

Injection Force of Reusable Insulin Pens: Novopen 4, Lilly Luxura, Berlipen, and KlikSTAR

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Abstract

Background:

Insulin pen devices are used by approximately half of insulin users worldwide. The injection force of insulin pens is a key element in their design. This study aimed to demonstrate that the sanofi-aventis reusable KlikSTAR® (CS) pen has an improved injection force over existing insulin pens.

Methods:

The injection force of four reusable insulin pens—Novopen® 4 (NP4; Novo Nordisk), Luxura® (LL; Eli Lilly and Co.), Berlipen® (BP; Haselmeier GmbH), and CS (sanofi-aventis)—was tested in a laboratory setting. Injection force was tested using two methods: six dispense rates between 6 and 24.66 U/s (constant volume flow rate) and constant button speeds of 4 and 8 mm/s.

Results:

The CS required a lower mean injection force versus NP4, LL, and BP at both doses and all dispense rates. Mean injection force was 45%, 126%, and 60% higher for NP4, LL, and BP versus CS, respectively ($p < .05$ for each of the comparisons), for a flow rate of 6 U/s at 60 U dose. Mean injection force in all pens increased with the dispense rate, but the injection force remained significantly lower for CS versus all other pens ($p < .05$). The injection force for CS was significantly lower for 60 U at 10 and 17.03 U/s than for 80 U.

Conclusions:

The study demonstrated that CS pens require a lower injection force at a wide range of different injection speeds than other reusable insulin pens. This is an important benefit for patients with diabetes, especially those with limited dexterity.

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Abbreviations: (BP) Berlipen, (CS) KlikSTAR, (LL) Luxura, (NP4) Novopen 4

Keywords: Berlipen, KlikSTAR, injection force, insulin pens, Lilly Luxura, Novopen 4

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