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ORIGINAL ARTICLE

Comparison of Clinically Relevant Technical Attributes of Five Insulin Injection Pens

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Abstract

Background:

Insulin injection pens are the predominant devices for insulin delivery in Europe and Japan because of their ease of use and convenience. This study compared clinically relevant technical attributes of durable insulin pens that are important to people with diabetes, specifically functions relating to cartridge-fitting, dose-setting, and dose-delivery on NovoPen® 4, ClikStar®, HumaPen Luxura®, Itango®, and Biosulin® Pen.

Methods:

Frequency components and duration of audible clicks on dose setting and injection were measured using audio equipment when setting and delivering 20 IU of insulin. To assess cartridge-fitting torque, each pen was attached to a torque gauge via the attached needle, and torque was measured with each 180° turn as the cartridge was screwed into the body of the pen. Rotary torque of the dose-setting dial was measured when setting the dose to the maximum dose unit of the pen. Injection force was measured when delivering 20 IU at 5 mm/s in a vertical position and at a tilt of 14.7° from vertical.

Results:

Audible clicks on dose-setting and dose-delivery were most distinguishable on NovoPen 4, while NovoPen 4 and ClikStar had generally lower cartridge-fitting torque and injection (both vertical and angled) force values.

Conclusion:

Overall, the results showed that durable insulin pens such as NovoPen 4 have useful features related to assembly, dose-setting, and injection, which may facilitate ease of use for diabetes patients, particularly elderly patients and those with visual and/or manual dexterity impairments.

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Abbreviations: (SD) standard deviation, (t-AUC) total area under the curve

Keywords: audible clicks, cartridge-fitting torque, diabetes management, dose-setting dial torque, injection force, insulin pen

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