

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. Improving vaccine-related pain, distress or fear in healthy children and adolescents—a systematic search of patient-focused interventions, *Human Vaccines & Immunotherapeutics*, 2018;14:11, 2737-2747

30+ INDEPENDENT RCTs • 2 META-ANALYSES • 84% ADULTS FELT NO FLU SHOT PAIN • EQUIVALENT TO VIRTUAL REALITY & LMX • 1/10 THE COST OF LMX • 3 MINUTE IV ACCESS V. 40M • 74% LESS ADULT DICLOFENAC INJECTION PAIN • SUPERIOR TO JET LIDOCAINE • SUPERIOR TO HYPNOSIS • 88% PAIN REDUCTION WITH PCL PRODUCTS • BETTER FLU SHOT EXPERIENCE THAN PREVIOUS • LESS PAIN WITH FLU SHOT • REDUCED FEAR & PAIN BY HALF IN NONADHERENT POPULATION • 90% WITH JIA WOULD RECOMMEND • **LEAST EXPENSIVE**



FROST & SULLIVAN

2017 Technology Leader
In Localized Pain Relief Therapy



Bibliography as of 6/1/2019

Adult and All-Age Studies Italicized; Pediatric Studies

Reviews and Meta-Analyses

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 Feb 28 (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)

Ballard A Khadra C, Adler S, Doyon-Trottier E, Le May S. Efficacy of the Buzzy® device for pain management of children during needle-related procedures: a systematic review protocol. *Syst Rev*. 2018 May 22;7(1):78.

Lee VY, Caillaud C, Fong J, Edwards KM. Improving vaccine-related pain, distress or fear in healthy children and adolescents—a systematic search of patient-focused interventions. *Hum Vaccin Immunother*. 2018;14(11):2737-2747 “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.

Ueki S, Yamagami Y, Makimoto K. Effectiveness of vibratory stimulation on needle-related procedural pain in children: a systematic review. *JBI Database System Rev Implement Rep*. 2019 Apr 23 in press. Included Buzzy, Dental Vibe, Blaine Labs. “The effect size for the BUZZY tended to be higher than that for the other devices.” “Overall, vibratory stimulation was significantly effective: self-rated pain: -0.55, 95% confidence interval [95% CI]: -0.92 to -0.18) observer-rated pain outcomes (SMD: -0.47, 95% CI: -0.76 to -0.18). [With Buzzy] the effect on the child's anxiety (SMD: -1.03, 95% CI: -1.85 to -0.20) was significant.”

Venipuncture

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 [PDF] Middle East Journal of Anesthesiology 2018 Feb 25(1):61-67. (N=184, Lowest w/ Buzzy Pain score 33.92 ± 15.59 (p = 0.016) 81.0% of patients satisfied w/ Buzzy)

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]

Ballard A, Khadra C, Adler S3, D Trottier E4, Bailey B4, Poonai N, Thérroux J, Le May S. External cold and vibration for pain management of children undergoing needle-related procedures in the emergency department: a randomised controlled non-inferiority trial protocol. *BMJ Open.* 2019 Jan 15;9(1):e023214 (N=346)

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 > 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))

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 w/ Buzzy (odds ratio, 3.05; 95% CI, 1.03-9.02), pediatric]

Bergomi P, Scudeller L, Pintaldi S, Dal Molin A. Efficacy of Non-pharmacological methods of pain management in children undergoing venipuncture in a pediatric outpatient clinic: A randomized controlled trial of audiovisual distraction and External Cold and Vibration. *J Pediatr Nurs.* 2018 Sep-Oct;42:e66-e72. (N=150, Buzzy significantly effective in children under 9. Reduced anxiety in parents and children.)

Binay Ş, Bilsin E, Gerçeker GÖ, Kahraman A, Bal-Yılmaz H. Comparison of the Effectiveness of Two Different Methods of Decreasing Pain During Phlebotomy in Children: A Randomized Controlled Trial. *J Perianesth Nurs.* 2019 Feb 20 S1089-9472(18)30414-3 (block randomization, 3-6 y/o, Pain scores were lower in the groups of external cold and vibration, and blowing soap bubbles than the control group.)

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):33-9. (N=176, 7-12 y/o, significantly lower anxiety and pain in group using Buzzy.)

Cozzi G, Crevatin F, Dri V, Bertossa G, Rizzitelli P, Matassi D, Minute M, Ronfani L, Barbi E. Distraction Using Buzzy or Handheld Computers During Venipuncture. *Pediatr Emerg Care.* 2018 Dec 27 (N=200, Mean age=8, Buzzy = to handheld computer distraction, both statistically significantly less pain than control.)

García-Aracil N, Ramos-Pichardo JD, Castejón-de la Encina ME, José-Alcaide L, Juliá-Sanchís R, Sanjuan-Quiles Á. Effectiveness of non-pharmacological measures for reducing pain and fear in children during venipuncture in the emergency department: a vibrating cold devices versus distraction.

Emergencias. 2018 Jun;30(3):182-185 (3 study groups, Reduced pain and fear in adults, Reduced pain in children)

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 Mar 17. (N=121, Buzzy = VR, both statistically significantly less pain than control.)

Inal S., Kelleci M. The Effect of External Thermomechanical Stimulation and Distraction on Reducing Pain Experienced by Children During Blood Drawing. *Pediatr Emerg Care.* 2017 Sep 5. *In press* (N=218, All groups using Buzzy had significantly reduced pain ($P < 0.001$), Lowest pain measured w/ Buzzy in combination w/ DistrAction Cards)

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)

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 Jul 27 [no sig. added benefit putting J-tip with Buzzy]

Küçük Alemdar D1, Yaman Aktaş Y2. 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 Jan 30 S0882-5963(18)30352-X (N=195, 5-10 y/o, Significant difference in intervention and control groups, Buzzy made the most impact on fear and pain ($p < 0.05$))

Moadad N, Kozman K, et al. Distraction Using the BUZZY for Children During an IV Insertion. *J Pediatr Nurs.* 2016 Jan-Feb;31(1):64-72. (N=48, 4-12 y/o, Buzzy significantly reduced pain)

Pakiş Çetin S, Çevik K. Effects of Vibration and Cold Application on Pain and Anxiety During Intravenous Catheterization. J Perianesth Nurs. 2019 Mar 7. S1089-9472." Vibration and cold gel pack application is suggested to relieve pain during IV catheterization in adults."

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.* 2017 Jan 24 doi: 10.1097/PEC.0000000000001041. (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.)

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 Sept/Oct;41(5):294-300. (N=105 elective surgical adults, no mean pain score difference. "Higher preprocedural anxiety benefitted most.")

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 ($p = 0.003$)."]

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, $p=.039$)

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 Distracting 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.)

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 sig. pain difference but 81% phlebotomists said easier with Buzzy, pediatric.]

Yilmaz D., Heper Y., Gözler. 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, ($p < .05$)]

**In Progress/Recruiting: Clark J. DHHS Buzzy for IV access pain relief in adults with cognitive difficulties.*

**In Progress/Completed: Ronfani L, Garofolo B, Buzzy versus Distraction during venipuncture. N=200 NCT02969902*

**In Progress/Completed: Stein K. Buzzy Use for IV access in Dentistry. University of Iowa College of Dentistry. NCT03619135*

Injections

**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, 7 year olds]*

Canbulat Sahiner N, Turkmen AS, Acikgoz et al. 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. Epub ahead of print. (N=60, Buzzy and Shotblocker both reduced pain compared to control.)

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 Jan-Feb;38:1-7 [N=50, pain significantly less (3.56 vs 5.92 , $p=0.015$), pediatric]

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, 2018 Nov 10 p1-9. (N=497 pain 0.87 v 1.12 $p=.035$, better than previous experiences 62% Buzzy 23.9% control $p<.0001$.)

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)

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]

Sahin M. 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 74% reduced, satisfaction 95 v. 84. P<.001 both)

Taddio A, McMurtry CM, Shah V, Riddell RP, Chambers CT, Noel M, MacDonald NE, Rogers J, Bucci LM, Mousmanis P, Lang E, Halperin SA, Bowles S, Halpert C, Ipp M, Asmundson GJ, Rieder MJ, Robson K, Uleryk E, Antony MM, Dubey V, Hanrahan A, Lockett D, Scott J, Votta Bleeker E; HELPinKids&Adults. Reducing pain during vaccine injections: clinical practice guideline. [includes “cold/vibration device”]

In Progress: Katia L, Joret I. Nantes University Hospital, France. Efficacy of the Buzzy® Device on the Prevention of Health Care Induced Pediatric Pain in a Vaccination Center (DOLVAX) NCT03220555

*In Progress: Mesterman R. Pain Perception of Children and Youth Receiving Non-sedated Botulinum Toxin-A Injections Using the Buzzy®. NCT02273284

*In Progress: Preventing presyncope and syncope in adolescents using simple, clinic-based interventions: A pilot study. Duke/CDC NCT03533829

*In Progress: Feasibility, Acceptability and Satisfaction of a New Device (Buzzy®) for Pediatric Procedural Pain and Anxiety Management During SQ, IV, and IM Needle-Related Procedures: A Pilot Study. NCT02771600

*In Progress: Steiner SJ, Riley Children’s Hospital. Buzzy for patients with IBD – improvement of treatment with Humira or Remicade. Presentation at ImproveCareNow.

*In Progress: David Nash, Montefiore Medical Center. N=200. Vibration Analgesia in Propofol Infusion During Adult Anesthesia Induction (VAPI). NCT03509857

*In Progress: Marcio Boniatti, Hospital Nossa Senhora da Conceicao Rio Grande Do Sul, Brazil, Minimizing pain during childhood vaccination. Infants, outcome crying in seconds NCT03540589

Lab Values and pharmacokinetic considerations

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

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

Hendriks J, Stals C, Versteilen A, Mommaas B, Verhoeven M, Tirion F, Haak MT, Ribbens W, Bosch M, Trommel M, Kostense S. Stability studies of binding and functional anti-vaccine antibodies. *Bioanalysis*. 2014 May;6(10):1385-93.

Michaut L, Laurent N, Kentsch K, Spindeldreher S, Deckert-Salva F. Stability of anti-immunotherapeutic antibodies in frozen human serum samples. *Bioanalysis*. 2014 May;6(10):1395-407.

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

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):235-41

Itching

Troger, A. Robinson H et al. Helping Children Cope with Discomfort Associated with Skin Prick Testing in a Pediatric Setting: A Quality Improvement Report. *J Allergy Clin Immunol* 133 (2) 2014:A

Musculoskeletal

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)

Dental

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.)

Cox J., Salama F, Lancaster B.. Effect of Vibration-Cold on Behavior of Children Receiving Local Anesthesia. University of Nebraska College of Dentistry. New York: AAD 2012:A

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.

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.

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.

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.

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, self-reported 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.)

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.