

## REVIEW ARTICLE

## ShotBlocker Efficacy in reducing Children's Pain: Literature Review

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## ABSTRACT

Injection is painful medical invasive procedure used commonly in hospitals for different diagnostic and treatment purposive. Children are more sensitive to pain response and incomppliance during injection procedure. Nurses need to engaged the new medical technologies such ShotBlocker for reducing patients` pain, fear, trauma, and increase their compliance and wellbeing. This review is highlight on the previous studies that investigated the ShoBlocker device in their randomized control trail for alleviating children`s` pain during injection procedure.

## KEYWORDS

• Nurse • Children Pain • Shot-Blocher • Efficacy

## KEY MESSAGES

Shotbloker is a modern medical device used to distract children attention to alleviate pain during painful procedures such injection.

## INTRODUCTION

Most of diagnostic and treatment medical intervention involved invasive methods, injection procedures are commonly used in hospitals for different medical purposes. Many patients may show incomppliance during such procedures, particularly, children due to their cognitive level. Pain and anxiety associated

with injection procedures are the common compliance of children during intramuscular and venipuncture injection, such feeling may associate negative consequences can effect on children`s health outcome.<sup>1</sup> Invasive procedures such intramuscular injections and venipuncture procedures, often cause significant physical and psychological

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discomfort for children. Their pain experience can be traumatic and have long term effects. The anticipation of pain can be distressing due to undergo previous unmanaged procedure leading to non-compliance.<sup>2</sup> Nurses as one essential members of the medical team and responsible to manage the associated pain in the invasive procedures. Traditionally, pain management includes pharmacological interventions such pain relieving medications, and non-pharmacological interventions including physical therapy, psychological interventions, massage, manual pressure, and distraction techniques. These methods have advanced over time with the evolved of medical technologies. Many significant interventions used to apply shutblocker, buzzy devices, and visual reality for decreasing pain and increasing patients` compliance.<sup>3</sup> Integration of new technologies within invasive procedures such injection can best meet patients` needs and achieve maximum comfort and pain alleviation without complications. It is crucial for nurses to prioritize pain management and implement strategies to minimize discomfort during invasive procedures. Pain management is a critical responsibility in ensuring patient comfort and reducing pain, that have a positive effect on their discomfort and enhance the compliance during the invasive procedures.<sup>4</sup> Recently, there have not been a comprehensive studies investigating the application of ShotBlocker within injection procedures for pediatric groups. However, several randomized controlled experimental studies have explored the effectiveness of ShotBlocker with various injection techniques.

### **Effect of ShotBlocker during intramuscular injection**

Intramuscular injection is a painful medical procedure, particularly among children. Some researchers were used ShotBlocker for reducing the associated pain during painful procedures such IM injection. Bilgen & Balci<sup>5</sup> in their randomized controlled study on penicillin injections examine the efficacy of ShotBlocker to alleviate pain in 150 children at age 7-12 years in pediatric emergency clinic. The pain level was evaluated by Faces Pain Scale-Revise and Visual Analog Scale. Compared to the ShotBlocker, the control group`s pain scores were notably greater. The authors demonstrated use of shotblocker in alleviating pain, particularly during painful injection

procedures like intramuscular injections, and makes the working environment for caregivers more comfortable. Another randomized controlled trial study by Zengin & Yayan,<sup>6</sup> conducted to evaluate the impact of ShotBlocker in reducing pain level during intramuscular injection, they enrolled 168 children at age (7-10) years in pediatric emergency department. Their result showed ShotBlocker was efficient in reducing pain level in children when compared to the control group. The children in Palm Stimulator group had lowest Pain score averages. This study introducing a novel technique for alleviate pain level during intramuscular injection in children. Drag *et. al*<sup>6</sup> Conducted a randomized controlled trial study on intramuscular injection to assess effectiveness of ShotBlocker to children aged 2 months to 17 years old. the participants in the study 165 children with ShotBlocker=80 and no-intervention=85. Healthcare professionals and caregivers observed reducing pain levels in children assigned ShotBlocker group. In light of these findings, the children in the control group felt pain more than did the children in the ShotBlocker and cold application groups. The ShotBlocker method is more effective than other groups in reducing children pain during IM injection. Caglar *et. al*,<sup>7</sup> was performed RCT study that aimed to examine ShotBlocker efficacy in managing neonates` pain during intramuscular hepatitis B vaccine on immunization, specifically the administration of the first hepatitis B vaccines via intramuscular injection to healthy full-term newborns. The ShotBlocker and control groups were compared prior, during and following the injection`s procedures across all stations. Physiological parameters were examined and compared prior, during, and following the procedure. The ShotBlocker group revealed lower pain score than control group after and during injection procedure at (P = .000). ShotBlocker was effective in reducing acute pain in term newborns within injections. Ordu *et. al*,<sup>8</sup> performed a randomized controlled study on subcutaneous insulin injection procedures with children aged from 6 to 12 years. The research trial was conducted at outpatient clinic for pediatric endocrinology. The study included 90 children diagnosed with type 1 diabetes, who were assigned randomly to the ShotBlocker, manual pressure and control groups (each group= 30 subjects). Using in this research the Wong-Baker Faces Pain Scale and

Children`s Fear Scale to evaluate and compare pain levels. After injection, pain levels were reducing in ShotBlocker and manual pressure groups compared in the control group. According to result the study, ShotBlocker and manual pressure were efficient in reducing pain and fear during receiving subcutaneous insulin injection.

### **Effect of ShotBlocker during intravenous injection**

In spite of venipuncture procedure development in pediatric groups, the success of the first attempt at peripheral insertion is lower compared to adults. In addition to the pain and anxiety that associated with the recurrent insertion of intravenous cannulation, that related to the small size of the blood vessels, skin sensitivity, and lack of experience of intravenous cannulation.<sup>9</sup> ShotBlocker was used in some previous experimental studies as pain reducer device during venipuncture procedure in different purposes. A randomized control trial study by Girgin & Göl<sup>10</sup> that aimed to investigate of pain level during children`s venipuncture. The children between aged 7-12 years old were enrolled in the study. Both the children themselves and their parents assessed the levels of pain before and after the venipuncture procedure. Compared with the control group, the scored pain after the procedure was lower in all intervention groups ( $p = .001$ ). There was no statistical difference in pain between the intervention groups. Karabey & Karagözoğlu<sup>11</sup> conducted a study on intravenous cannulation using pre-post design on single sample group, to evaluate effectiveness of ShotBlocker on relieve pain, and comfort. The participants in the study were 100 patients that met the inclusion criteria. The same nurse used standard insertion and ShotBlocker for the inserted intravenous cannulation into right and left forearms of cephalic veins. In this study, the Visual Analog Scale and the Comfort Scale were employed. Based on the study`s findings, using of ShotBlocker during intravenous cannulation is a useful technique to pain reduction. Sivri *et al.*<sup>4</sup> in their randomized trial study investigated the efficacy of ShotBlocker, in collecting blood samples from children admitted to the Child Health and Diseases Department of Medicine, aged 9-12 years. 242 participants who matched the patient selection criteria and provided their consent to participate in the trial. In comparison

to the control group, the ShotBlocker had significantly lower ratings on the Visual Analog Scale during venous blood collection. According to the study`s findings, ShotBlocker was effective in reducing pain in children.

Moeini *et al*<sup>4</sup> had a randomized clinical trial, to evaluate the impact of ShotBlocker and vibration on pain reduction during intravenous cannulation. The sample was (108) children at age (3-6 years). Subjects were randomly divided into three groups: warm vibrations, cold vibrations, and ShotBlocker. Before the intravenous cannulation, no differences were shown in children`s pain score ( $P>0.05$ ). while after the procedure a significantly different shown between the groups at ( $P<0.05$ ). The use of vibration and ShotBlocker devices are suggested in children to reduce pain during intravenous cannulation procedures.

### **Comparison between the effect of ShotBlocker and other distraction devices**

In a RCT study by Bilgen & Balcı<sup>1</sup> to compare the effect of ShotBlocker and Buzzy`s efficacy to alleviate children`s pain in pediatric emergency clinic. The children were randomly assigned into three categories: ShotBlocker, Buzzy, and control group. Each group include 50 individuals. The study results showed, compared to the ShotBlocker and Buzzy groups, the control group's pain scores were notably greater. Both the Buzzy and the ShotBlocker was helpful at alleviating pain but Buzzy was more efficacy in reduce pain. Therefore, it has been demonstrated that use of these tools can effectively alleviating pain, particularly during painful injection procedures. For comparison between the efficacy of ShotBlocker and Palm Stimulator on pediatric pain, Zengin & Yayan<sup>6</sup> carried out a RCT study on 168 children whose age group was (7-10) years in pediatric emergency department. The children met the inclusion criteria were randomly assigned into 3 groups: the ShotBlocker = 56, the Palm the Stimulator = 56 and the control group = 56. The ShotBlocker and Palm Stimulator both were efficient in reducing pain level in children when compared to the control group. This statistical difference in pain scores was not significant between ShotBlocker and Palm Stimulator. The manual pressure and ShotBlocker were used to alleviate pediatric pain during subcutaneous insulin injection procedures by Girgin *et al.* randomized controlled study. The study

included 90 children diagnosed with type 1 diabetes, who were assigned randomly to the ShotBlocker, manual pressure and control groups (each group = 30 subjects). After injection, pain and fear levels were reducing in ShotBlocker and manual pressure groups compared in the control group. According to result the study, ShotBlocker and manual pressure were efficient in reducing pain and fear during receiving subcutaneous insulin injection.<sup>8</sup> The effect of ShotBlocker, Buzzy device, and Distraction Card were evaluated by Sivri *et al*<sup>5</sup> trial study for reduce children pain levels in collecting blood samples. 242 participants who matched the patient selection criteria and provided their consent to participate in the trial, made up the sample: ShotBlocker (61 participants), Buzzy device (60 participants), Distraction card (60 participants), control group (61 participants). In comparison to the control group, the ShotBlocker, Buzzy device and Distraction card groups had significantly lower ratings on the Visual Analog Scale during venous blood collection. Moeini *et al*<sup>2</sup> conducted a randomized clinical trial to evaluate the impact of cold and warm vibration on pain reduction in children (3-6 years) by using buzzy device on 108 children, when subjected to intravenous cannulation. Subjects were randomly divided into three groups: warm vibrations, cold vibrations, and vibrations only (control group). The musical vibrating device is bee-shaped that was attached for 5 minutes to a warm or cold pack above the intravenous injection site at about 5-10 cm. The study's results stated that both cold and warm vibrations can reduce pain caused by injections, but cold vibrations appear to have a greater effect in reducing pain.

## CONCLUSION

Nurses must be aware of the latest developments in pain management, and promote good communication with patient, and help them achieve comfort and pain relief safely and effectively.<sup>12</sup> Numerous studies have investigated the effectiveness of ShotBlocker across various injection procedures and age groups, employing randomized control trial as research designs. Previous findings demonstrate that ShotBlocker effectively in reduce pain during various injection procedures. Also, there are studies utilize non-

pharmacological methods with randomized control trial as research designs during intravenous cannulation in school-age children in same context but not used the ShotBlocker. When critically appraised the reviewed literature, it became clear for the reader that research focuses largely on other injection procedures using the ShotBlocker in terms of alleviating pain during injection to children.<sup>13</sup>

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