

“An innovative new technique of pediatric vaccination: Take both hands and hold the needle to avoid damage of nociceptors and capillaries”

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Abstract

Pediatric vaccination is an important field in the daily pediatric care practice of pediatricians in Germany. According to the STIKO recommendations, children were vaccinated up to 20 times till the age of 17. A new technique of vaccination will be presented vaccinate a child taking both hands, one makes the injections, the other one holds the needle in the skin due to relieve pain and not to damage nociceptors. The importance of this technique is to avoid movement of the needle inside the skin after injection to avoid damage of nociceptors in the skin.

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Editorial

At present, per recommendation of the Permanent Vaccination Commission (Impfempfehlungen der Ständigen Impfkommission, STIKO) [1] Germany, children are vaccinated approximately 20 times with different vaccines—annually flu shots not included—by the time they are 18 years old. Injections are the most unpopular devices/processes among children and are often the cause of anxiety and fear. Furthermore, these lead to negative doctor–child relationship. However, by employing a few simple strategies children can be easily vaccinated. In regular pediatric practice, because of time constraints, pediatricians tend to vaccinate as quickly as possible, neglecting the child’s needs. As a child has to be vaccinated many times over the years, the doctor needs the cooperation of the child, failing which each injection episode becomes a big drama. Several studies have been conducted to determine which psychological interventions are the most effective for reducing vaccination-associated pain. Our aim, however, is to remind pediatricians and general practitioners how best they could vaccinate children with minimum effort and significantly less pain. It is important that we

revise this topic more often as vaccinations are done frequently.

To get an impression about this new technique, 300 vaccinations aged 3 months to 16 years were performed in our pediatric department with this two-hand technique. The child was fixed by the parent and one medical assistant in a fixed position of the leg. Injection sites were the musculus vastus lateralis and musculus deltoideus. Both hands injection technique was described as follows: a) Injection with one hand; b) grasping the needle inside the skin with the other hand and fix it in calm position without pulling it inside the skin; c) aspiration and injection of the vaccination fluid with one hand by fixation of the needle inside the skin to avoid damage of nociceptors. Very important is to hold the needle inside the skin very calm and fixed, so that only few nociceptors and capillaries will be damaged and pain level is low. All injections were performed by the same pediatrician in the pediatric department. Children were fixed by one medical assistant and the support of the mother or the father. In 300 children, 4 local reactions (2%) at the injection site were found, which were treated with the application of a highly

concentrated marigold essence respectively with antiphlogistics like diclofenac. Minimal capillary puncture was found in 19 patients (9.5%) with blood drop at the injection site. No long-term complication was found and no hematoma was found in the next days after vaccination.

We found in literature many publications anything done to distract the child's attention helps significantly in reducing a child's self-reported pain. This can be done by either using the electronic media (videotaped cartoons, music, etc) or simply letting a nurse, who had participated in a 15-minute training program, distract the child with an age-appropriate toy, to draw the attention away from the pain [2-5]. Another option involves breathing exercises, where children are asked to inhale and exhale deeply, possibly with the help of a whistle or bubbles [2,6,7]. These kinds of breathing exercises not only meet the intended purpose of the intervention but are also very useful for distraction. Furthermore, data support using hypnosis [6] as a method and informing children on the upcoming procedure [8]. The use of suggestion as a method for reducing pain is ineffective, because as a precondition the patient needs to be relaxed, which is rather difficult for a child. Another method that involves parents is ineffective as they themselves are anxious, and they may not be able to fully divert the child's attention [2]. All these publications shed light on deflection the Child's mind in the moment of vaccination.

The new technique of child vaccination shows a simple way to avoid damage of capillaries and nociceptors in the skin to hold the needle fixed in skin tissue. The importance lies on fixation of the needle tip in the skin as calm as possible to avoid stimulating nociceptors, which send pain sensations to the dorsal horn of the spinal cord by neurotransmitter substance P in the synaptical gap. It is therefore very important to avoid stimulating and damaging more nociceptors in the skin to avoid an intensive neurotransmitter reaction in the dorsal horn.

In conclusion, distraction in vaccination pain management in children plays also a role but a good injection technique is of great importance. Pain arises from irritated nociceptors in the skin, sending pain sensations to the dorsal horn. Therefore pediatricians should bare in mind that improving the technique of vaccination reduces the pain and stress level of the child and the parents. A puncture of capillaries can induce hematoma and movement restriction of the leg or the arm. An uncontrolled puncture without fixation of the needle in the skin with the other hand induces a higher damage of pain nociceptors. Pediatricians should bare in mind this new "two-hand technique".

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