

Tackling Diabetes with Sport

Guide to Type 1 Diabetes and Sport

EMCA Studia



Tackling Diabetes with Sport

Guide to Type 1 Diabetes and Sport

Created as an “Open Educational Resource”
Erasmus+ Project
“Sports&Diabetes - Tackling Diabetes with Sport”

www.sportsanddiabetes.eu

Alongside this guide there is also a kids guide as a comic book.



TACKLING DIABETES WITH SPORT

Guide to Type 1 Diabetes and Sport

LEAD MEDICAL EXPERTS

Maja Cigrovski Berković, M.D. Associate Professor
Felice Strollo, M.D. Professor

WRITER

Margaret Nicholls

SUPPORTING EXPERTS

Ines Jakopanec, patient expert
Christina Petrut, mag. psych.
Tihana Šadek, mag. nutr.
Alena Tatarević, mag. pharm.

EDITORS

Dunja Bračun, HAŠK Mladost
Sabine Dupont, IDF Europe
Natasha Kuhfuß, TSV Bayer 04

REVIEWERS

Mia Bajramagić, medical student
Dr. Michael C. Riddell, PhD
Ana Špoljarić, patient expert
Bas van de Goor, patient expert

ILLUSTRATIONS AND GRAPHIC DESIGN

Katerina Binovska
Ines Jakopanec

CO-PUBLISHERS

Hrvatski akademski športski klubovi Mladost
Sveučilišta u Zagrebu (HAŠK Mladost)
TSV Bayer 04 Leverkusen eV

PRINTING

Kappler Digital d.o.o.

PROJECT ERASMUS+ SPORT

Sports&Diabetes - Tackling diabetes with sport

EMCA Studia

Official bibliotheca of EMCA (European Multisport Club Association) with headquartes in Brussels, Belgium.
EMCA Studia gathers together all publications published by the member clubs and ongoing projects.

Zagreb & Leverkusen, 2022.

ISBN 978-953-48192-9-6 (print) (HAŠK Mladost)
ISBN 978-953-48192-09-9 (online) (HAŠK Mladost)



Co-funded by the
Erasmus+ Programme
of the European Union

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

The guide and additional materials are available in print and PDF version in English, German, Croatian, Italian and Greek language, but may come in other languages on the project website:
www.sportsanddiabetes.eu

IMPORTANT TO KNOW BEFORE WE START

The handbook was created as a combination of expert and experiential knowledge with the aim of showing all the important elements that are part of the life of a person with type 1 diabetes before, during, and after exercise. However, it is necessary to consider that each person living with type 1 diabetes is an individual and will need to adapt the advice accordingly.

Bas van de Goor, Olympic medalist, person living with diabetes, director of Bas van de Goor foundation:

“Diabetes is individual. Little to no people who are trying to have great BG during sport are successful on the first try. Be patient and never stop trying to improve. The negative effect of a short period of high BG is compensated wildly in the positive way by being active for an hour, so: JUST GO FOR IT.”

KEEP IN MIND !!

These are only suggestions for managing diabetes. Please consult your doctor or if you are unsure, follow the official guidelines of your diabetes association.

The full list of references used when creating this guide can be found on the project's website.

The PDF version of this publication, as well as versions in other languages and additional materials, are available at



www.sportsanddiabetes.eu

Hi you, I'm Super D - an athlete living with Type 1 Diabetes.

This guide is for all stakeholders: kids living with Type 1 Diabetes, their parents, coaches, teachers and all who are interested in the topic of 'Tackling Diabetes with Sport'.

The guide is split into four parts:

- 'need to know' for everyone
- 'want to know' to go deeper into the topic
- 'help you cope' for each stakeholder separately
- 'Part +' to individualize managing diabetes.

Enjoy!



WHAT YOU NEED TO KNOW

A1 - INTRODUCTION TO DIABETES AND SPORT

A2 - MYTHS ABOUT DIABETES

A3 - DIABETES EQUIPMENT GUIDE

A4 - UNDERSTANDING AND TREATING HYPOGLYCAEMIA

A5 - UNDERSTANDING AND TREATING HYPERGLYCAEMIA

A

WHAT YOU WANT TO KNOW

B1 - HOW DIFFERENT SPORTS AFFECT BLOOD GLUCOSE

B2 - HOW TO MANAGE DIABETES DURING SPORT

B3 - SPORTS NUTRITION

B4 - TRAINING CAMP AND TRAVELLING

B5 - INSULIN AND ANTI-DOPING REGULATIONS

B

WHAT CAN HELP YOU COPE

C1 - FOR YOUTH: IT'S GOOD TO TALK

C2 - FOR TEACHERS & COACHES: COACHING A CHILD WITH T1D

C3 - FOR PARENTS: YOUR MENTAL HEALTH - HOW TO COPE

C4 - FOR FRIENDS: HOW TO HELP

C5 - FOR SIBLINGS: HOW TO HELP YOUR BROTHER OR SISTER

C6 - FOR RELATIVES: HOW TO BE SUPPORTIVE

C

WHAT CAN HELP MANAGE

+ CHARTS

HYPO & HYPER CHART

NUTRITION CHART

ACTIVITY DIARY

ACTION SCHEDULE

TRAVEL CHECKLIST

+



PART FOR ALL

Everyone should know a few general things about the topic of diabetes and sport, don't you agree?

WHAT YOU NEED TO KNOW

INTRODUCTION TO DIABETES AND SPORT

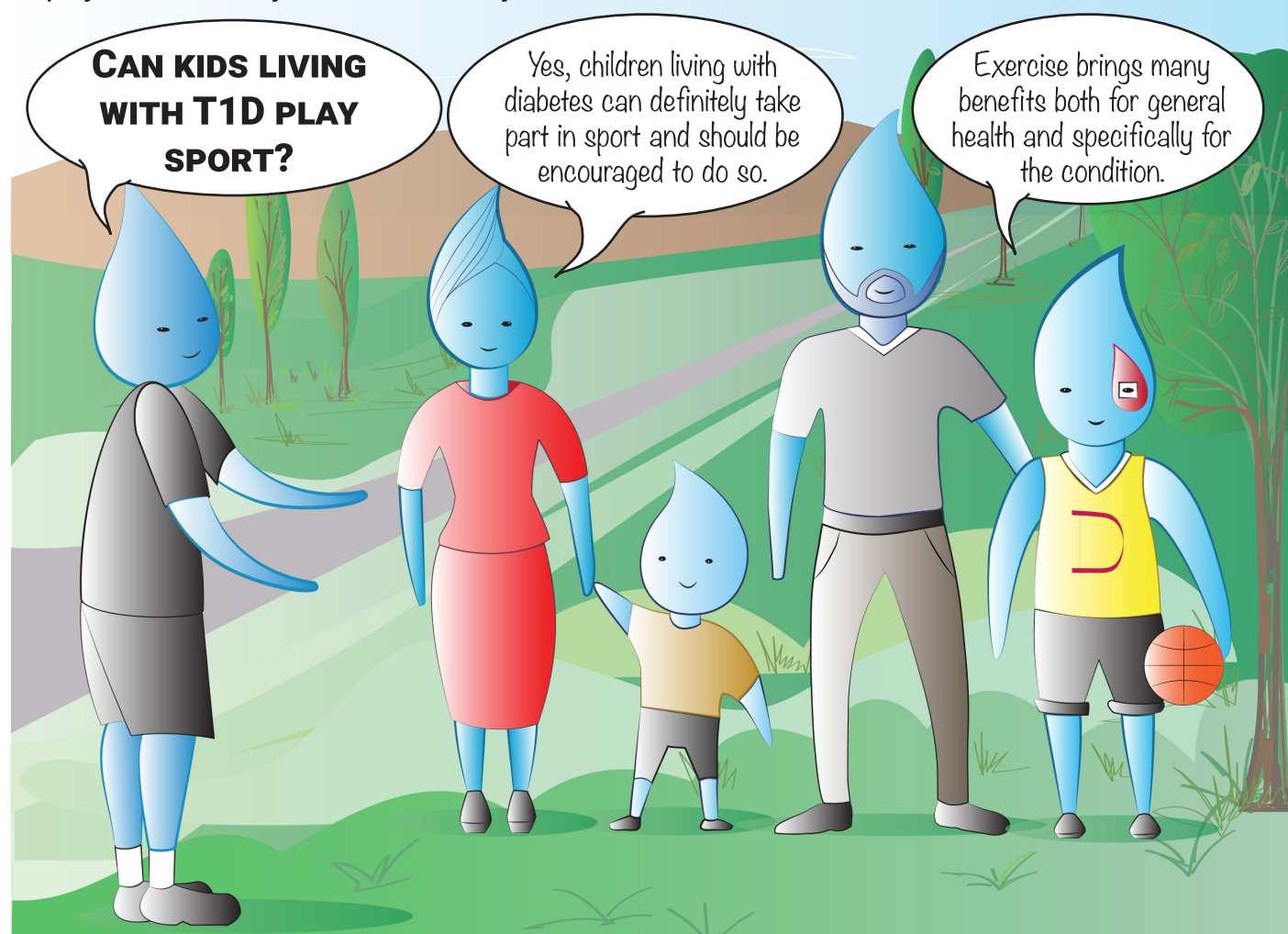
WHAT IS DIABETES?

People living with diabetes have too much glucose (sugar) in their blood. There are 14 different types of diabetes, of which the main ones are **Type 1 diabetes (T1D)** and **Type 2 diabetes (T2D)**. Type 1 diabetes tends to occur in children and adolescents, although it can also develop later in life. It cannot be prevented.

About 90% of people living with diabetes have Type 2, which develops as a result of a combination of unmodifiable, genetic, physiological, environmental, as well as modifiable, behavioural risk factors, such as diet, sedentary lifestyle and obesity. It mostly affects people in middle age or older, although increasingly becomes apparent earlier in life.

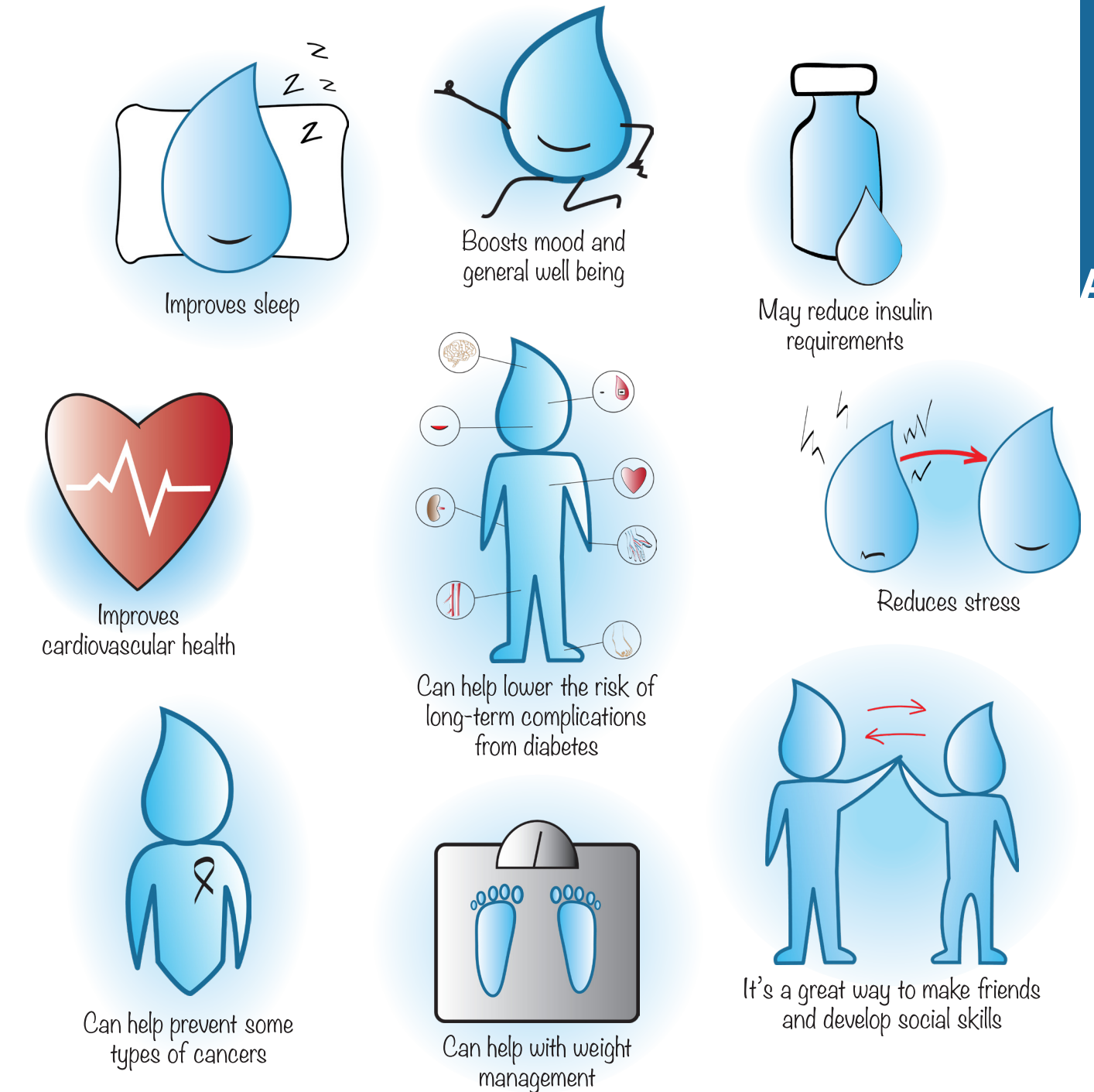
HOW IS IT TREATED?

If you have T1D your pancreas does not produce insulin, a hormone that is needed to regulate your **blood glucose (BG) levels**. This means that you have to take insulin daily to keep your BG within the normal range and stay healthy. How much insulin you need and how often you take it depends on many factors, such as how recently your diabetes was diagnosed, your age, your body size, your food intake, physical activity levels, and any other health issues.



9 BENEFITS OF REGULAR PHYSICAL ACTIVITY

For people living with diabetes, regular exercise has many beneficial effects on the body and the mind, including the following:



CHALLENGES

Physical activity does bring challenges for children, adolescents and teenagers living with T1D. It needs to be managed constantly in response to exercise, including every day activities such as running in the playground. It is usually necessary to adjust insulin doses and/or carbohydrate intake in order to balance BG levels. However, with preparation, good management and clear communication with coaches, counsellors and teachers (physical education/gym, etc), children with T1D can take part in exercise and sport safely.

ESSENTIAL TERMS TO KNOW

SUPER D:

A character that represents all athletes living with Type 1 Diabetes

BLOOD GLUCOSE LEVEL (BG):

A measurement of glucose in the blood stream that is usually taken from a finger prick.

INTERSTITIAL GLUCOSE (SENSOR GLUCOSE LEVEL):

Glucose in the fluids surrounding the cells in the body called the interstitial fluid which compared to BG level usually lags about 5 to 20 minutes.

GLUCOSE VARIABILITY (GLUCOSE TREND):

Change between highs and lows in BG levels.

HYPOGLYCAEMIA (HYPO):

Low blood glucose. *More in Part A4*

HYPERGLYCAEMIA (HYPER):

High blood glucose. *More in Part A5*

KETOACIDOSIS:

A hyper emergency, in which harmful ketones build up in the body. *More in Part A5*

KETONURIA:

High levels of ketones in urine.

CARBOHYDRATES (CHO):

One of the main nutrients that the body converts into glucose, which our cells use as the main source of energy. *More in Part B3*

GLYCAEMIC INDEX (GI):

All carbohydrates have a GI rating. This indicates how rapidly a food raises BG levels. *More in Part B3*

BASAL INSULIN:

Insulin dose to keep BG levels steady over a longer period. Therapy with insulin pens uses long-acting insulin, while therapy with an insulin pump provides small doses of fast-acting insulin.

BOLUS INSULIN:

A fast-acting insulin dose to prevent a rise in BG levels.

DIABETES EQUIPMENT:

A collective term that refers to both diabetes technology and any other supplies that are needed throughout the day to manage someone's diabetes (example: juice, water...). *More in Part A3*

MMOL/L OR MG/DL:

Two ways of measurement of a glucose level expressed differently depending on the country. A practical way of converting is to divide or multiply by 18 (ex. 10 mmol/L is 180 mg/dl).



MANAGING DIABETES DURING SPORT

Different types of exercise have different effects on the body, and all individuals have unique responses. The response of BG to physical activity depends on many factors, including exercise type, timing of exercise (morning or evening), intensity and duration, as well as insulin levels.

It is common for BG to decrease during aerobic exercise and to increase during anaerobic exercise (*check Part B1*). In addition, exercise can have a big impact on BG for several hours (sometimes even days) after the activity has stopped. Because everyone responds differently, children need to learn how their bodies react to exercise in order to find the right balance for them.

For anyone living with T1D, hypo is the most common concern during physical activity, training and competitions, but sometimes hyper can also occur. It is best to try to keep glucose levels between 5 - 14 mmol/L (90 - 250 mg/dl) for safety and performance reasons.



MYTHS ABOUT DIABETES

MYTH 1

Someone with diabetes can't play any sports and could never become an athlete.

FACT

Actually, people living with diabetes can do sport very well. We have many examples of successful athletes. Moreover, physical activity is crucial in managing diabetes.

Diabetes is a transmissible disease.

MYTH 2

Diabetes is a chronic illness that cannot be transmitted by touch, air, saliva or any other way.

FACT

MYTH 3

People living with diabetes can't eat sugar/sweets.

FACT

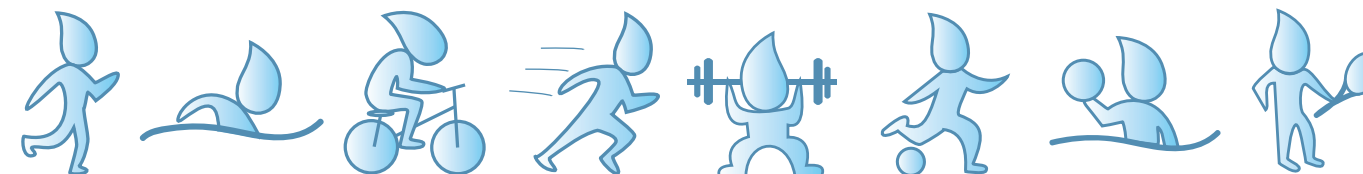
Actually, they can eat anything as long as they know how to calculate insulin intake for the carbohydrates they eat.

The cause of diabetes is eating too much sugar.

MYTH 4

T1D is an autoimmune disease so it can't be caused by anything you eat.

FACT



You can cure diabetes especially if you diet and exercise.

MYTH 5

Eating healthily and exercising are both extremely important in order to keep diabetes under control, together with insulin intake, but this is a chronic condition that currently has no cure.

FACT

MYTH 6

People who use insulin have the most severe form of diabetes.

FACT

All people living with T1D require insulin. It is not a marker of disease severity.

When you have a hypo or hyper it means that you are not taking care of yourself.

MYTH 7

Actually, these happen for many reasons, including not being able to adjust insulin to food intake, physical activity or even stress.

FACT

MYTH 8

Diabetes only affects obese people.

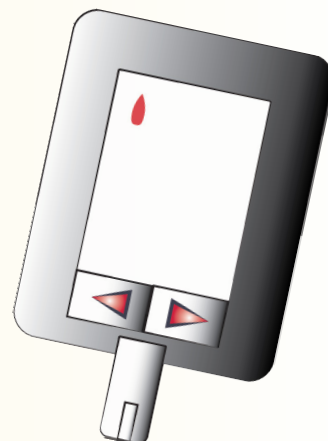
FACT

Obesity is a risk factor for developing T2D, although not all people living with T2D are either overweight or obese. T1D is an auto-immune disease, and we do not yet know what causes it.

DIABETES EQUIPMENT GUIDE

1 GLUCOMETERS

Glucometers are small devices used for measuring BG levels from a drop of blood, usually from a finger prick. They show the BG level a few seconds after the blood sample is placed on a test strip previously inserted into the glucometer. There are different types of meters, so their appearance, size (and accuracy) may vary. Some glucometers can also measure blood ketone levels. The procedure is the same but different test strips are needed for this.



2 CONTINUOUS GLUCOSE MONITORING (CGM) / SENSORS

Continuous glucose monitoring (CGM) systems make exercise management much easier and safer than before by continuously providing information on glucose levels. CGM sensors are tiny, coin-like devices worn just under the skin – usually on the arm or abdomen. They measure glucose concentrations continuously (at 1 to 5-minute intervals). During sport, this allows the participants to be aware of their glucose levels and trends in near real time and immediately react as instructed by their doctor. These devices keep the BG within the safest range most of the time.

There are two main types of devices:

Real-time CGMs (rtCGMs) display BG levels and trends automatically and trigger alerts for hypo and hyper.

Flash CGMs (fCGMs), also known as **intermittently scanned CGMs (isCGMs)**, only show BG levels and trends when the sensor is scanned manually with the reader. Phone apps can also be used to scan the sensor.

Modern technology in diabetes using rtCGM and isCGM systems enables better glycaemic management around exercise periods. Differences between BG and interstitial fluid glucose which are a result of lag time (usually between 5 - 20 minutes) have to be taken into account in situations of hypo and hyper. Both conditions should be checked by measuring BG levels.

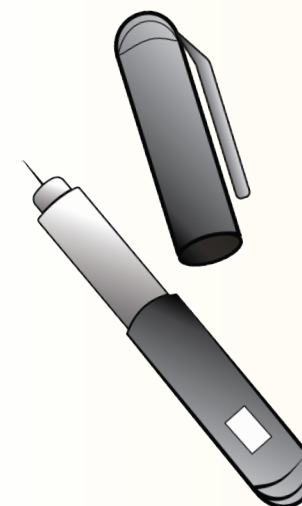


INSULIN SYRINGES AND PENS 3

Insulin syringes and pens are used for injecting insulin. There are several types of insulin, with different mechanisms of action. For example, rapid-acting insulins work over a short amount of time, and can be used at the start of a meal or to counteract sudden hyper.

Short-acting insulins typically start taking effect within 30 minutes and, therefore, are often taken 30 minutes before a meal.

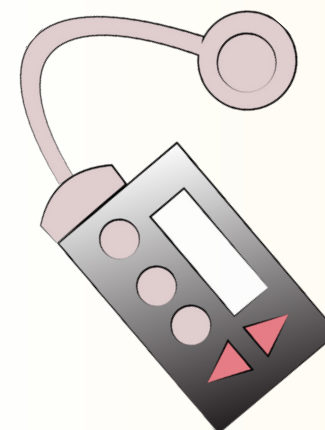
Long-acting insulins typically last for 24 hours (ultra-long insulins even longer) and cannot be used to counteract sudden hyper.



INSULIN PUMPS 4

Automated insulin pumps offer better flexibility and precision in insulin dosing, thus significantly improving quality of life. They automatically deliver small amounts of **short-acting insulin** every few minutes. Insulin rate can be temporarily adjusted for exercise, according to their doctor's instructions. In addition, they can inject tiny, individually tailored insulin boluses in case of sudden hyper. This is much easier and more convenient than an insulin pen or syringe. Nowadays there are two types of pumps: **with or without the catheter**.

Pumps can even be disconnected for a short time during competitions or training, which is useful for contact sports or swimming. More recent insulin pumps are even waterproof.



COMBINED SYSTEMS

5 INSULIN PUMP COMBINED WITH CGM (SENSOR)

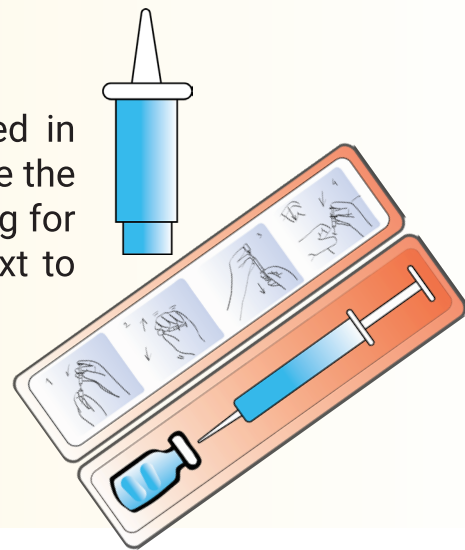
Sometimes pump and sensor can work in tandem. For example: **Sensor-augmented pumps (SAP)** show readings from a CGM to the person living with T1D, who can then adjust the insulin dose manually.

Closed loop systems continually check glucose levels and automatically adjust the amount of insulin given via the pump.

New systems are constantly being developed.

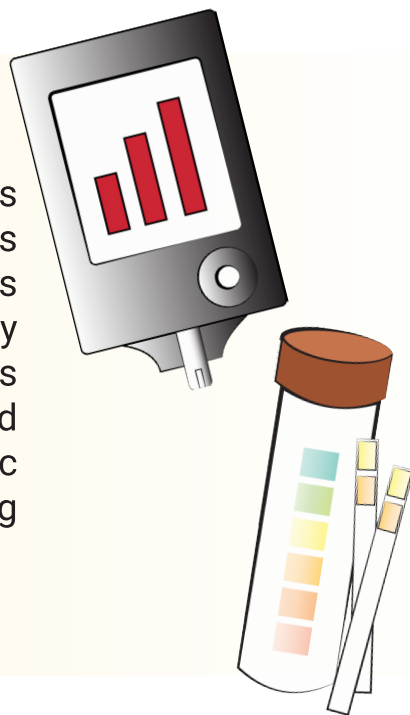
6 GLUCAGON

A glucagon injection kit or a nasal spray is used in cases of severe hypo with unconsciousness where the person is unable to sip sugary drinks, while waiting for first-aid intervention. This should be available next to the exercise field.



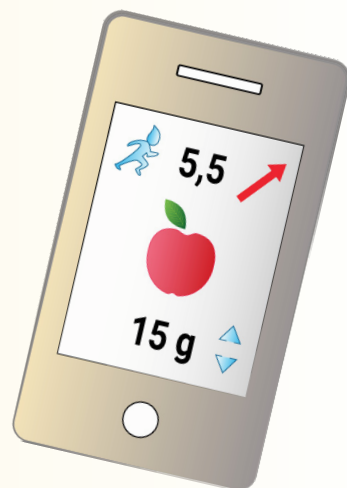
7 KETONE METER

Ketone meter is small device that accurately measures ketone levels from a drop of blood. Ketones are products of fat degradation in the presence of low insulin levels and are used by the body as an alternative energy source. When ketones accumulate in larger quantities (above 0.6 mmol/l), they may lead to an acute and potentially life-threatening complication called diabetic ketoacidosis (DKA). Ketones can also be checked using urine strips, but this method is not as accurate.



8 Apps

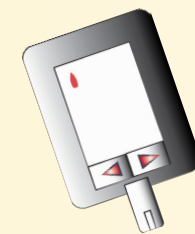
Digital health technology means that more and more apps are becoming available to help people manage their diabetes. Many apps also allow users to track activity, count calories and set goals for exercise and weight management. Evidence is still limited as to their safety and accuracy, however many people living with diabetes find these apps useful.



KEEP IN MIND

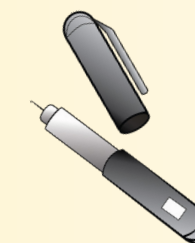


Diabetes technologies are constantly developing and improving. As with everything else in diabetes, the use of technologies is individual and depends on a number of factors (personal preference, difference in availability and cost of technology, etc.). Check with your diabetes community about which diabetes technology is available in your country. Each Super D can tick the technology they use.



☐ Glucometer

☐ Sensor (and its reader)
real-time CGMs
flash CGMs



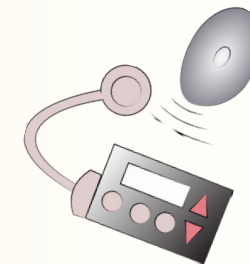
☐ Insulin pens / syringes

☐ Insulin pump
with catheter
without catheter



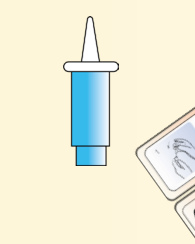
How to use the ticked technology?*

☐ Combine system
sensor-augmented pump
closed loop

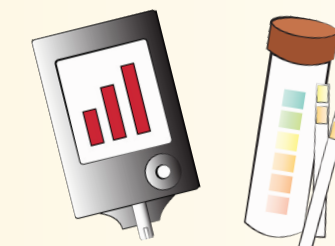


*Each Super D can write their short description

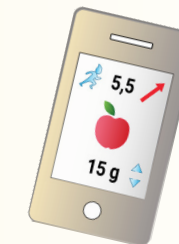
☒ Tick the ones you use



☐ Glucagon
injection kit
nasal spray



☐ Ketone meter
urine strips
blood strips



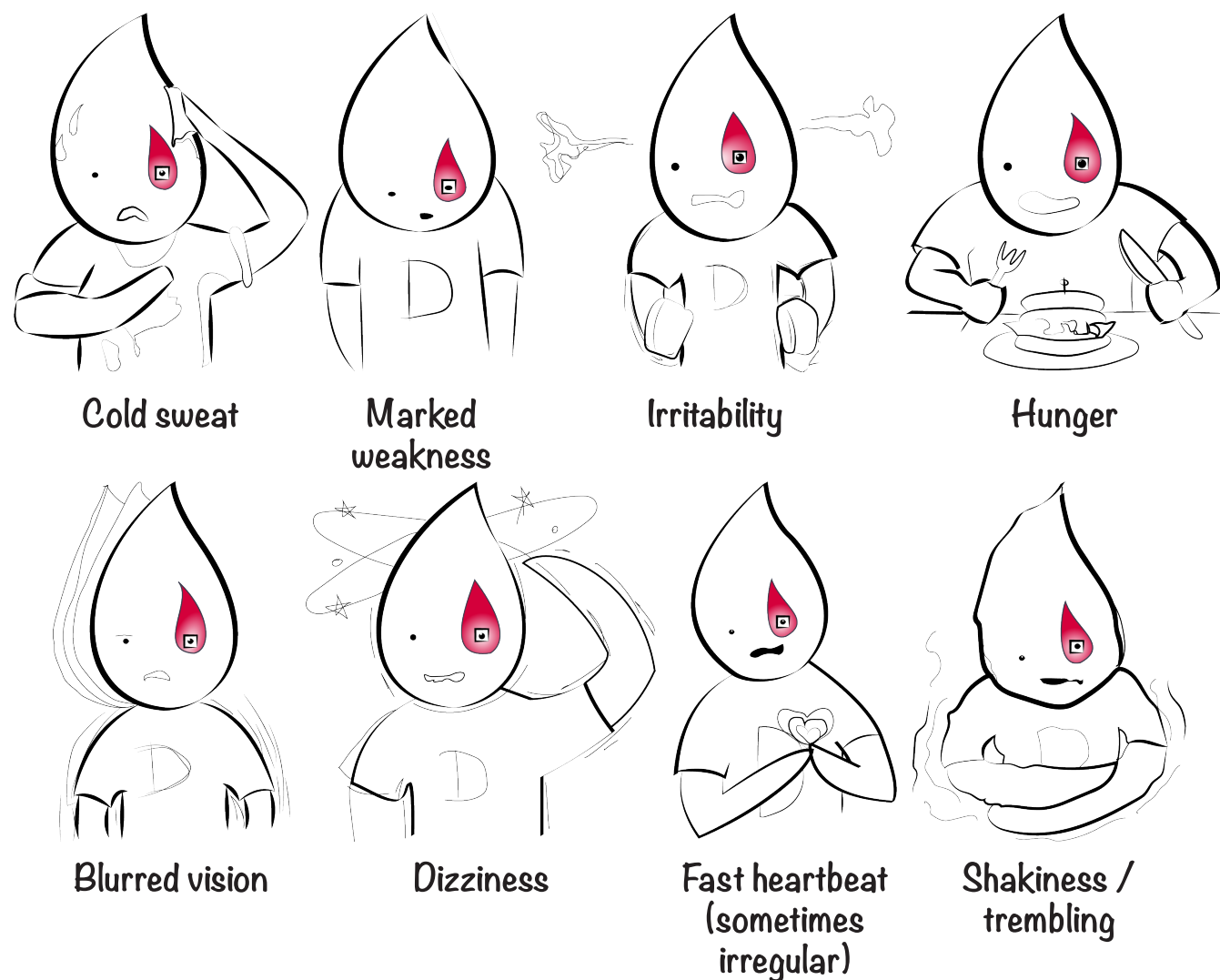
☐ Apps

UNDERSTANDING AND TREATING HYPOGLYCAEMIA

WHAT IS IT?

Low blood sugar. **Hypoglycaemia (hypo)** can occur during or immediately after exercise, or hours later. When BG falls **below 3.9 mmol/l (70 mg/dl)**, symptoms are usually apparent, but the levels at which hypo manifests as well as the symptoms vary from person to person.

SYMPTOMS OF HYPO



OTHER SIGNS TO LOOK OUT FOR:

Dilated or wide pupils	Pain and shakiness of the legs
Tingling or numbness of lips, tongue or cheeks	Sweaty palms
Anxiety	Weird dreams at night
Pale skin	
Progressively poorer concentration	
Muscle cramps	
Fainting	Additional individual symptoms - check "Hypo chart" (Part +)

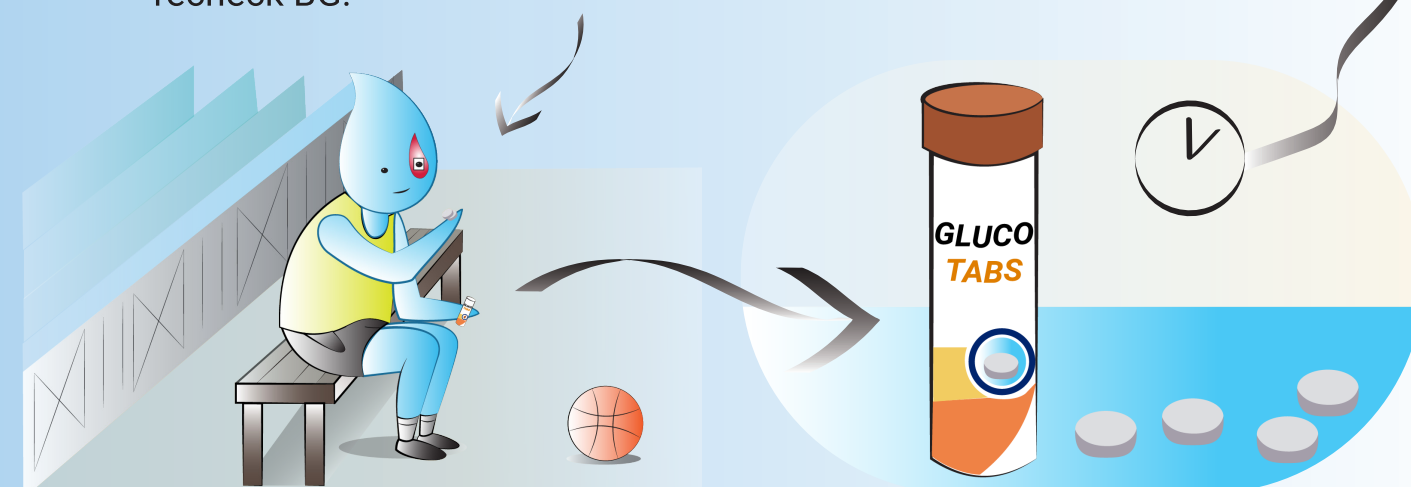
WHAT TO DO IF HYPO OCCURS

If you suspect hypo, **check the glucose levels.**



If a hypo is confirmed:

- 1 Stop exercising immediately.
- 2 Give sugar equivalent according to the '15 rule'.
Give 15g of carbohydrates, wait approximately for 15 minutes and then recheck BG.



- 3 If it is still low, take additional carbs and recheck after approx. 15 minutes.
- 4 Adapt the next insulin dosage according to the medical instructions.
Always ask about recent hypos before exercise. If there was a severe hypo within 24 hours, they should not exercise.

KEEP IN MIND



There can be a lag time in a CGM reading so check BG from blood.
Each hypo situation is different and individual.



*Use 'Hypo Chart' and 'Action Schedule' (Part +) to help you with precise steps.

SEVERE HYPO

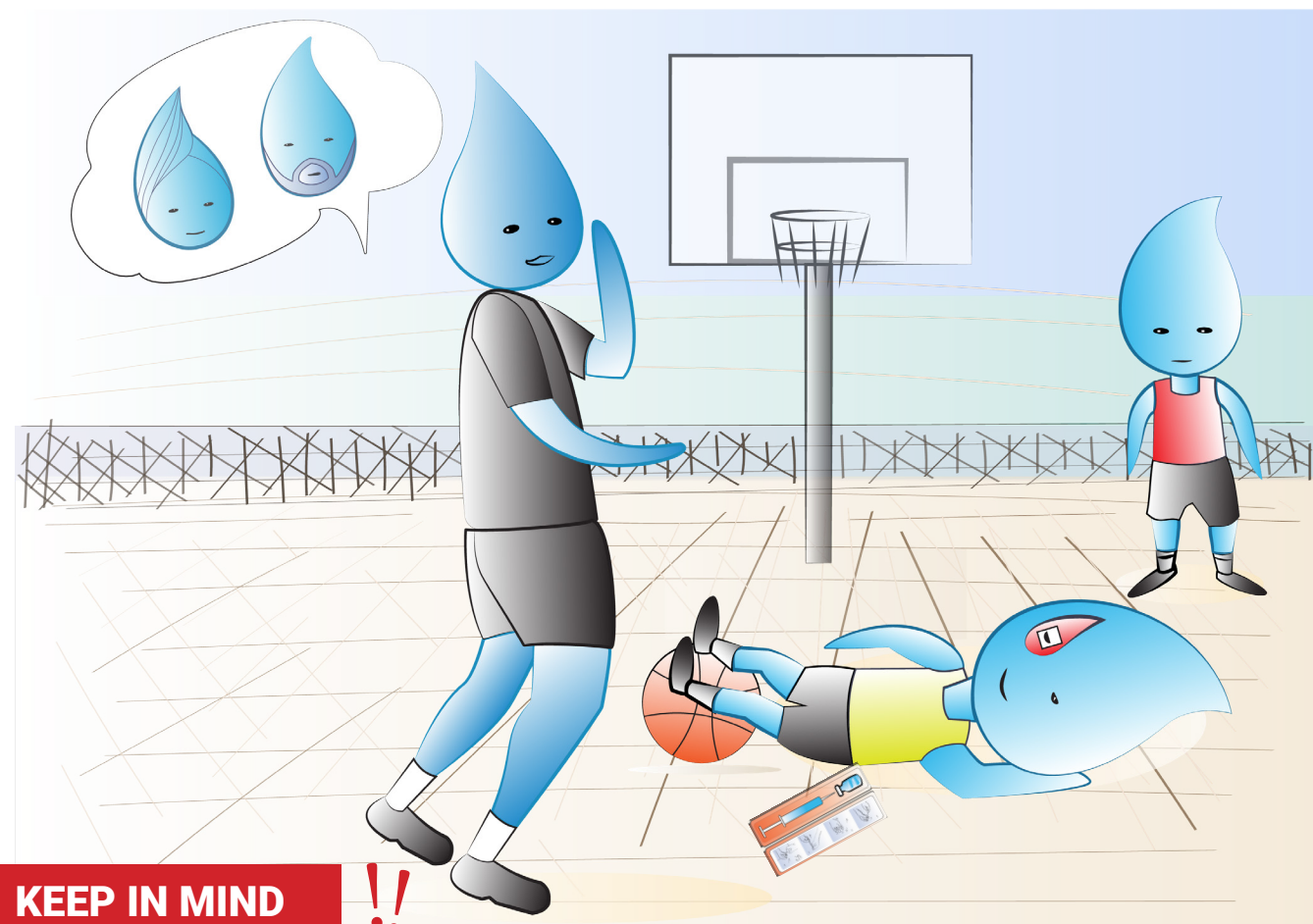
Severe hypo is defined as a hypo episode that requires **the intervention of a third party**, sometimes with medical assistance or even in hospital.

SYMPTOMS:

Confusion
Difficulties in concentrating
Blurred vision
Convulsions
Unconsciousness

WHAT TO DO IF SEVERE HYPO OCCURS?

- 1 Call for emergency medical assistance.
- 2 Administer glucagon (see *Part A3*) if you are trained in how to do this. Glucagon raises BG in someone experiencing a severe hypo.
- 3 Give a fast-acting carbohydrate drink or snack as soon as they become conscious.



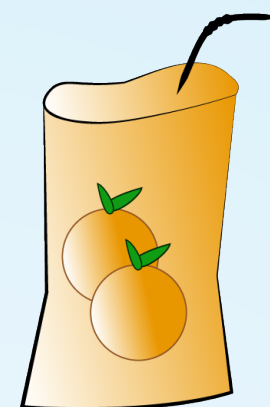
KEEP IN MIND !!

Often, the symptoms of a severe hypo can be misinterpreted with other conditions like an epileptic seizure, low blood pressure, heart stroke, drunkenness, etc.

GOOD TO KNOW

Foods containing about

15 g of rapid-acting carbohydrates



200 ml
Orange juice



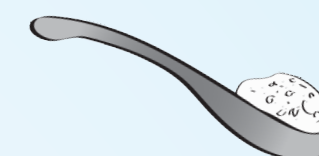
5 pieces Glucose or
Dextrose tablets



150 ml
Cola (sugary)



1/2 or 60 g
a ripe banana



1 tablespoon
sugar (white)

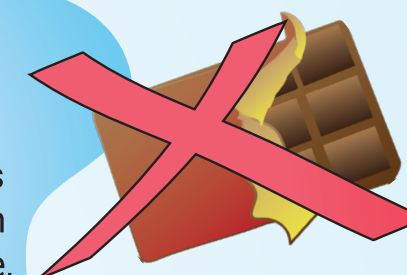


1 tablespoon
honey / jam



DID YOU KNOW?

Chocolate is not a desirable food for the treatment of hypo because, in addition to sugar, it contains fats that delay digestion and absorption of glucose into the blood. Therefore, chocolate contains slow-acting carbs.



KEEP IN MIND !!

Hypo can occur in cases such as:

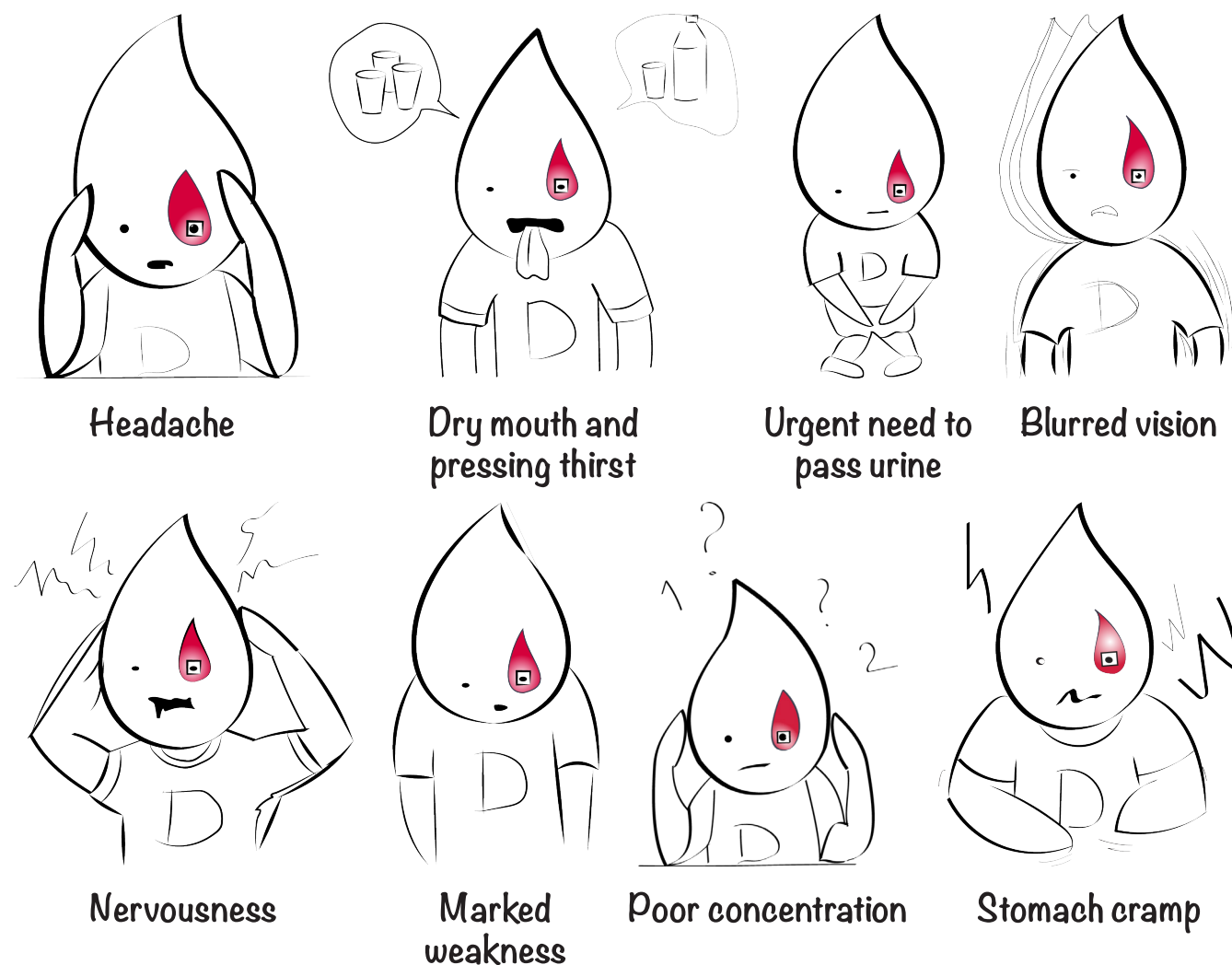
Too much insulin and diminished food intake
Physical activity
Other

UNDERSTANDING AND TREATING HYPERGLYCAEMIA

WHAT IS IT?

High blood sugar. There is no unique definition of **hyperglycaemia (hyper)**, but in terms of sport or doing exercise, levels **above 13.9 mmol/l (250 mg/dl)** should raise caution and prompt re-checking of BG. If possible, ketone levels in blood and/or urine should be checked too. High ketone levels mean that insulin is quite low or absent and, therefore, that hyper will increase further, without any sugar getting into the muscle. Indeed, spikes in blood sugar can occur spontaneously after low blood sugar events in the presence of enough insulin and, therefore, in the absence of ketones.

SYMPTOMS OF HYPER



OTHER SIGNS TO LOOK OUT FOR:

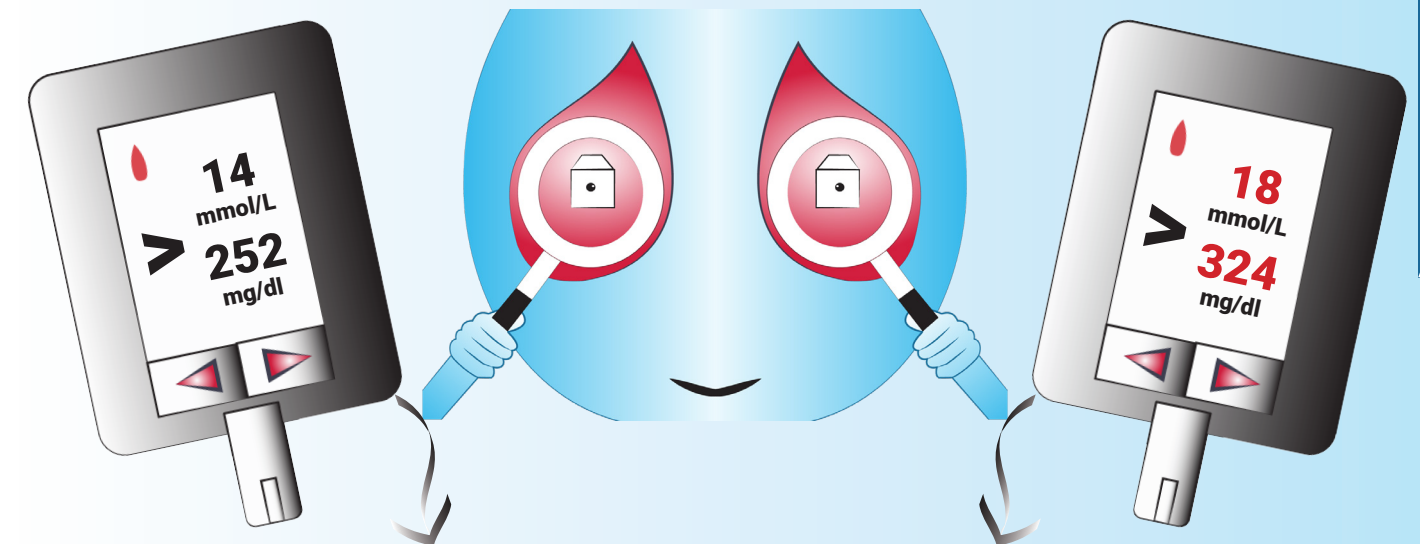
Small pupils	Clear signs of dehydration: very low blood pressure
Ketone smell (like a rotten apple)	(hypotension), dry skin (no sweat on clothes)
Poorer performance while doing sports	Tiredness
Behaviour changes	Additional individual symptoms - check "Hyper chart" (Part +)

WHAT TO DO IF HYPER OCCURS

If you suspect hyper, check the glucose levels.

If BG level is around
14 mmol/L (250 mg/dl):

If BG is above
18 mmol/l (325 mg/dl):



Recheck BG after 15 minutes and/or trends if the child has a CGM.

Check ketone levels if ketone meters or urine strips are available.

If BG is stable or on a downwards trend, continue with the sport/exercise.

If BG rises again stop the exercise.

1 Stop exercising immediately.

2 Rehydrate (ask the child to immediately start drinking at least 500 ml water in small sips).

3 Check ketone levels if ketone meters or urine strips are available.

4 Recheck BG after 15 minutes and/or trends if a CGM system is used. If it's not going down, adapt the insulin dosage according to the medical instructions.

As with hypo, symptoms may vary from person to person but, if ketones are present, the person tends to feel tired and less reactive, and it is mandatory to avoid exercise. If no ketone meter is available on the sports field, an alternative test is to smell the child's breath (rotten apple odour) and recheck BG after 15 minutes (no decrease means that insulin levels are low and ketones are present).

KEEP IN MIND !!

Each hyper situation is different and individual.

+ *Use 'Hypo Chart' and 'Action Schedule' (Part +) to help you with precise steps.

DIABETIC KETOACIDOSIS (DKA)

DKA is a hyper emergency. High BG and low insulin can cause harmful ketones to build up in the body.

SYMPTOMS:

Ketone smell (like a rotten apple)

Being very thirsty

A frequent need to pee

Feeling very tired

Confusion

Stomach - ache/cramps

WHAT TO DO IF DKA OCCURS?

- 1 Check ketones using a blood ketone monitor or urine strips, if available. If not, check BG levels and trending arrows (if CGM is available) as described before.
- 2 Rehydrate and give insulin until there is a safe level of ketones in the body (below 0.6 mmol/l).
- 3 See the physical condition; if the child is not well, seek immediate medical help.
- 4 If the ketone level is 3.0 mmol/l or above, seek immediate medical help.

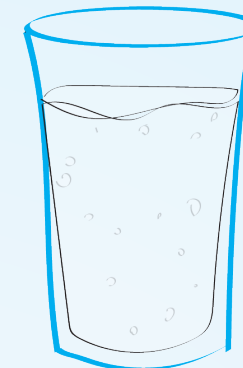


A form of hyper that is following a hypo event is called **rebound hyper**. When a hypo event has occurred the body's natural response is to release certain types of hormones that protect the body when it is endangered, in this situation from lack of glucose circulating the blood stream.

GOOD TO KNOW

The ideal drink for achieving adequate hydration and reducing hyper is plain water. When your BG levels are high, water enables more glucose to be flushed out of the blood. However, this method will likely only work if your blood sugar levels are high, such as over 10 mmol/L (180 mg/dl). You may need electrolyte replacement if you are exercising and sweating in the heat for more than an hour.

Water alternatives



Sparkling water:
refreshing, free of calories and sugar



Fruit infused water (with lemon, lime, berries):
various flavours without artificial ingredients or added sugar



Unsweetened tea:
rich in disease-fighting antioxidants



DID YOU KNOW?

Diet sodas with caffeine (Coke) can have diuretic effects. If you consume the drink in large amounts (several cups daily), you risk dehydration. If you live in a dry and hot climate, you might be more sensitive to caffeine's dehydrating effects. So water is the best way to stay hydrated.



KEEP IN MIND !!

Hyper can occur in cases such as:

Too much food intake and not enough insulin

Physical activity

Flu or any type of illness

Other



**PART FOR THOSE WHO WANT
TO GO DEEPER INTO THE TOPIC**

Here you will get some tips for better
management of diabetes during sport
activities, trainings and competitions.

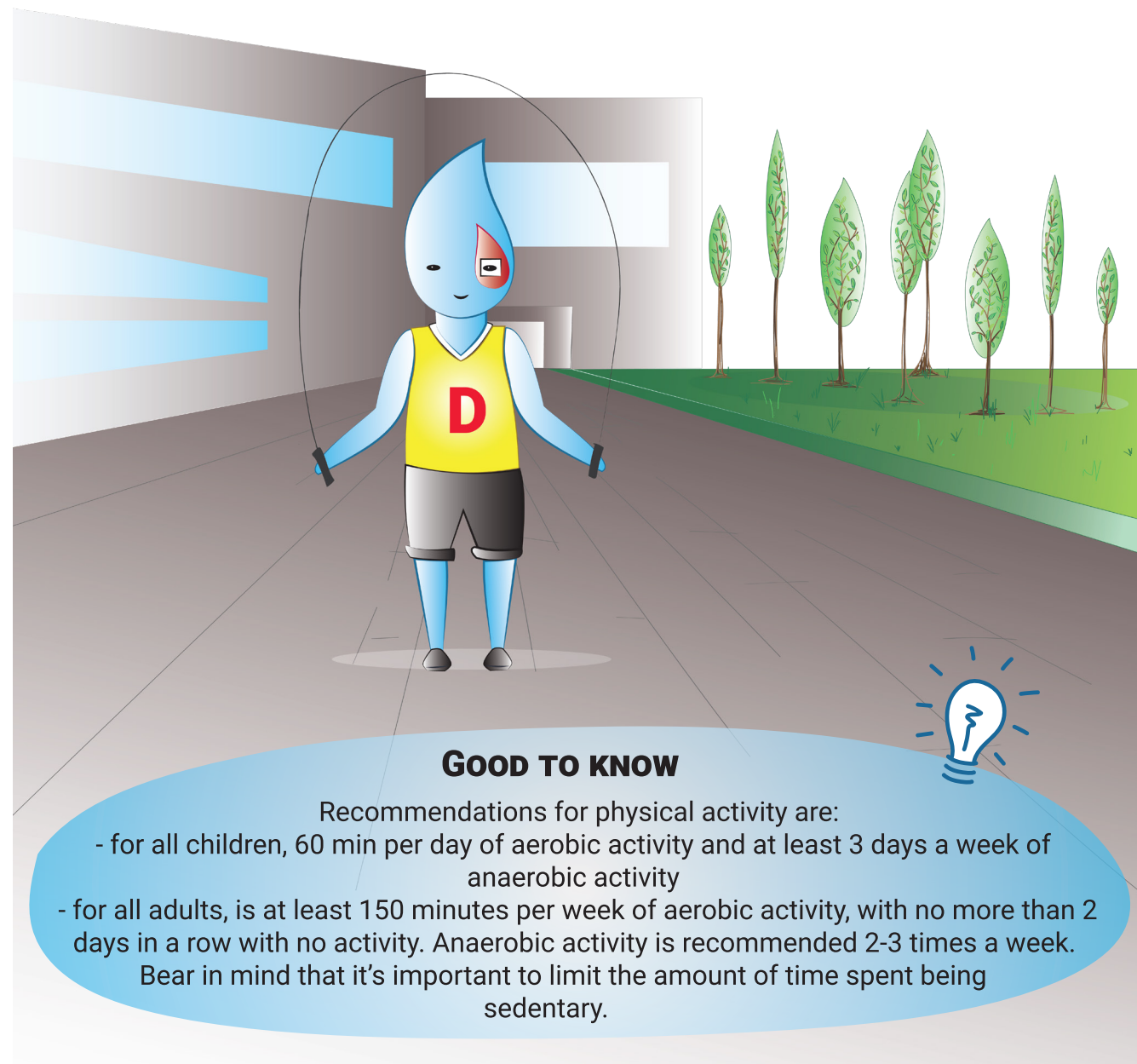
**WHAT YOU
WANT TO
KNOW**

HOW DIFFERENT SPORTS AFFECT BLOOD GLUCOSE

Exercise can be grouped into three main types: physical activity, physical exercise and sport. Different types of activity have different effects on BG levels and every person will have a unique response. In a kindergarten or school setting, exercise is usually physical activity or physical exercise, while sport can mostly be seen in different sports clubs.

PHYSICAL ACTIVITY

If a primary school or kindergarten teacher have in their care a child living with T1D, they will be present during periods of physical activity, for example, break times. This kind of activity might be unpredictable and unplanned, and is usually based around play. It might vary in intensity and duration but is usually short (up to 30 minutes) and most probably will not require adjustments in insulin dose or intake of extra carbohydrates. Nonetheless, it is best to check the BG levels.



PHYSICAL EXERCISE

Physical exercise (for example, physical education classes, school sports sessions) is usually planned and structured, therefore you can expect different changes in BG levels. These changes depend on the exercise type (aerobic vs resistance), exercise duration (short, lasting up to 30 minutes; or long, lasting for 45 minutes or more), and intensity (low, intermediate, high). Physical exercise has many beneficial effects for health and must be encouraged. Super D should check BG levels before, during and after the exercise, and follow regimen of insulin and carbohydrate intake. A teacher or a parent should advise and remind them to do so.



SPORT

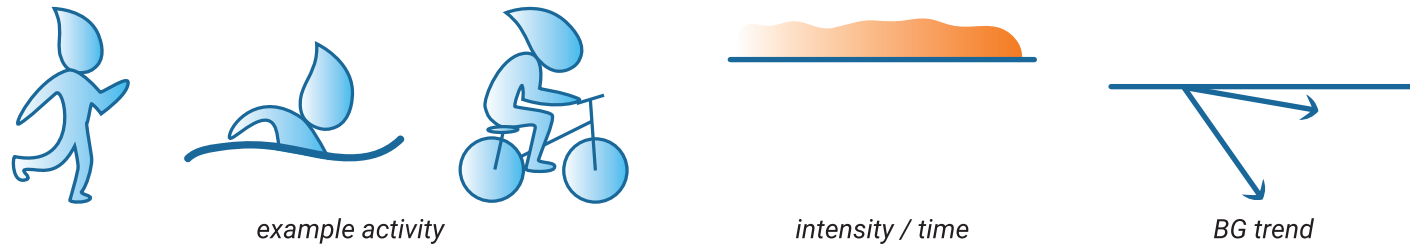
Sport is the type of physical exercise focusing on competitions and results. Therefore, training occurs in cycles related to preparation for the competitive season, the competitive season itself and periods of rest. Different phases require different patterns of carbohydrate intake and insulin dosing and, in some cases, weight management for specific sport categories. Moreover, glycaemic management of female athletes with T1D might change depending on the phase of the menstrual cycle.



AEROBIC EXERCISE

For example: running, jogging, swimming and cycling

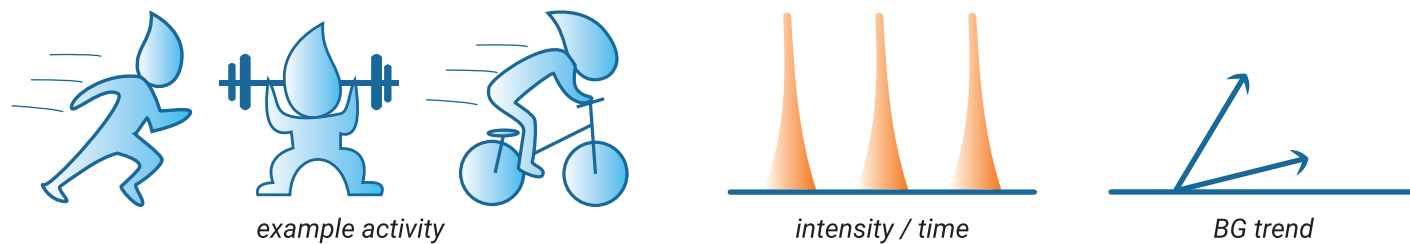
Aerobic exercise usually consists of steady physical activity of moderate intensity. This typically makes BG go down.



ANAEROBIC EXERCISE

For example: strength training, sprinting and high intensity interval training (HIIT)

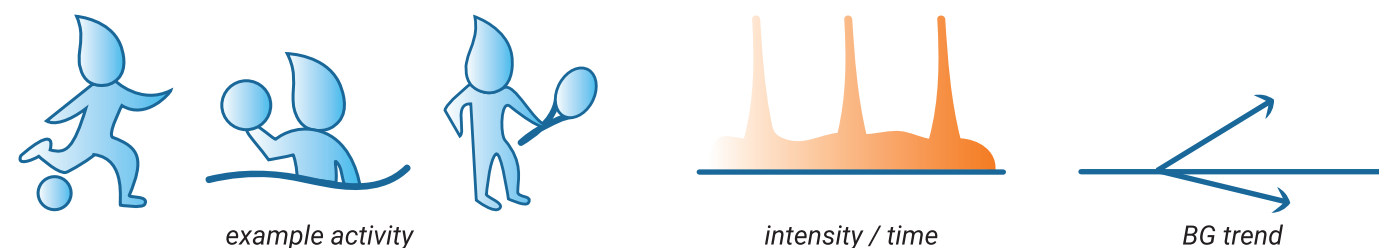
Anaerobic exercise typically consists of shorter spurts of high-intensity exercise. This usually makes BG rise.



MIXED EXERCISE

For example: football, basketball and other team sports

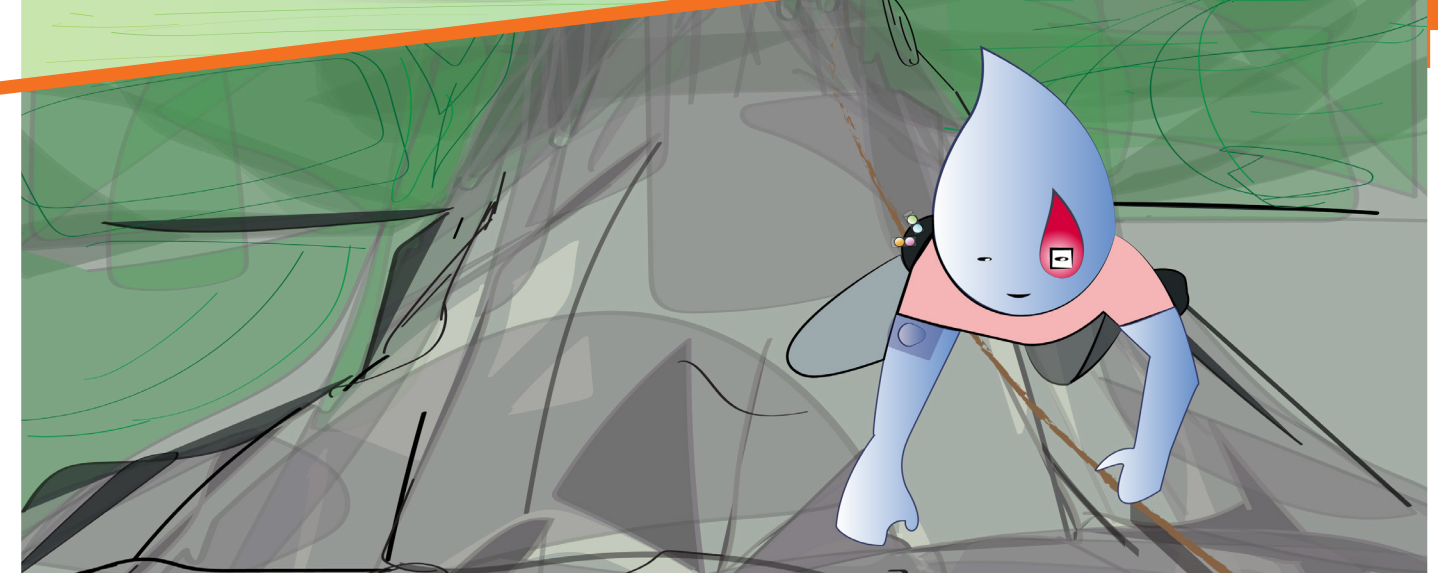
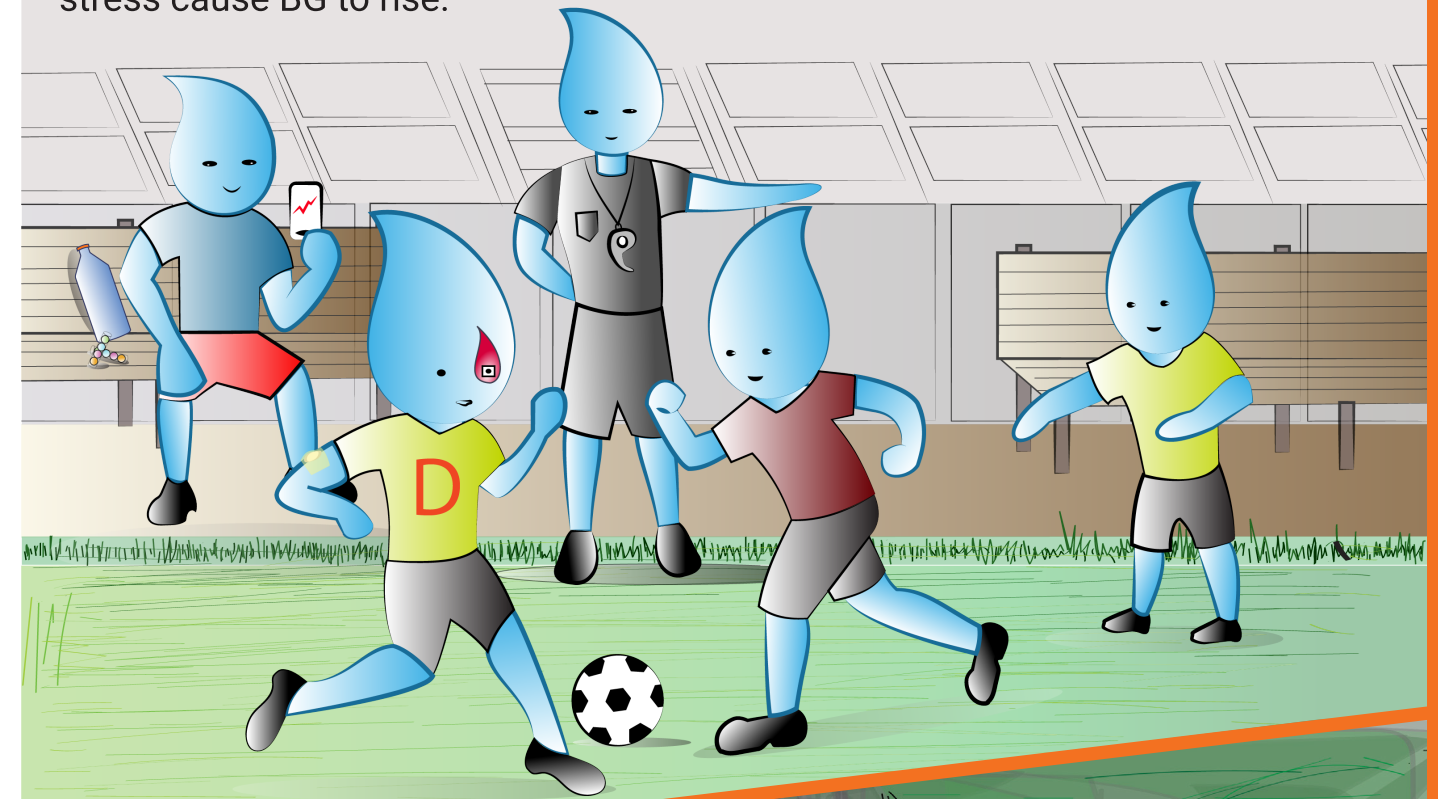
Most school or club training sessions and team sports consist of a mixture of aerobic and anaerobic exercise. Intensity often changes throughout a training session or match. This means BG can go up and down.



Mixed exercise can make it more difficult for Super D to plan the food it needs to eat beforehand. They also might need to adjust their insulin intake. With team sports it might not be easy to check glucose levels as a break in the game is not always allowed (wearing glucose sensors allows easy control at a glance (see Part A3). Fast- and slow-acting carbohydrates should always be available (see Part B3).

COMPETITIONS

Playing in a competitive match can have an effect too, because adrenaline and stress cause BG to rise.



EXTREME SPORTS

Certain extreme sports are only recommended if sessions have been carefully planned in advance, e.g., hang gliding, parachuting, diving and skiing at high altitudes.

KEEP IN MIND



The influence of different types of sports on BG is individual, and every Super D should find a way to master the management of their diabetes. See 'Activity Diary' (Part +).

HOW TO MANAGE DIABETES DURING SPORT

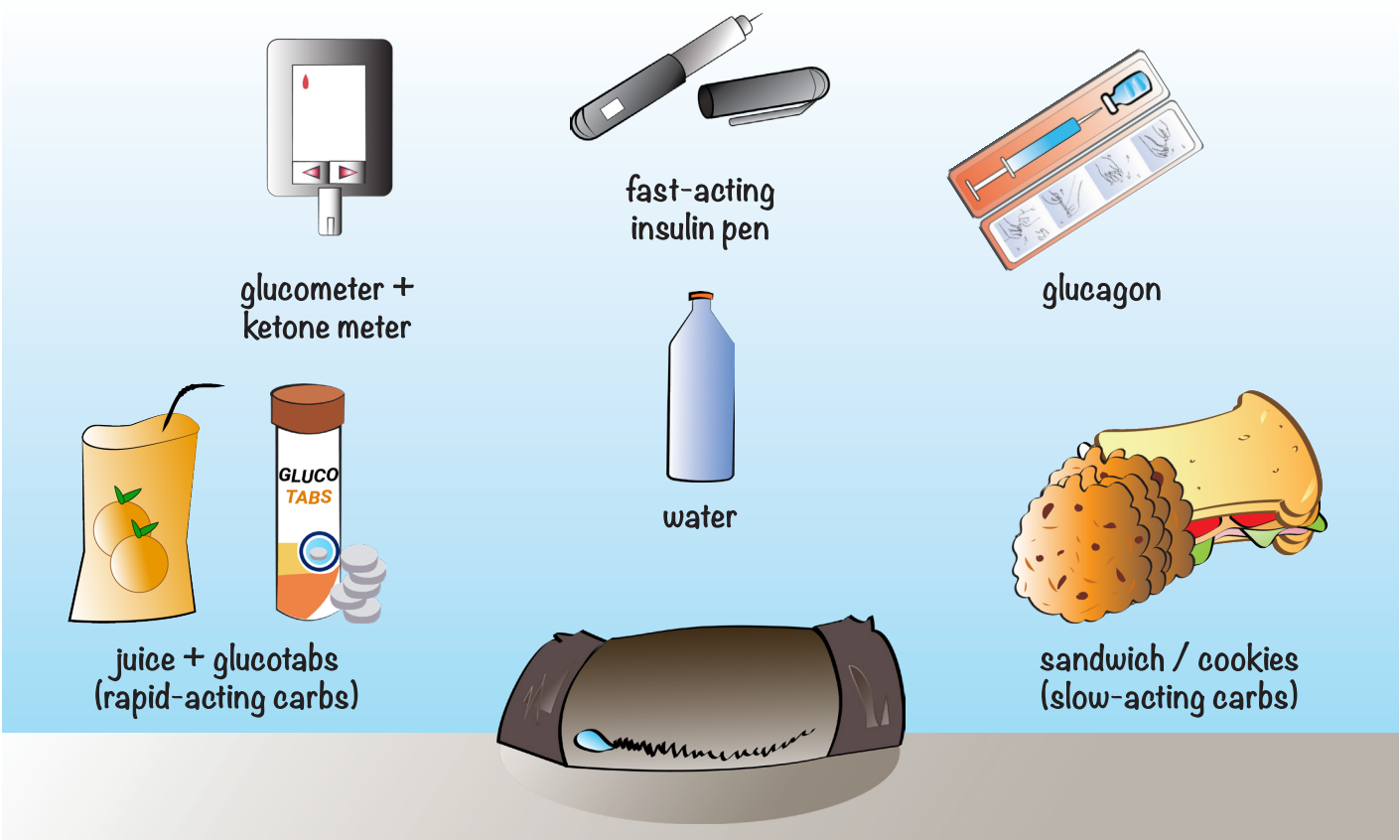
BLOOD GLUCOSE MONITORING

The most effective way to prevent hypo or hyper during sport is to monitor BG frequently. BG should always be checked before, during and after exercise. Eating carbohydrates immediately before or during sport might be required. This is highly individual and depends on the starting BG level, as well as the type, duration and intensity of the exercise, timing of exercise during the day (morning/afternoon).

Everyone’s needs are different, and often just learning by experience (trial and error technique) is the key for managing diabetes during sport. Keeping an activity diary (see Part +) together with the coach and the parents and analysing it with your doctor can help in gaining experience and developing personal strategies.

It is useful if parents provide the child’s school or club with a nutrition chart too. (see Part +).

WHAT TO PACK IN A TRAINING BAG?



KEEP IN MIND !!

If CGM and/or pump are being used, glucometer and insulin pen should also always be in the bag.

BEFORE STARTING EXERCISE

The table below indicates the actions suggested at different BG levels. This MUST be adapted according to individual reactions.

GLUCOSE LEVEL (BG)	ACTION
below 5 mmol/l 90 mg/dl	take 10 - 15 g carbohydrates (CHO)
5 - 8 mmol/l 90 - 145 mg/dl	take 0.5 - 1 g / kg / h CHO 15 - 30 minutes before exercise, especially when planning activity of intermediate-to-vigorous intensity
8 - 14 mmol/l 145 - 250 mg/dl	start the activity
above 14 mmol/l 250 mg/dl	Check ketones, if possible. If ketones lower than 0.5 mmol/l or no ketonuria, start low-to intermediate-intensity aerobic activity (postpone vigorous, anaerobic activity).
above 18 mmol/l 325 mg/dl and / or ketonuria	Do not exercise. Apply a fast-acting insulin bolus (dose) of 0.05 IU / kg.

For the majority, in case of CGM use, the target sensor glucose ranges should ideally be between 7.0–10.0 mmol/L (125–180 mg/dl) before prolonged aerobic exercise. The target might be even slightly higher for those with an increased risk of hypo. CGM are useful tools for safe exercise, especially because of the possibility of alarm use. To prevent hypo and hyper the recommendation is to set the alarm at the beginning of exercise to 5.5 mmol/L (100 mg/dl) and 10 mmol/L (180 mg/dl) because of the lag time (see Part A3).

REMINDER

Each Super D should fill out their own individual “Action schedule” (see Part +). Examples on how to fill in the charts and the PDF versions for printing can be found at sportsanddiabetes.eu.



DURING EXERCISE

Recheck glucose levels at least every 30-60 minutes if the starting levels are low or high, or in case of high-intensity activity or longer duration of activity. Recheck levels if there are symptoms that suggest low or high glucose levels, regardless of when the previous check took place.



AFTER EXERCISE

It is important to check BG levels immediately after exercise and for several hours afterwards because all types of exercise can cause delayed recovery from hypo.

ADDITIONALLY

The need for hydration and carbohydrate intake will also depend on the duration of the exercise. **The following is a rough guide** of what Super D should do.

EVENT DURATION: 30 TO 60 MINUTES

Begin exercise well-hydrated.
Take regular sips of water to replace most of the fluid lost.
Carbohydrate intake will benefit the performance of high-intensity exercise of about an hour.



EVENT DURATION: 1 TO 3 HOURS

30 g - 60 g carbohydrates per hour of exercise
Drink frequently at a rate that is comfortable and practical to replace most of the fluid lost by sweating.

EXERCISE DURATION: 3 HOURS +

30 g - 60 g carbohydrates per hour of exercise. When more than 70 g carbohydrates per hour are needed, use a mixture of sources (i.e., 2:1 ratio of glucose and fructose).
Drink frequently at a rate that is comfortable and practical to replace most of the fluid lost by sweating. You may also need to increase sodium intake.



STRATEGIES FOR MANAGING DIABETES DURING SPORT

REDUCING PRE-EXERCISE INSULIN BOLUS BY 50-70% (WHEN EXERCISE IS WITHIN 90-120 MIN OF A BOLUS)

- + Reduces **hypo** during exercise and risk of **rebound hyper**
- + Reduces carbohydrate (CHO) requirement
- Needs planning
- May result in starting exercise with raised BG

CHO FEEDING PRE-EXERCISE AND DURING EXERCISE

- + Reduces **hypo** during exercise
- + Useful for unplanned or prolonged exercise
- Not always practical

REPEATED LOW-DOSE CHO FEEDING DURING EXERCISE RATHER THAN A SINGLE CHO SHOT

- + Reduces risk of **hyper** during exercise
- + Useful for unplanned or prolonged exercise
- Not always practical

REDUCING PRE- AND DURING EXERCISE BASAL RATE BY 50-80%

- ### SETTING HIGHER TEMPORARY TARGET BG PRE- AND DURING EXERCISE*
- *Only for closed-loop systems
- + Reduces **hypo** during exercise and risk of **rebound hyper**
 - + Reduces carbohydrate (CHO) requirement
 - Requires planning as basal rate adjustments may need to be made at least 60 min before starting exercise

TAKING SMALL INSULIN BOLUS DOSE POST-EXERCISE

- + Prevents adrenaline induced **hyper** post-exercise
- **Hypo** might occur

REDUCING LONG-ACTING INSULIN ANALOGUE DOSES BY 20-40% ON THE TRAINING DAY

- + Reduces **hypo** during exercise
- + Reduces carbohydrate (CHO) requirement
- Requires planning as reduction of long-acting insulin will affect whole period of insulin activity
- May cause raised fasting BG

REDUCING POST-EXERCISE BASAL INSULIN BY 20% FOR 6 HOURS

- + Reduces nocturnal **hypo**
- May cause raised fasting BG

AVOIDING INSULIN PUMP STOP WHEN UNNECESSARY

- + Reduces **hyper** during exercise
- + A continuous flow of insulin is given, allowing the muscle best use of glucose
- **Hypo** might occur so adjustments might be needed in next sessions

PRE-EXERCISE OR POST-EXERCISE SPRINT

- + Reduces starting exercise **hypo** and immediate postexercise **hypo**
- Effect limited to shorter and less intense exercise
- No effect on **hypo** during exercise

LET SPRINTS COMPENSATE FOR LOW BG LEVELS ATTAINED THROUGH AEROBIC EXERCISE

- + Reduces **hypo** during exercise and risk of **rebound hyper**
- + Does not allow a huge stress-related glucose peak
- Some training is needed

TAKING CAFFEINE BEFORE EXERCISE

- + Reduces **hypo** during exercise
- + Reduces carbohydrate (CHO) requirement
- Impaired fine motor control
- May affect recovery and sleep

KEEP IN MIND



Sometimes hypers can occur because of an overtreated past hypo (known as rebound hyper). Optimal timing and percentage of the above mentioned reductions have to be individually determined. They depend on the type of training, the remaining insulin from the bolus applied within the previous two hours before training, consuming a CHO rich meal after the training, etc.

It's important to recognise why some hypos or hypers have occurred. A few adjustments may be needed for a strategy to be suitable for each Super D. As already said this is not exact science, a trial and error technique is the best, no matter how frustrating that can be.

Each Super D should keep their own "Activity diary" (see Part +).

SPORTS NUTRITION

For people living with T1D, nutrition is especially important because different foods affect BG levels in different ways. Carbohydrates (carbs) have a critical role to play in helping to maintain stable BG levels. The child's diabetes team will create an individually tailored plan. This often incorporates carb counting, which means the child can balance their insulin doses with the amount of carbs they eat and drink.

Sports nutrition should primarily support the healthy development of young athletes, ensure stable blood sugar levels, and then serve the purpose of improving sports performance.

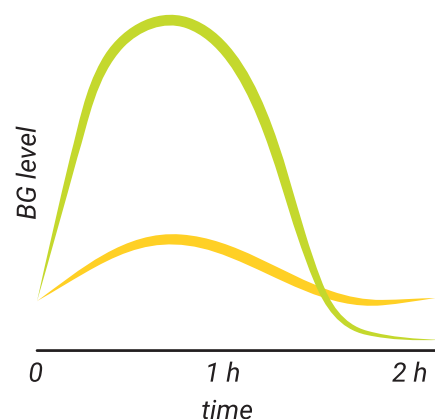
CARBOHYDRATES (CHO)

A child's body, in contrast to an adult's body, relies more on fat consumption as a source of energy during aerobic activities. Also, in high-intensity activities, children rely less on anaerobic sources than adults. Therefore, it is believed that children should not strive for a high percentage of energy intake derived from carbohydrates, but certainly this percentage should be more than 50%.

After exercise, if the BG level tends to fall, it is necessary to start consuming carbohydrates as soon as possible, both to maintain stable glycaemic values and to restore glycogen stores in the liver and muscles.

GLYCAEMIC INDEX (GI)

All carbohydrates have a Glycaemic Index (GI) value, which indicates how rapidly they raise BG levels. Carbohydrates with a low GI are digested more slowly than those with a high GI and therefore release glucose gradually and steadily. High GI foods can be used to raise BG levels when a child is experiencing a hypo.



HIGH GI CARBOHYDRATES

are recommended during and after activity. Intake of high GI carbohydrates within 1 hour before exercise is not recommended due to the possible induction of hyper at the beginning of activity.

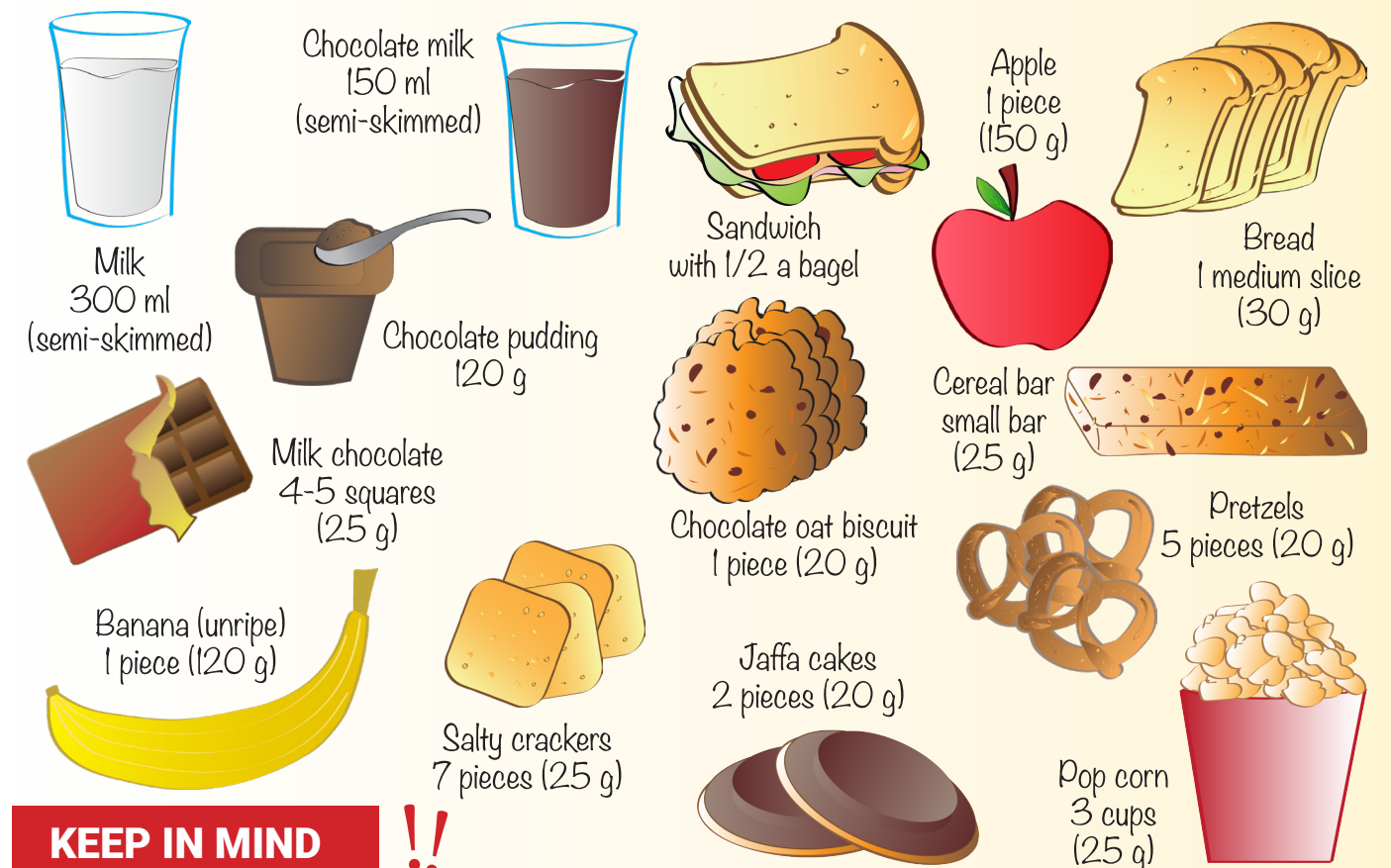
LOW AND MEDIUM GI CARBOHYDRATES

are considered to be the basis of a balanced diet, and are recommended before the start of activity because they cause a gradual release of glucose into the bloodstream.

FOODS CONTAINING ABOUT 15 g OF RAPID-ACTING CARBOHYDRATES



FOODS CONTAINING ABOUT 15 g OF SLOW-ACTING CARBOHYDRATES



KEEP IN MIND !!

This is just a rough guide. We recommend to follow the instructions on the package.

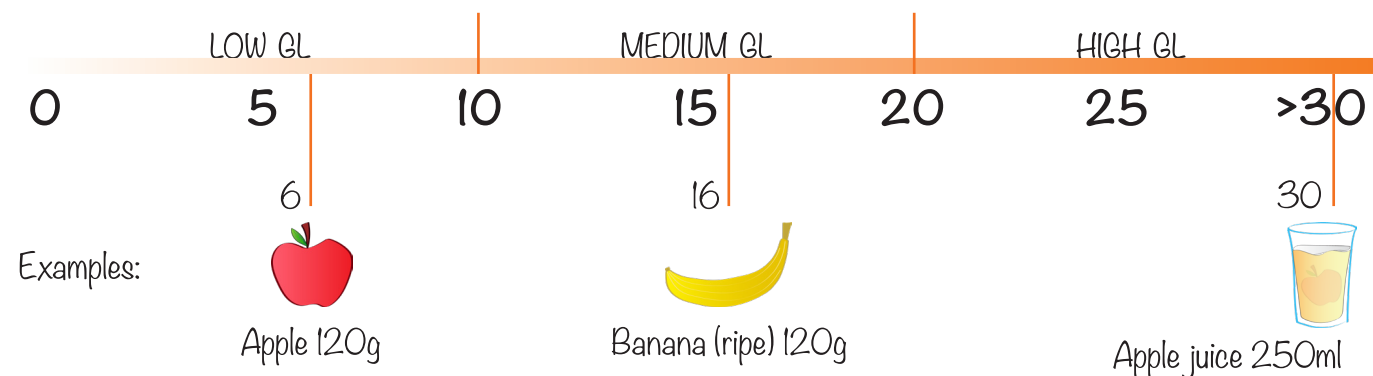
GLYCAEMIC LOAD (GL)/CARBOHYDRATE LOAD (CHO LOAD)

Glycaemic load is a measure that takes into account the amount of carbohydrate in a portion of food together with how quickly it raises BG levels (GI). Whereas the GI is a good way of making food choices, Glycaemic load helps to work out how different sized portions of different foods compare with each other in terms of their BG raising effect.

The Glycaemic load (GL) is worked out by the following formula:

$$GL = \frac{\text{GI of food} \times \text{grams of CHO in serving size of food}}{100}$$

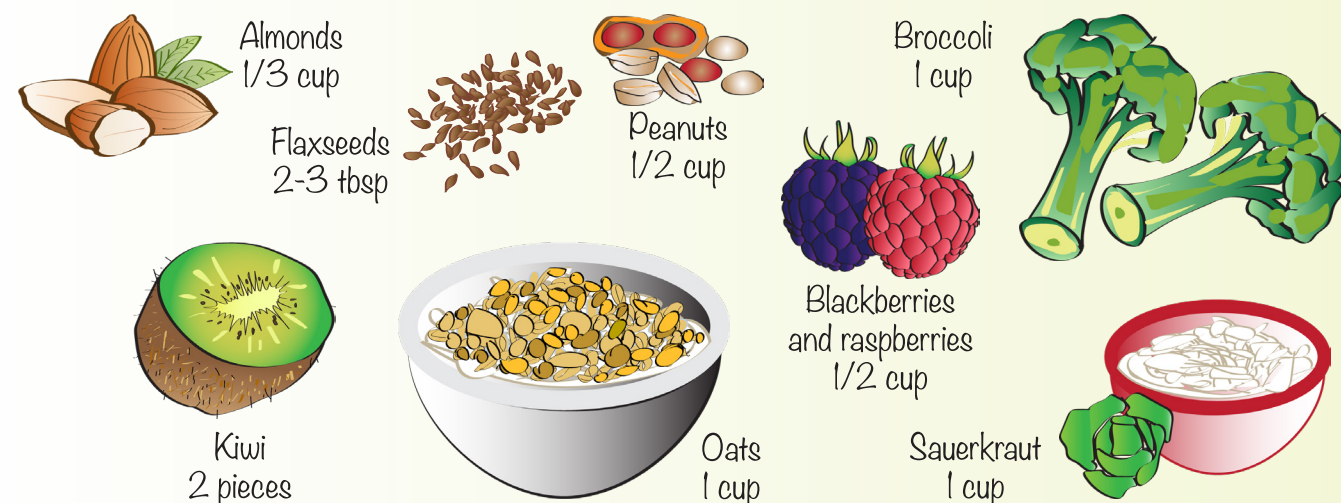
What counts as a high and low glycaemic load?



DIETARY FIBRE

Carbohydrates also include dietary fibre, which has a role in regulating glycaemia in people living with diabetes, so it is recommended to choose high-fibre carbohydrates as much as possible.

SERVING CONTAINING > 5 g FIBRE



ENERGY INTAKE

Energy needs depend on body weight and height, the type of sport, as well as the duration of training. Athletes who practice endurance sports have the greatest needs, while the requirements of some other athletes, such as sprinters, are two to three times less. The range of recommended energy intakes is wide, so an individual approach is needed, depending on the athlete, but also the sport.



DID YOU KNOW?

Energy expenditure per kilogram of body weight while walking or running at the same speed is higher in children than in adults. Additionally, the difference is greater the younger the children are. Thus, a seven-year-old child will expend 30% more energy than a young adult while running or walking at the same speed.

PROTEINS

Because of their growth and development, children need to ensure a positive nitrogen balance, i.e., they need to ingest more than they consume. The younger the child, the greater the need for protein, and the guidelines are:



Children from 7 - 10 years
1.2 g proteins/kg body weight daily

Children from 11 - 14 years
1 g proteins/kg body weight daily



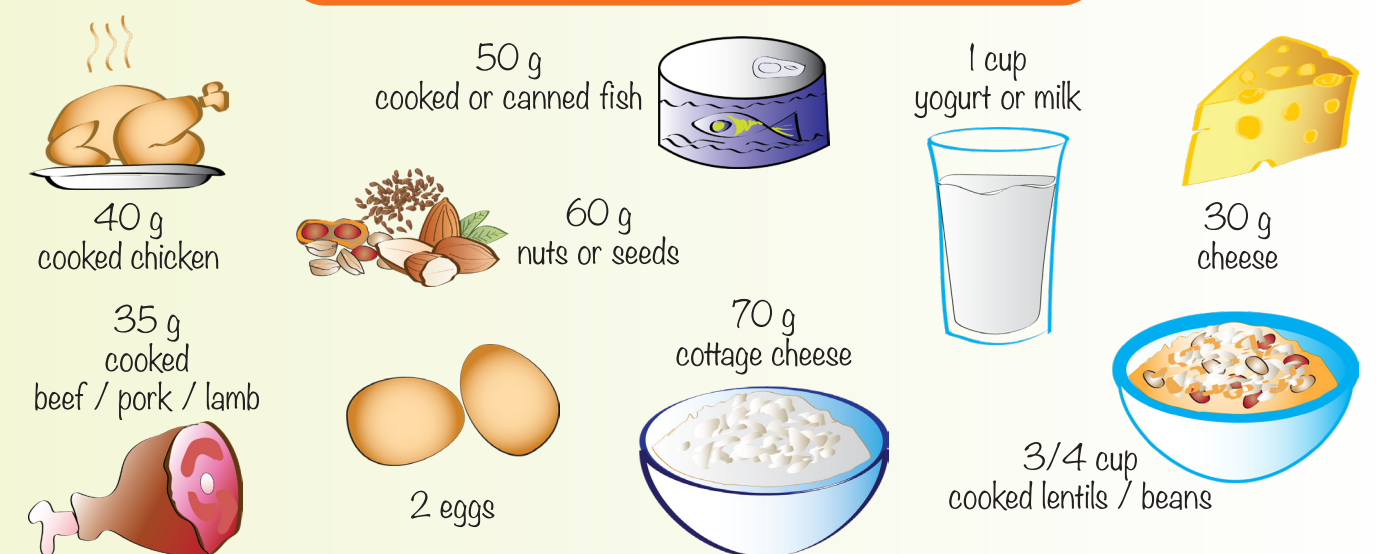
Adolescents from +14 years and adults

1.2 - 1.4 g of proteins/kg body weight daily for endurance sports
1.6 - 1.8 g of proteins/kg body weight daily for strength sports



It is very important that the diet is adequate in both quantity and composition, so that all proteins are ingested through the diet. Protein supplements are recommended only for sports where there is the highest risk of inadequate intake (gymnastics). Thus, the recommendation for protein intake is the same as for adult athletes and amounts to 12-15% of daily energy intake.

WHAT DOES 10 g OF PROTEIN LOOK LIKE?



FATS

For children as well as adults, the recommended fat intake is around 25-30% of daily energy intake. The type of fat consumed is very important, so unsaturated fats are preferred, while the intake of saturated and trans fats should be limited.

VITAMINS AND MINERALS

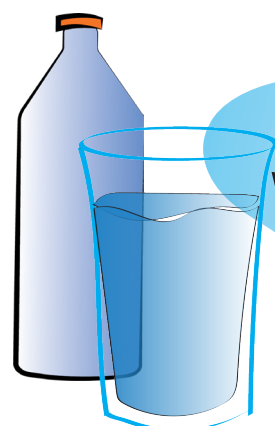
Vitamins and minerals are very important for good health and good sports results, but their supplementation is not justified. Most athletes, due to higher energy expenditure and higher energy intake, also consume higher amounts of vitamins and minerals than recommended. Athletes who eat adequately do not need supplements, with the exception of vegetarians, children who avoid eating fruits and vegetables, and children with acute illnesses.

In the case of minerals, special attention should be paid to calcium and iron, the lack of which is often noticed and can have serious consequences. Calcium is an important mineral for building bones, especially in the phase of intensive growth and development. It is ingested through milk and dairy products, and insufficient intake is associated with more frequent fractures and reduced bone mineral density.

Adequate iron intake is important during puberty and adolescence, when menstrual cycles are established (which loses a significant amount of iron). Adequate iron status is especially important in endurance athletes, and anaemia can occur in severe cases of deficiency. Iron intake through the consumption of foods of animal origin, such as meat, entrails and fish, is recommended, because it is absorbed more significantly than iron ingested by vegetables. In addition, absorption may be increased by combining iron-containing foods and vitamin C-containing foods.

HYDRATION

The fluid needs of child athletes mostly depend on the amount of sweating, which increases with more intense activity, high temperatures and high humidity. Children are more susceptible to heat stress than adults, so fluid replacement is extremely important for this age group. Indicative recommendations for fluid intake in child athletes are 2 to 2.5 l.



DID YOU KNOW?

Water loss of only 1% of body weight reduces endurance in children. For a child weighing 30 kg it is 300 ml and that amount is lost in 20-30 minutes. Therefore, adequate hydration at the beginning of the activity and drinking enough fluids during the activity are especially important.

BUILD A BALANCED PLATE

1/4

FISH, BEANS, EGGS, MILK, YOGHURT,
CHEESE, TOFU, MEAT

1/2

PLENTY NON-STARCHY VEGETABLES

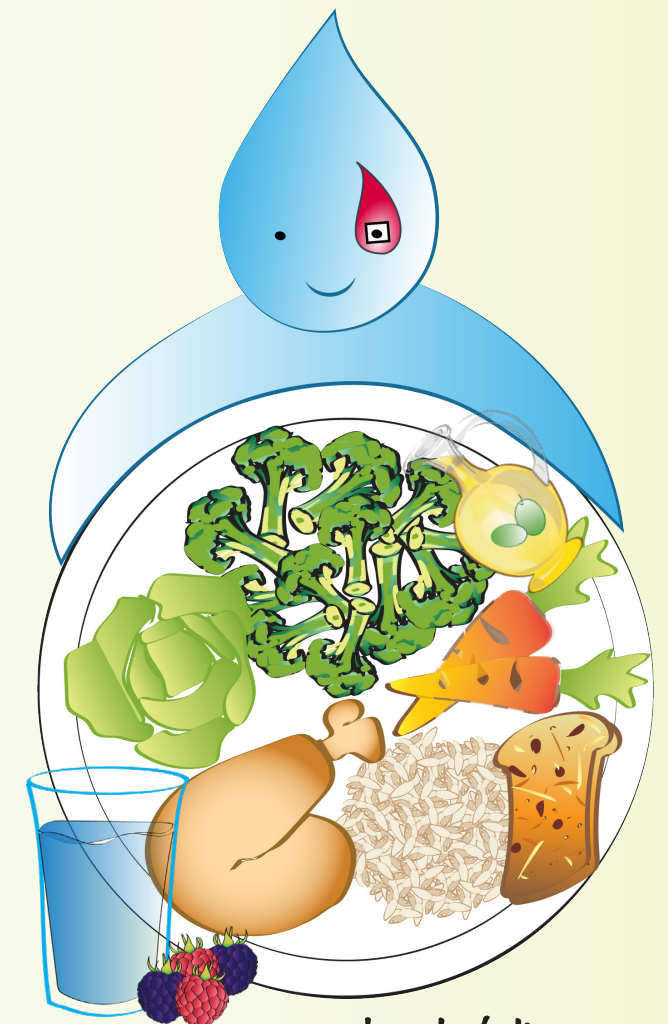
1/4

WHOLE WHEAT BREAD, OATS, BROWN
RICE, PEAS, SWEET POTATO, CORN

AVOCADO, NUTS, SEEDS, OLIVES AND
THEIR OILS

FRUIT

WATER



lunch / dinner



snack

breakfast



KEEP IN MIND



Sugar free doesn't mean carbohydrate free. Although no sugar is added, the product contains other types of carbohydrates such as starch. If you're trying to choose between a standard product and sugar-free product, look at the food label. If the item labelled sugar-free has a lot fewer carbs, it might be the best choice. If there's little to no difference in carbs, then pick one based on price or taste.

TRAINING CAMP AND TRAVELLING

If a child living with T1D is travelling with the school or going to a training camp, then it is vital to prepare well. This means having a protocol, an action schedule, a hypo and hyper chart, a nutrition chart and an overnight chart, if relevant.

PROTOCOL

A protocol is a set of guidelines to manage the child's diabetes. The protocol is created and signed by three parties: the child, the parent and the coach. This is how it works...



THE CHILD WITH DIABETES

Gives input for the 'Action schedule'. (see Part +)

Always shows an actual BG reading when asked by the coach.

Follows the insulin regimen provided by their own diabetes team and parents.

THE PARENT

Creates the 'Action schedule' with child. (see Part +)

Is always available by phone to help the coach if needed.

Trusts the protocol and action schedule, as well as the good intentions of the coach and the child.



THE COACH

Asks to be shown an actual BG reading if they don't trust the one given by the child with diabetes.

Follow the 'Action schedule', according to the BG measurement.

Will take care of the child when medical help is needed, as they do for all pupils.

TRAVELLING ABROAD

Children should bring documentation, such as a diabetes passport (if they have one), explaining that they have diabetes and the type of medication they take. This shows airport personnel that they need to have needles and other diabetes-related equipment in their cabin bag.

Insulin must be placed in the cabin bag and not in hold luggage, as it will freeze and become ineffective. Always try to keep insulin at 4 - 25°C but, even at temperatures of 25 - 37°C, insulin will retain its original properties for 3 months, and effectiveness will decrease by 1 - 2% at most.



REMINDER

In the Part + of this guidebook you can find the charts that can help with making the 'Action schedule' but also other charts that can help with the protocol when travelling. Each Super D can fill them, with parents if needed and share them with coach, teacher or trip guide.

For more information on travelling with diabetes, check:
www.idf.org/our-network/regions-members/europe/publications-and-resources/76-travellinganddiabetes.html



INSULIN AND ANTI-DOPING REGULATIONS

Insulin is a life-saving medicine for people living with T1D. Moreover, insulin allows athletes living with T1D to compete with safe BG levels and maintain good health, like any other athlete who does not need to use insulin.

In addition to BG regulation, insulin has many other effects on tissues and organs, like muscles, adipose (fat) tissue or liver, influencing the metabolism of carbohydrates (sugars), lipids (fats) and proteins.

It may surprise you, but because of its effects on muscles and stamina, some healthy athletes use insulin to enhance their performance in strength and endurance sports. This is prohibited and considered to be doping.

HOW DOES INSULIN AFFECT AN ATHLETE'S PERFORMANCE?

Insulin has an effect on muscles and stamina by:

- enhancing glycogen stores (sugar stored in the organs and tissues), making more energy available for muscle work
- promoting the entry of amino acids (protein's building blocks) into cells and the formation of proteins
- inhibiting muscle reduction and catabolism, thereby blocking the 'breaking-down' effect
- promoting muscle growth
- improving recovery



DID YOU KNOW?

According to the World Anti-Doping Agency (WADA), insulin is classified as a doping substance listed under S4 section named 'Hormone and Metabolic Modulators' of the WADA Prohibited List, with the directive to be prohibited at all times, meaning they are prohibited 'In- and Out-of-Competition.' The WADA Prohibited list is updated annually. It is the athlete's responsibility to be informed about prohibited substances and methods and to act in line with the anti-doping regulations.

WHY IS INSULIN CONSIDERED A PROHIBITED DOPING SUBSTANCE?

According to WADA, any substance or method that meets two of the three defined criteria is considered prohibited. The criteria are: substance or method enhances or has the potential to enhance sports performance, has an actual or potential risk for athletes' health, or violates the spirit of sport.

Athletes should remember that insulin used as doping is not only a violation of fair play values but can be life-threatening!

THERAPEUTIC USE EXEMPTION (TUE)

In situations when, for health reasons, an athlete needs to use medication that's on the WADA prohibited list, they should apply for a Therapeutic Use Exemption (also known as TUE) certificate. TUE approves athletes to take those medications while complying with the anti-doping rules.

WHEN AND HOW TO APPLY FOR TUE?

This section will give you quick insight into how to apply for TUE. For more detailed information, please consult the additional links on our website.

All athletes competing at national or international level can be tested at any time by a relevant anti-doping organisation. Athletes subject to doping control with diabetes on insulin require a TUE.

To get a TUE, athletes do not apply to WADA, but to National Anti-Doping Organisations (NADOs) for national-level athletes or to their International Federations (IFs) for international-level athletes.

TUE APPLICATION STEPS:

- 1** Athletes apply for a TUE as soon as they are prescribed insulin or other prohibited substances and methods.
- 2** The TUE form should be completed by a prescribing physician, who is responsible for providing supporting medical evidence.
- 3** The TUE application can be done using ADAMS (Anti-Doping Administration & Management System) or submitted directly to the athlete's anti-doping organisation.
- 4** Within 21 days of receiving the athlete's application, the TUE Committee (TUEC) makes a decision if TUE is granted or not.
- 5** In case of denial, athletes have the right to appeal against the decision.



KEEP IN MIND



If you want to know more check the ADEL - WADA Anti-Doping Education and Learning platform. ADEL enables broad anti-doping education for athletes, coaches and individuals who promote clean sport and anti-doping. With ADEL you can find many useful resources like webinars, online courses, fact sheets and checklists. All the links for this topic can be found at www.sportsanddiabetes.eu.

**PART FOR EACH
STAKEHOLDER SEPARATELY**

Here you will find out the tips that
can help you how to cope, help and be
supportive

WHAT WILL HELP YOU COPE



FOR YOUTH: IT'S GOOD TO TALK

TALKING TO FRIENDS & TEAMMATES

Your friends and teammates might not know anything about diabetes. So be prepared to talk to them about it and answer questions.

Practise in advance what to say about your diabetes and your routine in case someone asks you.

Be aware that you might get some uncomfortable questions or remarks.

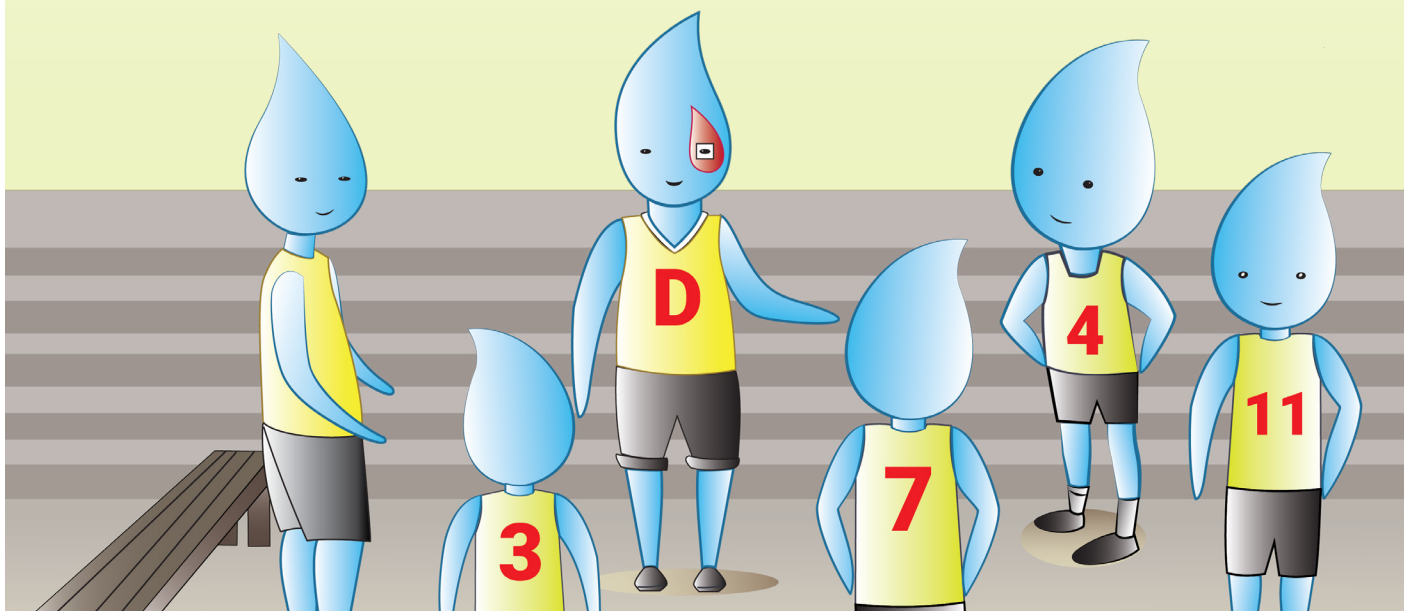
Use an assertive communication style, where you make sure you express your thoughts, while being aware of other people's emotions.

Be aware of your own emotions. How does talking with others about your diabetes make you feel?

Film a video (no longer than 10 minutes) that explains your life with diabetes, so that your friends can learn more about you. Let them ask questions afterwards.

Show empathy to other people's reactions.

Don't make all your conversations about diabetes. You are so much more than your diabetes and need to let others discover this as well.



TALKING TO TEACHERS & COACHES

Learn not to be overly demanding. If you need something for your diabetes, explain the situation nicely.

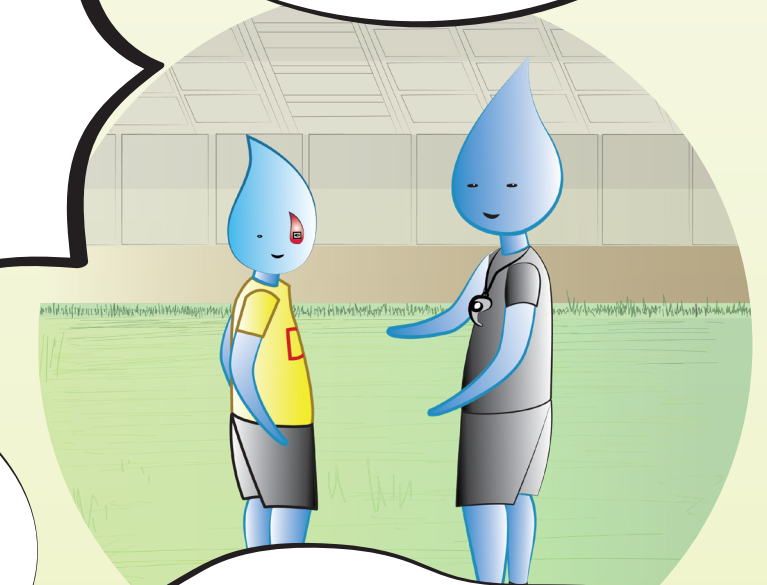
Talk to your teachers/coaches in advance and prepare them for what you have to do in recurrent situations (hypo/hyper, using a pen, testing BG in class, treating your hypo, alarm on your CGM, etc).

If you are in a training session and you feel that you can't do an exercise, politely ask your coach for a break and explain why you need it.

If someone does react negatively, talk about it with your coach and teammates at an early stage. Otherwise, tension might build up and affect your interactions.

Ask for help if you don't feel OK. No one will judge you or think that you are not fit for the team.

Keep in mind that everyone feels frustrated, sad or happy sometimes. You are no different.



IMPORTANT!
Don't push too hard to show everyone else that you are better. Know your physical limits.

LEARN HOW TO COPE

You might feel that diabetes has come into your life as a punishment or that it's something horrible that has changed everything. It does bring challenges: from your routine to the conversations with your parents, from the way your peers see you to the way your teachers look at you. You might feel it is limiting you and giving you physical pain when testing BG, injecting insulin or changing your infusion set.

It's normal and OK to feel sad and angry at times. Here are some things you could do to help you cope...

Talk to your parents or carers about how you feel and let them know how they can help you.

Be willing to learn about your diabetes. Once you get to grips with all the information, you will feel more comfortable about yourself.

If you experience fear of hypo, make sure you talk about it so that you can find a solution with your parents and doctor.

Some young people with diabetes struggle with their body image. Write a list of all your qualities and skills. When you have negative thoughts about yourself, share them with the people close to you. Don't bottle things up.

You might feel that diabetes is making you gain weight, and you might try to eat less or even binge eat and then vomit. If this is happening to you, talk about it.

Don't be afraid to pursue the sports you enjoy. Diabetes does not stop you from doing sports or anything else that you want to achieve!

Learn how to make diabetes your friend so that you can form a great team for a lifetime. If you have a good attitude towards your diabetes, so will everyone else.

You do not need to prove yourself to anyone. Just be yourself!

Enjoy your life, do fun things, make friends, and remind yourself that you are a normal person.



Place for your thoughts and questions:

FOR TEACHERS & COACHES: COACHING A CHILD WITH T1D

As a sports teacher or team coach, naturally you want the best for the team. Having a child living with diabetes on the team does not need to be challenging as long as everyone is informed and prepared.

If you are teaching or coaching a child with T1D, remember that they have the right to be there and that sport is very beneficial for their body, mind and development. At the same time, it is normal to feel anxious about whether they will have low blood sugar, whether they will perform well or what to do if they get injured.

The best thing to do is to learn as much as you can about sports and diabetes, know what to do if there is a medical emergency, as well as how hard you should push for performance.

Talk to the child's parents or carers about how you can help them in case of a crisis.

TALKING TO CHILDREN WITH DIABETES

Be supportive. Make sure they know that you are aware they have diabetes and that you are there for them.

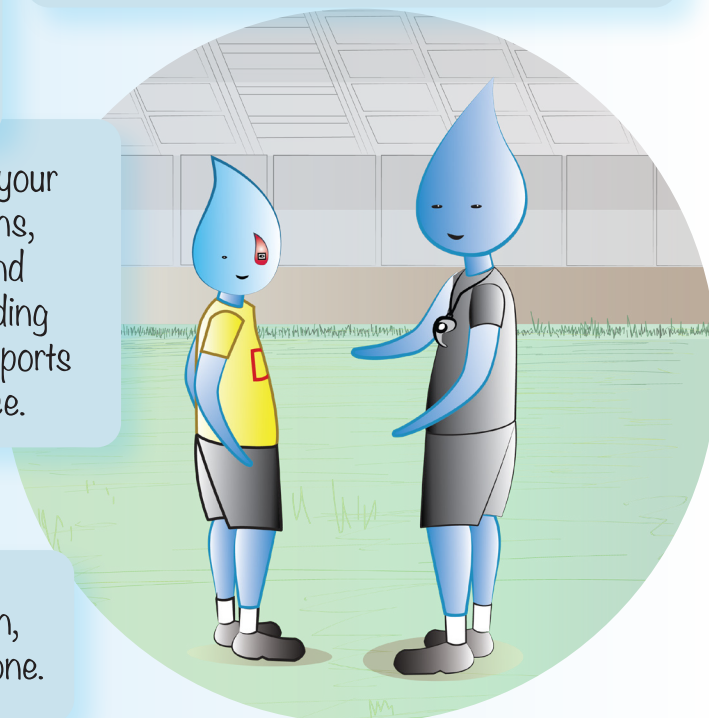
Give feedback regardless of diabetes. The child is there because they have a passion for that sport. They want to perform just like everyone else on the team.

If you need to make a diabetes-related comment, make sure you do this one-to-one with the child or their parent.

Be aware of your nonverbal communication, e.g., gestures, facial expressions and voice tone.

Be aware of your own emotions, thoughts and biases regarding diabetes and sports performance.

If the team player with diabetes doesn't feel well, don't push them. At the same time don't judge or punish them by not allowing them to take part.

**TALKING TO PARENTS**

Be assertive. Ask questions if needed.

Don't forget it is not only about diabetes. Help them understand how their child can improve their sports performance, just like everyone else.

If you run a team where parents get involved, make sure the other parents know about diabetes. Be available to answer questions because this will help to improve everyone's understanding.

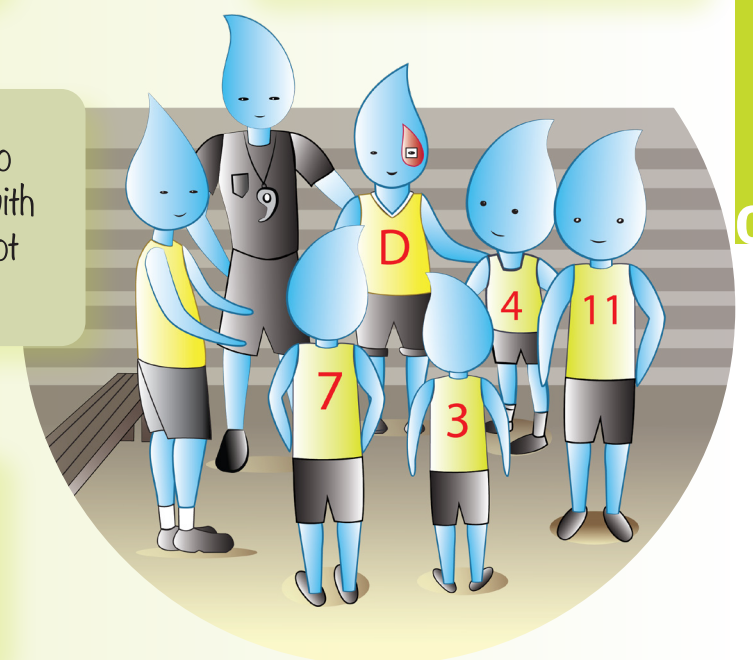
**TALKING WITH THE TEAM**

Don't differentiate between players. Make sure you highlight that the child with diabetes is part of the team and as valuable as everyone else.

Make sure the child with diabetes has the chance to explain their condition to everyone.

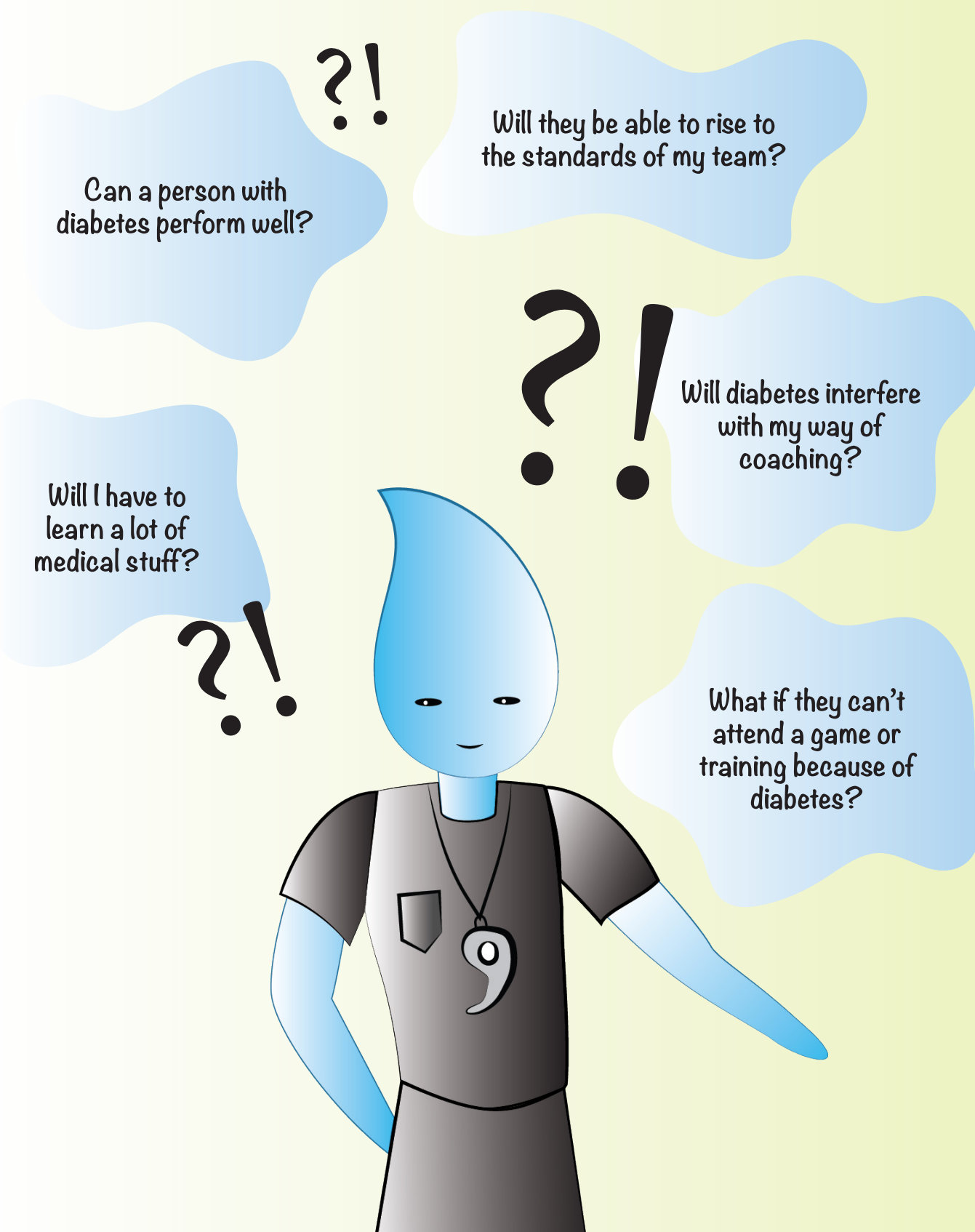
Don't allow teammates to bully or exclude the child with diabetes or say they're not good enough.

Be empathetic with the reactions and emotions of the other players. Create a safe environment where they can express their concerns.



MOTIVATION STRATEGIES

When coaching a team, everyone is aiming to win because, after all, a competition is a competition. There is nothing like the adrenaline rush when your team plays in an important game, especially when you are into sports. So it is natural to have doubts if you have someone living with diabetes on the team. You may ask yourself questions like:



To offer a fair chance to a child with diabetes who wants to be part of the team, it is useful to understand the following:

You do need to know some basics about diabetes, especially when to accept that a person can't play because of diabetes and how to treat a severe hypo if needed.

At the same time, you will see that people with diabetes are more organised, responsible and willing to demonstrate that they can do anything. **If they are in your team, it means that they are ready to manage their diabetes well.**

You have an opportunity to teach the rest of the team that they can achieve anything, and **you can create an environment where everyone can integrate**, aspire for performance and form a team.

Never forget that you are not alone in this and that as well as parents, you have an entire community that is ready to offer support. For sure, **no one will cheer you on more than the diabetes community.**

You as a coach/teacher have the wonderful ability to form people, to make them achieve great things and so, **you have all the skills** needed to handle any situation that might arise.

If you are scared there might be some diabetes incident, remember that **you have all the information you need** to support the player.

You are not in this alone. You have the child/teen and the parents to guide you whenever you need.

You are joining forces with the world diabetes community to prevent diabetes complications, to promote sports among people with diabetes and even create role models for millions of others around the world. Even having just one team member with diabetes **means you are contributing so much to the community.**

At the same time, it is normal to feel apprehensive about training someone with diabetes. Look back at your experience and see how many others with different personalities and needs you have trained... **you've got this!**

A person with diabetes needs to be integrated into a team, but it is not much different from integrating any other person. **It is all about communication** and sharing relevant and reliable information.

Working with a person with diabetes is not much different from working with any other person. You just need to pay a bit more attention to the factors related to sports and diabetes that are mentioned in this booklet.

FOR PARENTS: YOUR MENTAL HEALTH - How to cope

When your child is diagnosed with diabetes, it can be a shock. You might feel disbelief, confusion, anger, anxiety or even a sense of loss. You might feel overwhelmed by all the information you are given. All of these emotions are a normal part of adjusting to life with diabetes and it's important to ask for help and support. The daily pressures of caring for a child with more needs can be a strain, bringing intense emotions, exhaustion and even burnout.

Here are some tips to help you cope:

Stop for a minute. Listen to your thoughts, acknowledge your emotions and your behaviours. Write them down in a journal.

Teach your child about diabetes, make them feel comfortable about it and **involve them in decisions** about their diabetes.

Help your child conceptualise their illness at school, among peers, teachers and coaches.

Focus on the aspects of the problems that you can control. Evaluate the situation and ask yourself what is it that you can control, focus on that, create clear objectives and follow them.

Make time to do fun activities together as a family. Talk about things other than diabetes. Remember that **your child is so much more than their condition**.

Remember that **your health matters too**. Take breaks and ask for help.

Learn as much as you can about diabetes and write down any questions to ask your doctor. Remember that information is power and your **mind will be clearer when you know what to expect**.

Encourage your child to get involved in social activities and to do sports. If this makes you anxious, make sure you evaluate the situation, assess your thoughts and emotions and reason with them. If you find it difficult to do this on your own, ask for help from your doctor, nurse, therapist or diabetes association.

Prepare a hypo kit to be available at school, training and tournaments, and teach a responsible person how to use it in case of emergency. **This will help ease your mind.**

Whenever you feel too stressed, **take a walk**, listen to music or talk with your partner or a friend.

How to talk to your child about diabetes

- Be open with your child. Never make them feel that diabetes is a taboo subject.
- Show your child you are ready to listen. Encourage them to explain how they are feeling.
- Validate your child's emotions, e.g., 'I can imagine how you feel. It must be hard for you, but let's see what we can do about it.'
- Use reinforcements in conversation, e.g., 'I'm happy that we are talking about this. You are doing a great job. Thank you for sharing.'
- Ask your child their opinion about treatment, dosage and food choices. Don't treat their diabetes without involving them.
- Never use diabetes as a punishment or as a reason they can't do something. Don't say: 'You can't do sports because you have diabetes.' or: 'You can't have cake because your BG is high.'
- Help your child find solutions. E.g., 'Let's talk to the doctor and see what we need to do so that you can join the football team.' Or: 'Your blood sugar is a bit high. Are you sure it's a good idea to have a slice of cake now?' 'If you wait a bit longer then you can enjoy some cake without feeling sick.'
- Don't be judgmental when they are doing something wrong. Don't say: 'You are wrong.' 'You're not good enough' 'You don't try.'
- Make it a two-way conversation. Do say: 'What can you do differently?' 'I know you are struggling.' 'I appreciate your efforts, please tell me if there is something I can do to help.'



TALKING TO TEENAGERS

The strategies above are appropriate when talking to teenagers too. But remember that teenagers want to be independent and it's natural for them to be rebellious at times.

Rather than fighting against this, try to understand and give them space, while sending the message that you are there for them.

Listen to what they have to say.

Validate their emotions and their way of thinking.

Give alternatives without forcing them.

Tell them and show them that you trust them.

Do things together that are not related to diabetes.



TALKING TO COACHES/TEACHERS

It's extremely important to communicate with teachers and coaches about your child's diabetes.

Make sure they know what diabetes is.

Provide information on what they should do in certain situations.

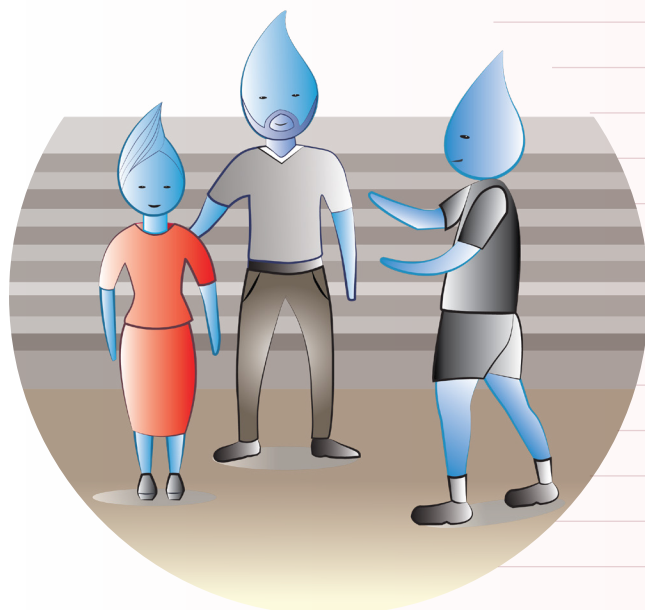
Offer them your time and energy so that they understand fully.

Be an active listener and let them ask questions.

Understand that sometimes they might get confused or be afraid of dealing with your child.

Reassure them that they need not feel afraid.

Let them know you appreciate their efforts to support your child.



HOW TO TRUST YOUR CHILD TO MANAGE THEIR DIABETES

As your child grows up, they need to become responsible for managing their diabetes. It can be difficult to give up control and trust your child's decisions. Here are some tips to help ease the process:

Ideally, you and your child should act as a team from day one of diagnosis. Talk together about treatment, implications and decisions.

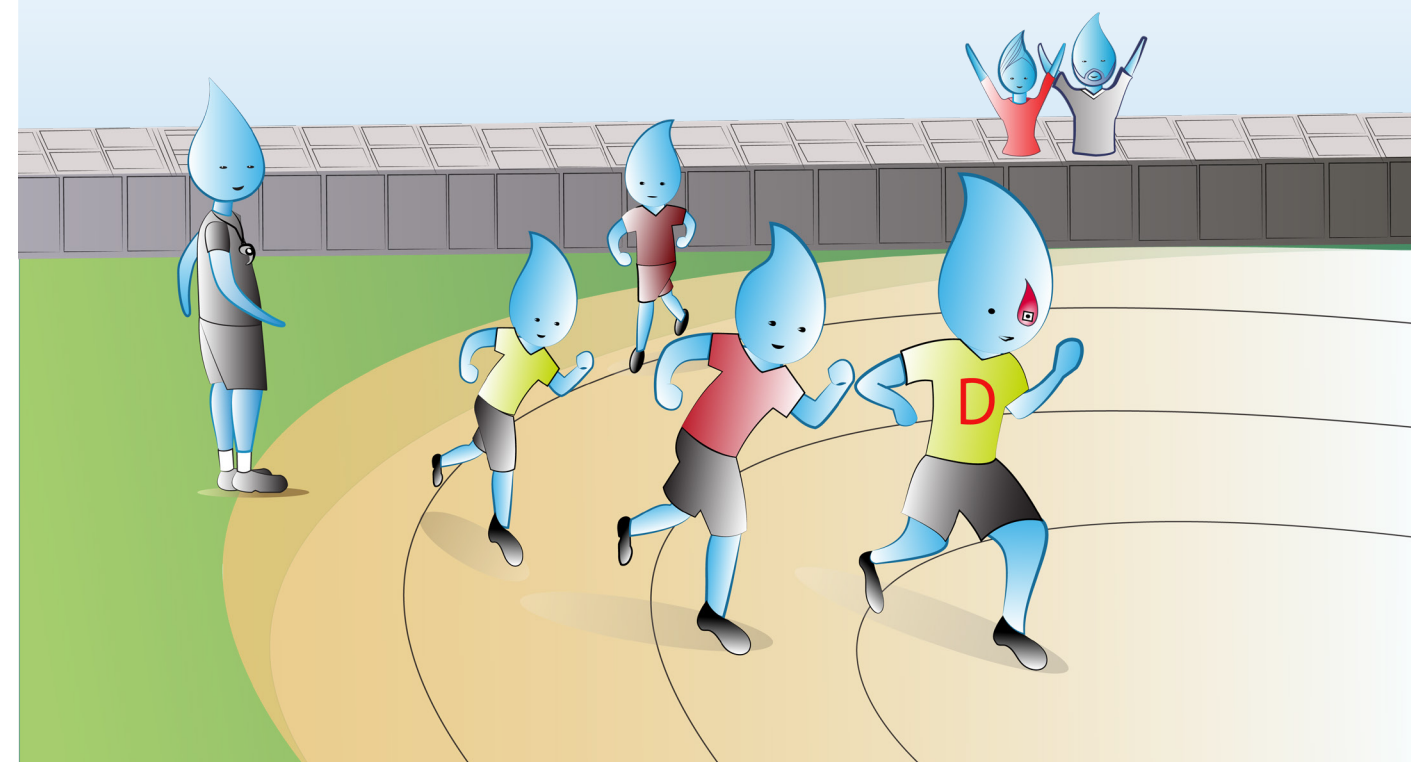
Once you have a treatment routine in place, try to let your child make the decisions. You can then take the role of supervisor.

Ask your child about their day with diabetes. Talk about the decisions they made and then brainstorm together if they should have done anything differently.

Make it a habit for your child to send you a message with their BG level and what insulin dosage they should take. Try not to ask for it in a demanding way.

Never criticise their decisions. Instead, find solutions for next time. If they feel judged, your child might try to hide what they're doing.

Don't forbid them to eat extra at school or at training. Gain their trust by helping them see the consequences and help them find alternatives.



FOR FRIENDS: HOW TO HELP

If your friend has just been diagnosed with diabetes, it could be a sad experience for you too. You want to comfort and help them but, at the same time, you might not know how.

Here are some tips on the best ways to help your friend:

Be empathic with what they are going through, but don't say that you know what they are struggling with (unless you also have diabetes). Show that you care by saying: 'I am sorry you are going through this, I can only imagine how difficult this might be for you.' Never say: 'It doesn't look that hard,' or blame them or their parents for diabetes.

Don't assume that there are things that they can't do. Don't avoid them or exclude them from activities you used to do together.

Accept that they might not want to talk about their diabetes. They might be going through their own period of acceptance, diabetes distress or burnout. Assure them that you are there for them and happy to listen when they are ready.

Don't behave differently with them by being more protective or always checking up on them because this might change the way they feel about your friendship or make them feel that because of diabetes, they are not the same and inspire pity rather than joy.

Encourage them to do sports and let them talk about their struggles.

Ask them questions from time to time. For example, you could ask what it is like to live with diabetes and what they need to do to control their blood sugar. Be interested in what they want to share. This will bring you closer and ensure that they feel comfortable around you without having to hide their diabetes management (blood testing, injections, bolus, etc).

You might want to set some rules together when talking about diabetes. For example, ask how they expect you to react in different situations and how much they would like you to get involved.

If they ever tell you that they don't want to eat something or do some kind of activity, don't insist and don't get upset. It can mean that they really can't at that moment because of diabetes.

Don't hesitate to ask for information and read about diabetes. Talk to your parents and share your emotions about what is going on with your friend.

You might need to learn how to pay attention to their hypo symptoms and how to treat a hypo. This might feel scary, but remember that this is how you can help your friend if needed.



FOR SIBLINGS: HOW TO HELP YOUR BROTHER OR SISTER

If you have a brother or sister who has been diagnosed with type 1 diabetes, it might be as difficult for you as it is for them or for your parents. You might worry that life will never be the same.

Here are some tips and tricks for you:

Listen to your emotions and try to understand what is going on.

Talk to your parents about how you feel. They might be overwhelmed, but don't forget that they love you the same, it's just that your sibling needs more attention at the moment.

Don't be afraid to talk to your sibling. Ask them how they feel and share your emotions about diabetes with them.

Try not to change your attitude or desire to play with your sibling due to fear of diabetes. Make sure that you know how to help in case of a diabetes emergency and then continue doing the same activities together.

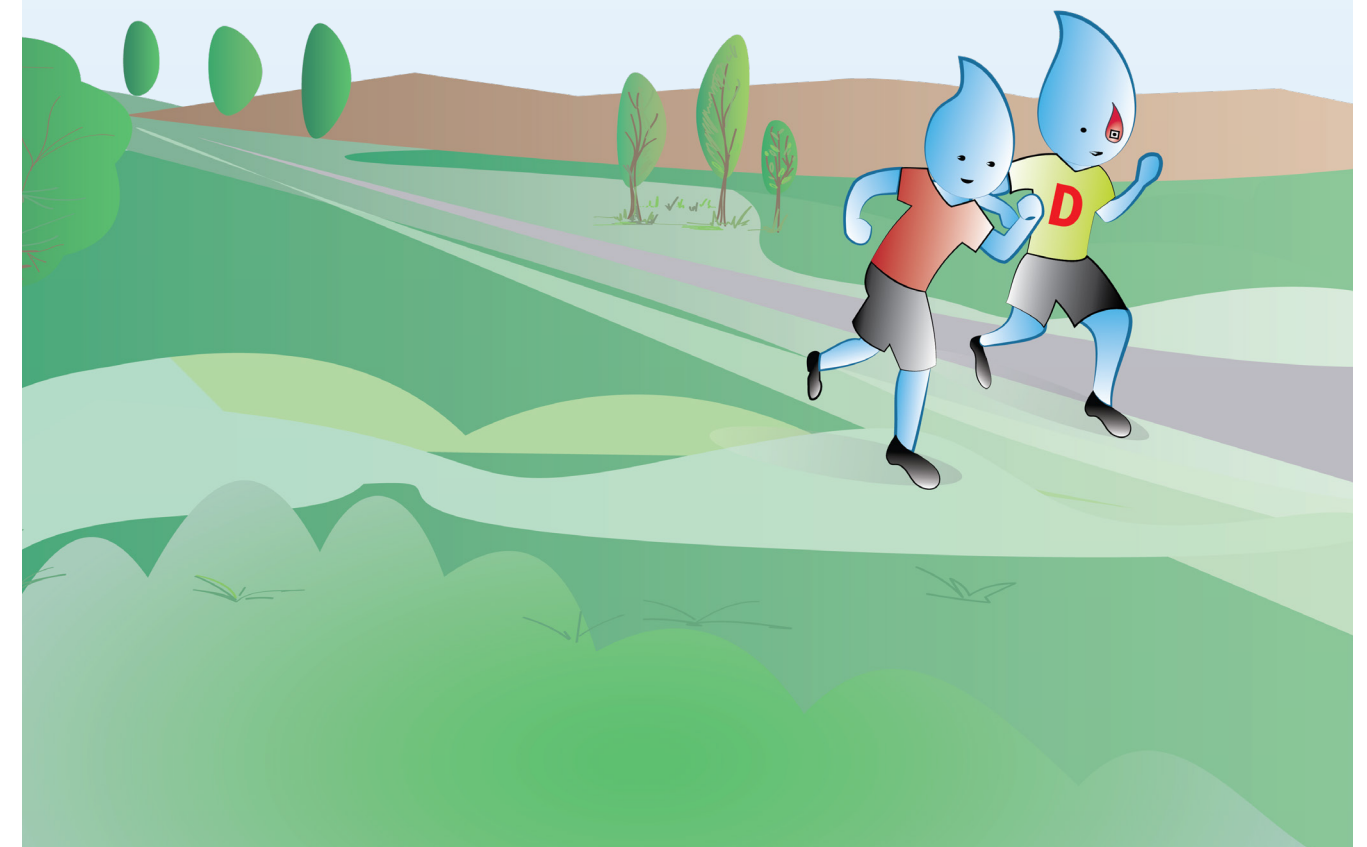


Understand that even if it is frustrating, there may be times when your sibling will not be able to play because of a hypo or hyper. Wait together, talk and then when you are both ready, you can continue.

Don't keep your emotions to yourself, make sure you talk to your parents, grandparents or even teachers about how you feel.

If you fight with your sibling from time to time, it's OK, we all do that, but don't fight over diabetes and never use diabetes as a punishment or to bully them. This will only make them feel frustrated about diabetes and we need to help them be friends with their condition because they will have it for the rest of their lives.

Do sports together. This will help a lot by sending them the message that they are not alone and that you are not afraid.



FOR RELATIVES: HOW TO BE SUPPORTIVE

One of your family members could be diagnosed with type 1 diabetes. It could be your grandchild, your cousin or nephew/niece. The news could hit your emotions hard because it is a person you know, love and deeply care for. It could be difficult to interact with them because you would like to help but don't really know how.

Here are some tips that might ease the situation:

First of all, try to identify how you feel about the diagnosis. It is normal to have intense negative emotions and it is highly recommended to understand them, feel them and express them. But make sure that you don't overwhelm your family members with negative and intense emotions.

If you're an adult living with diabetes, tell them that you know that it is hard but don't start talking about your bad experiences or your struggles with diabetes. This is their time to adjust and create their own path.

Be empathic without minimising their efforts to adjust to the complexity of diabetes. Tell them that you can only imagine what they are going through, and let them know that it is OK if they feel bad about their diabetes and ask them if there is anything you can do to help.

Don't avoid them because you don't know about diabetes.

Try not to assume that there are things that they can't do because of diabetes so don't exclude them from any activities.

Support and encourage them to do sports. It is normal to be worried about hypos or injuries but at the same time, we all know how much good sports can do.

If you are at a family reunion and they tell you that they can't eat something, don't insist. At the same time, don't give them a funny look if they take a piece of cake or a slice of pizza... it just means that they have calculated that they are allowed to have it.

Ask them about their diabetes, but less about numbers and more about emotions and how they are feeling.

Talk to their parents. They might need your emotional support too.



ADDITIONAL PART

Here is a workbook where you can find different charts that will help you to individualise your management of diabetes. Fill out by yourself or with a parent and share them with your teacher or coach.

**WHAT CAN
HELP
MANAGE**



CHARTS

HYP0 AND HYPER CHART

The person living with diabetes or their parent should supply a chart, outlining what to do at each stage, in the event that a hypo or hyper occurs. The child will write down the symptoms relevant to them and at what phase they usually get them.

NUTRITION CHART

For training camps and competitions, the person living with diabetes or their parents should also supply a nutrition chart.

ACTIVITY DIARY

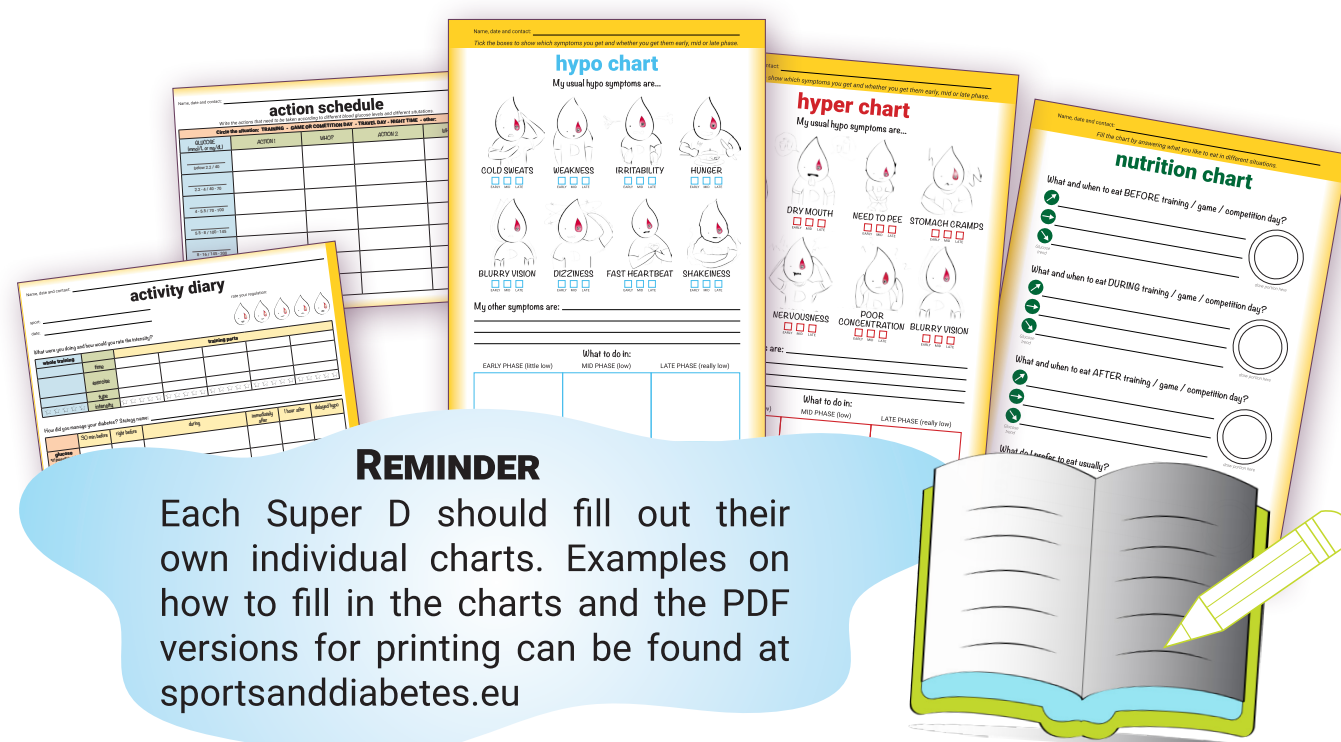
An activity diary is a chart used for collecting individual experience during exercise as to create personal best practice strategies for managing diabetes during sport. This form might not be right for everyone, use it to get inspired to create a personal form.

ACTION SCHEDULE

An action schedule shows what to do in certain situations, and who is responsible for doing them. Typically, it shows the actions that need to be taken according to different BG levels. It should be supplied by the person living with diabetes or their parent.

TRAVEL CHECKLIST

To be sure that everything is packed when travelling use the travel checklist which lists the most important things for diabetes to bring on the trip. Or get inspired to make a personal list.



Name, date and contact: _____

Tick the boxes to show which symptoms you get and whether you get them early, mid or late phase.

hypo chart

My usual hypo symptoms are...



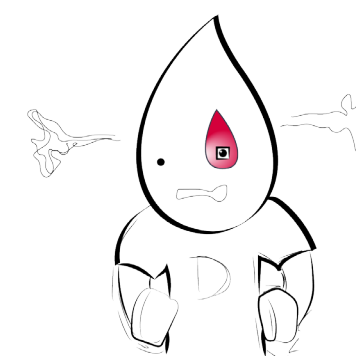
COLD SWEATS

☐ EARLY ☐ MID ☐ LATE



WEAKNESS

☐ EARLY ☐ MID ☐ LATE



IRRITABILITY

☐ EARLY ☐ MID ☐ LATE



HUNGER

☐ EARLY ☐ MID ☐ LATE



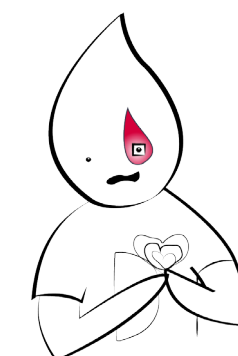
BLURRY VISION

☐ EARLY ☐ MID ☐ LATE



DIZZINESS

☐ EARLY ☐ MID ☐ LATE



FAST HEARTBEAT

☐ EARLY ☐ MID ☐ LATE



SHAKEINESS

☐ EARLY ☐ MID ☐ LATE

My other symptoms are: _____

What to do in:

EARLY PHASE (little low)

MID PHASE (low)

LATE PHASE (really low)

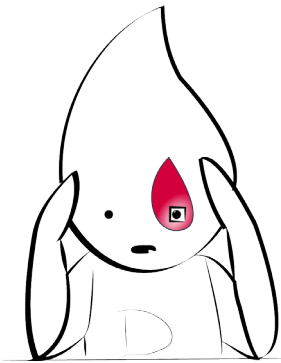
--	--	--

Name, date and contact: _____

Tick the boxes to show which symptoms you get and whether you get them early, mid or late phase.

hyper chart

My usual hypo symptoms are...



HEADACHE

☐

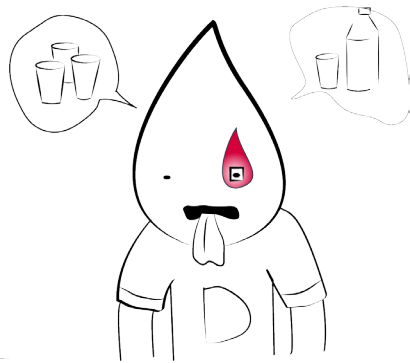
☐

☐

EARLY

MID

LATE



DRY MOUTH

☐

☐

☐

EARLY

MID

LATE



NEED TO PEE

☐

☐

☐

EARLY

MID

LATE



STOMACH CRAMPS

☐

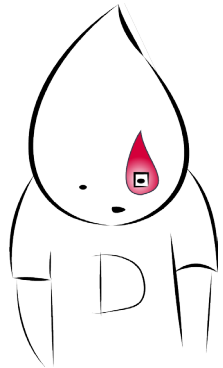
☐

☐

EARLY

MID

LATE



WEAKNESS

☐

☐

☐

EARLY

MID

LATE



NERVOUSNESS

☐

☐

☐

EARLY

MID

LATE



POOR
CONCENTRATION

☐

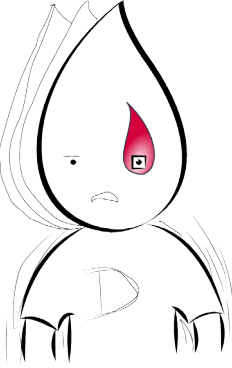
☐

☐

EARLY

MID

LATE



BLURRY VISION

☐

☐

☐

EARLY

MID

LATE

My other symptoms are: _____

What to do in:

EARLY PHASE (little low)

MID PHASE (low)

LATE PHASE (really low)

--	--	--

Name, date and contact: _____

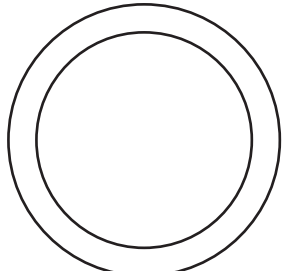
Fill the chart by answering what you like to eat in different situations.

nutrition chart

What and when to eat BEFORE training / game / competition day?



Glucose trend

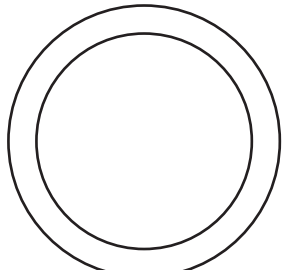


draw portion here

What and when to eat DURING training / game / competition day?



Glucose trend

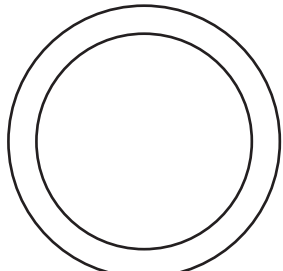


draw portion here

What and when to eat AFTER training / game / competition day?



Glucose trend

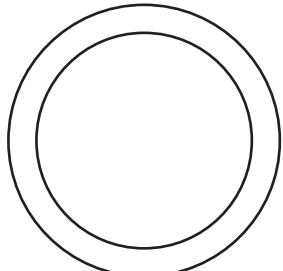


draw portion here

What do I prefer to eat usually?



Glucose trend



draw portion here

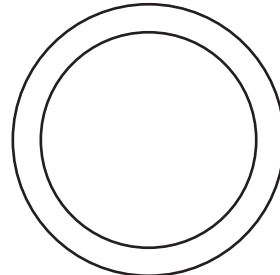
Fill the chart by answering what you like to eat in different situations.

nutrition chart

What and when to eat BEFORE training / game / competition day?



Glucose trend

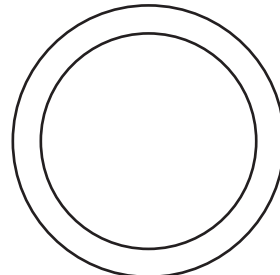


draw portion here

What and when to eat DURING training / game / competition day?



Glucose
trend

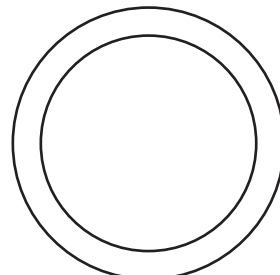


draw portion here

What and when to eat AFTER training / game / competition day?



Glucose trend

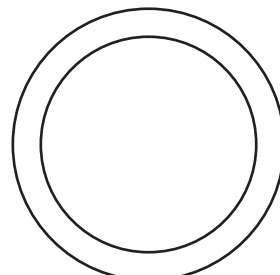


draw portion here

What do I prefer to eat usually?



Glucose trend



draw portion here

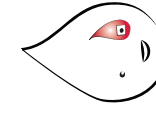
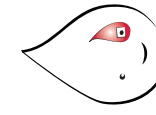
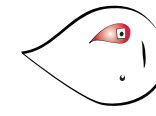
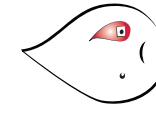
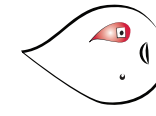
activity diary

Name, date and contact:

sport:

rate your regulation:

date:



What were you doing and how would you rate the intensity?

whole training		training parts			
	time				
	exercise				
	type				
☆☆☆☆	intensity	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆

How did you manage your diabetes? Strategy name:

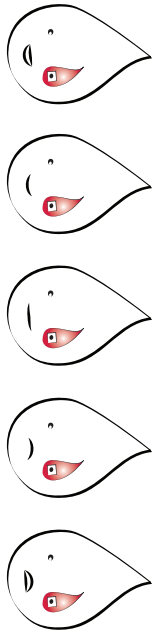
	30 min before	right before	during	immediately after	1 hour after	delayed hypo
glucose <i>*if possible add glucose trend</i>						
nutrition						
insulin dose						

	30 min before	right before	during	immediately after	1 hour after	delayed hypo
glucose <small>*if possible add glucose trend</small>						
nutrition						
insulin dose						

How did you manage your diabetes? Strategy name: _____

whole training		training parts									
	time										
	exercise										
	type										
☆☆☆☆	intensity	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆	☆☆☆☆

What were you doing and how would you rate the intensity?



rate your regulation:

sport: _____

date: _____

Name, date and contact: _____

active diary

Name, date and contact: _____

action schedule

Write the actions that need to be taken according to different blood glucose levels and different situations.

Circle the situation: TRAINING - GAME OR COMETITION DAY - NIGHT TIME - other:				
GLUCOSE (mmol/L or mg/dL)	ACTION 1	WHO?	ACTION 2	WHO?
<div>_____</div> <div>below 2.2 / 40</div>				
<div>_____</div> <div>2.2 - 4 / 40 - 70</div>				
<div>_____</div> <div>4 - 5.5 / 70 - 100</div>				
<div>_____</div> <div>5.5 - 8 / 100 - 145</div>				
<div>_____</div> <div>8 - 16 / 145 - 300</div>				
<div>_____</div> <div>16 - 24 / 300 - 500</div>				
<div>_____</div> <div>over 24 / 500</div>				

Name, date and contact: _____

Depending on what the child is using

travel checklist

☐ INSULINS VIALS

☐ INSULIN COOLER BAGS OR SACHETS

☐ INSULIN PENS (SHORT- AND LONG-LASTING)

☐ BACK-UP PENS

☐ NEEDLES

☐ INSULIN PUMP

☐ BACK-UP FOR PUMP (PEN)

☐ INFUSION SETS

☐ BATTERIES

☐ INSERTER

☐ SENSORS

☐ INSERTER

☐ TAPE

☐ CHARGER

☐ BATTERIES

☐ BLOOD GLUCOSE METER

☐ BACK-UP GLUCOSE METER

☐ TEST STRIPS

☐ LANCETS

☐ GLUCOSE TABS - DEXTROSE

☐ PREFERRED SNACKS

☐ KETONE METER

☐ GLUCAGON

☐ DIABETES PASSPORT OR SIMILAR

☐ DOCTOR'S/NURSE'S TELEPHONE NUMBER AND EMAIL ADDRESS

☐ CARBOHYDRATE APP OR BOOK

☐ DOCUMENT OF DOPING EXEMPTION - THERAPEUTIC USE EXEMPTION (TUE)

☐

☐

☐

☐

☐

☐

☐

☒ If using put a mark



Name, date and contact: _____

action schedule

Write the actions that need to be taken according to different blood glucose levels and different situations.

Circle the situation: TRAINING - GAME OR COMPETITION DAY - NIGHT TIME - other:

GLUCOSE (mmol/L or mg/dL)	ACTION 1	WHO?	ACTION 2	WHO?
below 2.2 / 40				
2.2 - 4 / 40 - 70				
4 - 5.5 / 70 - 100				
5.5 - 8 / 100 - 145				
8 - 16 / 145 - 300				
16 - 24 / 300 - 500				
over 24 / 500				

Name, date and contact: _____

Depending on what the child is using

travel checklist

☐ INSULINS VIALS

☐ INSULIN COOLER BAGS OR SACHETS

☐

☐ INSULIN PENS (SHORT- AND LONG-LASTING)

☐ BACK-UP PENS

☐ NEEDLES

☐

☐ INSULIN PUMP

☐ BACK-UP FOR PUMP (PEN)

☐ INFUSION SETS

☐ BATTERIES

☐ INSERTER

☐

☐ SENSORS

☐ INSERTER

☐ TAPE

☐ CHARGER

☐ BATTERIES

☐

☐ BLOOD GLUCOSE METER

☐ BACK-UP GLUCOSE METER

☐ TEST STRIPS

☐ LANCETS

☐

☐ GLUCOSE TABS - DEXTROSE

☐ PREFERRED SNACKS

☐ KETONE METER

☐ GLUCAGON KIT

☐

☐ DIABETES PASSPORT OR SIMILAR

☐ DOCTOR'S/NURSE'S TELEPHONE NUMBER AND EMAIL ADDRESS

☐ CARBOHYDRATE APP OR BOOK

☐ DOCUMENT OF DOPING EXEMPTION - THERAPEUTIC USE EXEMPTION (TUE)

☐

☐

☐

☐

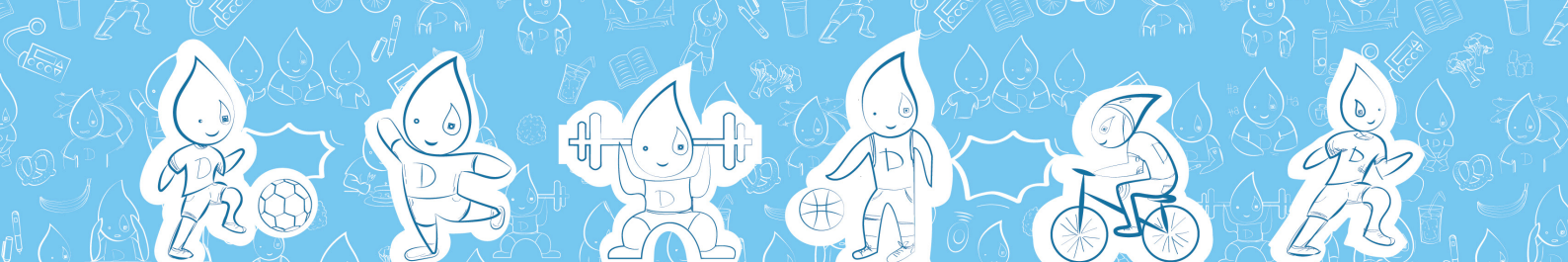
☐

☐

☐

☒ If using put a mark





Many young people living with diabetes are not aware of the role physical activity can play in managing diabetes and often, because of lack of knowledge of gym teachers, coaches and even parents, they are excluded from doing sports. While some publications on this topic exist, they are mainly scientific, targeted at healthcare professionals and not easily reachable and understandable for the general public.

The partners in the Sports&Diabetes project set out to create a simple, comprehensive, and easy-to-use publication that quickly provides information about the basics of doing sport when living with diabetes. This enables all persons living with diabetes to participate in sport activities. This publication contributes to debunking the stigma that one cannot practice sports if they have diabetes, can help clarify many misunderstandings and can serve as a step-by-step tool for everybody who is interested in the topic of diabetes and engaging in different types of physical activity.

The project wants to convey the clear message that, with a few necessary steps, such as measuring and monitoring blood glucose before, during, and after the sports activity, with backup storage of insulin, on hand carbohydrates, emergency contacts in place etc., a person living with diabetes will be empowered to make the right decisions and be able to enjoy sport activities.

The PDF version of this publication as well as versions in other languages, and additional materials are available at sportsanddiabetes.eu.



Co-funded by the
Erasmus+ Programme
of the European Union