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The Efficacy of the Z-Track Method for Intramuscular Injections and Analysis of Z-Track Study by Uludağ University



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Abstract

Z-track method is used in all intramuscular injections with the exception of vaccinations. It is commonly taught that this is to reduce pain and to ensure all the medication is delivered into the muscular tissue. This project analyzes studies and medical articles to determine if this is the truth or if abstaining from using the Z-track method is indicated.

Introduction

When an injection is delivered into the muscular tissue it is called an intramuscular injection (IM injection). Common sites for giving these injections are the deltoid, vastus lateralis, and gluteus muscles. Different sites are used depending on the development of the recipient, the length, and the size of the needle.

Common practice for giving intramuscular injections is to use a method of injection known as Z-track. The method involves pulling the tissue beside the injection site to cause a displacement of the skin and fatty tissue over the muscular tissue which will be injected into the muscle. When this is done, the small hole created by the injection is displaced into three parts as the three layers of tissue are no longer aligned. This prevents the medication injected into the muscular tissue from leaking into the more superficial surfaces. This is because some IM medications can be irritating to the dermis. Additionally it ensures that all the medication is delivered into the tissue desired.

This project analyzes the method and results of a study by Uludağ University's Department of Nursing in Turkey regarding the effectiveness of the Z-track method of injection.

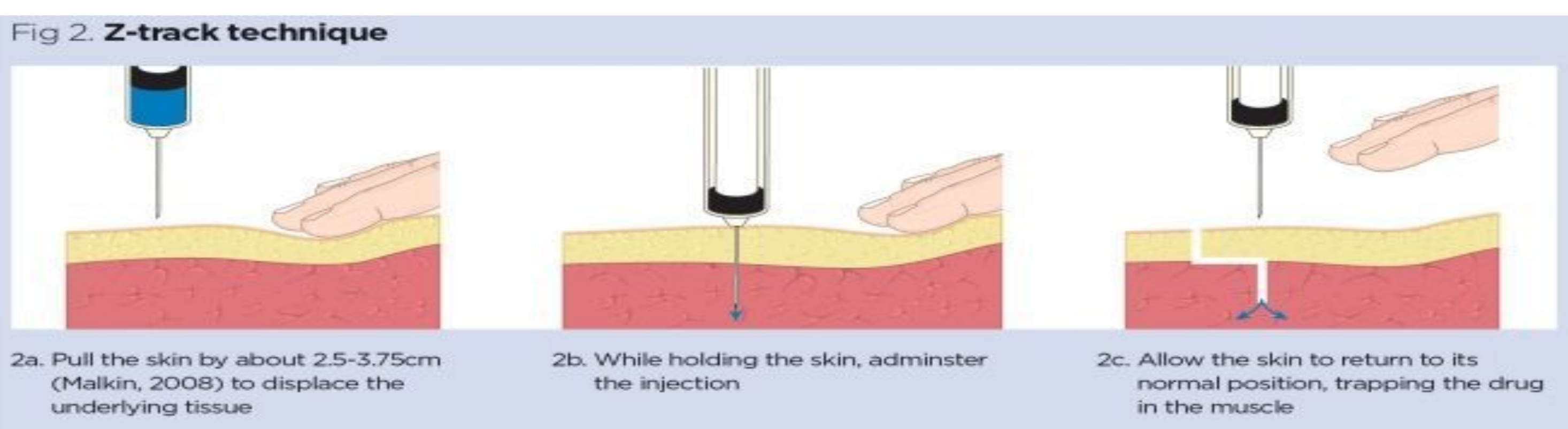


Figure 1. Z-track method diagram

Methods and Materials

This study was conducted in a government hospital in Marmara, Turkey. It consisted of 26 female and 34 male patients, whose ages ranged from 18-65 years old. These 60 participants were split into two separate groups: an experimental group and a control group. The Z-track method was used during the intramuscular injection for the experimental group and the standard method injection was used for the control group. All participants were injected with three milliliters of their prescribed diclofenac sodium. After the procedure was completed, another researcher used a standard 7 x 7 cm pre-prepared drying paper press and placed it on the injection site. A milli metric ruler was used to record the diameter of the leakage. A registered nurse, who did not know which technique would be used, assessed their patient for pain using the Visual Analog Scale during the procedure.

Results

Uludağ University found that In the group that received their injection with the Z-track method their average pain was reported to be 28.30 with an average leakage of 6.93 mm. The control group which did not receive Z-track injections had an average pain of 36.4 and average leakage of 10.03 mm.

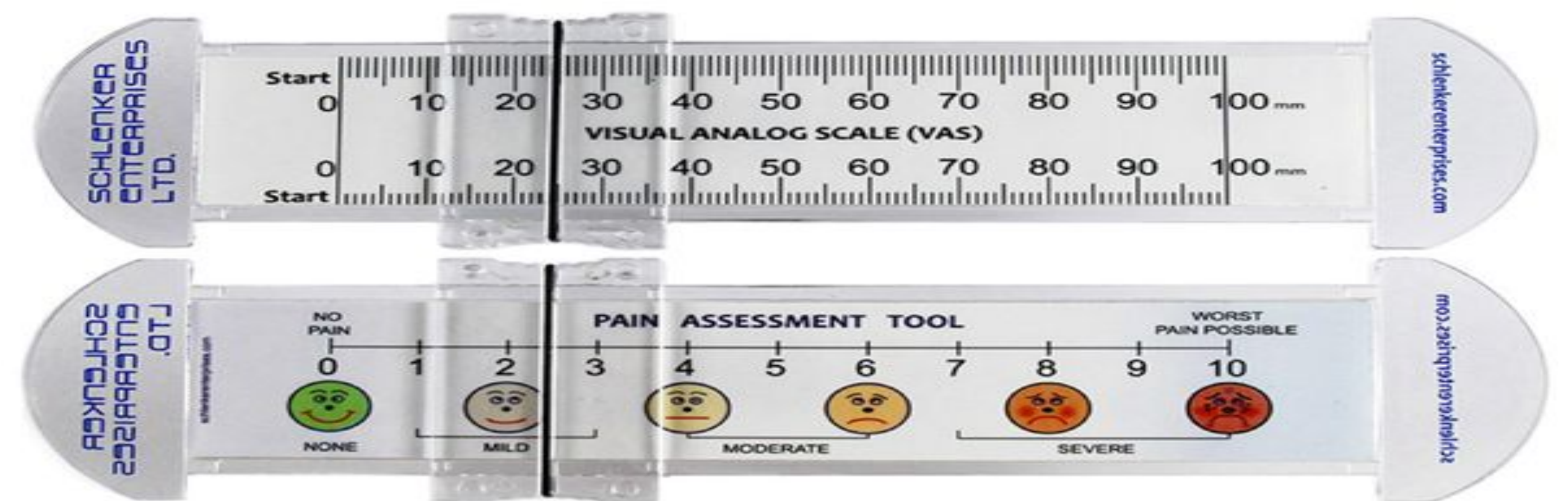


Figure 2. Visual Analog Pain Scale

Discussion

In an article by ONS College in 2017, the administration of IM injections was discussed. In general, Z-track method should be used for injections with a volume of 3 mL or greater, additionally it has been found that injections of 2.5 mL or more cause more pain than lower volume injections (Vanderploeg, 2017). In discussion we determined this to be the likely reason that Z-track is not used or recommended for vaccinations as they are typically very low volume injections. For example the Pfizer-BioNTech COVID-19 Vaccine is two injections of 0.3 mL. If both were to be given simultaneously the volume would still be far below the 2.5 or 3 mL mark.

It should be noted that IM injections are relatively uncommon in healthcare settings aside from vaccinations. This is due to the use of Intravenous tubes and the use of the subcutaneous injection (in which the medication is administered into the fatty tissue). It was found in one study of 288 nurses that 74.6% did not know the Z-track method (Aumeran, Badrikian, Guiguet-Auclair, Legrand, Reynaud, Viennet, 2019)

It appears that the Z-track method is an underutilized technique, likely due to the less than frequent administration of non-vaccine IM injections. This is unfortunate because all evidence in cited studies show that the use of the Z-track method can reduce pain and medication leakage.



Figure 3. Deltoid Injection

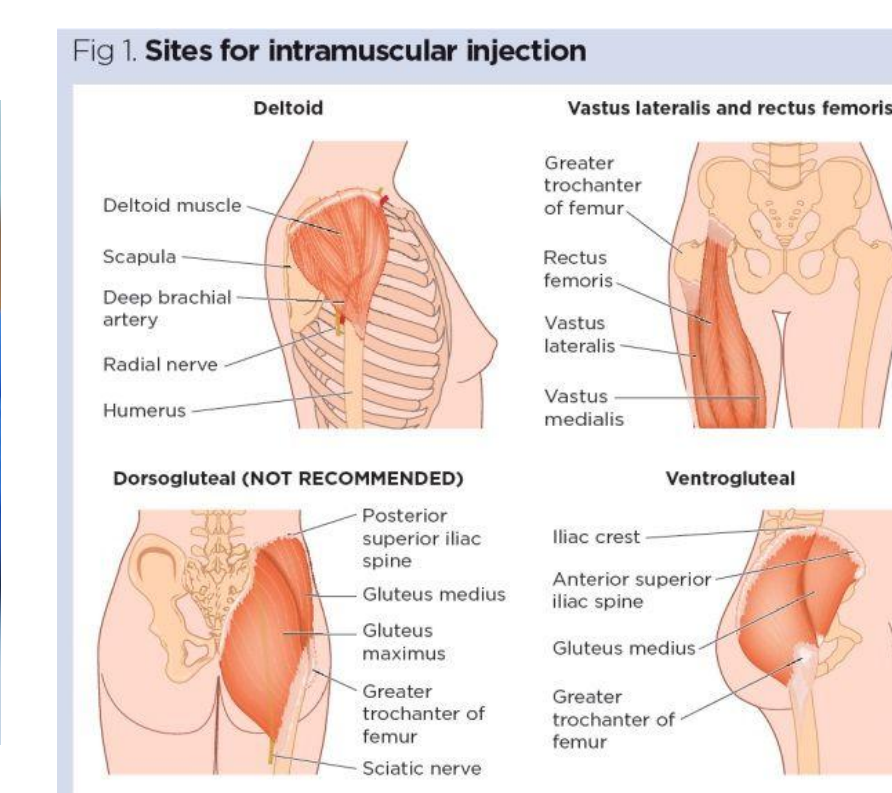


Figure 4. Sites for Intramuscular Injection

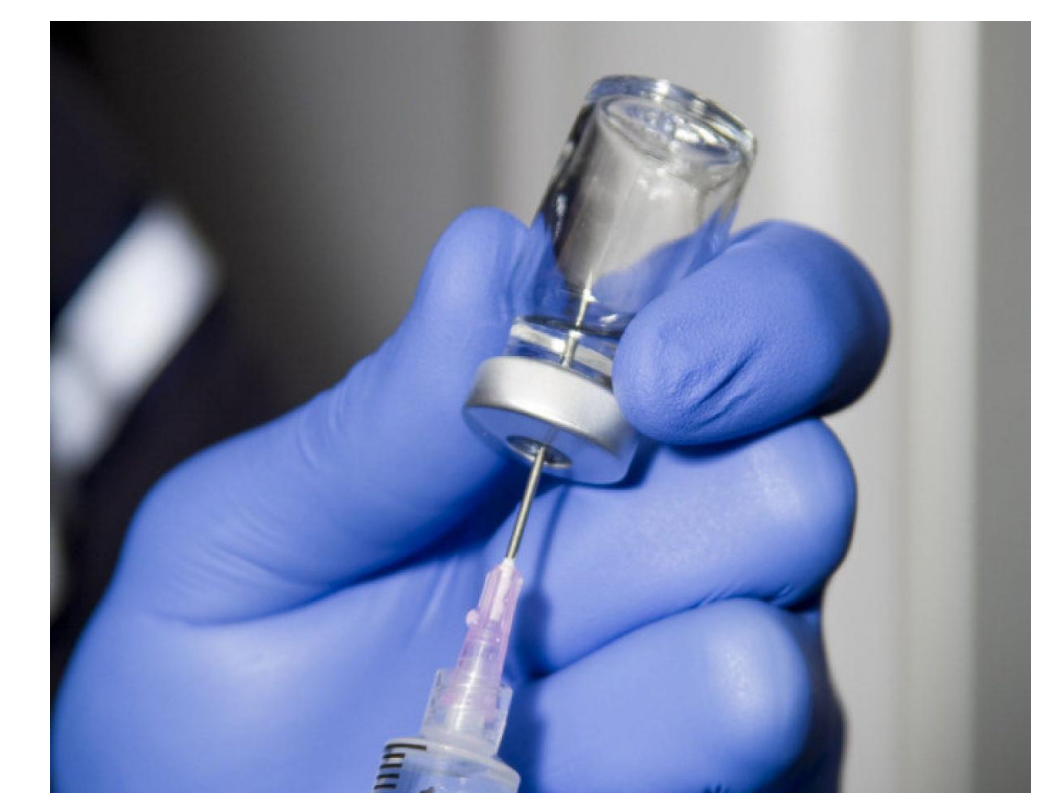


Figure 5. Syringe and Vial

Conclusions

Studies have shown that the Z-track method of intramuscular injections significantly reduces the amount of leakage post-injection. Z-track also reduces pain and irritation at the injection site.

The Z-track method should continue to be implemented in nursing practice. It is important to educate future nurses about this method as well as educating current nurses about it's effectiveness and importance in adequate patient care. By increasing nursing knowledge about the Z-track method of injection, we can increase the quality of care patients receive.

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