

## Analysis of the NovoTwist Pen Needle in Comparison with Conventional Screw-Thread Needles

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### Abstract

Administration of insulin via a pen device may be advantageous over a vial and syringe system. Hofman and colleagues introduce a new insulin pen needle, the NovoTwist, to simplify injections to a small group of children and adolescents. Their overall preferences and evaluation of the handling of the needle are reported in the study. This new needle has the potential to ease administration of insulin via a pen device that may increase both the use of a pen device and adherence to insulin therapy.

*J Diabetes Sci Technol* 2011;5(6):1488-1489

Outpatient insulin therapy administration consists of two forms: injections, either by a vial and syringe or pen device, or pump therapy. Although injections using a pen device are the mainstay of therapy in Europe and Asia, in the United States, most patients use a vial and syringe system.<sup>1,2</sup> However, there are advantages of insulin pens over vial and syringe. Pens can be easier to operate than vials and syringes, particularly for children and those with limited manual dexterity.<sup>3</sup> They also require a lower injection force, which is thought to decrease the pain associated with injections.<sup>4</sup> They are easier to transport than vials and thought to be more accurate than vial and syringe, especially at doses less than 5 U.<sup>5</sup> Certain pens also have additional features such as half-unit increments, audible clicks, and memory of the last dose administered. In the original article, "Needle with a Novel Attachment versus Conventional Screw-Thread Needles: A Preference and Ease-of-Use Test among Children and Adolescents with Diabetes," Hofman and colleagues<sup>6</sup> introduce a new needle tip to increase the preference of insulin injection via a pen device.

In this open-label, randomized, crossover usability study, 30 children (6–12 years) and adolescents (13–17 years) on insulin therapy using a pen device were asked to compare the NovoTwist needle, which attaches via a bayonet fitting, to the NovoFine<sup>®</sup> needle, which attaches via the conventional screw-thread mechanism. The NovoTwist needle is pressed down and turned a quarter of a turn, compared with the conventional screw-thread needle, which required several turns to attach and detach the needle correctly. The children were instructed on the use of the NovoTwist needle and then asked to attach the needle to the Next Generation FlexPen<sup>®</sup>, inject into a foam cushion, and detach the needle and repeat the procedure three times, using a new needle each time. Afterward, they completed a questionnaire about their preference and rating of the two insulin pen needles. The children found the NovoTwist needle to be easy to use and preferred it over the NovoFine pen needle. Parents of children who required assistance for their daily injections stated that they would be "very likely" to allow their child to attach the NovoTwist needle.

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**Keywords:** diabetes, insulin pen

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The NovoTwist needle was easier to attach, administer insulin, and detach. However, the authors do not provide any details about the security of the attachment or the amount of insulin leakage from the needle tip. The bayonet fitting needs to be as secure and accurate with the insulin dose. The NovoTwist needs to be securely attached since there are less turns to secure the needle to the pen, otherwise there is the danger of the needle popping off of the pen. In those requiring small doses, the amount of insulin leakage at the pen tip is not minimal and may potentially affect therapy. Therefore, more information is needed before one can conclude the NovoTwist needle as the “safest” needle. Injections were performed into a foam ball; therefore, whether or not there is a difference in pain from injection is unknown. Further, the children in this study were already using a pen device for insulin injections and preferred the NovoTwist. However, it would be interesting to see which pen needle is preferred by children who are switched to a pen device from a vial and syringe system.

Multiple daily injections is the standard of care in the treatment of type 1 diabetes, thus requiring more children to administer their own insulin injections during school or after school, as schools have less nursing staff and parents work. Younger children may have a fear of self-injection while older adolescents may not remember their doses, both leading to poor adherence. As stated by Hofman and colleagues,<sup>6</sup> one of the major concerns of parents is their child’s ability to manage his or her own diabetes treatment. Any technological advancement that can simplify the technique or ease the administration of insulin injections is one that should be further investigated in order to be accepted by providers, families, and patients. The NovoTwist needle has the potential to simplify the mechanism of needle attachment and perhaps motivate increased adherence to insulin therapy.

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