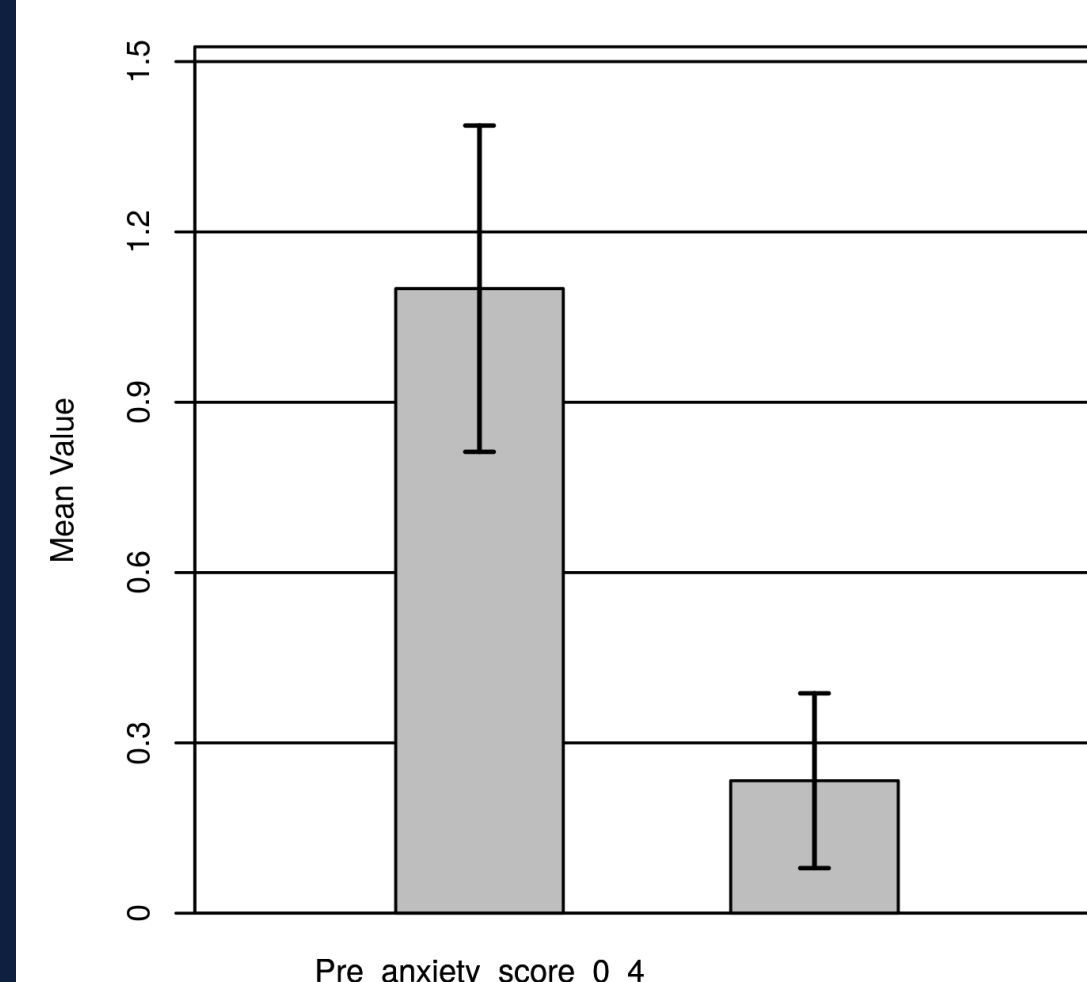
- Evidence-Based Quality Improvement Project that used the Plan, do Study, Act Framework
- Participants ages 7 -18 years old with no neurologic deficits, hearing impairment, or vertigo
- Setting in an outpatient department, children's hospital in Southern California
- Effectiveness measured with four outcome measures
 - Children's perception of both pain and anxiety related to the procedure
 - Children's and parent's overall satisfaction with the VR distraction technique



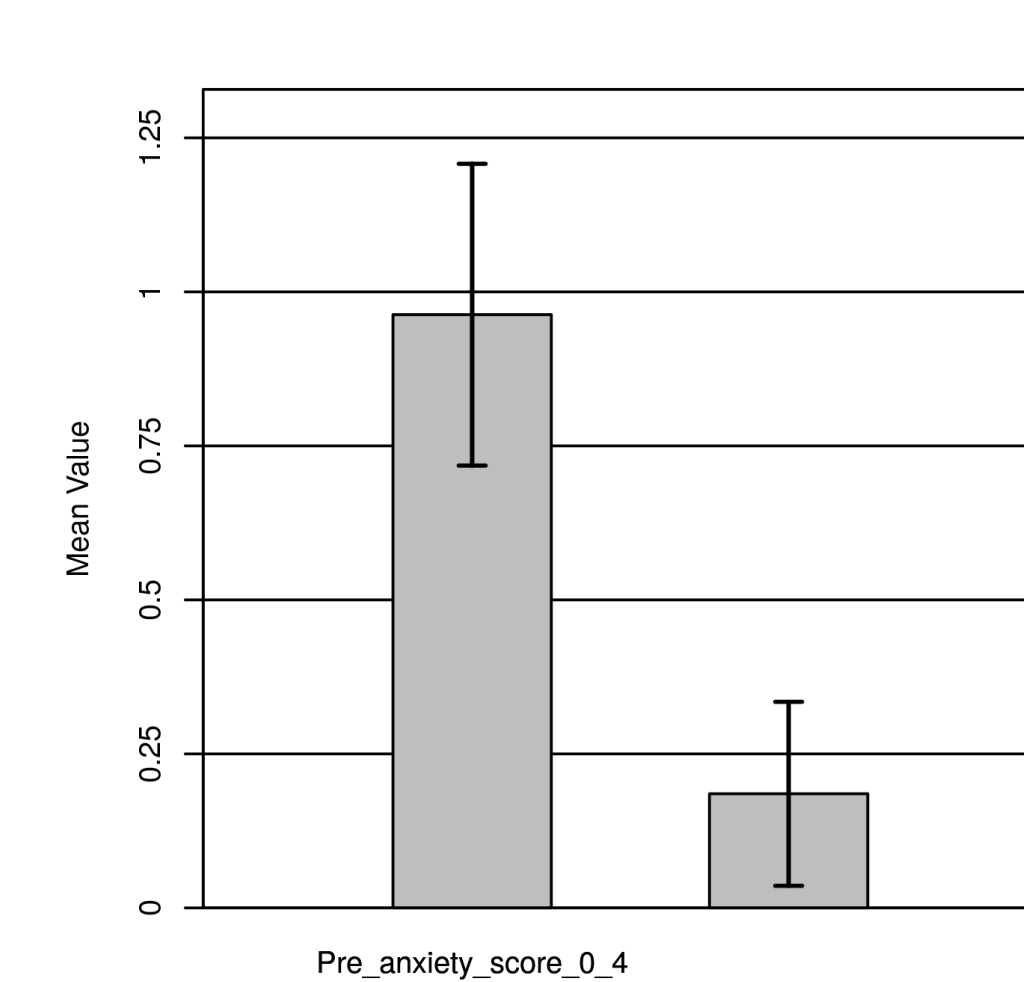
Instructions for Children: "These faces showing different amounts of being scared."

Analysis of Data

Pre-Anxiety Score and Post-Anxiety Score Cast and Pin Procedure
n=30 (p<.001)



Pre-Anxiety Score and Post-Anxiety Score Cast Procedure Only
n=27 (p<.001)



- Convenience sample of 30 children and parents
- Average age of children was 10.10 (SD 2.29), range of ages 7-14 years
- 70% (n=21) were male
- 90% (n=27) were cast removal
- Moms represented majority of parents (n= 23, 76.67%)

Results

- Pre-Procedure, one child of 30 reported level 2 pain score, who was a pin removal
- Post Procedure, three of the 30 children reported pain; one had a pin removal and the two described the pain as stiffness not related to the procedure
- Post Procedure 27 reported no pain and anxiety was reduced statistically significant (p<.001)
- Post Procedure Satisfaction Survey:
 - Child would use VR again answered yes (n=29), 96.67%
 - Parent would use VR again for child answered agreed (n= 5), 16.67% and strongly agreed (n=24), 80%

Discussion

- Offered all 37 children VR as a distraction technique with 7 children who preferred a different modality by Child Life Specialist
- Registered Nurses assessed pre and post pain scales and pre and post anxiety scales
- Interprofessional collaboration is essential

Limitations

- Limited sample size
- No control group to compare

Conclusion

- Results suggest VR as an effective distraction technique during cast and pin removal
- Parents would use VR again for child
- Child would use VR again