

SS desensitization by bunny cartoon based LA syringe for behavior management of Down syndrome child

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Abstract

Background

Children with Down syndrome often present significant challenges during dental treatment because of cognitive impairment, communication difficulties, and heightened dental fear and anxiety, particularly during local anesthesia administration. Conventional behavior guidance techniques may not always achieve adequate cooperation in this population, necessitating individualized, non-pharmacological approaches. Since children with Down syndrome demonstrate strong visual learning abilities, the use of visually engaging distraction aids may improve acceptance of dental procedures. A bunny-shaped syringe camouflage, designed to conceal the conventional dental syringe, has been introduced as a child-friendly behavior management aid that reduces the threatening appearance of local anesthesia equipment. This case report highlights the use of a bunny-shaped syringe as a visual distraction tool to reduce anxiety, enhance cooperation, and facilitate successful dental treatment in a child with Down syndrome

Keywords: Down syndrome, pediatric dentistry, dental anxiety, needle phobia, desensitization, behavior management, bunny-shaped syringe, local anesthesia, child-friendly dentistry, special health care needs

Introduction

Pediatric dentistry addresses both primary and comprehensive oral health needs of infants and children, including those with special health care requirements. One of the main challenges in this field is managing uncooperative and anxious children during treatment. Dental fear and anxiety (DFA), defined as strong negative emotions associated with dental procedures among children and adolescents, is a major cause of behavioral management difficulties and non-compliance. Careful pain assessment and appropriate control strategies during treatment can help reduce anxiety, foster mutual trust between dentist and patient, and encourage a positive attitude toward future visits. Additionally, certain medical conditions in children may affect the timing, type, and techniques used in dental treatment, particularly with regard to pain and anxiety control. Both pharmacological and non-pharmacological behavior management techniques are employed to deliver safe and effective dental care. The American Academy of Pediatric Dentistry (AAPD) provides guidelines that emphasize reducing pain, fear, and anxiety; building a positive attitude toward treatment; and establishing trust between the dentist and the child and parents. The choice of technique must be individualized, taking into account the child's cognitive, social, and emotional characteristics.

Local anesthesia (LA) is defined as a loss of sensation in a localized area of the body by inhibiting the conduction process in peripheral nerves or depressing the excitation in the nerve endings. In dentistry, the administration of LA is challenging, as needle phobia is considered one of the leading causes of dental fear and anxiety, especially among young children. Building a good and trusting relationship between the dentist and a child patient is a crucial factor for maintaining the child's cooperation during treatment. Once trust is gained between the child patient and their dentist, a

positive feeling toward dental visits is formed and stored in the child's memory. Keeping tools and instruments out of sight -including the dental syringe - that might be scary-looking from a child's perspective is considered a critical factor in minimizing anxiety and fostering trust between child patients and their dentist. Hiding the dental syringe from a child's sight during LA administration can be challenging.



A Bunny-Shaped Syringe Camouflage Design - A newly developed colorful, and playful bunny-shaped syringe camouflage the threatening metal dental syringe during LA administration can be an effective distraction tool to alleviate dental anxiety. For children with Down syndrome, who are often highly visual and may be especially sensitive to distressing sights, this simple intervention can significantly reduce fear and foster cooperation. By making the dental environment feel safer and more welcoming, dentists not only alleviate anxiety during current procedures but also help build a positive attitude toward future visits. Ultimately, effective dental care for children with Down syndrome rests on individualized planning, empathy, and a commitment to developing trust with both the child and their caregivers.

Case Report

Children with Down syndrome face unique challenges in dental care due to their distinct medical, cognitive, and behavioral traits. Common oral issues like macroglossia, delayed eruption, malocclusion, and a high risk of periodontal disease are often compounded by difficulties in communication, intellectual disability, and anxiety in clinical settings. Traditional behavior management techniques may fall short, making it necessary to adopt more individualized, nonpharmacological strategies. Visual learning one of their cognitive strengths can be effectively harnessed using tools like flashcards and storyboards. These visuals break down dental procedures into simple, predictable steps, easing fear and improving cooperation. This case report illustrates how a visual-based approach

helps manage behavior and builds trust and confidence, transforming the dental experience for a child with Down syndrome into a more positive and successful one.

Children with Down syndrome show distinct features in their hands, legs, and walking pattern. Their hands are usually wide and short, often with a single deep crease across the palm and short fingers. The feet display a gap between the first and second toes, sometimes called a “sandal gap”. Hypotonia (low muscle tone) and joint laxity are common, leading to delayed milestones in activities such as sitting, standing, and walking. Walking may be slow, with shorter steps and a wider base for stability due to balance difficulties. Children with Down syndrome typically reach physical milestones, including walking, later than other children, but can eventually participate in physical activities

A 7-year-old male child, medically diagnosed with Down syndrome (trisomy 21), was referred to the Department of Pediatric and Preventive Dentistry for the evaluation and management of multiple dental caries and chronic poor oral hygiene. There was no history of seizures, and the child was not on any systemic medications at the time of referral.

Developmentally, the child exhibited moderate intellectual disability, consistent with the cognitive profile frequently associated with Down syndrome. His expressive language skills were limited, and while he possessed moderate receptive language abilities, his comprehension appeared to decline in unfamiliar or high-stress situations. According to the parents, communication with the child was often a challenge, especially in new environments or during emotionally triggering experiences, such as medical or dental appointments.



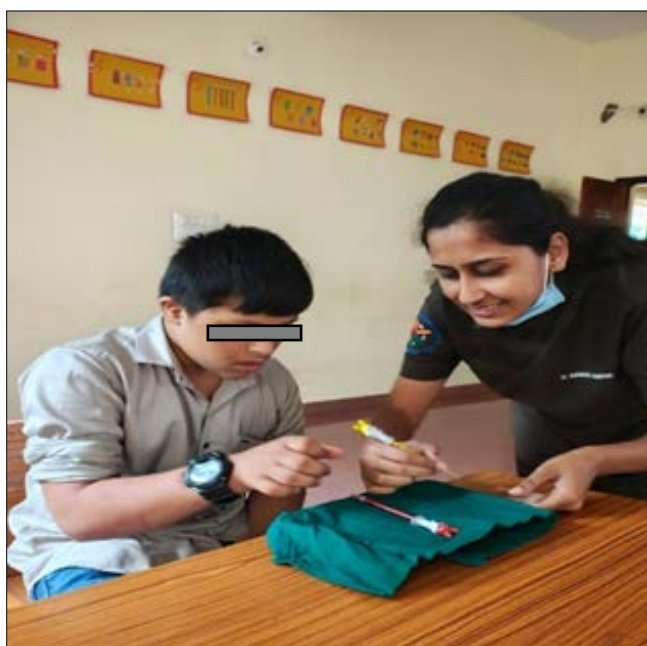
During the initial clinical encounter, the child presented as anxious and socially withdrawn. He avoided eye contact and remained physically close to his mother, often clutching her clothing or hand for reassurance. Attempts by the dental team to initiate verbal interaction were met with minimal responsiveness or complete disinterest, reinforcing the need for a nonverbal, more engaging approach. Despite these challenges, a limited intraoral examination was completed, which revealed gross

caries lesions affecting multiple primary molars, generalized gingival inflammation, and extensive plaque accumulation. The presence of halitosis and evidence of bruxism (as suggested by wear facets on primary dentition) further pointed to neglected oral hygiene practices and underlying behavioral patterns such as oral fixation or stress-related grinding. Due to the child's lack of cooperation and heightened anxiety, radiographic examination was deferred during this initial visit.



The primary objective of the behavior management approach was to build a foundation of trust, reduce anticipatory anxiety, and gradually enhance the child's ability to cooperate during dental visits. Recognizing the unique

challenges faced by children with cognitive and developmental disabilities, the behavior management strategy incorporated evidence-based techniques drawn from Applied Behavior Analysis (ABA) and visual pedagogy.



As part of this individualized approach, a specially designed SS syringe, which was colorful and visually appealing, was used during administration of local anesthesia. The modified syringe concealed the appearance of the conventional dental syringe and transformed a potentially anxiety-provoking instrument into a more child-friendly visual stimulus. The child was introduced to the syringe before its use, allowing familiarization with the instrument and reducing the fear associated with conventional dental equipment. Treatment was subsequently carried out using the SS syringe. During administration of local anesthesia, the child demonstrated noticeably less anxiety and improved cooperation compared with the initial dental encounter. The

colorful and playful appearance of the syringe appeared to act as a distraction and reduced the child's negative response toward the dental instrument. The child tolerated the procedure better and was able to participate more cooperatively during treatment. The use of the SS syringe provided a simple, nonpharmacological modification to conventional behavior management. Children with Down syndrome may respond strongly to visual cues and may experience increased apprehension toward unfamiliar medical and dental equipment. Replacing the conventional appearance of the syringe with a colorful and engaging design can therefore help reduce the perceived threat associated with local

anesthesia. In this case, the approach contributed to reduced anxiety, improved cooperation, and a more positive treatment experience.

This case highlights the importance of individualized behavior management in children with Down syndrome. Rather than relying solely on conventional verbal communication, incorporating visual cues, distraction, positive reinforcement, and child-friendly dental instruments may improve acceptance of dental procedures. The SS syringe represents a simple and potentially useful adjunct to non pharmacological behavior management, particularly during procedures involving local anesthesia. Compassionate dental care for children with Down syndrome requires tailored behavioral strategies, empathetic communication, patience, and collaboration with caregivers to establish trust and promote successful dental experiences.

Discussion

Children with Down syndrome often have unique cognitive and behavioral profiles, which affect their reactions in dental settings. Limited verbal abilities, a brief attention span, and sensitivity to new experiences can make dental visits challenging to manage. Behavior guidance should be carefully tailored to the child's needs. Instead of relying on storyboards and flashcards, a playful, bunny-shaped syringe provides an engaging visual tool that can capture the child's attention and make local anesthesia delivery less threatening.

Several behavior management techniques have been advocated to overcome the needle phobia through desensitization. Trials using tell show do approach by Glassman recommended showing the needle in the final steps of a desensitization process. Duff Recommends showing the needle to the child prior to the anesthesia because if not shown the child may imagine a needle that is much larger and produce more pain than they actually are and thus proceeding to a degree of even phobia to the site of a needle. In this study we used an innovative technique for managing the needle phobia by using a camouflage method along with a tell show do procedure, thus preventing the imaginary fears from resurfacing. The Camouflaged syringe was selected on the patient's choice of his favorite color and was told that it carried sleepy water to the tooth thus preventing or dissociating the dental needle from the vague impression the child may have had of a threatening instrument, when hiding the needle. We followed the principles described by Spedding and Mink where we told the child that we would put his tooth to sleep, but he would stay awake and that it might feel like a pinch or an ant bite similar to the reframing technique which uses euphemistic or less traumatic language to describe a particular technique or situation to the child.

This bunny syringe acts as both a distraction and an aid, transforming an anxiety-provoking moment into a manageable experience through visual appeal. Its design aligns with the Tell-Show-Do principle but offers a stronger visual focus, which suits the visual learning strengths seen in many children with Down syndrome. When the child's attention is directed to the friendly shape, the dental procedure becomes easier to tolerate, boosting cooperation and predictability. From a behavioral theory perspective, the bunny syringe functions as an antecedent intervention: it prepares the child, provides positive reinforcement, and supports the success of each dental step. Social Learning

Theory encourages children to imitate positive behaviors they observe; with the bunny syringe, the child sees and interacts with a reassuring, relatable object, helping to normalize the dental experience. Cognitive-Behavioral approaches note that predictability reduces anxiety; knowing what will happen next, especially with the help of an appealing visual tool, lessens resistance and fear. Beyond theory, the bunny syringe adds warmth and consistency to the dental environment—qualities that help children with Down syndrome thrive and feel secure. Consistent use builds trust and comfort, making dental visits smoother and more positive over time. Incorporating bunny-shaped syringes is not just a practical adjustment, but an empathetic, evidence-based practice that honors each child's unique style and fosters better dental experiences

Clinical Implications

Clinically, this approach highlights the importance of individualized, child-centered behavior management in pediatric dentistry, particularly for children with special health care needs such as Down syndrome. Dental fear and anxiety, especially related to local anesthesia and needle phobia, can significantly hinder cooperation and treatment delivery. Using visually appealing, non-pharmacological tools like a bunny-shaped syringe helps mask threatening stimuli, reduces anxiety, and supports trust-building between the dentist and child. By aligning with the visual learning strengths of children with Down syndrome, such interventions improve cooperation, enhance the effectiveness of pain control, and foster a positive dental experience. Ultimately, empathetic modifications to the clinical environment promote safer care, better behavior outcomes, and improved attitudes toward future dental visits.

Conclusion

The bunny-shaped syringe provided a simple and innovative approach to reducing anxiety associated with local anesthesia in a child with Down syndrome. Its playful visual design helped divert attention from the conventional dental syringe, resulting in improved cooperation and treatment acceptance. This child-friendly modification may be a useful non-pharmacological adjunct for creating more positive and comfortable dental experiences in children with special health care needs.

References

1. Savitha S, Abraham A, Gangur A. Management of a Child with Down Syndrome Using flashflicks and storyscape. *International Journal of Science and Research (IJSR)*, 2025, 591-596. 10.21275/SR25708150307.
2. Savitha S, J D, Moorthy K, Nair R, Prabhu S. CAMOUFLAGE TECHNIQUE: A NOVEL BEHAVIOUR MANAGEMENT STRATEGY FOR LOCAL ANESTHESIA. *World Journal of Pharmaceutical Research*, 2023;9:685-697. 10.20959/wjpr202010-18181.
3. Savitha S, H K, Swathi R. Savitha's Desensitization Technique - A Novel Approach to Classical Conditioning in Pediatric Practice of Alpha Generation. *International Journal of Science and Research (IJSR)*, 2025;14:1301-1304. 10.21275/SR25128145613.

4. Dusseja S, Rao D, Panwar S. Comparative evaluation of the effects of 3D-printed camouflaged caterpillar, camouflaged alligator and conventional syringes on anxiety and behaviour in children. *Eur Arch Paediatr Dent*, 2026 Jan 21. Doi:10.1007/s40368-026-01169-z.
5. Alamoudi NM, *et al.* The effect of using a camouflaged dental syringe on children's anxiety and behavioral pain. [Journal details]. This study found significantly lower behavioral pain with the camouflaged syringe compared with a conventional syringe.
6. Kumar V, *et al.* A clinical comparative study between conventional and camouflaged syringes to evaluate behavior and anxiety in 6–11-year-old children during local anesthesia administration—a novel approach. *J Dent Anesth Pain Med*, 2018;18(1):35-40. Doi:10.17245/jdapm.2018.18.1.35.
7. Kaur R, *et al.* Evaluation of child preference for dentist attire and usage of camouflage syringe in reduction of anxiety. *J Indian Soc Pedod Prev Dent*. [Study of 600 children aged 6–14 years].
8. Ahmad MS, *et al.* Evaluation of child preference for dentist attire and usage of a camouflage syringe in reduction of anxiety. *J Pharm Bioallied Sci*, 2024;16(Suppl 1):S757-S760. Doi:10.4103/jpbs.jpbs_997_23.
9. Pruegsadee P. A comparative study between conventional and cartoon syringes to evaluate pain perception and anxiety in children during dental local anesthesia administration. *J Department Med Serv*, [2025].
10. Jensen OE, Stjernqvist K. Behavior management in dentistry for patients with Down syndrome: Using visual pedagogy to improve cooperation. *J Dent Child*, 2020;87(3):153-158.
11. Marlowe M, Disney G, mcmahan R. Using behavioral techniques to improve dental care for children with special needs. *J Dent Child (Chic)*, 2006;73(2):87-92.
12. Kazdin AE. Behavior modification in applied settings. 7th ed. Long Grove: Waveland Press, 2012.
13. Mengoni SE, Nash H, Hulme C. The benefit of orthographic support for oral vocabulary learning in children with Down syndrome. *J Child Lang*, 2013;40(1):221-243. Doi:10.1017/S0305000912000396
14. Sari L, Primarti RS, Setiawan AS. Navigating Treatment Refusal: Behaviour Guidance for Down Syndrome Oral Health Management. *Case Rep Dent*, 2024, 2024.