FITTER Forward: Frequently Asked Questions

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Q *What recommendations do you have regarding the use of new drugs such as GLP-1 receptor agonists?*

A **Berard:** There is a section within the manuscript regarding GLP-1 and other non-Insulin agents. **Please refer to the section "Considerations for Injectable Treatments for Diabetes (Noninsulin)" in Klonoff et al. 2025 for recommendations regarding GLP-1 receptor agonists.*

Miller: These are not new, they have been in use for approximately a decade now. Many of my colleagues are not familiar with their use, but they are considered foundational as first line agents from the American Diabetes Association. As these are Biologics, I would recommend familiarity with them because they are foundational in the treatment of diabetes, and in some cases can provide remission through pharmacology.

Q *Have there been any changes to the size of the dose into one site before the doses may need to be split? This is particularly relevant to our highly insulin-resistant clients.*

A **Klonoff:** I recommend no more than 75 Units of insulin in a single site, and more than that warrants splitting the dose into two parts. Some studies have recommended a maximum dose of as much as 150-200 Units maximum per dose.

Miller: If you're getting to doses over 80 units per day you should go to a concentrated long acting insulin, but I would urge you to go to treating postprandial glucose problems because basal insulin is only used to cover fasting glucose. If you were getting into a scenario where you need to split the long acting dose, I think that you should shift your attention towards meal time coverage or GLP-1 receptor agonist.

Q *Evidence/FITTER Forward recommendations supports refresher training at 6 months, but how can you tell if additional training or retraining is warranted sooner?*

A **Berard:** After initialization of insulin therapy, it is pivotal at the next diabetes-related visit to review injection technique. This is a new journey for people, and they have so much information that needs to be taken in with initiation. An assessment should be done at the first follow-up visit to ensure there are no questions. Formal reevaluation at 6 months, as demonstrated by iSTERP, has shown that continued reinforcement at 6 months and beyond is pivotal for ongoing proper injection technique. It is a journey, not a destination.

Miller: Ask questions about how their injection experience is going. Are they rotating sites? Are they seeing any change in absorption or are they noticing any skin changes? A refresher may be necessary if there are any concerns regarding these questions.

Q *In the 2016 recommendations, there was talk about replacing the skinfold with a 45-degree angle injection when using 6mm needles. Does FITTER Forward contemplate or share any new recommendations?*

A **Berard:** *Based on the FITTER Forward recommendations, a 90 degree angle is recommended for most adults regardless of use of a skin lift. Please refer to the sections "Proper injection technique for pens" and "Proper injection technique for syringes" for more detail.

Q *What evidence is there that insulin should not be injected into areas with tattoos?*

A **Berard:** While strong evidence does not exist in the area of injecting into tattoos, theoretically there could possibly be a change in absorption. Keeping this in mind, best practice is to avoid the area. The other thought is with new tattoos there is a possibility of dye contamination with injections. However, personalization as always is important with selecting sites.

Q *How long does it take for lipodystrophy to resolve after injections into the area have been stopped?*

A **Klonoff:** With strict site rotation, mild cases (small nodules) may resolve within 2–6 months and severe cases (large/dense areas) can require 12–24 months for full resolution.

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Q *What are some examples from your practice or studies that have shown how injection technique education has changed outcomes for patients?*

A **Klonoff:** I recommend that you read Huang et al., 2023 and review the Supplemental Table 4 in Klonoff et al., 2025.

Q *Can you share key takeaways or tips for healthcare providers to consider when teaching injection techniques to their patients?*

A **Berard:** The importance of site rotation is pivotal and often missed. Patients need to allow time for insulin to be delivered by holding the device in as directed by the manufacture, typically 5 – 10 seconds. Patients should inspect the site before injection, and use a new needle with each injection. Most importantly, review injection sites and technique at each diabetes-related visit. Patients develop interesting habits, so ask for a review of how and where they inject to make sure they are on the right track.

Miller: I like to do the "see one and do one approach" where you demonstrate in the office visually. You can also use graphics, and then have the patient demonstrate an injection technique. You don't have to put anything in the body, but make sure to walk them through all the different steps, so they are confident. I think the biggest piece of advice is don't assume they know how to do it and are doing it effectively.

Q *Is there a "template" that can be used on the skin to avoid previous injections?*

A **Berard:** Many educators use hand and finger techniques to help patients develop a rotation pattern without actually marking the skin – the FITTER tools available on https://fitterdiabetes.com education tools have an excellent visual for helping patients think about site rotation.

Miller: I generally examine the skin, look for signs of Lipodystrophy and advise patients to avoid the area that I point out to them and to utilize the other regions that are displayed in the handouts regarding subcutaneous insulin injections.

Q *What are the best ways to assess patient understanding during training?*

A **Miller:** In our clinic, we assess: 1) confidence that the patient provides us 2) demonstrations in the office 3) their ability to do all the steps of the injection 4) the location they inject in, and 5) personal assessment of their own skin.

Q *What are some common errors you find from patients regarding injection technique?*

A **Berard:** Common errors include: lack of injection site rotation, not keeping the device under the skin long enough, reuse of needles, using sites that are unconventional (forearm, breast), and failing to remove inner needle cap.

Miller: It may come as a surprise that we often get patients who don't even remove needle caps prior to injecting. What may seem common sense to you may not be to a person injecting, so make sure to clearly outline all the different steps and inquire as to their ability to do all the various things that are necessary to effectively administer the medication effectively.

Q *How can people assess for lipohypertrophy – something that is a practice pearl?*

A **Berard:** Ask, look, and feel. A visual inspection of the area can often demonstrate lipohypertrophy. When a physical exam is being performed, it is best done in the supine position with exam gel or lotion on the fingers to ensure a good glide across the skin. When supine is not possible – the patient should be standing.

Klonoff: To detect lipohypertrophy a person using insulin should regularly (or each time they visit their physician) inspect and feel the areas where they inject insulin to look for: 1) lumps or bumps under the skin, which may range in size from about one inch wide to as large as a golf ball or orange, 2) areas where the skin feels thicker, firmer, or more rubbery than the surrounding tissue, 3) swollen spots that stick out from beneath the skin, 4) loss of sensation or areas that may feel numb or less sensitive, and 5) changes in skin appearance over the affected area. In some cases, ultrasound can be used for detection, but this method is not widely available.