



### Meet Ann



52 year old ♀  
Type 2 diabetes  
for 12 years

- Injecting 30/70 biphasic mix insulin for the past 7 years.
- Injecting 50 units before breakfast and 30 units before evening meal.
- Using an 8mm pen needle.
- HbA1c has been drifting up over the last 18 months from 7.8% to her most recent value of 8.9%.

### Current Challenges

1. Unexplained glycaemic variability.
2. Occasional episodes of unexplained hypoglycaemia.



### Technique Review:



- **Site selection:** uses her abdomen and occasionally will use thighs but finds injections there “burn”.
- **Site rotation:** rotates by moving from left to right on her abdomen, similar location either side, examination indicates evidence of lipohypertrophy.
- **Technique:** injects at a 90° angle, no skin lift and does not resuspend her insulin before each injection.

**Ann has developed a few short-cuts that may be contributing to her erratic readings. She does not:**

- resuspend her insulin before injecting;
- rotate her sites properly; or
- perform a lifted skin fold with her 8mm pen needle.

### What does the research say?



#### Gibney 2010<sup>1</sup>

Inadvertent intramuscular (IM) injections may **increase pain** and/or **adversely affect blood glucose control**.



#### Chowdry 2003<sup>2</sup>

Injecting into areas of lipohypertrophy can result in a significant **delay** in insulin absorption and cause **fluctuating blood glucose results**.



#### Berard 2011<sup>3</sup>

Exercise, increased skin temperature and massaging at the injection site can **increase the absorption rate of insulin** and potentially **result in hypoglycemia**.



### Recommendations for Ann:



Resuspend cloudy insulin (roll 10 times, tip 10 times, visual check) before each injection to ensure that she is receiving the proper mixture of insulin.



Use a shorter pen needle (4mm) to reduce pain and potential risk of IM injections. Inject at a 90° angle without a lifted skin fold.



Use a structured rotation pattern including injections into abdomen and thighs. Avoid areas of lipohypertrophy.



Consider reducing insulin dosage to prevent hypoglycaemia when using healthy injection sites.



Monitor glucose levels at least twice daily and book a follow up in 2 weeks.



### Did you know?

**Insulin absorption is most consistent in the abdomen.<sup>4</sup> In order to avoid an intramuscular injection, the use of a 4mm pen needle across a wide range of BMI's (19 to 65 kg/m<sup>2</sup>) is effective without compromising glycaemic control.<sup>1</sup>**

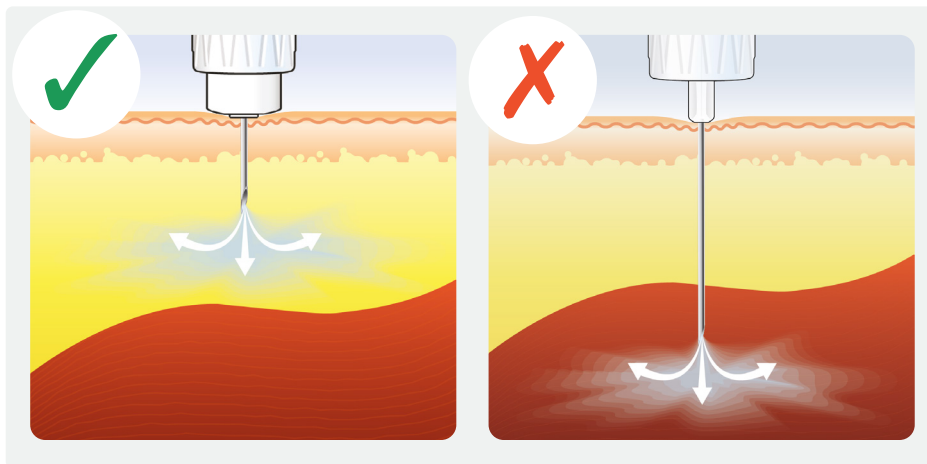




### Did you know?

#### Where you inject matters.

1. Insulin should be injected into the subcutaneous, or “fatty layer” of your skin where absorption is predictable and consistent.
2. An accidental injection into your muscle can actually speed up the action of your insulin and could result in an unexpected low.

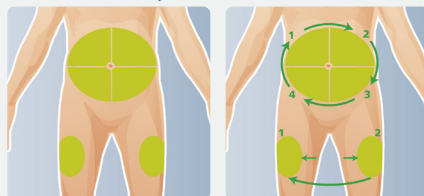


### Did you know?

#### How you inject matters

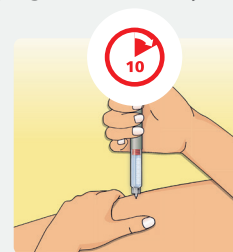
- 4, 5 and 6mm needles are suitable for all people with diabetes, however, the risk of an injection into the muscle increases as the needle gets longer. In obese patients, there is no difference in glycemic control, safety, leakage rates and patient ratings between 4-mm, 5-mm and 8-mm pen needle lengths.
- Avoid injecting into damaged skin, scars, stretch marks or moles as absorption may not be consistent at those sites.

- A structured site rotation plan can reduce your risk of developing lipohypertrophy at your injection sites. Rotate between the anatomical areas (ie. rotate between your abdomen, thighs and buttocks) and rotate well within your injection zone (ie. your next injection within a zone should be 1-2 cm from your last).



- Hold the needle in the skin for a count of 10\* after your injection is complete. Proper hold time will ensure that you receive your complete dose of insulin and reduce the risk of insulin dripping from the pen or leaking from your skin. Counting higher than 10 may be necessary for higher doses.

\* May vary for specific insulins; Refer to prescribing information.

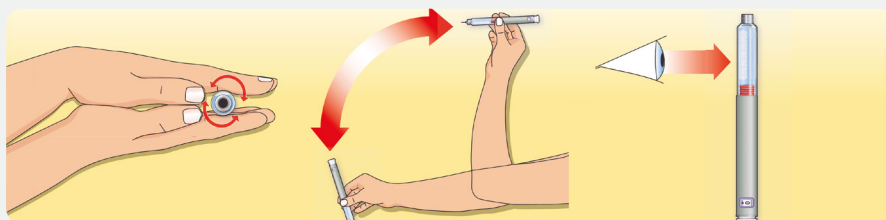


### Did you know?

#### How you prepare your insulin

**affects how it works** If you are using a cloudy insulin (NPH or mixed insulin), you need to ensure that it is properly mixed before each injection.

It's easy. Roll it between your hands 10 times, tip it 10 times and visually check to ensure that it has a consistent, milky appearance.



**Some factors can speed up the absorption of your insulin and affect your blood glucose control.**



Massage



Exercise



Hot tubs

1. Gibney MA, et al. Skin and subcutaneous adipose layer thickness in adults with diabetes at sites used for insulin injections: implications for needle length recommendations. *Curr Med Res Opin* 2010;26(6):1519-30.  
2. Chowdhury TA, Escudier V. Poor glycaemic control caused by insulin induced lipohypertrophy. *Brit Med J* 2003;327:383-4.  
3. Berard L, et al. Recommendations for Best Practice in Injection Technique. 2011.  
4. Braaketer EW, et al. Injection site effects on the pharmacokinetics and glucodynamics of insulin lispro and regular insulin. *Diabetes Care*. 1996;19:1437-1440

