t·r·e·n·d™ DIABETES

For Healthcare Professionals:

CORRECT INJECTION TECHNIQUE IN DIABETES CARE BEST PRACTICE GUIDELINE

2nd Edition, March 2021

CONTENTS

INTRODUCTION

In 2009 work to promote the benefits of optimal injection technique began. Since then many thousands of clinicians across the United Kingdom have fully implemented the Injection Technique Matters (ITM) Guidelines.

In the last decade huge progress has been made. Improvements in health outcomes and overall wellbeing for people who use insulin following ITM Guideline intervention are clinically proven.

This newly refreshed and updated guideline seeks to build upon this success and support all clinicians with the most up to date evidence based clinical practice, information and guidance.

Thousands of clinicians across the United Kingdom deliver injection technique care using the ITM guidelines. They experience first hand the benefits for their practice and the joy of seeing people with diabetes who use injectable therapies achieve their health potential.

Our goal is to make the Guideline simple to implement and ultimately support the development of clinicians to become experts in insulin and GLP-1 Receptor Agonist (GLP-1 RA) delivery and enable people who inject to become experts in their own, leading to best possible health outcomes and supporting improved health and wellbeing.

Join thousands of clinicians across the UK and other countries such as Germany, France, Southern Ireland, New Zealand and Australia, who are implementing the ITM Guidelines.

ABOUT THIS GUIDANCE

Authors

Debbie Hicks: Nurse Consultant-Diabetes, Medicus Health Partners, Enfield, Co-Chair Trend Diabetes
June James: Nurse Consultant-Diabetes, University Hospitals of Leicester NHS Trust, and Associate Professor University of Leicester, Co-Chair Trend Diabetes
Mike Smith: Independent Consultant

About Trend Diabetes

TREND-UK was a working group of diabetes nurses with different skills and backgrounds, set up in 2009 in response to a request for a collective voice that represented all diabetes nursing groups. The original founding co-chairs of TREND-UK are experienced Nurse Consultants, working in a variety of settings and who were closely involved with other organisations representing nurses and other healthcare professionals working in diabetes.

This original group has now evolved into Trend Diabetes to reflect their work with other countries as well as the UK. Trend Diabetes produces a number of resources for healthcare professionals and people living with diabetes. These are available at www.trenddiabetes.online. Access to these resources is free of charge to anyone registering as a member of Trend Diabetes.

OUR SUPPORTERS

GlucoRx

GlucoRx Ltd. is very pleased to sponsor and unconditionally support this second edition of the "'Injection Technique Matters - Best Practice in Diabetes Care". Achieving the best injection technique possible enhances the lives of the many people living with diabetes having to medicate with injectables, helping them to obtain the best possible (and individualised) outcomes and to minimise the risks involved. It is vitally important for them to be taught correctly from the outset and to have access to the most relevant information. The contents of this document will allow healthcare professionals to access the latest research and to promote the importance of adhering to the latest recommendations on injection technique. Promoting best practice plays a core role in GlucoRx's day to day activities and helping to disseminate this practical guideline could not be more in line with our company's ethos.

Novo Nordisk

At Novo Nordisk, we are driving change to defeat diabetes and other serious chronic conditions. Novo Nordisk is a global healthcare company with more than 90 years of innovation and leadership in diabetes care. This heritage has given us experience and capabilities that also enable us to help people defeat other serious chronic conditions: diabetes, haemophilia, growth disorders and obesity. Headquartered in Denmark, Novo Nordisk employs approximately 42,000 people in 77 countries and markets its products in more than 165 countries. Every day, millions of people all over the world rely on our products, which are manufactured in seven countries. As the acknowledged leader in diabetes care, we work to prevent, treat and ultimately cure this increasingly onerous disease. Over the past 90 years, our researchers have pioneered many breakthroughs in its management, and today, our determination to help these people is stronger than ever. For more information, visit novonordisk.co.uk

Owen Mumford

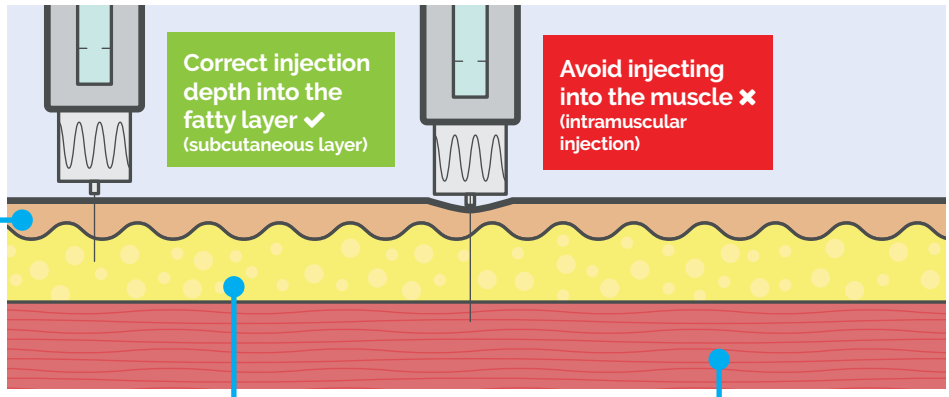
Owen Mumford believes that every person with diabetes should have access to continual education on injection technique, with regular reviews of methods to safely support themselves so that injecting is always safe, accurate and comfortable. Access to this kind of information can really improve quality of life, and as such, we recognise the important role that ITM has in facilitating optimum injection techniques, promoting good routines and generally enhancing the care of people with diabetes. We are proud to support the Trend Diabetes ITM initiative by bringing almost 70 years of experience in delivering innovative medical device solutions for people using injectable therapies, and helping medical professionals improve the delivery and management of treatments for diabetes as well as many other conditions. By working together we aim to achieve the best possible positive health outcomes for everyone managing diabetes so that the full benefits of the treatment can be achieved whilst avoiding long-term complications.

INJECTION DEPTH

Insulin must be injected into fat layer under the skin.

- **Always** use 4mm needle or a lifted skinfold when required to ensure deposition in fat layer
- **Never** reuse needles

Rationale: People who reuse needles have a high risk of developing lipohypertrophy.



Skin:
- Skin over injections sites is on average 3mm thick

Fat:
- The fat layer thickness is highly variable
- Fat thickness depends upon age, gender, race and can even vary across individual injection site
- **Rationale:** Fat layer has a stable and steady blood flow making it ideal for insulin & GLP1 absorption

Muscle:
- The muscle layer is highly vascular with a blood flow many times greater than fat
- Blood flow in muscle is highly variable dependent upon activity levels
- **Rationale:** Insulin injected into muscle can lead to hypoglycaemia and suboptimal blood glucose levels

What do clinicians say?

> "I have used the document relentlessly within clinical practice. It is an embedded document within our training package and a copy is sent to all staff that attend the training as this dispels any myths and gives us confidence that the insulin is being given correctly."

Nicola Suddick, Lead DSN,
South Warwickshire Foundation Trust

INJECTION SITES

Always inject into correct site.

Correct injection sites are:
- Upper arms
- Abdomen
- Upper buttocks
- Thighs

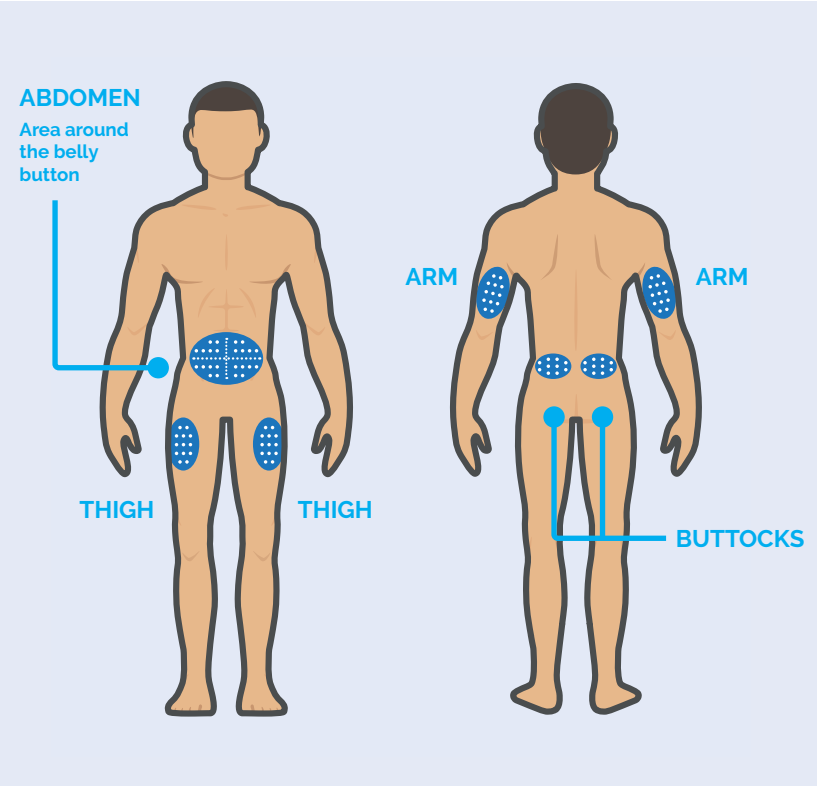
Analogue insulin and GLP1:

All sites suitable

Human insulin:

The rate of absorption of some insulins varies according to the site of delivery.

- The abdomen is the preferred site for the injection of soluble insulin (as it is absorbed faster in this area).
- The thighs and buttocks are the preferred sites for Neutral Protamine Hagedorn (NPH) insulin where absorption is slowest.
- When pre-mixed insulin is being injected, it is suggested that the abdomen is used in the morning, and the thigh or buttock in the evening.

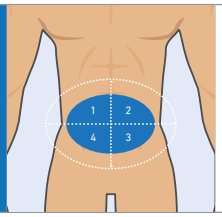


INJECTION ROTATION

Always follow correct injection rotation

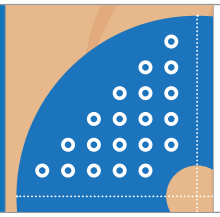
Correct injection site rotation principles:

1



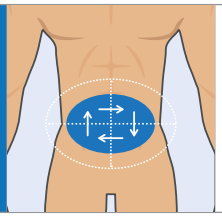
- Inject into one area no more frequently than every 4 weeks

2



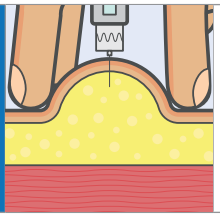
- Each new injection should be given at least 1cm or one finger's width away from the last

3



- Use an injection area for approximately one week then move to the next

4



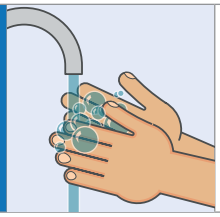
- Never inject into areas affected by lipos
- Use a lifted skin fold in children and slim adults to avoid an intramuscular injection

Rationale: 98% of patients with lipohypertrophy did not rotate injection sites or rotated incorrectly in a study by Smith M. Clapham L. and Strauss K, (2017) https://daneshyari.com/en/article/5587110

10 STEPS TO INJECTION SUCCESS

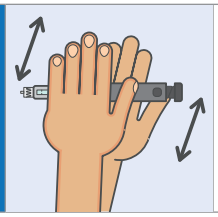
The correct 10 step injection process to teach your patients is illustrated below:

1



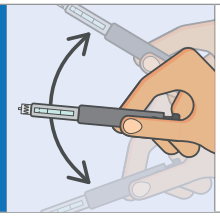
- Wash and dry hands

2



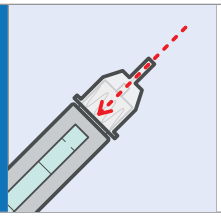
- Remove pen cap
- Cloudy insulin - roll pen 10 times

3



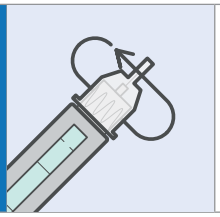
- Then invert pen 10 times

4



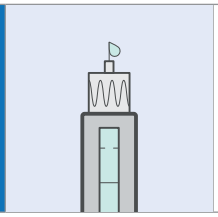
- Select new needle and remove paper tab

5



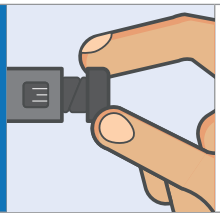
- Apply new needle to pen device & remove outer cover

6



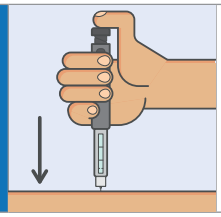
- Check needle patency by expelling 2 units of insulin

7



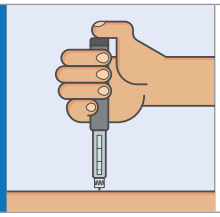
- Dial required dose

8



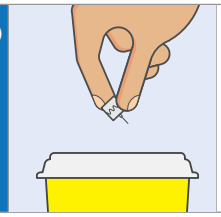
- Insert needle through skin at 90°
- Inject dose fully

9



- Count to ten before withdrawing needle from skin

10



- Remove needle and dispose safely

PSYCHOLOGICAL AND EDUCATIONAL ISSUES

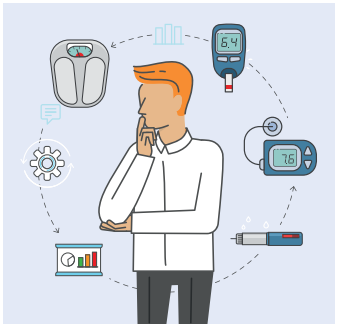
- At commencement of injection therapy and at regular intervals (e.g. at annual review) Health care professionals (HCP) should discuss the individuals' psychological and emotional concerns and encourage them to express their feelings and fears.

  Rationale: this may help overcome any hurdles to optimal injection technique.

- Aim for a positive and therapeutic environment at commencement of injections.

  Rationale: Threats and intimidation that therapy is a punishment, or a sign of failure to manage type 2 diabetes are counter productive and could lead to long term issues with treatment.

- People who inject should be supported to self-manage the administration of their medication and be involved in the choice of regimen appropriate to their individual needs.
- Tailor-made educational programmes should be developed according to the needs of the individual including physical functioning, cognitive functioning, culture and emotional wellbeing.
- When demonstrating correct injection techniques, distraction therapies, stories, and imagery or devices may be helpful for those who are nervous of the procedure.
- If a child, young person or adult is nervous of giving themselves an injection of insulin then there are devices which could be discussed which may help (see page 10).



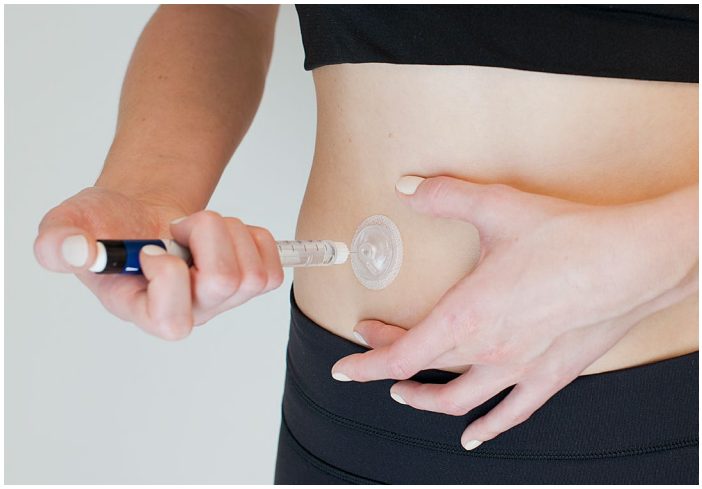
What do clinicians say?

> "This document is a fantastic resource for HCPs and has a real impact to the lives of people with diabetes. The practical information provided is clear, easy to follow and is applicable to all care environments. The online access to the resources is really useful."

Erica Richardson, Lead DSN,
Telford and Shropshire Hospitals Trust

TickleFLEX Injection Aid is an accessory for the end of an insulin pen that proposes to make self-injecting a safer, more comfortable, more consistent and worry free process. See www.tickleflex.com for more information.

iPort Advance injection port is a small injection port that lets you take your injectable medications without having to puncture your skin for each injection. It's easy to wear and easy to use. The port can be worn for up to three days during all normal activities, including sleeping, bathing and exercise. See www.medtronicdiabetes.com for more information.



InsulCheck Connect is an example of a connected device that supports people with diabetes to achieve best practice, better adherence, avoid double dosing events and be more independent. See www.glucorx.co.uk for more information.

What do clinicians say?

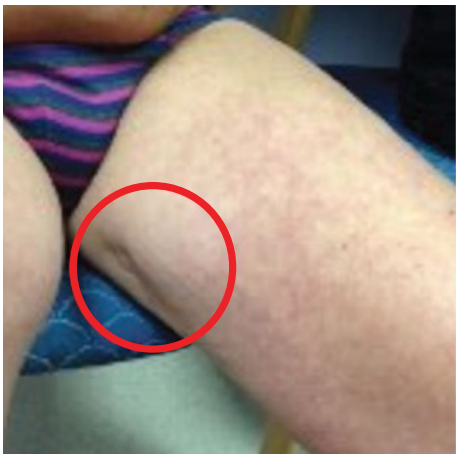
> "This document provides a useful aide memoire and guidance for healthcare professionals supporting injectables management in people with diabetes"

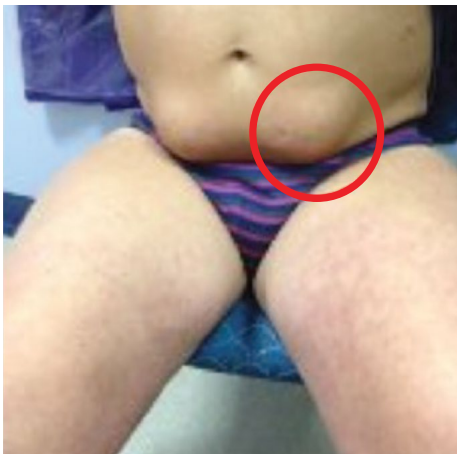
Debbie Voight, DSN,
NHS Tayside

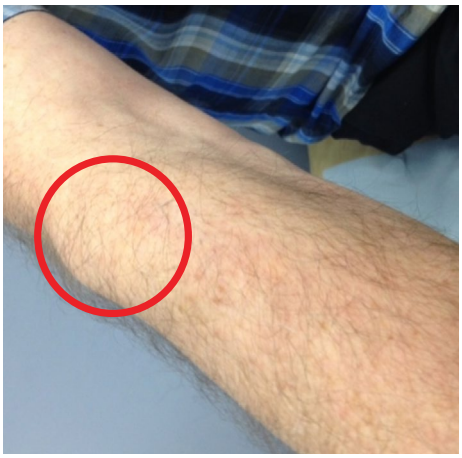
INJECTION TECHNIQUE TROUBLE SHOOTING: LIPOHYPERTROPHY

Correct injection technique self-care and clinician education & support is critical in order to prevent the development of lipohypertrophy. Lipohypertrophy is very common, found in at least 2/3 of patients who use insulin. Lipohypertrophy (lipo) is a thickened, rubbery lesion of fat tissue that develops in the subcutaneous layer where insulin is injected. Lipo lesions vary in size and shape and can sometimes be difficult to observe and palpate.

See examples below (permission for use given by Linda Clapham, DSN)







The primary causative factors of lipohypertrophy are:

- Incorrect injection site rotation technique or not rotating
- Duration of insulin use
- Frequency of injections
- Needle reuse

Injecting into lipohypertrophic tissue can cause severe glycaemic variation. Research has shown that glycaemic variation can cause:

- Hypoglycaemia (weight gain, increased fear of further hypos)
- Hyperglycaemia (weight loss)
- General malaise
- Poor HbA1c
- Long term complications

As you will see in the case study, later in this document correct injection technique is crucial to achieve the expected absorption and action of the injected medication. Lipohypertrophy is a consequence of incorrect injection technique and has been linked to multiple problems. In a study group of people who injected insulin:

- 39.1% of people experienced unexplained hypoglycaemia
- 49.1% of people experienced glycaemic variation
- An excess insulin usage of an average 15 units per patient per day (450 units per month = £90 per person per year was observed) Smith M. Clapham L. and Strauss K, (2017) https://daneshyari.com/en/article/5587110

Healthcare professionals (HCPs) should teach correct injection technique when initiating insulin and GLP-1 RAs but also at subsequent reviews so ensuring that all people who inject insulin should:

- Be taught to check for signs of developing lipohypertrophy and report any abnormalities to their HCP. (see Section 2. How to examine for lipos - page 12)
- Be taught to rest areas of lipohypertrophy **BUT** discuss with HCP before switching to a different site (dose adjustment may be required to minimise risk of hypoglycaemia)

Using the correct injection technique has major benefits for the person with diabetes:

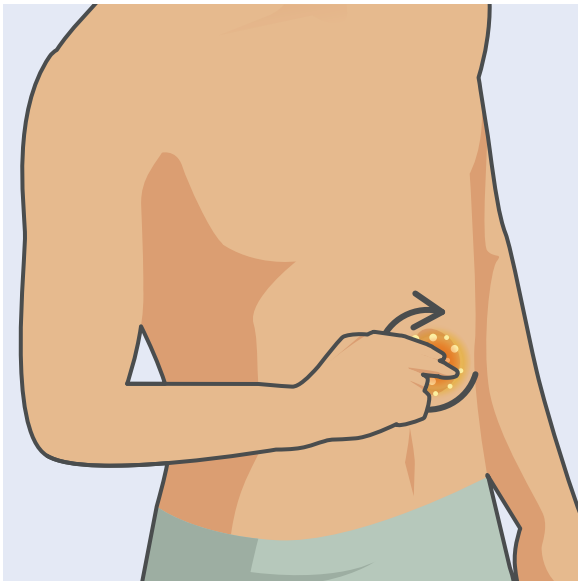
- Optimal absorption of insulin
- Less glycaemic variation i.e. unplanned admissions for severe hypoglycaemia
- Lower dose of insulin required

Using the correct injection technique has major benefits for the NHS. Improved health outcomes and lower overall cost of treatment:

- Fewer unplanned admissions for severe hypoglycaemia
- Less cost of ineffective insulin
- Less prescribed insulin used

How to examine for lipos

- Always inspect for lipohypertrophy in good light
- Gain consent to examine
- Look for changes in contour of skin
- Warm, clean hands
- Use water soluble gel
- Use tips of fingers
- Work towards suspected area of lipohypertrophy with a light massage-like motion (Figure 10)
- Push deep into tissue through fat to feel muscle below (if possible) then push forward toward until lipohypertrophic tissue is felt
- Feel for a change in the subcutaneous tissue
- Document size and position of lipohypertrophy
- Avoid using area for at least 3-6 months
- Re-examine at next visit



What do clinicians say?

> "This document is user-friendly, relevant and key to the training needs of all new and established DSNs. It is a powerful tool that is essential in diabetes management."

Maggie Carroll, Clinical Service Lead, Hertfordshire Integrated Diabetes Service

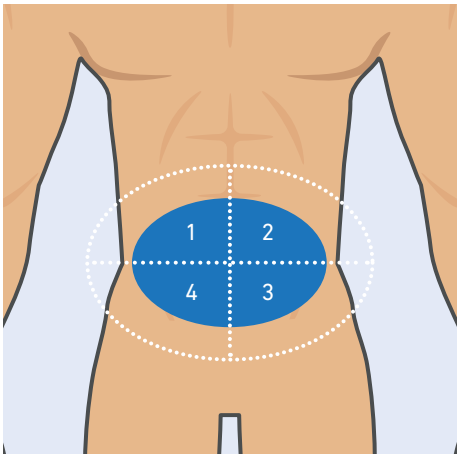
INJECTION TECHNIQUE TROUBLE SHOOTING: BLEEDING AND BRUISING

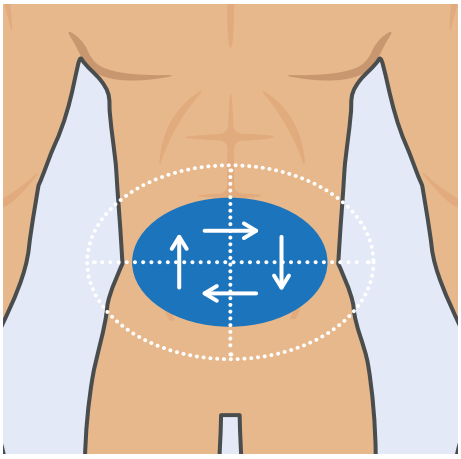
Occasionally bleeding may occur at the site of an injection. Bleeding or bruising may be a sign of poor injection technique i.e. jabbing hard with the needle, pushing the needle too deeply into the tissue or moving the needle once in the subcutaneous tissue leading to micro trauma. This is more likely to occur in those people who are taking anti-coagulant or anti-platelet therapies.

Evidence has shown that neither bleeding nor bruising has any negative impact on blood glucose levels,

Bleeding or bruising can be minimised by:

- Review injection technique
- Using a new needle for every injection to prevent distortion of needle
- Rotating injection sites, as well as within sites
- Applying pressure with a cotton pad or tissue should stop any bleeding.



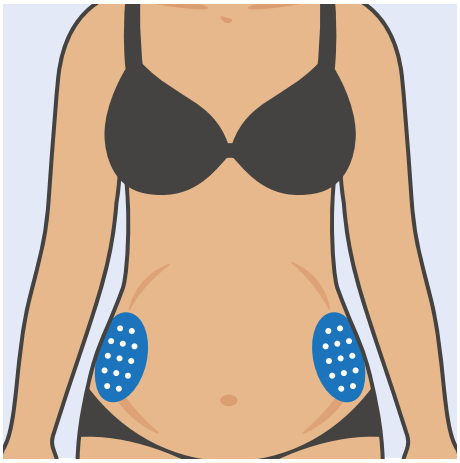


PREGNANCY

- There is a lack of research into the best injection technique during pregnancy so any recommendations are based on expert opinion and patient experience.
- During pregnancy the skin on the abdomen stretches to accommodate the growing baby.

Many women who inject insulin are concerned that the injection may penetrate into the womb.

During the first trimester the abdomen is still a safe site for injections using 4mm needles even at a 90 degree angle. However, during the second and third trimester women should be advised to use either the sides (if they can be reached - see Figure 14) or into the outer upper thighs, or upper outer arms.



- During the first trimester the abdomen is still a safe site for injections using 4mm needles even at a 90 degree angle.
- During the second and third trimester women should be advised to use either the sides (if they can be reached - see figure) or into the outer upper thighs, or upper outer arms.

⚠ **Reassure mums to be that a 4mm pen needle will not penetrate into the womb by following the above injection scheme**

CONTINUOUS SUBCUTANEOUS INSULIN INFUSIONS (INSULIN PUMPS)

There are many different models of insulin pumps to date. Initiation of Insulin Pump therapy is a specialist area of practice but is becoming more commonly seen now, especially in pregnant women with type 1 diabetes. It is still important, within the education process, to encourage an appropriate rotation of sites as good practice.

Examples of CGMS systems available in the UK.

Unfortunately, there is conflicting evidence as to whether good rotation has any major effect on injection sites or glycaemia when using cannulas which are part of an insulin pump delivery system. The average recommended time a cannula is in situ is 3 days.

In the most recent studies from 2014 onwards which was found, as documented below, they tried to explore whether lipohypertrophy was an issue for insulin pump users:

Nonmetabolic Complications of Continuous Subcutaneous Insulin Infusion: A Patient Survey

John C. Pickup, BM, DPhil, Nardos Yemane, BSc, SRD, Anna Brackenridge, MD, et al,
Diabetes Technology & Therapeutics Volume 16, Number 3, 2014,[a] Mary Ann Liebert, Inc. DOI: 10.1089/dia.2013.0192

- The commonest infusion site problem was lipohypertrophy (26.1%), which occurred more often in those with long duration of CSII.
- **Conclusions:** Pump, infusion set, and infusion site problems remain common with CSII, even with contemporary technology.

Duration of Infusion Set Survival in Lipohypertrophy Versus Nonlipohypertrophied Tissue in Patients with Type 1 Diabetes

Andrew W. Karlin, BA, Trang T. Ly, MBBS, FRACP, et al, Diabetes Technology & Therapeutics. Volume 18, Number 7, 2016 Mary Ann Liebert, Inc. DOI: 10.1089/dia.2015.0432

- **Conclusion:** Lipohypertrophy did not significantly affect infusion set survival or mean glucose. Achieving optimal infusion set performance requires research into factors affecting set survival. Additionally, the recommendation for duration of set change may need to be individualised.

Improving Patient Experience with Insulin Infusion Sets: Practical Guidelines and Future Directions

Alison B. Evert, MS, RDE, CDE, Bruce W. Bode, MD, FACE, Bruce A. Buckingham, MD et al, The Diabetes Educator Online. First, published on April 7, 2016 as doi:10.1177/0145721716642526

- **Conclusion:** Development of practical tools and standardized guidelines for empowering patients to prevent, diagnose, and troubleshoot CIIS problems that contribute to unexplained hyperglycaemia will be necessary to realize the full benefit of insulin pump therapy along the continuum of diabetes education.

Lipohypertrophy in CSII patients and its relationship to key clinical parameters poster (ATTD,2018)

Smith M, Baggott A, Green E, et al,Plymouth Diabetes Centre, Derriford Rd, Crownhill, Plymouth PL6 8DH, UK

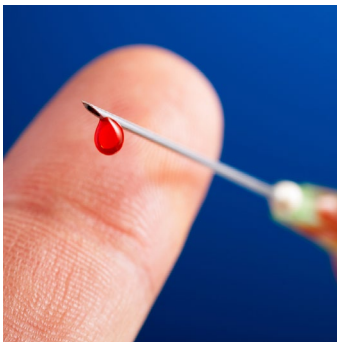
- **Conclusion:** Lipohypertrophy is present in nearly 3 out of 5 CSII patients and palpation picks up more lipohypertrophy than visualisation alone. In our CSII patients lipohypertrophy is not related to HbA1c, TDD, hypoglycaemia, glycaemic variability or DKA suggesting that the mechanism and clinical implications in CSII patients may differ from those in insulin injectors.

The jury is out until more research is performed in this area, but existing science suggests that lipohypertrophy present in insulin pump users does not seem to adversely affect HbA1c, TDD, hypoglycaemia, glycaemic variability or DKA.

SAFETY

⚠ All HCPs, downstream workers and members of the public are at risk of sharps/needlestick injury (NSI). Sharp medical devices present a potential risk for both injury and transmission of disease e.g. hepatitis/HIV

Ensure a safe working environment:



- All HCPs, employers and employees must comply with relevant national and local legislation for the use of sharps.
- This should include:
  - Conducting regular risk assessments in all situations where there is potential for exposure to sharps injury.
  - Injectors, caregivers, family and downstream workers (e.g. porters and cleaners) must receive appropriate education and training in how to minimise risk of sharps injury by:
    - following optimal techniques
    - being made aware of the potential adverse effects of an injury
    - provide and wear appropriate protective clothing (e.g. gloves)
    - use available safety devices.
  - HCPs should be involved in the selection, trial and choice of all injection/safety devices used in their health care setting.
  - Health care settings where insulin pens are used must follow a strict one-patient/one-pen policy.
  - Hepatitis B Virus (HBV) vaccination should be offered by the employer to all workers exposed to sharps. Vaccination status should be reviewed annually.
  - Needle recapping **must not** be undertaken.
  - First aid information on what to do in the event of a sharps/NSI should be readily available.
  - HCPs must report all sharps/NSI following local policy guidelines.

Sharps Disposal:

- Safe disposal of sharps should be taught to people with diabetes who inject, care-givers and all others who may encounter the sharp device from the beginning of the injection therapy initiation and reinforced thereafter. They should be made aware of local safety and disposal regulations.
- Approved healthcare waste sharps containers must be beside the person who is receiving or administering the injection.
- Under no circumstance should sharps material be disposed of into the public refuse or rubbish system.

Safety Devices:

- Attention must be paid to the use of safety devices. If they are used incorrectly or not activated, they provide no additional risk reduction over conventional (non-safety) devices and may lead to dosing errors.
- Safety devices should be considered first-line choice if injections are given by a:
  - Community nurses
  - People who inject with small children at home and/or sub-optimal sharps disposal options should also consider using safety-engineered devices
  - For certain people with diabetes e.g. those known to be seropositive for Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV), children injecting at school, care homes and prisons.

Specific References

- NICE Clinical Guideline CG139: Healthcare-associated infections: prevention and control in primary and community care (2012).
- Health and Safety (Sharp Instruments in Healthcare) Regulations 2013: A guide for employers and employees.

CLINICAL CASE STUDY

⚠ This case study is real. The facts are real. Personal details have been changed.

Background to this clinical case

The clinician who published this case study had for some time been developing considerable expertise in the diagnosis and management of lipohypertrophy. The diabetes clinical team had detected that a significant number of individuals with diabetes were experiencing hypoglycaemia requiring emergency third party assistance and yet were not getting any follow up support or therapy change. The diabetes team worked in close liaison with the ambulance and paramedic service and set up a systematic referral process (pathway). This ensured that all individuals who experience hypoglycaemia requiring paramedic intervention, either discharged by paramedics or admitted to hospital, get an automatic referral to the diabetes specialist team.

Stewart's story

Stewart, a 63-year-old man with type 1 diabetes, was involved in a serious car accident whilst driving home from work. Stewart's job required him to drive many thousands of miles each year. Stewart was seriously injured in the crash and his car was written off. He was stabilised by paramedics at the scene. He was subsequently transferred to the local emergency department and admitted to hospital. Stewart was referred to the diabetes specialist team using the local 'pathway' and seen following discharge from hospital.

Let's take a look at Stewart's clinical history:

- Male
- 63 years old
- Diagnosed Type 1 diabetes aged 35 years
- Long history of unexplained hypoglycaemia

What did Stewart's clinic notes show?

20 years ago	• Stewart had been advised that abdominal injection sites were 'overused' and that he was recommended to 'rest and rotate' injection sites › Total daily dose of insulin was 78 units › HbA1c was 75mmol/mol (9%) › Following intervention i.e. resting and rotating sites, HbA1c dropped to 55mmol/mol (7.2%)
19 years ago	• Stewart was changed to multiple daily injections of insulin › Insulin isophane and insulin lispro, total daily dose 48 units › Again written in notes requested to 'rest' abdomen injection sites
10 years ago	• Stewart's insulin doses increased to 24 units of isophane and 72 units of lispro per day • Using 8mm pen needles • Driving >1000 miles per week • Stewart stated that he was deliberately keeping blood glucose levels high to avoid hypoglycaemia whilst driving
1 year ago	• 2 severe hypoglycaemic episodes over three days • Required paramedic assistance • Stewart was referred to diabetes team by paramedics using local referral pathway • Seen by dietitian, diet reviewed no further intervention noted • Routine annual diabetes clinic review followed a few weeks later • HbA1c stable 66mmol/mol (8.2%) › No hypoglycaemia reported by Stewart › Noted that needle reuse was significant 'wanted to save the NHS some money'. Stewart was supported to use needles once only

6 months ago	• Referred to diabetes team by ambulance service following severe road traffic accident. Following history obtained from Stewart when seen by diabetes team: › Stewart was driving home when he experienced severe hypoglycaemic episode and crashed his car – no other vehicle involved › Stewart was badly injured and admitted to hospital, his car was subsequently written off » Stewart's driving licence was suspended, causing immense challenges to his working life › Day of the accident › Stewart told diabetes team his blood glucose was 7mmol/L when he planned to leave work at 18.20hrs » He was delayed and finally left work at 20.00hrs » Ambulance recorded time of accident call out as 20.56hrs » Stewart said he injected 22 units of insulin glargine at 06.00hrs » He had not taken any insulin doses during the day » Stewart ate a banana and chocolate bar at approx. 17.00hrs › All hypoglycaemic episodes up to and including this one are 'unexplained' › Stewart and his wife insisted he had no lumps at his injection sites and that he correctly rotated - notes show they both responded similarly at all review clinics in the past › Following assessment by diabetes nurse: » Stewart was asked to record all blood glucose levels and clinical team would telephone in one week to discuss » The following week Stewart reported blood glucose levels mostly ranging from 7-13, but again he had 2 unexplained hypoglycaemic episodes » Despite firmly declining in the past Stewart agreed to return to clinic to have his injection sites examined and palpated › Follow up clinic to assess injection sites: » All injection sites including non-orthodox were visually checked and palpated » Lipohypertrophic lesions were found (see images on page 11) - Bilaterally lower abdomen - Bilaterally upper medial thigh › Clinical plan: » Avoid injecting into lipohypertrophic lesions » Educate and support Stewart to correctly rotate injection sites » Switch to a 4mm pen needle to minimise accidental intramuscular injection » Reinforced single needle use message » Dietary support in regard to correct 'carb counting' and insulin ratio » Frequent telephone and clinic follow up to continue education and support
Today	• Insulin glargine reduced from 22 units per day to 16 units • Insulin lispro doses approximately 30 units each reduced to no more than 12 units (1 unit/10g carbohydrate ratio) • Total daily dose reduced from 112 units to 52 units • Home blood glucose showed >70% readings within target range • One reading of 3.8mmol/L in last few months • All subsequent 'mild' hypoglycaemic episodes are 'explained' • Stewart is happier, more confident and can predict his blood glucose levels with more accuracy

What do we learn from this case study?

- Injection technique is a critical part of diabetes self-care.
- All clinicians must support their patients to:
  - Correctly rotate injection sites
  - Never reuse needles
  - For people of all sizes always use 4mm pen needle
  - Avoid injecting into lipohypertrophic lesions
- All clinicians must:
  - Examine and palpate injection sites at least every year
- In the event of unexplained hypoglycaemic episodes and or detection of lipohypertrophy:
  - Take history of injection technique habits paying careful attention to rotation, needle length and reuse
  - Examine and palpate injection sites
  - Monitor the patient closely as significant hypoglycaemia may be a consequence of correcting suboptimal injection technique
  - Support patients to alter insulin doses according to blood glucose results

This is a statement made by a different person cared for by Stewarts team

> "I hesitate to say it this early in case I jinx it, but it looks as if you have another success story with me and the injection site experiment. For hours on end yesterday I was 5 and 6 mmol/L and this was on vastly reduced insulin doses. I am astonished, literally, it feels like a miracle! Thank you so much for sharing the information with me and good luck for your ongoing important research."

APPENDIX: ROUTINE CARE CLINICAL PROCESS CHECKLIST

Health professionals also have a responsibility to reassess injection technique and examine injection sites as part of routine, on-going diabetes management. These are some of the questions you may choose to use during your consultation to assess injection technique.

1. Where do you store your insulin?
2. Show me how you mix your insulin before giving your injection (only if this is required).
3. Show me where you inject your insulin?
4. Do you check for lumps under the skin, have you identified any and if so do you avoid injecting into these areas?
5. How often do you change the sites where you inject?
6. How far apart do you space injections?
7. How often do you change your needles?
8. What angle do you insert the needle into the skin?
9. How long do you leave the needle in the skin after pressing down the dose button?
10. How do you dispose of used “sharps”?

ENDORSEMENTS

Diabetes UK both welcomes and supports the Injection Technique Matters - Best Practice in Diabetes Care initiative. Injection technique leads to good blood glucose control which is vital in preventing the long term complications of diabetes. as so many people with diabetes are now being prescribed injectable medication, this is a timely and important enterprise which will bring great benefit to them.

Simon O'Neill,
Director of Health Intelligence. Diabetes UK

Advances in the treatment of diabetes have led to an increase in the number of injectable therapies available. Correct technique is of paramount importance in order to ensure that people with diabetes benefit from injectable therapies. As a company committed to 'make life better' for people with diabetes, Lilly UK welcomes the Injection Technique Matters initiative as an important step in supporting diabetes care in the UK.

Dr Kunal Gulati,
Medical Director Lilly Diabetes - UK, Ireland and the Nordics

Novo Nordisk fully endorse the Injection Technique Matters – Best Practice in Diabetes Care (ITM) initiative. The benefits of modern injectable medications for the treatment of diabetes can only be fully realised through the use of correct injection technique. Novo Nordisk believes it is imperative that Healthcare Professionals understand the importance of good injection technique and convey this to people with diabetes under their care. ITM is a superb initiative, whereby leading professionals in diabetes care review and update the evidence to bring relevant developments in this area

Dr Avideh Nazeri,
Director of Clinical, Medical & Regulatory, Novo Nordisk

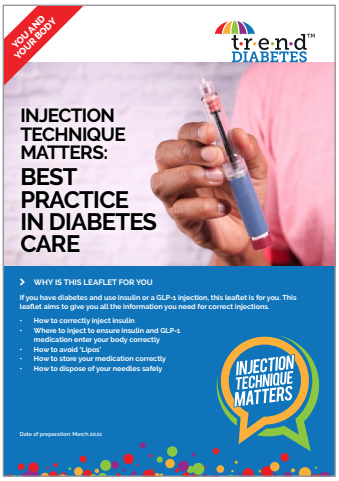
Sanofi UK is committed to improving the care for people with diabetes who are using insulin and GLP-1 therapy by providing a range of injectables. We are proud to support the 'Injection Technique Matters - Best Practice in Diabetes Care' initiative which aims to

improve current practice through the sharing of scientific evidence and demonstration of best practice. At Sanofi our mission is 'to help our customers help their patients enjoy a better life' and we appreciate the importance of good injection technique to ensure that

people with diabetes who are using injectable therapy achieve the most benefit from their medication and wish Injection Technique Matters every success with this initiative.

Professor Mike Baxter,
National Advisor for Clinical External Engagement,
General Medicines Business Unit in the UK and Ireland at Sanofi..

RESOURCES FOR PEOPLE LIVING WITH DIABETES



Handbook

- Injection Technique Matters: Best Practice in Diabetes Care

Checklist

- Key things to remember if you use injectable medication to treat your diabetes

Injection Technique Matters – Best Practice in Diabetes Care is supported by:

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