

Injection Technique: The Neglected Area in Glycemic Management

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Presentation Outline

- Psychological Challenges of Injections
- Storage of Insulin
- Needle Length
- Insulin Injection Technique
- Injectable Therapies









Psychological Barriers to Insulin Use

Diabetes-specific fears:

- Fear of hypoglycemia
- Fear of needles or needle phobia
- Worries about complications



Fear of hypoglycaerina affects one in seven people with Type 1 diabetes.

Fear of hypoglycaemia affects one in seven people with Type 2 diabetes.

Diabetes and Emotional Health: a handbook for health professionals supporting adults with type 1 or type 2 diabetes. National Diabetes Services Scheme; 2019. FIT UK & FIT Ireland Forum for Injection Technique. The UK & IRE Injection and Infusion Technique Recommendations. 5th ed. 2020.



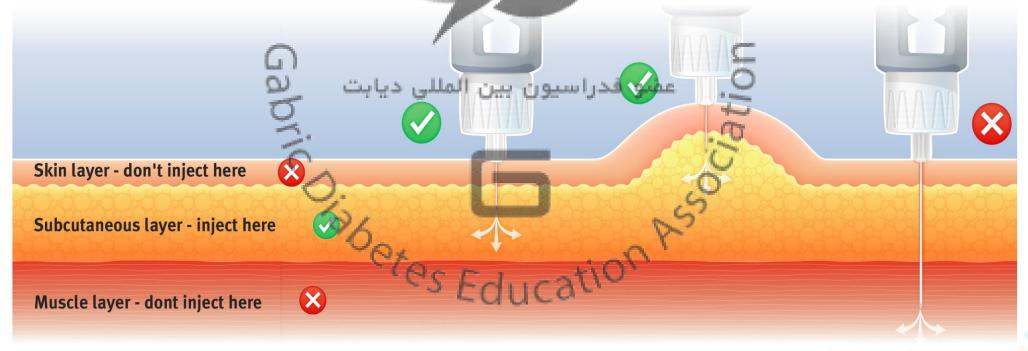
Storage of Insulin

- Unopened insulin vials and cartridges should be stored at refrigeration temperature (2 to 8 °C).
- once insulin is opened for use, it should not be used past the recommended time (usually 28 days but could be up to 56 days).
- Insulin should never be frozen or exposed to extreme heat (greater than 30 °C).
- Do not store insulin in direct sunlight.
- Insulin administered at room temperature may reduce irritation, burning or pain, and facilitates the re-suspension of cloudy insulin.



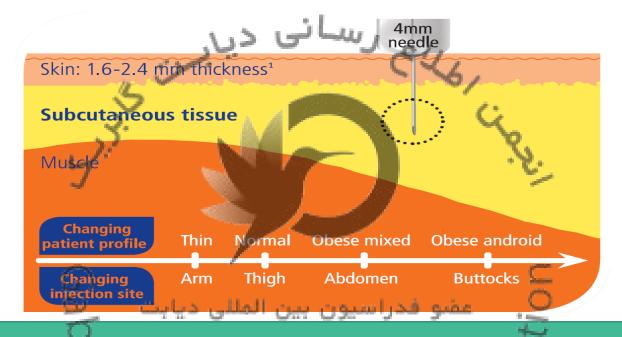
Needle Length

- Insulin is best absorbed in the subcutaneous layer.
- Insulin injected into the muscle will not be absorbed properly. It may be painful and could be the cause of low or high blood sugars.





Needle Length



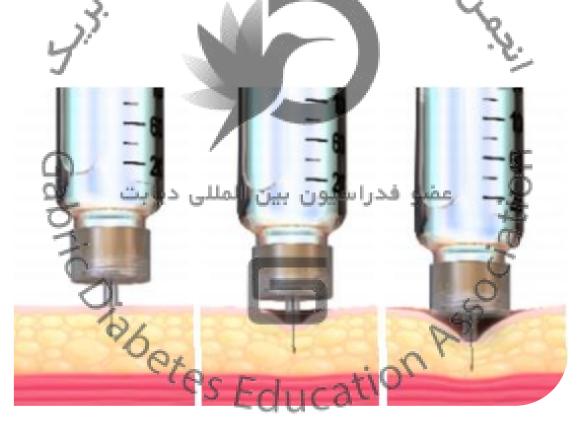
4 mm pen needle is considered the safest pen needle for adults and children regardless of age, sex, ethnicity, or BMI.

4-mm pen needles provide equivalent A1C control to 8-mm and 12-mm pen needles in people with obesity who are taking large doses of insulin.



Intramuscular Injection

• Excessive injection force can increase risk of IM injection.





Skin Pinch

• A skin lift may be warranted to prevent an IM injection in a slim limb or abdomen, even when a shorter needle is used.



FIT Forum for Injection Technique Canada. Recommendations for Best Practice in Injection Technique. 4th ed. 2020.
FIT UK & FIT Ireland Forum for Injection Technique. The UK & IRE Injection and Infusion Technique Recommendations. 5th ed. 2020.



Lifting Skin Fold

• The optimal sequence when injecting into a skinfold:

Gently lift a skinfold

Inject the insulin slowly

Count to ندراسیون بین اا 10 Withdraw the needle

Release the skinfold

FIT Forum for Injection Technique Canada. Recommendations for Best Practice in Injection Technique. 4th ed. 2020. FIT UK & FIT Ireland Forum for Injection Technique. The UK & IRE Injection and Infusion Technique Recommendations. 5th ed. 2020.



to the skin, not at an angle, regardless of whether a The 4-mm needle should be inserted perpendicular raised. skinfold is

4mm

5mm

6mm (pen or syringe)

8mm

8mm (pen or syringe) عضو فدراسيون بين المللى ديابت

Preferable to use shorter pen needles and syringes

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12.7mm

Not Recommended



• Injections should be administered in a clean site on the body, using clean hands.

• If necessary, people should clean their hands and the injection site with soap and water.

• Disinfection of the injection site is generally not required.





 Gather supplies, Including your pen, insulin and pen needles.

• Cleaning the medication cartridge or vial with an alcohol swab is required.







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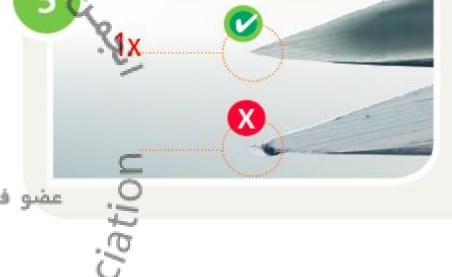
FIT UK & FIT Ireland Forum for Injection Technique. The UK & IRE Injection and Infusion Technique Recommendations. 5th ed. 2020.



- Attach the pen needle.
- Ensure that the pen needle(PN) is International Organization for Standardization (ISO) certified compatible with the insulin pen.
- Position the PN along the axis of the pen before screwing or snapping it on.
- Pierce straight through the septum of the cartridge.

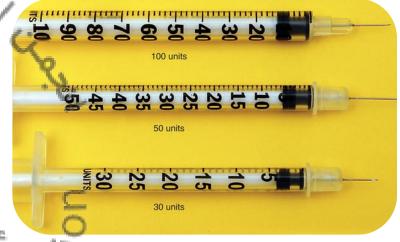


- Use pen needles and syringes only once.
- Syringe or pen needles should only be used once.
- Reusing insulin needles is not optimal injection practice and patients should be discouraged from doing so.



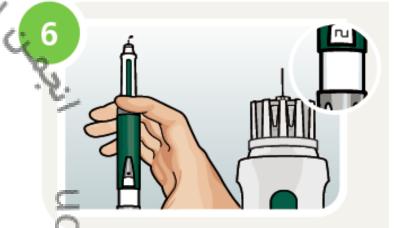


- Proper syringe selection is crucial.
- The decision regarding which syringe is appropriate should be based on the amount of insulin to be administered (volume: U-30, U-50, or U-100 syringes) and length of needle.
- Due to the need to pierce the insulin vial stopper, the shortest available needle length of an insulin syringe is currently 6-mm.





- Prime your pen.
- Prime pen upwards with 2 or 3 units as per pen instructions.
- Repeat if needed until drops come out.
- GLP-1 pens only need to be primed the 1st time you use them.





Pen Priming Importance in Correct Dose Delivery

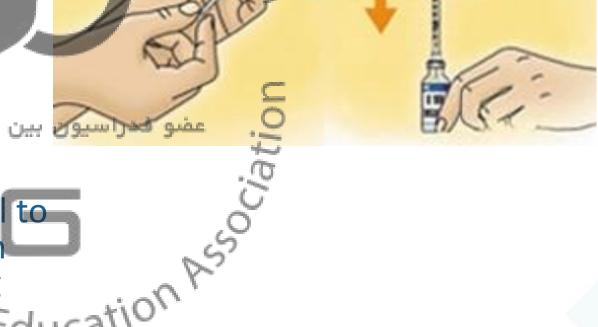
- Greater than 50 μ l of air: the accuracy in clinical use might suffer.
- Accumulate 200 µl of air in cartridge, the pen might deliver only 37 % of the dialed dose and a full 2/3 of the dose would be wasted. عفو تحراسيون بين الملاء
- Air buffers the flow rate of the insulin and slows it.
- The greater amount of the air, the slower the flow rate.





 When using syringe to draw up the insulin from vial, the air equivalent to the dose should be drawn up first and injected into the vial, to facilitate easier withdrawal.

• If air bubbles are seen in the syringe, hold it with the needle pointed upwards, tap the barrel to bring them to the top, and then remove the bubbles by pushing the plunger to expel the air.





- Choose injection site.
- The arm is not a preferred area for self-injection, due to:
 - Difficulty accessing the correct zone
 - Difficulty in handling the delivery device to achieve the necessary 90-degree angle
 - The lessened thickness of subcutaneous fat, which could create a greater potential for IM injection.

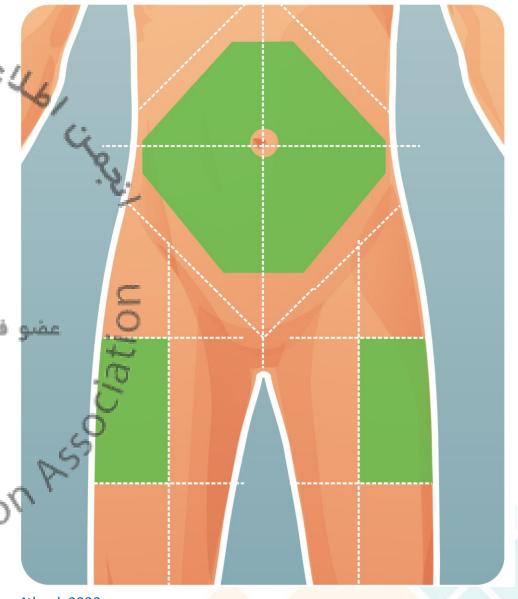




Correct Injection Site

- Abdomen boundaries
 - 1-cm above symphysis, 1-cm below lowest rib, 2- to 3-cm away from umbilicus and laterally at the flanks.
- Thighs:
 - upper third anterior lateral aspect of both thighs.

The abdomen is the preferred site for soluble human insulin since absorption of this insulin is fastest there.

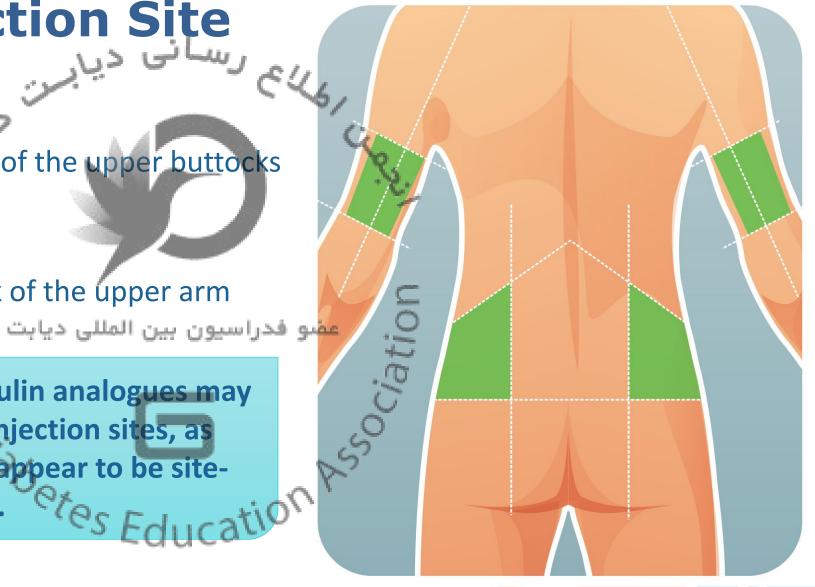




Correct Injection Site

- Buttocks:
 - Upper outer quadrant of the upper buttocks and flanks
- Arms:
 - Middle 3rd of the back of the upper arm

Rapid- and long-acting insulin analogues may be given at any of the injection sites, as absorption rates do not appear to be sitespecific.





Correct Injection Site in Pregnancy

• First trimester: Women should be reassured that no change in insulin site or technique is needed.

• Second trimester: Lateral parts of the abdomen can be used to inject insulin. Insulin can be injected over the entire abdomen as long as properly raised skinfolds are used

• Third Trimester: Injections can be given into the lateral abdomen as long as they are made into properly raised skinfolds.







- Rotate between injection areas
- Rotate within injection zones

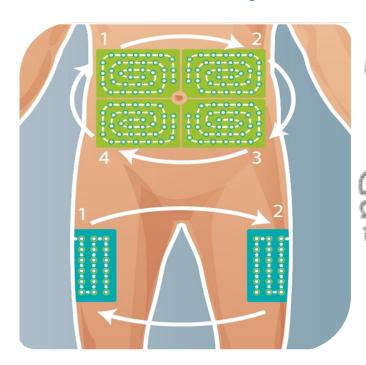
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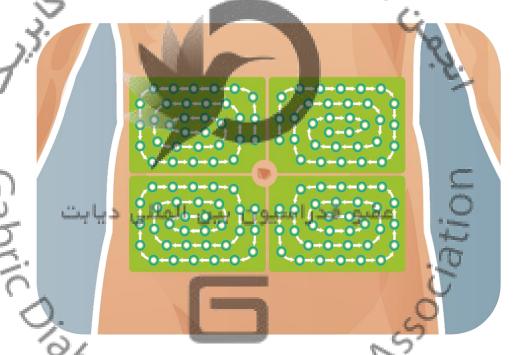


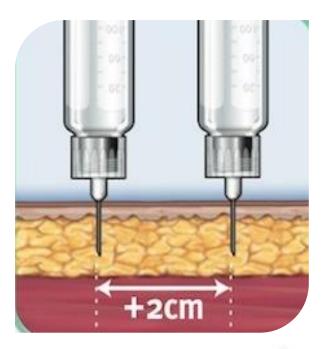
Structured Rotation Plan

Rotate the site you use

Rotate within the site you use







Use 1 zone per week and move clockwise

Injections within any quadrant should be spaced at least 1-2cm from each other





- Dial dose, Insert, push completely and count to 10.
- Always push the button vertically (along the axis of the pen)



- Needles should be safely disposed of immediately after use and should not remain attached to the pen.
- This prevents the entry of air or other contaminants into the cartridge or leakage of medication from the cartridge, both of which can affect subsequent dose accuracy.
- Pen devices and cartridges are for single-person use only and should never be shared, due to the risk of cross-contamination.



- A syringe should NEVER be used to remove insulin from a pen with concentrated insulin, as the scale on insulin syringes is made for U-100 insulin only.
- The use of current insulin syringes with concentrated insulin (U-200, U-300 or U-500) could result in an overdose.







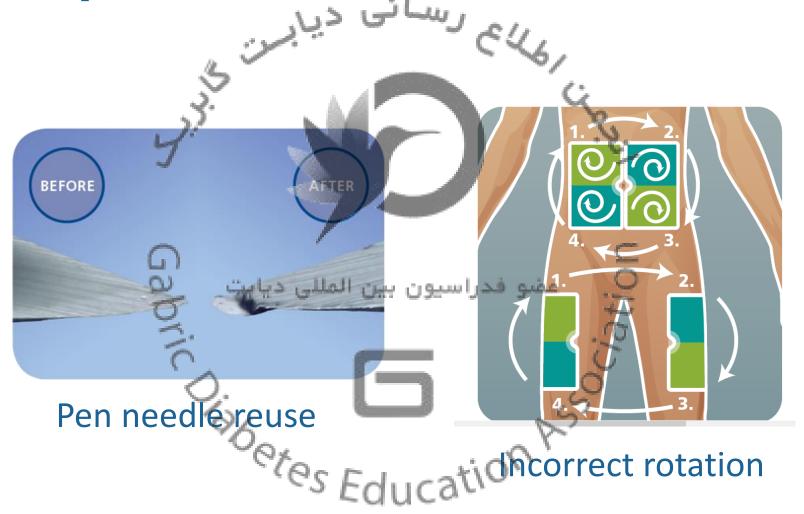
Insulin Injection challenges: Lipohypertrophy (LH)

- The most common cutaneous complication of insulin therapy
- Change in the SC tissue
- A raised or mound-like, convex pattern with no change in skin color or hair distribution
- A harder, and more rubbery or less bouncy tissue





Most important factors associated with LH





Lipohypertrophy: the Silent Enemy in Diabetes

- Higher HbA1C values
- Unexpected hypoglycemia
- Glycemic variability
- Frequent DKA
- Increased total daily dose of insulin
- Increased cost due to Excessive insulin and Hospitalization



LH Examination

- Frequency:
 - At least once a year on all persons injecting insulin.
- Patients with LH lesions:
 - More frequently
- Educate patient formonthly self-examination and to report any change to the HCP: منو فدراسيون
- Technique:
 - Visual Inspection
 - Palpation
- Documentation and monitoring





LH Management

1- Skip LH lesions

By avoiding injections into lipohypertrophic sites over a 3- to 6-month period, these lesions may decrease by up to 50% in diameter or in some instances resolve completely.



LH Management

2-Decrease insulin dose based on patient BG report

• In order to reduce the risk of hypoglycemia when changing from a lipohypertrophic injection site to a healthy site, patients should be cautioned to reduce their insulin dose initially and monitor their blood glucose levels more frequently.



LH Management

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3. Increased glucose monitoring

4. Site rotation education

5. Record LH lesion sites

6. LH lesion site examination





cm

Insulin Leakage

Skin leakage:

- A small amount of skin leakage (little pearl of liquid at injection site) can be ignored.
- Use needles with thin-wall or extra thin-wall technology
- Count to 10 after the plunger is fully depressed (More/less seconds in higher/lower dose)
- Frequent skin leakage: a direct observation of their self-injection is important to detect possible technique-related issues

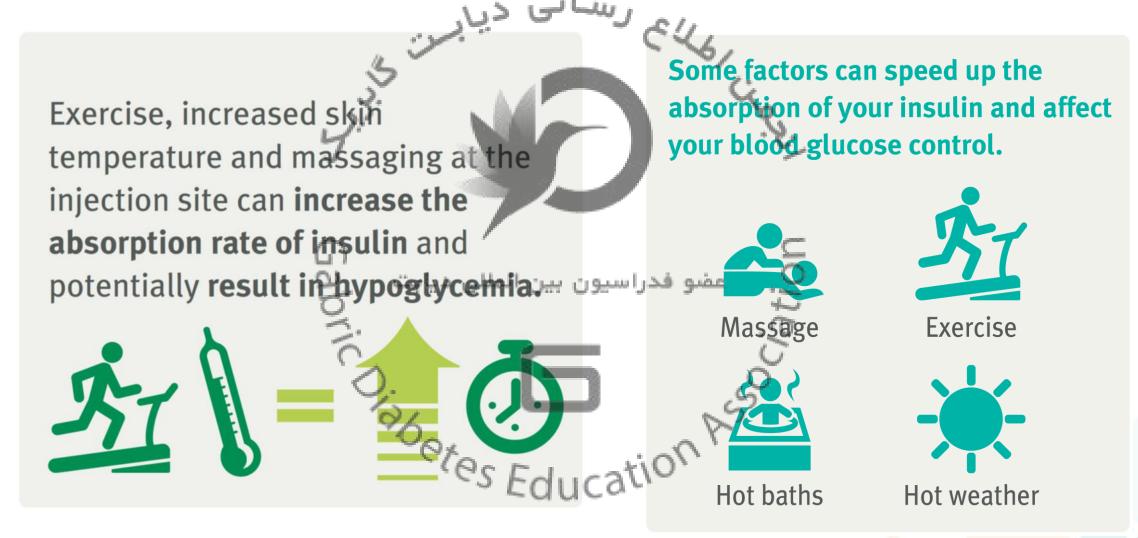


Factors That Affect Insulin Absorption





Factors That Affect Insulin Absorption





Takeaway Notes...

- Review patients injection techniques especially when patients are experiencing poor glycemic control
- Education is a must for all including patients and HCPs.





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