

Patchworks: Freestyle Libre data interpretation training for Type 1 Diabetes

Dr Ben Houlford, Caroline Atkinson, Dr Kate Fayers, West Hampshire Community Diabetes Team, Southern Health Foundation NHS Trust

Introduction

In November 2017 the Freestyle Libre flash glucose monitoring system became available on the NHS to selected patients. This device had been available to self-funding patients for several years and filled a gap between traditional finger prick blood glucose testing and continuous glucose monitoring – with the former being awkward, painful and yielding little in the way of data and the latter being prohibitively expensive for self-funders and only available to very few patients on the NHS (due to its cost).

We developed an education course designed to help patients get the maximum benefit from this device and to support the CCG requirement* for “ a further course of education on the use of...the management system...”. The course would be focussed on interpretation of the wealth of extra data provided and integrated into the Patchworks pathway for the Freestyle Libre - which forms part of the Type 1 diabetes pathway for the West Hampshire Community Diabetes team.

The Freestyle Libre System

The Freestyle Libre device was launched in the EU by Abbott in 2014. The device uses Flash Glucose Monitoring meaning that users wear a sensor on their arm, which lasts 2 weeks, and take readings by passing the handheld reader device (or their NFC enabled mobile phone – if set up with the Libre app) over the sensor. This process downloads up to 8 hours of readings from the sensor (taken by the sensor at 15 minute intervals when not being scanned).

These data are interpretable at different levels depending on the users wishes. On the reader itself the following are available:

- 1) A reading of interstitial glucose level every time it is scanned (minimum interval 1 minute)
- 2) The user is shown a trend arrow showing the direction their glucose levels have been going
- 3) Daily Patterns is a cut down baby version of the Abulatory Glucose Profile (AGP) giving an at-a-glance view of how glucose levels have been behaving throughout the current and previous days
- 4) Low Glucose Events gives information about hypo occurrence

Users can upload the data from the device and analyse data using the Libre View software, which produces a report including:

- 1) The AGP, which uses a wealth of data to produce a graphical representation of the user's glucose control. These data are presented with a traffic light grid to enable users to easily see where their focus needs to be. The AGP allows analysis of data in a longitudinal (i.e. how glucose levels typically vary throughout the day) and cross-sectional (i.e. Variability at a certain time of day) way. When understood and used appropriately this gives tremendous insight to the user with regards to their patterns of glucose levels and how their diabetes reacts to different situations at different times of day.
- 2) The weekly view, which displays a day-by-day view a week's worth of data in a graphical format
- 3) Graphical views of low glucose readings, average glucose levels (throughout an aggregated day) and data capture details (particularly useful if users seldom swipe the reader over the sensor)

Clearly these different data representations endow users with vastly more data than they are used to with finger prick blood glucose testing and this realisation drove the development of the Patchworks course.

At-a-glance Glucose monitoring comparison

	Finger prick blood glucose monitoring	Flash glucose monitoring	Continuous glucose monitoring
Accuracy	++	+	+
Alarms	No	No	Yes
Convenience	-	++	+++
Cost	+++	+	-
Data	-	+++	+++

Quality Improvement: Patient co-design

The Patchworks course was designed to enable patients to get the best out of their devices. Since the device was to be available with NHS funding to selected patients we felt they should be empowered to use it to its full capability.

We therefore ran a focus group to gather the thoughts and opinions of a group of patients who were already using the Freestyle Libre as self-funders.

These expert patients were invaluable in the development of this course and their commitment was such that the focus group session hugely overran. Many aspects of what was then merely an outline of the course were fleshed out and altered and adjusted as a result of the patients' input.

The outline of the two hour course was thus:

- 1) An explanation of the Type 1 Diabetes education pathway
- 2) Patient Information Pack – including various measures to assess the impact of the Patchworks course to be completed before attending
- 3) Thoughts on what patients would like to gain from the course
- 4) Reminders about the importance of good glycaemic control
- 5) Monitoring – how we do it and why it's important
- 6) How to set up the Freestyle Libre
- 7) Hypoglycaemia revision
- 8) DVLA guidance
- 9) Data analysis
- 10) Ambulatory Glycaemic Profile analysis including patients' own AGPs

The last two parts formed the bulk of the course both in terms of time and emphasis. The AGP analysis session was very much patient-led and encouraged them to do the work, analyse the data and solve the problems.

West Hampshire Clinical Commissioning Group criteria for availability of the Freestyle Libre

This method of monitoring must not be initiated in a primary care setting and should only be recommended by an NHS consultant-led service. Primary care clinicians may subsequently be asked to prescribe the monitoring sensor packs.

Freestyle Libre may be recommended in patients aged 4 years old and above with Type 1 diabetes, or those with Type 1 or Type 2 diabetes who are pregnant, and who fulfil one or more of the criteria below:

- Patients who are required to undertake intensive monitoring with 8 or more finger prick blood tests daily.
- Those who meet the current NICE criteria for insulin pump therapy (HbA1c >69.4mmol/mol) or disabling hypoglycaemia as described in NICE TA151 where a successful trial of flash glucose monitoring may avoid the need for pump therapy
- Those who have recently developed impaired awareness of hypoglycaemia, when it may be used as an initial tool in its management with a review at 6 months.
- Frequent (>2 per year) hospital admissions with diabetic keto-acidosis or hypoglycaemia where other management plans have failed.
- Those requiring third parties to carry out monitoring or where conventional blood testing is not possible.

The patient should have previously been through an advanced insulin self-management education course or local accredited education programme. ***The patient should be actively engaged in enrolling themselves into the management system and would be expected to go through a further course of education on the use and interpretation of the readings the management system delivers.**

Prescribing should be for a 6 month trial period. If no improvement is demonstrated in one or more of the impact areas below, then the use of FreeStyle Libre should be reviewed with the possibility of changing to an alternative method of monitoring.

- Reductions in severe/non-severe hypoglycaemia
- Reversal of impaired awareness of hypoglycaemia
- Episodes of diabetic ketoacidosis
- Admissions to hospital
- Reduction in HbA1c by more than 0.5% where appropriate
- Blood Glucose Testing strip usage reduced
- Quality of Life changes using validated rating scales
- Commitment to regular scans and their use in self-management.

West Hampshire Community Diabetes Team Type 1 Diabetes Libre Pathway

PATCHWORKS REFERRAL

- Offer group start and complete audit trail
- Offer PATCHWORKS EDUCATION SESSION in 1 month
- Book in 6 month Virtual upload clinic (DSN review)

Attend PATCHWORKS group education (or complete Libre Online Academy)

6 month Libre Upload clinic –

- Has patient sent back self declaration?
- Attended education?
- Has patient uploaded?
- Have they met criteria /goals (see box to right)?

Yes- send letter to GP to continue prescribing sensors
Book into consultant/DSN clinic 6 mths

No
Discuss with patient & send letter to GP to stop prescription
Offer clinic appointment or discharge

Criteria to met at six months

- Reductions in severe/non-severe hypoglycaemia
- Reversal of impaired awareness of hypoglycaemia
- Episodes of diabetic ketoacidosis
- Admissions to hospital
- Reduction in HbA1c by more than 0.5% where appropriate
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Reception and conclusions

The pilot session of the course was on 23rd January 2018. This was a half-day session and was very collaborative with patients making suggestions regarding future content. Patients also expressed interest in becoming peer educators. So far eight groups have been booked to commence the Patchworks Pathway over the next year, capacity of 20 type 1 diabetes patients per session.

As with any patient education course benefit is not in the patient feedback alone but in the impact on glycaemic control and patient wellbeing, particularly psychological wellbeing.

Our aim is to enable patients who access the Freestyle Libre system on the NHS to not only have a more comfortable and convenient way of testing their glucose levels, but furthermore to be able to use it to its full potential. By including choice (face to face or online education) and self declaration of outcomes we have designed a pathway that best supports active self management and engagement.