Comfort or Just Extra Weight? Investigating Weighted Blankets in Pediatric Dental Sedation

Shelly (Xuerui) Wu, DMD[1]; Liana Santos, BS[1]; Jean Marie Star, DDS,MPH[1]; Stephen Wilson, D.M.D., M.A., Ph.D[2]
1. Department of Orofacial Sciences, University of California, San Francisco School of Dentistry, Division of Pediatric Dentistry,
2. Independent Researcher

UCSF School of Dentistry

Introduction

Dental caries is one of the most common chronic conditions in children, often necessitating treatments with use of procedural sedation to manage anxiety, induce relaxation, and allow consciousness throughout the procedure. Sedation often involves the use of protective stabilization methods, such as the papoose board, to limit patient movement and prevent injury.[1] While some practitioners find these techniques essential, others considers them to be distressing.[2] The American Academy of Pediatric Dentistry (AAPD) advises that protective stabilization should only be used after less restrictive methods are considered and with parental consent.[3]

Weighted blankets (WBs) have emerged as a potential alternative for managing anxiety through deep pressure stimulation.[4] The primary aim of this study is to evaluate the impact of WBs on Protective Stabilization (PS) and behavior during oral conscious sedation (OCS). The secondary aim is to identify factors linked to PS engagement.

Methods

This randomized pilot study was conducted at the UCSF pediatric dental clinic with a convenience sample size of 30 children aged 4-12 undergoing dental procedures under oral conscious sedation. Patients were randomized into two groups: Weighted Blanket (WB) group and the Sham Weighted Blanket (Sham WB) group. The WB group received a six-pound weighted blanket (Dr. B. Essential, Flagstaff, AZ, USA) (Figure 2). The sham WB group received a visually identical blanket from the same manufacturer (Figure 2), with total weight of less than 1 lb. PS was used only when clinically necessary and in accordance with AAPD guidelines. Recruitment included a pre-procedure phone call to gauge interest in enrolling, followed by written consent available in English and Spanish on the day of treatment. Data collection included demographics, prior Frankl scores, sedation regimen and detailed observational logs during the sedation visit. Behaviors were tracked using the North Carolina Behavior Rating Scale.

Figure 1: Study Diagram

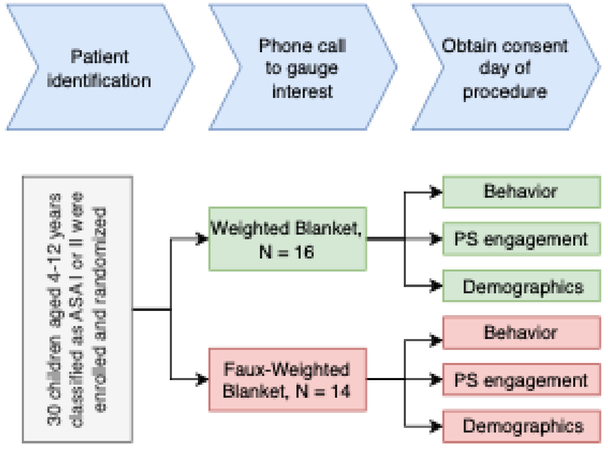

Table 1: Demographics and Sedation Regimen

Variables	Weighted Blanket, N=16	Sham Blanket, N=14	All, N=30	P-Value
Demographics				
Age, mean (SD)	7.4 (1.71)	8.15 (1.82)	7.76 (1.77)	0.27
Female gender	10 (63%)	8 (57%)	18 (60%)	1.00
Sedation Regimen				
Midazolam	13 (81%)	9 (64%)	22 (73%)	0.42
Hydroxyzine	16 (100%)	14 (100%)	30 (100%)	1.00
Morphine	12 (75%)	11 (79%)	23 (77%)	1.00
Nitrous	16 (100%)	14 (100%)	30 (100%)	1.00
Number of PO medications, mean (SD)	2.56 (0.51)	2.43 (0.51)	2.50 (0.51)	0.48

Figure 2: Sham-Weighted Blanket vs Weighted Blanket

Sham-WB(A) WB(B)

Results

- Demographics: There are no significant differences in age, gender, or sedation time between groups (Table 1)
- Sedation regimens included 2-3 oral medications combined with nitrous oxide inhalation. There were no statistically significant differences in the types of sedation medications used between the WB and sham-WB groups (p=0.48) (Table 1)
- There was no significant difference in use of PS between WB and sham-WB groups in protective stabilization needs (Table 2)
- Wrist straps were engaged significantly earlier in WB group (p=0.02) (Figure 2, Table 2)
- Crying was the most common behavior (37.7% of sedation time), with no statistically significant differences in crying, torso movement, or verbal protest between groups (Figure 3)
- WBs did not significantly alter behavior during sedation (Figure 3)
- Children who did not need PS received more SDF applications than those with PS, near statistical significance (p=0.06) (Table 4)
- 60% of participants required PS and 83.33% of treatment plans completed as planned (Table 4)

Figure 3: Disruptive Behavior During Procedures (% of Total Minutes)

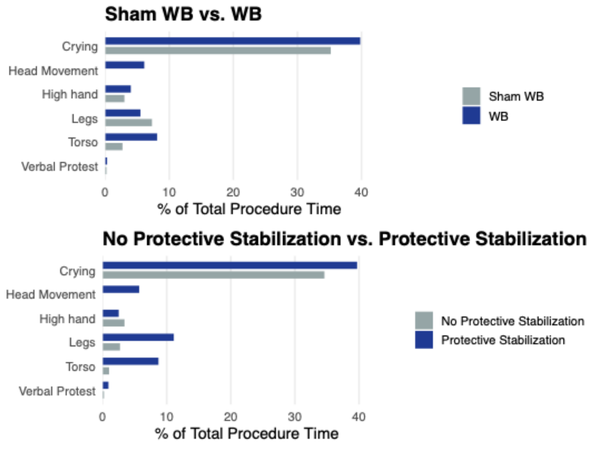

Table 2: Protective Stabilization Use by WB and Sham-WB Groups

Protective Stabilization Use	Weighted Blanket, N=16	Sham-Blanket, N=14	P-value
No US Used	6 (38%)	6 (43%)	0.53
Wrist PS Used	10 (63%)	8 (57%)	0.53
Leg PS Used	6 (38%)	3 (21%)	0.44
Upper Body PS Used	4 (25%)	2 (14%)	0.66
All PS Used (Wrist, Leg, Upper Body)	2 (13%)	4 (29%)	0.66

Table 3: Engagement of Protective Stabilization

Passive Restraint, N=18	Weighted Blanket, N=16	Sham-Blanket, N=14	All	P-Value
Used Wrist Restraint	10.00	8.00	18.00	0.53
Wrist Min to Engagement, mean (SD)	1.20 (2.30)	8.50 (8.91)	4.44 (7.03)	**0.02**
Wrist Total Min Engaged, mean (SD)	33.30 (17.34)	25.13 (12.72)	29.67 (15.60)	0.28

Table 4: Dental Procedures with and without PS

Variables	Protective Stabilization, N=18	No Protective Stabilization, N=12	All	P-Value
Dental Procedures	Mean (SD)			
Prior Number of Sedations	0.39 (0.78)	0.42 (0.67)	0.40 (0.72)	0.92
Number of sextants administered local anesthesia	1.72 (0.96)	1.67 (0.78)	1.70 (0.88)	0.87
Fillings completed	(0.82)	2 (1.15)	1.85 (0.99)	0.57
Stainless steel crown	0.94 (1.39)	0.83 (1.47)	0.90 (1.4)	0.84
Extraction	1 (1.14)	1.08 (1.56)	1.03 (1.30)	0.87
Sealants	2 (0.89)	2.50 (2.12)	2.13 (1.13)	0.63
SDF	2.50 (1.29)	8 (4.24)	4.33 (3.56)	**0.06**
Completed procedure, N (%)	14 (78)	11 (92)	25 (83)	0.62

Discussion

- Proportion of PS use was lower than expected despite its frequent designation as standard of care during OCS
- WBs were well-tolerated by children and did not disrupt procedural workflow, suggesting that WBs are feasible for use during procedural sedation
- Lack of statistically significant difference in PS use between WB and sham-WB may stem from limited sample size and statistical power as well as non-documented baseline variability in participants' behavior
- Outcomes may be influenced by factors including provider behavior and child's mood on treatment day
- As children in WB groups had wrist straps engaged earlier than those in sham-WB groups, weighted stimulus over hands may provide sensory feedback and greater hand activity
- Wrist restraint alone was sufficient for most sedation visits, potentially reducing need for full-body PS
- Minimally invasive treatments like SDF can be effectively integrated into OCS visits
- Crying was the most common disruptive behavior, occurring in 35 to 40% of the procedure across Faux WB group and WB group respectively
- A trend of increased disruptive behavior was observed in the WB group, as well as in those who required protective stabilization, compared to those who did not
- 40% of participants, regardless of WB group assignment, did not require protective stabilization

Figure 4: Protective Stabilization (papoose board)

Conclusion

- WB had no overall significant impact on the provider's decision to engage PS
- Children in the WB group received the wrist strap earlier in the procedure
- Majority of children in the study received wrist PS engagement during OCS visit
- Minimally invasive dental treatments during sedation likely minimizes the use of PS

References

1. Behavior Guidance for the Pediatric Dental Patient American Academy of Pediatric Dentistry Reference Manual 2024;
2. Use of Protective Stabilization for Pediatric Dental Patients American Academy of Pediatric Dentistry Reference Manual 2024;
3 .Malik P, Ferraz Dos Santos B, Girard F, Hovey R, Bedos C. Physical Constraint in Pediatric Dentistry: The Lived Experience of Parents. JDR Clin Trans Res. Oct 2022;7(4):371-378. doi:10.1177/23800844211041952
4. Chen HY, Yang H, Meng LF, Chan PS, Yang CY, Chen HM. Effect of deep pressure input on parasympathetic system in patients with wisdom tooth surgery. J Formos Med Assoc. Oct 2016;115(10):853-859. doi:10.1016/j.jfma.2016.07.008
5.. Chambers WL, Fields HW, Machen JB. Measuring selected disruptive behaviors of the 36- to 60-month-old patient. Part I: Development and assessment of a rating scale. Pediatr Dent. Sep 1981;3(3):251-6. Figure 3 https://specializedcare.com/collections/rainbow-stabilizing-products/products/stabilizing-wrap