

Insulin Hypertrophy & Lipoatrophy

Injecting insulin repeatedly into your subcutaneous tissues can cause changes at these sites. Minor damage to blood vessels can cause bruising, which will heal and is not life-threatening. If you notice blood at the site of injection, apply pressure to the site to reduce the likelihood of bruising.

Of greater concern is insulin hypertrophy of adipose tissue and lipoatrophy. These two effects are also not life-threatening but can affect insulin absorption. Both of these effects may be avoided by rotating injection sites.

Insulin Hypertrophy

- Insulin hypertrophy (also known as lipohypertrophy) results in adipose tissue enlargement near the site of insulin injection. This can result in fatty, lumpy areas.
- The cause is not known but is thought to be a consequence of insulin increasing glucose absorption and fat production.
- The fatty deposits are harmless, but you may find them cosmetically unacceptable.
- If you inject insulin into a site that has hypertrophied, avoid injecting into fatty lumps. Insulin may not be absorbed effectively through them.
- Hypertrophy usually disappears or diminishes when the injection site is rotated.

Lipoatrophy

- Lipoatrophy causes the fat under your skin to disappear, leaving a slight, sometimes fibrous, depression. These effects can be thought of as the opposite of lipohypertrophy.
- The cause of lipoatrophy is unknown, but it is thought to be an immunological reaction to insulin that inadvertently damages the fatty tissue near the insulin. Another theory suggests that lipoatrophy is the result of damage from repeated injections at a site.
- To reduce the chance of an immunological reaction, you can switch to human insulin. Human insulin is less likely to produce an immune response than beef- or pork-derived insulin.
- As in lipohypertrophy, depressions from lipoatrophy are cosmetic and not life-threatening.
- To avoid lipoatrophy, rotation of injection sites and human insulin are recommended.
- To reverse lipoatrophy, human insulin is often injected near the border of the depression. The rationale is that insulin's fat deposition effect will help fill the depression with adipose tissue. This process can take months to complete.
- Never inject insulin into lipoatrophied depressions, because the absorption from these sites is unpredictable.

Bruising and Pain

Bruising and pain are a common complaint that users mention in messages on Internet newsgroups. Jonathan Mills, associate professor of computer science at Indiana University and the leading on-line proponent of jet injectors, says that he initially had some bruising. He attributes it mainly to using too light a setting.

Jeff Hitchcock, who runs the "Children with Diabetes" Web page found "absolutely no pain" when he tested it on himself. His test of three adults and two children showed that only one user—who happened to be his daughter Marissa—found it too painful.

General comments

1. Bruising:

In my experience, having started with the injector at the same time as I took insulin, and being careful to follow the instructions and to practice with saline first for a few days, and based on a statistically insignificant number of other users: it will take a few weeks to adapt to the insulin. Even humulin is not 100% pure human insulin. Once your body is used to the preservatives and carriers -- which are far more evenly distributed with a pressurized injection and so more likely to cause a local allergic reaction in the skin -- the bruising will stop. Stick with it.

(After two years: no more welts after those first few weeks. My suspicion is that it was a brief allergy to the preservatives, and that it had nothing to do with small variations in injection technique -- the injector seems to be forgiving of such tiny error)

2. Deep bruising:

Deep bruising is usually accompanied by a large drop of blood or bleeding at the injection site for several seconds. The injection may have been painful. A small dark purple bruise, perhaps 1 inch (2.5cm) in diameter, forms later at the injection site. If you've been pretty

consistent in your technique, you probably forgot to adjust the back-off clicks entirely. I've done it myself.

3. 'Wet' injections:

If the injection site is wet, and has a 'puddle' of insulin afterwards, the pressure setting was probably too light. Increase it. But, if you have been using your injector for several months, and are not rotating sites (a benefit of the injector) and didn't make a mistake on your settings or change your dosage amount...then check the inside of your vial adapter. Changes in atmospheric pressure or temperature can cause the insulin in the adapter to bubble out as you load the injector, and leave the injector head holding enough insulin to wet your skin. Since an injector has enough strength to shoot a stream of insulin through your clothing and into your leg if you activate it accidentally (experience speaks here), the odds are that the injector head was wet. But check your dosage, pressure settings, vial adaptor, etc. at your next injection to be sure nothing has changed.

4. Cleaning and Sterilization:

Isopropyl alcohol may or may not sterilize an injector. The manufacturers argue about this, and I could not get a definitive answer from the physicians I asked. For best results, do NOT share your injector, and DO follow the manufacturer's guidelines.

Having said that, I will also say that I now clean and sterilize the injector only 3-4 times per year, and it works fine. In part, this may be because I use mostly R insulin, which does not clog the orifice. Keep track of your injections if you choose to do this: a series of shallow or deep injections may be due to a clogged injector or crystallized insulin inside the injection chamber (and no, this is unlikely to be a problem during the first month or two of use).

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