



# Improving insulin injection technique and patient satisfaction with *Insulclock*<sup>®</sup>

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## Background

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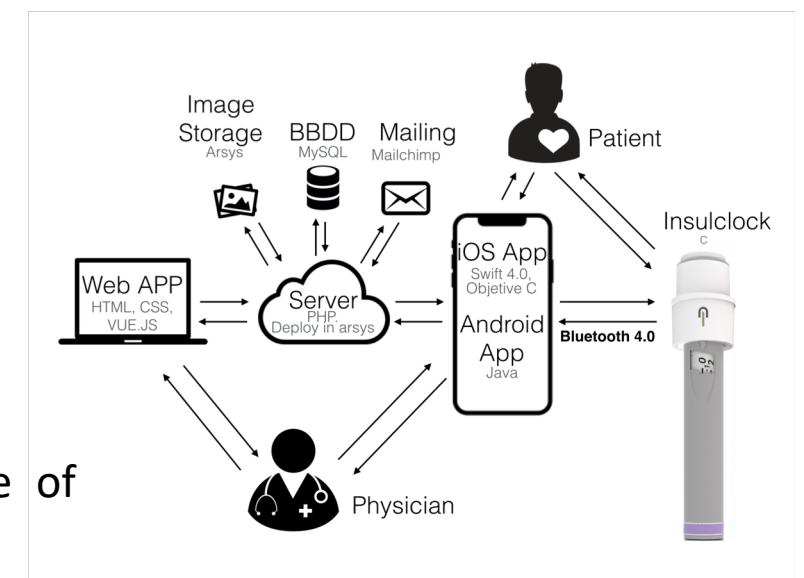
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Achieving and maintaining controlled glycemic levels is challenging in people with insulin-treated DM, being poor treatment adherence and suboptimal insulin injections the main obstacles to treatment success.

Insulin manufacturers recommend maintaining the needle under the skin at least 6 seconds after the user primes the dose button.<sup>1</sup>

*Insulclock*<sup>®</sup>, an electronic device to be plugged into the insulin pen, records the time of injection and makes an alert if the injection time is shorter than 6 seconds.



## Methods

The duration of the injections carried out by 8 participants was monitored to detect if they complied with manufacturer's recommendations. We measured the time of injection with *Insulclock*<sup>®</sup>, one week before and two weeks after setting this alarm function in 8 patients with type 1 DM (4 women, 21-48 years).

*Insulclock*<sup>®</sup> excludes those pulsations that are not preceded by a double pulsation, last less than 2 seconds or more than 15 seconds +1 second/unit injected. This mechanism is incorporated to avoid the detection of involuntary pulsations.

The Insulin Treatment Satisfaction Questionnaire (ITSQ) questionnaire was used to assess patient treatment-satisfaction.

## Results

- Performance tests revealed that *Insulclock*<sup>®</sup> time of injection was long after the alarm function was used (5,37% vs 2.61% of injections shorter than 7 seconds,  $p < 0.05$ ). (Figure 1)
- The ITSQ showed a general self-perceived benefit with the *Insulclock*<sup>®</sup> use (table 1).

## Commentary

Failure to comply with the recommended injection duration may result in suboptimal doses injected.<sup>1</sup> Two patient surveys previously showed that only around 23% of patients held the needle in the skin for >10 seconds.<sup>2,3</sup> In addition, the time the needle was kept under the skin was correlated with HbA<sub>1c</sub> levels.<sup>4</sup>

Figure 1. Duration of the injection before and after setting the *Insulclock*<sup>®</sup> alarm.

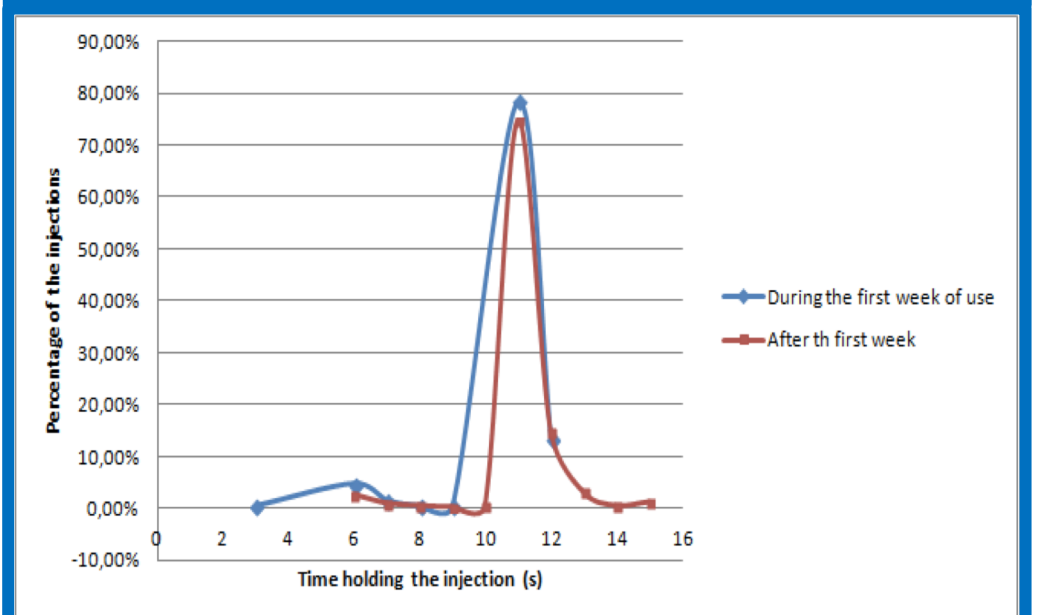


Table 1. Insulin Treatment Satisfaction Questionnaire (ITSQ)

Insulin Treatment Satisfaction Questionnaire (ITSQ)	CHANGE	
1 How much of a bother is it for you to take all your daily insulin doses as prescribed?	0,83	No bother at all (1) A tremendous bother (7)
2 How much does your current insulin treatment interfere with your ability to enjoy social or leisure activities?	-0,17	Does not interfere at all (1) Interferes tremendously (7)
3 How much does your current insulin treatment interfere with your work or school activities? (If you do not work or attend school, think about your regular daily activities)	-1,17	Does not interfere at all (1) Interferes tremendously (7)
4 How much do you have to plan the timing of your meals or snacks around the insulin you currently use?	0,50	No planning at all (1) A tremendous amount of planning (7)
5 How much do you have to plan what you eat with your current insulin treatment?	-0,83	No planning at all (1) A tremendous amount of planning (7)
6 How much do you have to plan your physical activities (such as exercise or strenuous household chores) around your current insulin treatment?	-0,33	No planning at all (1) A tremendous amount of planning (7)
7 How confident are you that you can avoid symptoms of low blood sugar (such as sweating, trembling, dizziness, blurred vision) with your current insulin treatment?	-1,00	Extremely confident (1) Not at all confident (7)
8 How confident are you that you can avoid severe episodes of low blood sugar that result in loss of consciousness (fainting or passing out) with the insulin you currently use?	-0,83	Extremely confident (1) Not at all confident (7)
9 In general, how bothered are you by symptoms of low blood sugar (such as sweating, trembling, dizziness, blurred vision) due to the insulin you currently use?	-0,17	Not at all bothered (1) Extremely bothered (7)
10 How much do you feel that the insulin you are currently using increases the chances that you will experience low blood sugar?	-0,83	Not at all (1) Extremely (7)
11 How worried are you about experiencing low blood sugars during the night with the insulin you currently use?	-0,83	Not at all worried (1) Extremely worried (7)
12 How confident are you that you can avoid symptoms of high blood sugar (such as dry mouth, thirst, frequent urination, fatigue, increased appetite) with your current insulin treatment?	0,33	Extremely confident (1) Not at all confident (7)
13 How satisfied are you with the stability of your blood sugar levels with your current insulin treatment?	0,00	Extremely satisfied (1) Not at all satisfied (7)
14 Overall, how pleased are you with the blood sugar control you achieve with your current insulin treatment?	0,17	Extremely pleased (1) Not at all pleased (7)
15 In general, how stressful is it for you to manage taking your current insulin treatment?	-0,50	Not at all stressful (1) Extremely stressful (7)
16 How burdensome is it for you to manage your current insulin treatment?	-0,33	Not at all burdensome (1) Extremely burdensome (7)
17 How easy is it for you to take the correct amount of insulin each time with your current method of taking insulin?	0,50	Extremely easy (1) Not at all easy (7)
18 How convenient is your current method of taking insulin when you are away from home?	-0,17	Extremely convenient (1) Not at all convenient (7)
19 How much pain or other physical discomfort do you experience with your current method of taking insulin?	0,67	No pain or discomfort (1) A tremendous amount of pain or discomfort (7)
20 How comfortable are you taking insulin in a public place (where people might see you with your current method of taking insulin)?	-0,33	Extremely comfortable (1) Not at all comfortable (7)
21 How much emotional distress or anxiety do you experience related to your method of taking insulin?	0,83	No distress or anxiety (1) A tremendous amount of distress or anxiety (7)
22 Overall, how satisfied are you with your current method of taking insulin?	1,33	Extremely satisfied (1) Not at all satisfied (7)

Total: -0,11

## Conclusions

*Insulclock*<sup>®</sup> insulin time duration function offers possibilities for insulin-treated diabetes self-management that would help healthcare providers and insulin users to avoid frequent errors in insulin administration.

1.- Tresiba SMPC. URL [http://www.ema.europa.eu/docs/en\\_GB/document\\_library/EPAR\\_-\\_Product\\_Information/human/002498/WC500138940.pdf](http://www.ema.europa.eu/docs/en_GB/document_library/EPAR_-_Product_Information/human/002498/WC500138940.pdf). 2.- De Coninck C, et al. J Diabetes 2010; 2: 168-79. 3.-Berard L et al. Can J Diabetes 2015; 39: 146-151. 4.- Ji J et al. Curr Med Res Opin 2014; 30: 1087-1093.

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