



Meet George



49 year old ♂

Type 1 diabetes for 30 years

BMI = 23kg/m²

- HbA1c = 77mmol/mol, FBG ranges from 2-18 mmol/L, pre meal 2-26 mmol/L, bedtime 7-17mmol/L.
- Long acting insulin: 24 units before breakfast and 14 units before bed.
- Rapid acting insulin: 1 unit for each 10g of carbohydrate at breakfast and 1.5 units for each 10g with remaining meals and snacks.
- Correction factor: 1 unit of rapid acting insulin will lower his blood glucose by 2mmol/L.

Current Challenges

- Elevated HbA1c.
- Unexplained glycaemic variability.



Injection Technique Review:

- **Site rotation:** does not use a structured pattern.
- **Site selection:** prefers to inject in his thighs, as they are the easiest for him to access, but will randomly use his abdomen.
- **Site inspection:** lipohypertrophy present at his two favourite injection sites (thighs).
- **Technique:** currently injects 4mm pen needle at a 90° angle, no lifted skin fold. Changes his pen needle every 2-3 days.

Duration of diabetes, lack of attention to proper site rotation and needle reuse has led to the development of lipohypertrophy.¹ Insulin injected into an area of lipohypertrophy may not be absorbed properly and could affect blood glucose control.²

What does the research say?

Cureu 2011³

To reduce the risk of intramuscular injections, the most suitable injection sites for adults are the abdomen, thighs and buttocks.



Bartsch 2006⁴

The abdomen has the most consistent absorption and is preferred site for injection with consideration given to patient preference.



Patton 2011⁵

To reduce risk of lipohypertrophy, structured site rotation within the same anatomical region is recommended. Each injection should be at least 2-3cm from the last.



Recommendations for George



Avoid injecting into his two areas of lipohypertrophy (thighs).



Use a structured rotation plan, starting with his abdomen.



Increase blood glucose monitoring and consider reduction of insulin dose when using healthy injection sites by up to 20%.



Follow up HbA1c in 3 months showed improvement in his glycemic control. George continues to use a structured rotation plan and keeps track in his record book.



Don't reuse pen needles. Advise George on the single use of pen needles (he is using them 2-3 times) and to avoid leaving the needle on the pen between injections.

FIT UK Recommendation:⁶

Patients should be taught a personalised rotation for their injection sites to prevent lipohypertrophy and maintain consistent absorption.



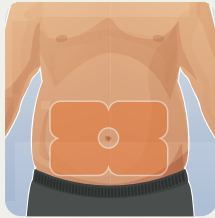
Did you know?



Where you inject insulin matters.

The preferred areas to inject are:

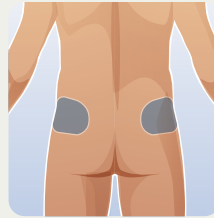
- abdomen
- thighs
- buttocks



abdomen



thigh



buttocks



back of arms

The back of the arm may also be used but you may need help in order to reach the correct area.

Did you know?

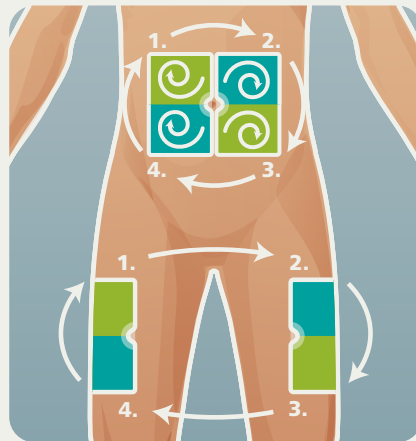


A structured rotation pattern can help prevent problems at injection sites. Structured rotation means rotation between injection sites and within an injection site.

For example,

1. Divide your abdomen injection area into 4 areas.
2. Divide each area into smaller sections. Use only one section each week.
3. Rotate within that section, in a circular pattern, with the next injection being 2-3cm from your last.
4. Rotate to the next section the following week, etc.

rotate the site you use



rotate within the site you use



Did you know?

Risk of lipohypertrophy, at your injection sites, is higher when you don't change injection sites often. Injecting into an area of lipohypertrophy may prevent your insulin from working the way it should. That's why it's important to rotate properly and check your site before you inject.

Steps for site inspection:

1. Stand up and feel the area where you normally inject.

2. Look and feel for puffiness, raised areas, redness, hardness or lumpiness.
3. Discuss any concerns with your health care professional.

It's all about keeping your injection sites healthy. Establish a routine and keep track!



My Site Rotation Plan

There are many examples of how to rotate your injection sites. Your health care professional can assess your sites to help you design a site rotation plan that will work best for you.

See next page for an example of an injection site rotation plan.

¹ Vardar B, Kizilic S. Incidence of lipohypertrophy in diabetic patients and a study of influencing factors. *Diabetes Res Clin Pract* 2007; 77:231-236. ² Johansson UB, et al. Impaired absorption of insulin aspart from lipohypertrophic injection sites. *Diabetes Care* 2005;28(8):2025-7. ³ Cureu B, et al. VDBD Guide: The injection in diabetes mellitus. (written in German), May 2011. ⁴ Bärtsch U, et al. Injectable therapy Pen Devices for treatment of diabetes (article in German). *Ther Umsch* 2006; 63: 398-404. ⁵ Patton SR, et al. Survey of Insulin Site Rotation in Youth With Type 1 Diabetes Mellitus. *J Pediatr Health Care* 2010; 24: 365-371. ⁶ Hicks D, et al. The First UK Injection Technique Recommendations 2nd Edition October 2011.



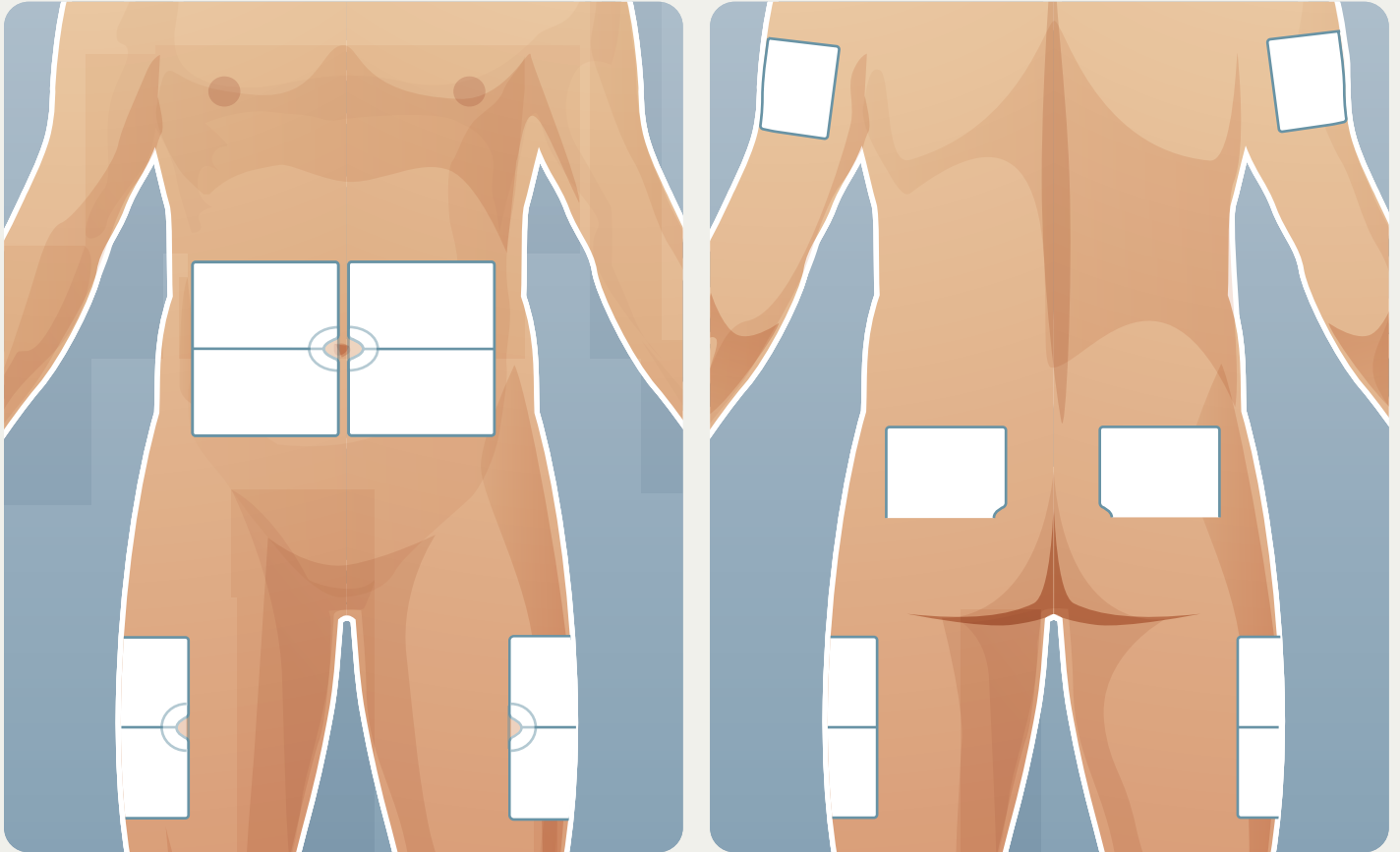
FIT Technique Plus*

Site Selection & Site Rotation

*Educational tools based on
FIT Canada Technique Plus
adapted for the UK



My Site Rotation Plan



Notes...
