

## Reduce Vaccination Pain: is it Possible?

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**Received:** November 30, 2021; **Published:** January 11, 2022

### Abstract

The article is a fine-tuning of the different techniques to try to reduce vaccination pain. The problem is felt not only (and not so much!) in Italy but mainly abroad where several Guidelines have been drawn up for some years by important international public health bodies such as the WHO or scientific societies such as the Canadian Medical Association and the American Academy of Pediatrics. The article shows that without additional expense it is possible to reduce vaccination pain only by training medical and nursing staff to use techniques that have been validated for years.

**Keywords:** *Vaccination Reduce*

### Introduction

Vaccinations are the most common source of iatrogenic pain in childhood. The brevity of pain in no way justifies the fact that it should not be prevented. Especially if the vaccines are numerous and repeated even at a short distance of time. These are the reasons why pediatricians and vaccination health personnel must be trained to prevent, as far as possible, vaccination pain.

The pain associated with vaccinations causes anxiety and distress for children who receive the vaccination, their parents and the nursing staff who have to administer the vaccine. According to some studies, 8 out of 10 parents believe that health workers have a duty to make vaccinations less painful. In addition, injection pain can be one of the causes of refusal and / or delay in adherence to the vaccination calendar. In a 2015 "statement" the WHO declares that "Pain during vaccination sessions is manageable and managing pain does not decrease the effectiveness of the vaccine" [1]. Studies conducted in the United States and Canada indicate that between 24% and 40% of parents are concerned about vaccination pain in children; 85% of them are convinced that vaccination health personnel have a responsibility to practice less painful vaccinations and 95% want to learn how to reduce pain when vaccinating their children [2-4].

All children from the 3rd month of life until adolescence are subjected to a long series of very important vaccination practices because they have allowed the disappearance of often deadly infectious diseases. A practice, therefore, very important that you can not do without, even if in our country still survive "outbreaks" of fight against vaccinations on the basis of false beliefs that still circulate especially in the "network".

The problem of reducing vaccination pain is also considered serious by the WHO, which considers pain reduction to be a good practice in global immunization programs. That is why the WHO has published a document with a series of effective and inexpensive tips to limit crying and desperate screaming in young patients. There are, in fact, several simple, inexpensive, safe interventions that actually reduce pain during vaccination.

According to the WHO Strategic Advisory Group of Immunization Experts(Sage) [2] it would be enough to extend to the whole world the guidelines adopted by Canada [5] to reduce the level of suffering during vaccination. They are good practices that could relieve pain in people and all age groups. The WHO therefore calls on all governments to introduce the following measures into national immunization programmes:

- Health personnel who practice vaccinations must be calm, cooperative and prepared. During administration, you should avoid using alarmist terms(such as: "Arriva la puntura"), choosing instead to use neutral words (for example: "I proceed").
- Vaccine recipients must be positioned correctly: infants and young children must be held in their arms by a family member. Children and adults, on the other hand, must sit upright.
- Whoever has the vaccine should not aspirate or retract the plunger of the syringe before intramuscular injections, because doing so can increase pain.
- If you have to administer more than one vaccine in the same circumstance, you have to start with the least painful one and end with the one that hurts the most.
- If the recipient of the vaccine is a small child, the caregiver must be present throughout the procedure.

In countries where it is culturally acceptable, newborns may be breast-breasted during or just before vaccination.

- You can try to distract children under the age of six using toys, videos or music.

Four years have passed since 2015 (the year in which the WHO document was published) and it would be useful and interesting to know how many of the health workers involved in vaccinations know of its existence. And also what is the percentage of vaccination centers in which, in the various regions, the WHO recommendations have been implemented and in particular whether short training courses have also been held on the practices to be implemented to reduce vaccination pain.

This article is intended to be a contribution to the prevention of vaccination pain and is aimed at both vaccinating doctors and the health personnel who work with them. Not only that but also to parents to make them aware of anti-pain practices, so that they can require medical and nursing staff to take measures to reduce pain and actively collaborate with staff who practice vaccinations.

The international guidelines, especially the Canadian, WHO and US guidelines, examined the different measures to be taken in relation to the age of the child.

The measures examined were

- Breastfeeding;
- Administration of sweet substances;
- Use of topical anesthetics
- Injection techniques and locations
- Psychological interventions.

### Let's examine them one by one

#### Breastfeeding

Surely it is shown that if the baby is kept at the breast during vaccination he feels much less pain. It is a simple practice, pleasing to the mother. The noticeable decrease in perceived pain is due to a set of factors: contact between mother and baby, toning, sweet taste. Nursing staff should encourage the mother to keep the baby breastfeeding. The best results are expected if breastfeeding began a few minutes before the puncture and continued for a few minutes later.

#### Administration of sweet substances

In children who cannot be breast-breasted, it has been widely demonstrated and reported in Canadian and American guidelines that sweet solutions, especially of sucrose or glucose, in various concentrations are capable of correcting or decreasing the perception of pain centrally. Concentrations of sucrose from 25% to 75% and glucose from 12% to 50% have been used in the various studies, Administration should take place two to three minutes before vaccination and its effect is maintained for about 10 minutes.

#### Use of topical anesthetics

Local anesthetics reduce the pain of both subcutaneous and intramuscular injections, despite the fact that their penetration into the skin is limited. Many agents have been tested and all are safe and not very expensive, but almost all have too slow a start of activity, about 60 minutes.

The most studied is the EMLA cream which is a 5% mixture of lidocaine and prilocaine: it is safe even in those born from premature birth and does not alter the immunogenicity of vaccines. Unfortunately, the time required for the start of the pain-relieving activity is very long (about an hour) so its use is very limited in vaccination in the clinic.

Other local anesthetics (amethocaine, vanpooling, liposomal lidocaine) have been studied but none have proven to be easy to use.

In a meta-analysis, which appeared in an Anglo-Saxon journal [6], 5 articles were selected from over 90 selected on Pub MED NCBI, cost-effectiveness of different local anesthetics to reduce pain during vaccination. Based on the results of this research, which compared local anesthetics with placebo, the AAs concluded that EMLA reduces crying time and visual and behavioral scores but their effect is modest, at a rate of 10 - 30%, and that EMLA should be considered as part of a broader strategy during infant vaccination. For example, reinforcement of breastfeeding [7]. Such results well accord with the idea that the local anesthetic can only combat the pain caused by the insertion of the needle through the skin and not the pain associated with injecting vaccine into muscle tissue. In any case, the use of EMLA does not induce adverse reactions to the vaccine or reduce the antibody response of the hexavalent vaccine in children from birth to 6 months [8].

#### Techniques, injection sites and choice of needle size

A longer needle has been shown to induce less pain and result in fewer side effects than a shorter needle:

These measures are recommended:

- For 2-month-old infants: needle length of 16 mm (5/8 of an inch)
- For infants length of 25 mm

- For older children, if the deltoid is used, a length of 16 mm to 25 mm is fine, while if the vast lateral is used, a length of 25 mm to 30-31 mm is fine.
- For teenagers and adults, using the deltoid, a length from 25 mm to 50 mm is fine.

It is recommended not to aspirate before injecting vaccines intramuscularly in children of all ages. Aspiration, an old practice used in intramuscular drug injections, can increase pain due to the combined effects of a longer needle dwell time in tissues and a needle movement action on its own axis. There are no documented dangers or non-aspiration before vaccination. It is advisable to administer the most painful vaccine last rather than first during vaccinations at all ages. A systematic review shows that children feel less pain if the injection is rapid (1 second per 0.5 ml) without aspiration. As far as the injection site is concerned, the Canadian guidelines and the WHO (2.5) provide for vaccinations to be entered in the vastus lateral thigh for up to 18 months. From 18 and 36 months it is indifferent whether vaccinations are practiced in the vastus lateral or in the deltoid. Above 36 months they must be practiced in the deltoid.

### Distraction techniques

Infants: soothers, game, musical.

Preschoolers: soap bubbles, music, games.

School-age children: play games, talk about other things, videos.

Teenagers: video games, focus on other

The mechanisms behind these distraction techniques are basically two

- Gate Control: cognitive attention is the influence of perception processing at the central level.
- Theory of limited attention span: If you turn your attention to a distracting task there are fewer resources available to pay attention to pain [10].

### Education and implementation

Training of vaccination doctors on pain prevention is recommended. They must be prepared on the techniques of administration of vaccines. The presence of parents during the administration of the vaccine in children from ten years old and under is recommended. Children appear much less stressed when parents are present before and after vaccination. Since the behavior of parents can affect the level of stress of children, parental education is recommended to facilitate the care of the child and to relieve pain, fear and anguish. Older children undergoing vaccination should be informed about what will happen (procedural information), how they will feel (sensory information) and how to deal with them (training on strategies to mitigate pain and fear).

### Conclusions

Pain reduction is considered part of good clinical practice by the WHO. Everyone involved in vaccination programs must identify and support the interest of physicians, the willingness and ability to adopt the recommendations of the guidelines to achieve the best results. Additional resources (supplies, staff, etc.) may be needed to educate and support physicians, parents, and individuals in implementing recommendations to reduce vaccination pain.

Even with the correct implementation of all the recommendations proposed by the different guidelines, the reduction of vaccination pain to 0 is not to be expected. But its considerable reduction that can, on the other hand, always be achieved, and life a share of refusal of vaccinations, which unfortunately in the last few years in Italy has contributed to significantly lowering vaccination coverage especially for some vaccinations. But in the first place it reduces an unnecessary even if brief suffering that represents the first iatrogenic pain that the bambino has to face in life.

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**Volume 11 Issue 2 February 2022**

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