

Increasing Local Blood Flow by Warming the Application Site: Beneficial Effects on Postprandial Glycemic Excursions

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Abstract

The absorption profile of rapid-acting insulin analogs delivered subcutaneously is slow compared with physiological insulin. Shorter time to peak and shorter duration of insulin action are important steps toward reducing high postprandial blood glucose concentrations in diabetes therapy and are critical for the development of a closed-loop insulin delivery system. Many attempts have been made to develop more rapid-acting insulins. Since the 1950s, different approaches, such as jet injectors and sprinkler needles, which try to increase the absorption areas of injected insulin, have been developed; however, none of them are commonly used in diabetes therapy. Massage and heat increase tissue blood perfusion and, thereby, the absorption of subcutaneously applied insulin. The main focus of this article is a novel device that allows local application of heat to human skin. The device can be connected to a regular insulin pump. This device could demonstrate a significant effect on insulin absorption and postprandial glucose excursions in multiple clinical trials.

J Diabetes Sci Technol 2012;6(4):780-785

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Abbreviations: (AUC) area under the curve, (HbA1c) glycosylated hemoglobin

Keywords: continuous subcutaneous insulin infusion, insulin absorption, postprandial excursion, prandial insulin, skin heating, skin temperature

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