

Needle pain and fear are barriers to health. In 1995, James Hamilton published one of the first needle fear papers.¹ At the time, he concluded that 10% of adults and 25% of children feared needles - and that it was a serious health risk. By 2012, research showed 24% of adults and 63% of those born in 2000 feared injections.² We now know fear correlates the number of injections given on a single day in the 4-6 year window.³ At this preschool age, children remember pain and fear, but can't abstract enough to understand why people they trust are hurting them. Before 1985, the number of scheduled preschool injections was zero; by 2000, it was often as high as five. Buzzy is the most proven needle pain reliever and the only intervention proven to reduce fear. Addressing needle pain is a public health priority - Buzzy Helps!

1 Hamilton JG. Needle phobia: a neglected diagnosis. J Fam Pract. 1995 Aug;41(2):169-75. PMID: 7636457

2 Taddio A, Ipp M, Thivakaran S, et al. Survey of the prevalence of immunization non-compliance due to needle fears in children and adults. Vaccine. 2012 Jul 6;30(32):4807-12. PMID: 22617633

3 Baxter AL, Cohen LL, Burton M, Mohammed A, Lawson ML. The number of injected same-day preschool vaccinees relates to preadolescent needle fear and HPV uptake. Vaccine. 2017 Jul 24;35(33):4213-9. PMID: 28647169

The following references are all unfunded independent investigations of Pain Care Labs' products Buzzy and/or DistrACTION Cards as of 4/30/2026. Studies by the inventor (Baxter) were funded by grants from Hope Street Kids and NICHD Grant Number 4R44HD056647-02.

Select Reviews and Meta-Analyses

Cocchi E, Bloise S, Jusufi L, Marchetti F. **Toward Age-Specific Application of Pediatric Non-Pharmacological Pain Strategies: A Bayesian Reanalysis of the Buzzy Device.** Paediatr Anaesth. 2026;36(2):194-201. DOI:10.1111/PAN.70094; PMID: 41307283

Jin F, Wang X, Qi M, Zhang W, Zhang Y. **Effectiveness and safety of Buzzy device in needle-related procedures for children under twelve years of age: A systematic review and meta-analysis.** Medicine (Baltimore). 2024;103(15):e37522. DOI:10.1097/MD.00000000000037522; PMID: 38608108

Su HC, Hsieh CW, Lai NM, Chou PY, Lin PH, Chen KH. **Using vibrating and cold device for pain relieves in children: a systematic review and meta-analysis of randomized controlled trials.** J Pediatr Nurs. 2021 Mar 15;61:23-33. DOI: 10.1016/j.pedn.2021.02.027; PMID: 33735633

da Silva Moura JW, Takashima M, Silva TL, et al. **Effectiveness of Buzzy® for pain relief in children during intramuscular injections: Systematic review and meta-analysis.** J Pediatr Nurs. 2026;86:625-632. DOI:10.1016/j.pedn.2025.12.013; PMID: 41418424

Buzzy® is the Most Proven & Most Effective Solution for Needle Pain & Fear

“Conclusion: Interventions using **coolant and vibration together, as well as a combination of site-specific and patient-led interventions, showed the most consistent effects** in reducing self-reported pain, fear or distress.”

Lee VY, Caillaud C et al. 2018;14(11):2737 - 2747. PMID: 29792557

Faghihian R, Rastghalam N, Amrollahi N, Tarrahi MJ. **Effect of vibration devices on pain associated with dental injections in children: A systematic review and meta-analysis.** Aust Dent J. 2021 Mar;66(1):4-12. “The findings revealed that use of DentalVibe for Paediatric dental injections was not effective in reducing pain perception. However, use of Buzzy showed promising results.” PMID: 33258142

Zhao L, Qi P, Wang X, Su X, Liao L. **Local analgesia for the relief of pain in children undergoing venipuncture and intravenous cannulation: a systematic review and network meta-analysis.** BMC Anesthesiol. 2025;25(1):115. DOI:10.1186/S12871-025-02991-6; PMID: 40055583



Venipuncture

- 1st *Abidin N, Yahya N, Izaham A, Mat W, Zain J, Zainuddin M, Mahdi S. Assessing the effectiveness of a thermomechanical device (Buzzy®) in reducing venous cannulation pain in adult patients. Middle East Journal of Anesthesiology 2018 Feb 25(1):61-67. (81.0% of patients satisfied with Buzzy®; N=184, Reported pain lowest with Buzzy® 33.92 ± 15.59 (p = 0.016).) First 4-arm trial in adults. Ice added additional 10% relief.*
- 🔑 Andrews TJ, Fennell J, Wrotniak BH, Territo H. **The effectiveness of a gate channel device on pain the pediatric emergency department: A randomized controlled trial.** *Int Emerg Nurs.* 2025;83:101704. DOI:10.1016/j.ienj.2025.101704; "Buzzy was highly superior to vapocoolant and control, reducing FACES score 1.5 while the other two increased scores." PMID: 41151204
- * Apuzzo L, Burrai F, Sellami S, Brioni E, Micheluzzi V. **Effectiveness of Buzzy on Pain and Anxiety in Children and Adolescents Undergoing Needle Procedures: A Meta-Analysis.** *Holist Nurs Pract.* 2025 July 14. DOI:10.1097/HNP.0000000000000750; PMID: 40657920
- Bahorski JS, Hauber RP, Hanks C, Johnson M, Mundy K, Ranner D, Stoutamire B, Gordon G. **Mitigating procedural pain during venipuncture in a pediatric population: A randomized factorial study.** *Int J Nurs Stud.* 2015 Oct;52(10):1553-64. [N=173, Buzzy® equivalent to LMX4] PMID: 26118441
- 1st **Ballard A, Khadra C, Adler S, Doyon-Trottier E, Le May S. Efficacy of the Buzzy Device for Pain Management during Needle-Related Procedures: A Systematic Review and Meta-analysis.** *Clin J Pain.* 2019 Jun;35(6):532-543. (N= 1138, pain reduction -1.11; 95% confidence interval [CI]: -1.52 to -0.70; P<0.0001), anxiety reduction (SMD -1.37; 95% CI: -1.77 to -0.96; P<0.00001.) First Buzzy Meta-Analysis. PMID: 30829735
- * **Basiouny NS, Hamad I. Effect of Thermo-Mechanical Stimulation on Pain Associating Venipuncture among Children with Leukemia.** *IOSR J Nurs Health Sci.* 2019;8(1), 88-98. DOI: 10.9790/1959-0801028898
- 1st *Baxter AL, Leong T, Mathew B. External thermomechanical stimulation versus vapocoolant for adult venipuncture pain: pilot data on a novel device. Clin J Pain. 2009 Oct;25(8):705-10. [Buzzy reduced pain > cold spray, adult] (N=31, Reduced Pain (mean 9.9 mm, 95% confidence interval 0.82-19, P=0.035, SD 16) compared to vapocoolant (mean 7.9 mm, 95% confidence interval -1.8-17.7, P=0.1, SD 16.9).) PMID: 19920721*
- Baxter AL, Cohen LL, McElvery HL, Lawson ML, von Baeyer CL. An integration of vibration and cold relieves venipuncture pain in a pediatric emergency department.** *Pediatr Emerg Care.* 2011 Dec;27(12):1151-6. (N=81, Pain scores lower with Buzzy (-2; 95% CI, -4 to 0) than with vapocoolant (1; 95% CI, 0-2) Venipuncture success more likely with Buzzy (odds ratio, 3.05; 95% CI, 1.03-9.02), pediatric] PMID: 22134226
- Bilgen Sivri B, Feng YS, Michler C, Kuemmerle-Deschner J, Mahler C. The effect of Buzzy®, DistrACTION® cards on reducing pediatric pain and fear during blood collection in the rheumatology polyclinic: A randomized controlled trial.** *J Pediatr Nurs.* 2023;73:e446-e454. DOI:10.1016/j.pedn.2023.10.013 PMID: 37919179
- 📄 **Bourdier S, Khelif N, Velasquez M, et al. Cold Vibration (Buzzy) Versus Anesthetic Patch (EMLA) for Pain Prevention During Cannulation in Children: A Randomized Trial.** *Pediatr Emerg Care.* 2021;37(2):86-91. DOI:10.1097/PEC.0000000000001867; [N = 607.] "Buzzy takes ... no additional time, and can be used 1000 times for the cost of ≈ 25 EMLA patches." PMID: 31181022
- Canbulat N, Ayhan F, Inal S. Effectiveness of external cold and vibration for procedural pain relief during peripheral intravenous cannulation in pediatric patients.** *Pain Manag Nurs.* 2015 Feb;16(1):33-39. (N=176, 7-12 y/o, significantly lower anxiety and pain in group using Buzzy.) DOI:10.1016/j.pmn.2014.03.003; PMID: 24912740
- Chandraleka S, Sumathy P, Renuka K. Effectiveness of Buzzy technique on pain curing intravenous cannulation among children admitted in pediatric ward at MGMCRI, Puducherry.** *Int J Appl Res.* 2019; 5(6): 404-407. DOI:10.5005/JP-JOURNALS-10085-7197

Cho YH, Chiang YC, Chu TL, Chang CW, Chang CC, Tsai HM. **The Effectiveness of the Buzzy Device for Pain Relief in Children During Intravenous Injection: Quasirandomized Study.** JMIR Pediatr Parent. 2022;5(2):e15757. DOI:10.2196/15757; PMID: 35486419

Erdogan B, Ozdemir AA. **The Effect of Three Different Methods on Venipuncture Pain and Anxiety in Children: Distraction cards, Virtual Reality, and Buzzy.** J Pediatr Nurs. May-June 2021;58:e54-e62. 4 groups RCT age 7-12, n=108, Buzzy > VR > Distraction cards and all >> control. PMID: 33485746

Fathalla AA, Bayoumi MH. **Effect of Thermomechanical Stimulation (Buzzy[®]) and Cryotherapy on Children Pain, Anxiety and Satisfaction During Blood Specimen Collection.** Journal of Health, Medicine and Nursing. 2018;57:12-25. IISTE.org

Gahlawat M, Kodi M, Deol R. **Effect of external cold and thermomechanical stimulation on anxiety and pain during intravenous cannulation among children.** Sudan J Paediatr. 2021;21(2):01–11. (N=60 age 3-12. Self-reported procedural pain 2.80 ± 1.86 with Buzzy[®], control 7.47 ± 2.40 p<.0001.) PMID: 35221428

Gerçeker GÖ, Binay Ş, Bilsin E, Kahraman A, Yılmaz HB. **Effects of Virtual Reality and External Cold and Vibration on Pain in 7- to 12-year-old Children During Phlebotomy: A Randomized Controlled trial.** J Perianesth Nurs. 2018 Dec;33(6):981-989. (N=121, Buzzy = VR, both statistically significantly less pain than control.) PMID: 29559294

🔑 Hasgul B, Mutlusahinoglu. **The effects of the Buzzy device on pain, anxiety, blood pressure, and pulse rate during venous blood sampling in adults: a randomised controlled study.** Irish J Med Sci 2025 Dec. 17 epub ahead of print. *Buzzy significantly better for all outcomes.* doi: 10.1007/s11845-025-04246-2. PMID: 41405676

🔑 Inal S, Kelleci M. **The Effect of External Thermomechanical Stimulation and Distraction on Reducing Pain Experienced by Children During Blood Drawing.** Pediatr Emerg Care. 2020 Feb;36(2):66-69 (N=218, Control, Buzzy, DistrACTION cards, Buzzy + Distraction cards. All groups using Buzzy had significantly reduced pain (P < 0.001), Lowest pain measured with Buzzy in combination with DistrAction Cards, *underscoring the need to add cognitive distraction.*) PMID: 28885392

Inal S, Kelleci M. **Relief of pain during blood specimen collection in pediatric patients.** MCN Am J Matern Child Nurs. 2012 Sep;37(5):339-45. [Buzzy v. control, pediatric] (N=120, 6-12y/o, Lower pain (p < .001) and anxiety (p < .001) w/ Buzzy[®].) PMID: 22895207

Kearl YL, Yanger S, Montero S, Morelos-Howard E, Claudius I. **Does Combined Use of the J-tip[®] and Buzzy[®] Device Decrease the Pain of Venipuncture in a Pediatric Population?** J Pediatr Nurs. 2015;30(6):829-833. (No significant added benefit putting J-tip with Buzzy[®]) PMID: 26228308

Küçük Alemdar D, Yaman Aktaş Y. **The use of the Buzzy, Jet lidocaine, bubble-blowing and aromatherapy for reducing pediatric pain, stress and fear associated with phlebotomy.** J Pediatr Nurs. 2019;45:e64-e72. (N=195, 5-10 y/o, Significant difference between intervention and control groups, Buzzy made the most impact on reducing fear and pain (p < 0.05).) PMID: 30711327

🔑 1st Long-Yi H, Zi-Yun Z, Ming-Li W, Le-Shan Z. **A multidimensional assessment of vibration and cold for venipuncture pain in children aged 7 and above: A randomized controlled trial.** Appl Nurs Res. 2025;86:152012. DOI:10.1016/j.apnr.2025.152012. First 4-arm trial in children; *cold added 25% relief.* PMID: 41330657

Mendes-Nato M, Santos SL **Vibration associated with cryotherapy to relieve pain in children.** BrJP. São Paulo, 2020 Jan-Mar;3(1):53-7. DOI: 10.5935/2595-0118.20200012

* Merino-Lobato C, Rodríguez-Gallego I, Pabón-Carrasco M, Romero-Castillo R, Jiménez-Picón N. **Virtual reality vs. buzzy[®]. efficacy in pain and anxiety management during pediatric venipuncture. Systematic review and meta-analysis.** J Pediatr Nurs. 2023;73:22-33. PMID: 37603924

Moeini M, Sadeghi T, Sezavar M, Mohammadi R. **Comparing the Effect of Cold and Warm Vibration on Pain Caused by Intravenous Cannula Insertion in Children Using a Buzzy Device.** *J Mazandaran Univ Med Sci.* 2020;30 (189): 48-60. Cold vibration group had significantly lower pain than control, warm did not. IRCT20181104041553N1

🔑 Pakiř Çetin S, Çevik K. **Effects of Vibration and Cold Application on Pain and Anxiety During Intravenous Catheterization.** *J Perianesth Nurs.* 2019 Aug;34(4):701-709. "Buzzy application is suggested to relieve pain during IV catheterization in adults." Pain was less than expected in 44/50 Buzzy patients and 0/50 control, and more than expected in no Buzzy patients and 6/50 control ($P < .000$), with overall less pain (1.04 v 5.32) and greater satisfaction. (95.3 v 82.12) $P < .001$. PMID: 30853329

🕒 Potts D, Davis KF, Fein J. **A Vibrating Cold Device to Reduce Pain in the Pediatric Emergency Department: A Randomized Clinical Trial.** *Pediatr Emerg Care.* 2019 Jun;35(6):419-425. (N=224, 4-18y/o, Buzzy equivalent to LMX for pain, satisfaction patients, satisfaction nurses. Time for IV procedure completion significantly shorter in group using Buzzy.) PMID: 28121978

Redfern RE, Micham J, Sievert D, Chen JT. **Effects of Thermomechanical Stimulation During Intravenous Catheter Insertion in Adults: A Prospective Randomized Study.** *J Infus Nurs.* 2018;41(5):294-300. (N=105 elective surgical adults, no mean pain score difference. "Higher preprocedural anxiety benefitted most.") PMID: 30188451

Faheim SS, Mahfoz FFA. **Efficacy of Buzzy with Distraction Cards Versus The Traditional Method for Reducing Pain and Parent's Satisfaction during Venipuncture in Healthy Children.** *IOSR-JNHS.* 2019;8(3): 78-89. e-ISSN: 2320-1959. p-ISSN: 2320-1940

Schreiber S, Cozzi G, Rutigliano R, Assandro P, Tubaro M, Cortellazzo Wiel L, Ronfani L, Barbi E. **Analgesia by cooling vibration during venipuncture in children with cognitive difficulties.** *Acta Paediatr.* 2016 Jan;105(1):e12-6. [N=70, pediatric, severe cognitive impairment, "reported no or mild procedural pain in 32 cases (91.4%) in the Buzzy group and in 22 cases (61.1%) in the no-intervention group ($p = 0.003$)."] PMID: 26401633

Singh NC, Goyal S, Sharma A, Kothari N, Kaloria N, Bhatia P. **Comparison of Lidocaine Spray, Buzzy® Device with Conventional Technique to Reduce Pain of IV Cannulation in Pediatric Patients: A Randomised Controlled Trial.** *Indian J Pediatr.* 2026 Mar 26. DOI:10.1007/S12098-026-06096-X; PMID: 41886183

Susam V, Friedel M, Basile P, Ferri P, Bonetti L. **Efficacy of the Buzzy System for pain relief during venipuncture in children: a randomized controlled trial.** *Acta Biomed.* 2018 Jul 18;89(6-S):6-16. N=72, Buzzy pain 3.65 v. Magic Glove 4.67, $p = .039$ PMID: 30038198

Tork HM, **Comparison of the Effectiveness of Buzzy, Distracting Cards and Balloon Inflating on Mitigating Pain and Anxiety During Venipuncture in a Pediatric Emergency Department.** *Am J Nursing Science* 2017 Feb;6(2):26-32. (N=180, Pediatric, Lowest pain scores with Buzzy (1.90±1.34) vs Distraction cards (3.17±2.13) vs Balloon inflating (2.83±1.41) vs control (4.15±1.29), ($p = 0.012$), Buzzy and Distraction card groups had the greatest reduction in anxiety.) DOI:10.11648/J.AJNS.20170601.14

Whelan HM, Kunselman AR, Thomas NJ, Moore J, Tamburro RF. **The impact of a locally applied vibrating device on outpatient venipuncture in children.** *ClinPediatr (Phila).* 2014 Oct;53(12):1189-95. (N=64, historic cohort study, no significant pain difference but 81% phlebotomists said easier with Buzzy, pediatric.) PMID: 24924565

🔑 Yilmaz D, Heper Y, Gözler L. **Effect of the Use of Buzzy during Phlebotomy on Pain and Individual Satisfaction in Blood Donors.** *Pain Management Nursing.* 2017 Aug;18(4):260-267. [N=90, Pain reduced, satisfaction increased, adult blood donors, ($p < .05$)] PMID: 28601479

Yilmaz D, Özyazıcıođlu N, Çıtak Tunç G, et al. **Efficacy of Buzzy® on pain and anxiety during catheterization in children.** *Pediatr Int.* 2020 Sep;62(9):1094-1100. PMID: 32311184

Immunization

- Besirik SA, Turgut MA, Sahiner NC, Baxter AL, Kirboga Z. **Reducing vaccination pain using a multidermatomal or deltoid region buzzy[®] applications versus control: A randomized controlled study.** *J Pediatr Nurs.* 2025;85:783-791. Multidermatomal placement reduced pain 93% vs traditional deltoid placement 67% from control in 90 13-year-olds receiving Td vaccines. DOI:10.1016/J.PEDN.2025.10.011; PMID: 41151224
- 1st Bhattacharya R, Batra B. **Comparison of Effect of Various non-pharmacologic Methods on Pain in Infants during Vaccination.** *Int J Preven Curat Comm Med* 2019; 5(4): 7-11 Result: The mean pain score of four groups (G1 - breast feeding, G2 - Buzzy, G3 - Helfer technique & G4 - control) were 3.77, 3.80, 4.50 and 4.83. First infant trial. DOI:10.24321/2454.325x.201922
- Canbulat Şahiner N, İnal S, Sevim Akbay A. **The effect of combined stimulation of external cold and vibration during immunization on pain and anxiety levels in children.** *J Perianesth Nurs.* 2015 Jun;30(3):228-35. (72-75% TdAP pain reduction, 104 7-year olds.) PMID: 26003770
- Dur Ş, Karadağ Aytemiz ÖE, Dinç S. **Comparative effectiveness of the Buzzy[®], ShotBlocker[®] and Helfer skin tap technique in reducing pain and fear during pediatric intramuscular injections: A randomized controlled trial.** *Int Emerg Nurs.* 2026;84:101744. (4-12 yr, pain and fear lowest in Buzzy.) DOI:10.1016/J.IENJ.2026.101744; PMID: 41512361
- Girgin BA, Aktas E, Kiliç D, Gözen D. **Let's Prefer the Pain Reducing Intervention, Buzzy or ShotBlocker: A Randomized Controlled Trial.** *J Dr Behcet Uz Child Hosp.* 2020;10(3):290-8. DOI:10.5222/BUCHD.2020.13007 Buzzy significantly more effective, highest parent satisfaction.
- Redfern RE, Chen JT2, Sibrel S3. **Effects of Thermomechanical Stimulation during Vaccination on Anxiety, pain, and Satisfaction in Pediatric Patients: A Randomized Controlled Trial.** *J Pediatr Nurs.* 2018 JanFeb;38:1-7 (N=50, pain significantly less with Buzzy[®] (3.56 vs 5.92, p=0.015).) PMID: 29167074
- Redfern RE, Micham J, Seegert S, Chen JT. Influencing Vaccinations: A Buzzy Approach to Ease the Discomfort of a Needle Stick – a Prospective, Randomized Controlled Trial. Pain Management Nursing. 2019 Apr;20(2):164-169. (N=497 adults; pain 0.87 v 1.12 p=.035, better than previous experiences p<.0001; most effective for adults with needle fear.) PMID: 30425014*
- Sapçi E, Bilsin Kocamaz E, Gungormus Z. **Effects of applying external cold and vibration to children during vaccination on pain, fear and anxiety.** *Complement Ther Med.* 2021 May;58:102688. DOI: 10.1016/J.CTIM.2021.102688; PMID: 33640458
- Şıktaş Ö, Uysal G. **The Effect of Buzzy Application on Pain Level During Vaccine Injection in Infants.** *J Nurs Care Qual.* 2023;38(1):E9-E15. DOI:10.1097/NCQ.0000000000000656; PMID: 36066846
- 🔑 Smith MJ, Harrington TA, Chung RJ, et al. **Preventing Postvaccination Presyncope and Syncope in Adolescents: A Randomized Controlled Trial of a Clinic-Based Intervention.** *J Peds.* 2026;293. N = 322. Buzzy significantly reduced severe presyncope 25%. (p=0.02.) DOI:10.1016/J.JPDS.2026.115035; PMID: 41692229
- Sönmez Düzkaya D, Uysal G, Şıktaş Ö, Karakul A, Açıkgöz A. **Effects of the Helfer skin tap technique and Buzzy[®] application on the levels of pain and fear experienced by children during vaccination: A randomized controlled trial.** *J Pediatr Nurs.* 2024;79:e278-e284. DOI:10.1016/J.PEDN.2024.10.037; PMID: 39489632
- Taddio A, McMurtry CM, Shah V, et al; HELPinKids&Adults. **Reducing pain during vaccine injections: clinical practice guideline.** *CMAJ.* 2015 Sep 22;187(13):975-982. [includes “cold/vibration device”] PMID: 26303247
- 🕒 Thompson A, Rodrigo ML, Roberts A, Waddell J, Carter R. **Effect of vibratory device on the time of administration of vaccines and on patient satisfaction measures.** *J Child Health Care.* 2025;29(3):618-625. DOI:10.1177/13674935241242156; PMID: 38556616
- Walter EB, Harrington T. **Preventing presyncope and syncope in adolescents using simple, clinic-based interventions: A pilot study.** NCT03533829. No presyncope or syncope in Buzzy or Buzzy + Music intervention. 1 syncope in Music only group. N=30.
- Yılmaz D, Kutlu M, Baki E. **A comparison of the effect on pain management of two non-pharmacological methods used during administration of Pfizer-BioNTech COVID-19 vaccine (BNT162b2): A randomized controlled study.** *Jpn J Nurs Sci.* 2023;20(3):e12533. DOI:10.1111/JJNS.12533; PMID: 36999594

Injections

Bilgen BS, Balci S. **The effect on pain of Buzzy and Shotblocker during the administration of intramuscular injections to children: a randomized controlled trial.** J Korean Acad Nurs. 2019 Aug;49(4):486-494. "The children in the Buzzy group had significantly less [penicillin injection] pain than the children in both the Shotblocker and control groups p<.001." PMID: 31477677

Canbulat Sahiner N, Turkmen AS, Acikgoz A, Simsek E, Kirel B. **Effectiveness of Two Different Methods for Pain Reduction During Insulin Injection in Children with Type 1 Diabetes: Buzzy and Shotblocker.** Worldviews Evid Based Nurs. 2018 Oct 11. PMID: 30307692

🔑 1st Özaslan NZ, Öksel B, Sahin N, Sönmez HE. **Buzzing Away Pain: Efficacy of Buzzy® in Reducing Pain During Canakinumab Treatment for Familial Mediterranean Fever.** Cureus. 2025;17(3):e81242. DOI:10.7759/CUREUS.81242; 5-18 years. 1st subcutaneous biologic study, reduced pain by half. PMID: 40291186

Rundell JD, Sebag JA, Kihm CA, Herpen RW, Vlahovic TC. **Use of an external vibratory device as a pain management adjunct for injections to the foot and ankle.** The Foot and Ankle Online Journal. 2016;9(4): 6. (N=108, 31.3% decrease in pain associated w/ injections in treatment vs control group.) DOI:10.3827/FAOJ.2016.0904.0006

1st Russell K, Nicholson R, Naidu R. **Reducing the pain of intramuscular benzathine penicillin injections in the rheumatic fever population of Counties Manukau District Health Board.** J Paediatr Child Health. 2014 Feb;50(2):112-7. [N=118, Nonadherent group, pain and fear reduced 50%, teens and adults.] PMID: 24134180

🔑 Şahin M, Eşer İ. **Effect of Buzzy® application on pain and injection satisfaction in adult patients receiving intramuscular injections.** Pain Management Nurs. 2018 Dec;19(6):645. Diclofenac, (N=65, average age 52, Pain reduced 74%, satisfaction 95 v. 84. P<.001 both.) PMID: 30318424

Yilmaz G, Alemdar DK. **Using Buzzy, Shotblocker, and Bubble Blowing in a Pediatric Emergency Department to Reduce the Pain and Fear caused by intramuscular injection. A Randomized Controlled Trial.** J Emerg Nurs. 2019 Sep;45(5):502-511. "Pain and fear were notably less in the group of children receiving the Buzzy intervention than ShotBlocker or bubble-blowing." PMID: 31257044

Dermatology

Alshawan M. **A Prospective comparison between skin cooling and skin vibration in reducing the pain of local anesthetic injection.** J Cosmet Dermatol. 2020 Jun;19(6):1490-1493 "Skin vibration may be more effective than skin cooling in alleviating the pain caused by local anesthetic infiltration. (Buzzy without ice)." PMID: 31556234

Chorney SR, Villwock JA, Suryadevara AC. **Vibration Versus Ice to Reduce Cosmetic Botulinum Toxin Injection Pain—A Randomized Controlled Trial.** Ear Nose Throat J. 2019;98(6):351-355. PMID: 31072196

Heel Stick

1st Bulduk M, Aysin N, Can V, Tan Aysin J, Dilbilir Y, Kurt Can E. **The effect of Buzzy application on pain and comfort level during heel stick in newborns: a randomized controlled study.** Anatolian Curr Med J. 2025;7(2):170-176. 1st heel stick study. DOI:10.38053/ACMJ.1625979

Dental Injections

Alanazi KJ, Pani S, AlGhanim N. **Efficacy of external cold and a vibrating device in reducing discomfort of dental injections in children: A split mouth randomised crossover study.** Eur Arch Paediatr Dent. 2019 Apr;20(2):79-84. (N=60 FLACC and Wong-Baker both p<.001 favor Buzzy.) PMID: 30519955

AlHareky M, AlHumaid J, Bedi S, et al. **Effect of a Vibration System on Pain Reduction during Injection of Dental Anesthesia in Children: A Randomized Clinical Trial** Int J Dent. 2021;8896408. PMID: 33564311

Baldawa H, Tirupathi S, Ramakrishnan M, et al. **Effectiveness of combined extraoral vibration and cooling on pain perception due to inferior alveolar nerve block administration in children: a systematic review and meta-analysis.** J Dent Anesth Pain Med. 2025;25(4):227-237. DOI:10.17245/JDAPM.2025.25.4.227; PMID: 40787135

Bilsin E, Gungormus Z, Gungormus M. **Efficacy of external cooling and vibration on decreasing the pain of local anesthesia injections during dental treatment in children: A randomized controlled study.** J Perianesth Nurs. 2020;35(1):44-47. External cooling and vibration had a significant effect on reducing injection pain during dental treatment. PMID: 31564620

Dhembare-Patil AA, Jain M, Sogi HPS, Sharma P, Gambhir A, Kumari S. **Comparative Evaluation of Buzzy System and Conventional Masked with Camouflage Syringe for Pain Perception in 5-12-year-old Children: A Split-mouth Study.** Int J Clin Pediatr Dent. 2026;19(2):164-170. PMID: 41800015

Hassan M, Wassef N, Fouad M. **Effect of External Cold and Vibration (Buzzy Device) Versus the Conventional Technique on Pain Perception During Local Anesthesia Injection in Children.** Egypt Dent J. 2024; 70(3), 2221-2229. NCT05067218; DOI: 10.21608/EDJ.2024.287626.3033

HA, Rao A, Natarajan S, Yarmunja Mahabala K, Nayak A. **Efficacy of an external cold and vibrating device in reducing discomfort during the administration of an inferior alveolar nerve block in children: A split-mouth randomised crossover study.** F1000Res. 2023;12:984. DOI:10.12688/F1000RESEARCH.138340.1; PMID: 38550249

Narimany R, Faghihian R, Jafarzadeh Samani M. **Effectiveness of External Precooling and Vibration Induced by BUZZY on Pain and Anxiety During Inferior Alveolar Nerve Block Injection in Children.** Int J Dent. 2024;2024:5515522. DOI:10.1155/2024/5515522; PMID: 39268175

Prasanna PL, Suresh P, Srinivasan K. **Interpreting the Meaning of Pain Severity Scores in Children Using Buzzy and Distracting Cards- A Randomized Clinical Trial.** SAR J Dent Oral Surg Med. 2021;2(2), 22-35. DOI: 10.36346/SARJDOSM.2021.V02I02.001

🔑 Sahithi V, Saikiran KV, Nunna M, Elicherla SR, Challa RR, Nuvvula S. **Comparative evaluation of efficacy of external vibrating device and counterstimulation on child's dental anxiety and pain perception during local anesthetic administration: a clinical trial.** J Dent Anesth Pain Med. 2021 Aug; 21(4): 345-355. *Buzzy significantly better than jiggling the cheek.* PMID: 34395902

Shetty A, Naik SS, Patil RB, Valke PS, Mali S, Patil D. **Effectiveness of an extraoral cold and vibrating device in reducing pain perception during deposition of local anesthesia in pediatric patients aged 3-12 years: a split-mouth crossover study.** J Dent Anesth Pain Med. 2023;23(6):317-325. DOI:10.17245/JDAPM.2023.23.6.317; PMID: 38076506

Subramaniam P, Ghai SK. **Reducing Discomfort during Local Anesthesia Administration in Children: A Clinical Study.** Int J Clin Pediatr Dent 2021;14(3):353-356. DOI: 10.5005/jp-journals-10005-1948; PMID: 34720506

Suohu T, Sharma S, Marwah N, et al. **A Comparative Evaluation of Pain Perception and Comfort of a Patient Using Conventional Syringe and Buzzy System.** Int J Clin Pediatr Dent 2020;13(1):27-30. Conclusion: Buzzy can reduce pain and anxiety during local anesthetic delivery. PMID: 32581474

Vishwanathaiah S, Maganur PC, Areshy RA, et al. **Effect of Buzzy Bee in Reducing Pain Perception during Local Anesthesia in Children: A Split-mouth Crossover Study.** Int J Clin Pediatr Dent. 2025;18(11):1390-1396. DOI:10.5005/jp-journals-10005-3454; PMID: 41328375

Itching

Troger A, Robinson H, Mancina SC, Sharma HP, Kelly K. **Helping Children Cope With Discomfort Associated With Skin Prick Testing In a Pediatric Setting: A Quality Improvement Report.** J Allergy Clin Immunol. 2014;133(2):AB124. DOI:10.1016/J.JACI.2013.12.464

Misc.

Bisht P. **Effectiveness of Self-Instructional Module on Knowledge of Buzzy Technique among Staff Nurses Working in Paediatric Ward in Shri Mahant Indresh Hospital, Patel Nagaer, Dehradun Uttarakhand.** Galore Int J Health Sci Res. 2020 Apr-Jun; 5(2).

🔑 Hwang LK, Nash DW, Yedlin A, Greige N, Larios-Valencia J, Choice C, Pothula A. **The Effect of Vibration on Pain During Intravenous Injection of Propofol: A Randomized Controlled Trial** Ann Plast Surg. 2021 Jul 1;87(1s Suppl 1):S36-S39. *Buzzy significantly reduced burning pain.* DOI: 10.1097/SAP.0000000000002827; PMID: 33833179

Musculoskeletal

Marovino TA, Baxter A. **Crossover Trial of Novel Mechanical Oscillatory Vibration Frequency Device versus TENS for Musculoskeletal Pain [abstract].** PM R. 2019; 11(S2)(suppl 2).

Marovino T, Majewski M. **Pain Therapy Options for Home.** Practical Pain Management 2019 Jan-Feb; 19(1):56-59. (pooled OR of reducing pain by 3 on a 10 pt scale 2.25 95%CI 1.34-3.77 p=.0021)

PhD Theses & Dissertations

Gilcrest, Morgan T., **“Does Buzzy® reduce needlestick pain in children between the ages 5 and 12 years old?” (2021).** PCOM Physician Assistant Studies Student Scholarship. 594.

Long, Katherine, **“Don’t Be Such a Buzzy®Kill: Reducing Pain During Vaccinations in College-Age Students” (2021).** Evidence-Based Practice Project Reports. 165.

Kim, TK. **Implementation and Evaluation of a Nonpharmacological Device to Improve Satisfaction During Immunization.** 2021, U Maryland.

Zmrzel, Sara Cortnie, **Increasing Healthcare Provider Knowledge About Pediatric Vaccine Administration Pain Mitigation Techniques: A Quality Improvement Project.** The University of Arizona. ProQuest Dissertations Publishing, 2018. 13419696.

DistrACTION[®] Cards

Aydin D, Sahiner NC **Effects of music therapy and DistrACTION[®] cards on pain relief during phlebotomy in children.** Appl Nurs Res. 2017 Feb; 33:164-168. (N=200, mean age +/- 2.35 years. All interventions reduced pain.) PMID: 28096012

Aydin D, Sahiner NC, Ciftici EK. **Comparison of the effectiveness of three different methods in decreasing pain during venipuncture in children: ball squeezing, balloon inflating, and DistrACTION[®] cards.** J Clin Nurs. 2016 Aug;25(15-16):2328-35. (N = 120, mean age 9.64 +/- 2 years. All interventions reduced pain.) PMID: 27112434

Canbulat N, Inal S, Sönmezer H. **Efficacy of distraction methods on procedural pain and anxiety by applying DistrACTION[®] cards and kaleidoscope in children.** Asian Nurs Res (Korean Soc Nurs Sci). 2014 Mar;8(1):23-8. (N = 180, mean age 8.8 +/- 1.5 years. DistrACTION[®] lowest pain p<.001.) PMID: 25030489

Inal S, Kelleci M. **Distracting children during blood draw: looking through DistrACTION[®] cards is effective in pain relief of children during blood draw.** Int J Nurs Pract. 2012 Apr;18(2):210-9. PMID: 22435986

Mohanasundari SK, Raghu VA et al. **Effectiveness of Flippits [DistrACTION[®] cards] and Virtual Reality Therapy on Pain and Anxiety Among Children Undergoing Painful Procedures,** Cureus. 2021 Aug 12;13(8):e17134. (N=105 age 3-12y, pain scores of VRT and card groups were less than the control group (aOR, 95% CI 0.635, 0.504-0.799, P = 0.000 and aOR, 95% CI 0.705, 0.572-0.868, P = 0.001, respectively) and no difference was observed between VRT and Cards group.) PMID: 34548966

Prasanna PL, Suresh P, Srinivasan K. **Interpreting the Meaning of Pain Severity Scores in Children Using Buzzy and Distracting Cards- A Randomized Clinical Trial,** SAR J Dent Oral Surg Med, 2021;2(2), 22-35.

Risaw L, Narang K, Thakur JS, Ghai S, Kaur S, Bharti B. **Efficacy of Flippits [DistrACTION[®] cards] to Reduce Pain in Children during Venipuncture - A Randomized Controlled Trial.** Indian J Pediatr. 2017 Aug;84(8):597-600. PMID: 28378139 "Odds of severe pain/discomfort (total pain score 7-10) were 2.5 times higher in controls as compared to the intervention group (OR 2.5; 95% CI: 1.40-4.45) (P 0.002). Conclusions: The use of simple distraction technique using DistrACTION[®] can significantly relieve the pain associated with blood sampling in children."

Sahiner NC, Turkmen AS. **The effect of DistrACTION[®] Cards on reducing pain and anxiety during intramuscular injection in children.** Worldviews on Evidence-Based Nursing 2019;1-6. (N=120, selfreported pain cards 5.67+/-3.5 v. control 7.65 +/- 2.77, p=.001. Anxiety Parent-reported cards 1.73 v. control 2.53 p=.003.) PMID: 30997744

Sahiner NC, Bal MD. **The effects of three different distraction methods on pain and anxiety in children.** J Child Health Care. 2016 Sep;20(3):277-85. Distraction cards had lower pain with venipuncture. PMID: 26040282



Buzzy® Reduces Impact of Prolonged Tourniquet Application for Hematology:

In a study by Dr. Lima-Olivieri et al., it was found that leaving a tourniquet in place 120 seconds caused the largest derangement of hematology lab values compared to free flowing blood collection. (1) Dr. Lima-Olivieri et al. then tested Buzzy®, leaving it in place between 90 and 180 seconds and comparing results to free-flowing blood.(2)

The changes from leaving a tourniquet in place for 2 minutes were greater than the changes from leaving Buzzy® in place 2 minutes. Dr. Lima-Olivieri did not reference his earlier work, or discuss his labs funding by the maker of the free-flow unit. The Journal solicited an opinion.

Table 1 - Both Buzzy and a tourniquet were left on 90 – 180 seconds and compared to a transilluminating free flowing collection device where blood was collected without a tourniquet. Comparison numbers between free-flow versus Buzzy® and free-flow versus Tourniquet with percentage Mean Difference between paired results. **Buzzy® caused less difference after two minutes than a standard tourniquet for all outcomes except lymphocytes: prolonged tourniquet +2.6%, prolonged Buzzy -3.9%. The greatest clinical concern is overestimating WBC and neutrophils, failing to recognize immunocompromise.**

	Units	Trans	Buzzy®	% Diff Buzzy	Trans	Tourniquet	% Diff Tourniquet
RBC	(10 ¹² /L)	4.80±0.55	4.90±0.55	2.0	4.68(0.45)	4.81(0.46)	2.8
Hb	(g/L)	137.9±12.7	141.4±13.2	2.5	14.1(1.4)	14.6(1.4)	2.6
Hct	(%)	40.6±4.0	41.5±4.0	2.2	41.7(4)	42.9(4)	2.9
MCV	(fL)	84.4 (81.8-88.3)	84.6 (81.9-88.1)	0.2	88(5)		1.1
RDW	(%)	12.7±0.5	12.7±0.6	0			
WBC	(10 ⁹ /L)	7.35±1.94	7.10±1.89	-3.5	6.59(1.87)	6.9(2.02)	4.8
Neu	(10 ⁶ /L)	4.27±1.57	4.15±1.49	-2.9	3.72(1.31)	3.87 (1.4)	4.2
Lymp	(10 ⁶ /L)	2.41±0.80	2.32±0.80	-3.9	2.23(0.73)	2.29(0.75)	2.6
Mono	(10 ⁶ /L)	0.29±0.08	0.28±0.05	-3.6	0.33(0.11)	0.34(0.13)	3.9
Eos	(10 ⁶ /L)	0.16±0.08	0.16±0.07	0	0.30(.34)	0.37(0.36)	24.1
Baso	(10 ⁶ /L)	0.046±0.02	0.041±0.02	-12.2	0.026(0.02)	0.021(0.02)	23.8
Plt	(10 ⁹ /L)	274±66	272±66	-0.7	200(46)	208(46)	3.6
MPV	(fL)	9.12±0.81	9.09±0.71	-0.3			

Legend RBC: red blood cell count; Hct: haematocrit; Hb: haemoglobin concentration, MCV: mean corpuscular volume; MCHC: mean corpuscular haemoglobin content; RDW: red blood cell distribution width; WBC: white blood cell count; NEU: neutrophil count; LYMP: lymphocyte count; MONO: monocyte count; EOS: eosinophil count; BASO: basophil count; PLT: platelet count; MPV: mean platelet volume.

1. Lima-Oliveira G, Lippi G, Salvagno GL, et al. **Transillumination: a new tool to eliminate the impact of venous stasis during the procedure for the collection of diagnostic blood specimens for routine haematological testing.** Intl J Lab Hematol. 2011 Oct;33(5):457-62. PMID: 21412480

2. Lima-Oliveira G, Lippi G, Salvagno GL et al. **A new device to relieve venipuncture pain can affect haematology test results.** Blood Transfus. 2014 Jan; 12(Suppl 1): s6–s10 PMID: 24120583

3. Baxter AL, Lawson ML. **Concerns with the methodology, analysis and discussion of the Buzzy® and transillumination comparison article.** Blood Transfus. 2014 Jan;12(Suppl 1): s3–s5 PMID: 24599904

Buzzy® Reduces Impact of Prolonged Tourniquet Application for Chemistry:

In one study by Dr. Lima-Olivieri et al., it was found that leaving a tourniquet in place 2 minutes caused the largest derangement of chemistry lab values from free flowing blood using a device made by a manufacturer in his town.(4)

Dr. Lima-Olivieri et al. then tested Buzzy®, leaving it in place also for 2 minutes and comparing to free-flowing blood.(5) The changes from leaving a tourniquet in place for 2 minutes were greater than the changes from leaving Buzzy® in place, and in neither case was there a derangement in potassium from lysed cells that was clinically significant.

Dr. Lima-Olivieri did not reference his earlier study or note funding from the free flowing unit, and the journal solicited an editorial.(6)

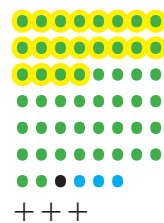
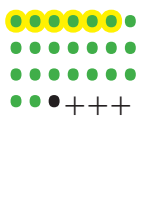









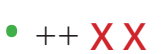
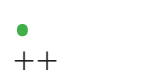


	Units	Free-flowing	Buzzy®	% Diff Buzzy	Free-flowing	Tourniquet	% Diff Tourniquet
Glucose	mmol/L	4.66 (4.33-5.11)	4.66 (4.27-5.11)	0	4.77 ± 1.0	4.83 ± 1.0	1.2
Total Protein	g/L	78.9 ± 3.6	80.1 ± 4.4	1.5	76.0 ± 6.0	79.0 ± 6.0	3.8
Albumin	g/L	47.9 ± 3.4	48.9 ± 3.7	2	46.0 ± 4.0	48.0 ± 5.0	4.2
AlkPhos	μkat/L	1.14 ± 0.3	1.19 ± 0.3	4.2	1.53 ± 0.37	1.56 ± 0.39	1.9
Triglyceride	mmol/L	78.9 ± 3.6	80.1 ± 4.4	1.5	1.63 ± 0.95	1.68 ± 0.96	3.0
Potassium	mmol/L	4.0 ± 0.3	4.0 ± 0.4	0	4.2 ± 0.2	4.3 ± 0.4	2.3
Sodium	mmol/L	144.3 ± 1.8	144.3 ± 1.9	0	142.2 ± 3.2	142.7 ± 3.2	0.4
Phosphate	mmol/L	1.32 ± 0.2	1.30 ± 0.2	-1.5	1.17 ± 0.16	1.18 ± 0.19	0.8
Calcium	mmol/L	2.36 ± 0.1	2.37 ± 0.1	0.4	2.35 ± 0.12	2.40 ± 0.12	2.1
Magnesium	mmol/L	0.81 ± 0.06	0.81 ± 0.07	0	0.810 ± 0.08	0.827 ± 0.08	2.0

4. Lima-Oliveira G, Lippi G, Salvagno GL, et al. **New ways to deal with known preanalytical issues: use of transilluminator instead of tourniquet for easing vein access and eliminating stasis on clinical biochemistry.** *Biochimica Medica*. 2011;21(2):152-9. PMID: 2213855

5. Lima-Oliveira G, Lippi G, Salvagno GL et al. **Quality impact on diagnostic blood specimen collection using a new device to relieve venipuncture pain.** *Indian J Clin Biochem*. 2013 Jul;28(3):235-4. PMID: 24426217

6. Baxter AL, Lawson ML. **Methodological concerns comparing Buzzy® to transilluminator device.** *Indian J Clin Biochem*. 2014 Jan;29(1):114-5. PMID: 24478562

All published needle pain interventional trials as of 4/30/2026. Bibliography available upon request.

	IV RCTs	Non-Vaccine Injection RCTs	Vaccine RCTs	Prep Time	Cost Per Use	Meta-Analyses	Summary
Buzzy® Multi-Patient	 +++	 •+++	 •+	1 min	\$0.10	••••	Efficacy increases with age (Bayesian, Cocchi et al., 2026) IV pain relief = to LMX; EMLA ≈ 10% better* Injections: Buzzy > EMLA for age 4+; Buzzy ≈ approximately equivalent age < 4*
	 +++						
Infant			••				
Adult	 ••+	 ++	 •••				*Summary data applies to classic positioning. New 2025+ positioning may improve efficacy.
DistrACTION® Multi-Use	 ••+	 ••	 •	10 sec	\$0.01		97% say better phlebotomy experience
EMLA® Disposable	 •••		 • ++ XX	60 min	\$2-6		Vasoconstricts until 90 min; requires 1 hour for pain relief
Infant	 •++		 •••••••• +++++ X			++X	
Adult			•				
LMX-4® Disposable	 •••••••• •••••••• ++			20 min	\$2-6		LMX is not FDA-cleared for needle procedures
Ice Pack		•• (Adult)		30 sec	Free		
ShotBlocker® Single Patient		••+ (Adult)		1 min	\$1 Per Patient	•	ShotBlocker = Buzzy for insulin; Buzzy > SB for vaccination
Child	+	XX	+ XX			•	

- Reduced Pain: Compared to Control, Standard of Care, or Another Intervention
- Reduced Pain and Anxiety
- Outcomes Other than Pain/Fear
- Equivocal or Less Effective, Less Time, Less Expensive than Another Intervention
- + Equivalent to Another Intervention
- X Negative Pain Study: Did Not Reduce Pain vs. Control (or Buzzy)