

DDRC Healthcare – looking at things slightly differently... Diabetes



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This presentation has been put together by DDRC Healthcare. It focuses on a basic understanding of diabetes together with the guidelines for divers with diabetes.

This lecture is not intended to be an in depth medical lecture, but merely a “basics lecture” to enable divers to better understand the condition, and to ensure that divers know the guidelines regarding diving and diabetes, and where to source the relevant authoritative report.

Diabetes and Diving

What is diabetes?

It is a common health condition

2.8 million diagnosed people in the UK

850,000 estimated undiagnosed



So what is diabetes?

Diabetes affects some 2.8 million people in the UK, with another estimated 850,000 people who have a mild form of diabetes, but are completely unaware of the fact, and therefore they go undiagnosed.

Diabetes and Diving

What is diabetes?

Caused by the amount of glucose in the blood being too high

This is because the pancreas does not produce sufficient, or any, insulin to help the glucose enter the body's cells

Or, if insulin is produced it does not function properly



We hear a lot about diabetes but how many of us in this room understand the basics of the condition?

Diabetes is caused by the amount of glucose in the blood being too high. This is a result of the pancreas not producing enough insulin, or any insulin in some cases. Insulin helps the glucose to enter the body's cells, and sometimes when insulin *is* produced it does not function correctly.

Diabetes and Diving

What is diabetes?

Insulin is a hormone produced by the pancreas

It enables glucose to enter the body's cells

We need glucose for energy to function properly

The liver produces some glucose, but the rest comes from digesting carbohydrates



So now we know that insulin is important, but what is insulin and what is it's function?

Insulin is a hormone (produced by the pancreas) which enables glucose to enter the bodies cells.

We need glucose to function properly – glucose gives us the energy we need to work, rest, and play, and of course dive! So you can see this is an important mechanism to enable normal everyday life.

We get glucose from digesting carbs (carbohydrates) – things like cereals, breads, grains, fruits, vegetables, and of course sweets. The liver also produces a certain amount of glucose.

Diabetes and Diving

What is diabetes

There are two types of diabetes, Type 1 & Type 2

Type 1 - approximately 5% to 15% of diabetics

The body is unable to produce any insulin

Treated with insulin injections, & healthy diet

Can develop at any age, but usually before age 40



There are two types of diabetes – Type 1 and Type 2.

Type 1 accounts for between 5% to 15% of all diagnosed diabetics. In this kind of diabetes the body is not able to produce any insulin at all, so this means that the person concerned is treated with insulin injections, and at the same time there is a great emphasis placed on a healthy diet and a good exercise regime.

Type 1 can develop at any age, but is usually in early childhood and roughly before the age of 40 or so.

Diabetes and Diving

What is diabetes

Type 2 - approximately 85% to 95% of diabetics

Your body can still make some insulin, but either not enough, or it doesn't work correctly

Usually develops after the age of 40, there are some ethnic exceptions

Treated with healthy diet, increased exercise, and often with tablet medication and eventually insulin which may be necessary



Type 2 is the more common kind of diabetes and accounts for 85% to 95% of all diagnosed diabetics. It develops when the body can still make a *certain* amount of insulin, but not enough, or it can be when the insulin that *is* produced does not work properly (known as insulin resistance).

This kind of diabetes generally develops in people over the age of 40, but in some populations - South Asian and black people for example, it often appears earlier from the age of about 25.

As you may have heard or read through the media, it is also becoming increasingly more common in children, adolescents and young people of all ethnicities (races) due to Western diet and lifestyle (especially obesity).

The treatment for this kind of diabetes is often through diet and increased exercise only – but can also involve medication with tablets, and ultimately - insulin injections may be necessary.

Diabetes and Diving

What is diabetes

Symptoms of undiagnosed diabetes;

Feeling tired

Weight loss

Visual disturbance

Increased frequency of infection

Slow healing wounds

Wanting to pass urine more frequently

Increased thirst



There are a number of symptoms that may signal to the doctor that you may be suffering from diabetes.

Diabetes and Diving

What is diabetes

Development of symptoms

Type 1 symptoms are more obvious and develop more quickly, often over weeks

Type 2 symptoms develop less quickly, often over years and so are less obvious

In both types symptoms respond well to treatment



However, the timing of the development of the symptoms differs, with Type 1 symptoms tending to be more obvious and developing much more quickly – over a period of weeks, compared with Type 2 which develop more slowly, sometimes over years and therefore are potentially less obvious.

Both kinds of diabetes respond well to treatment, once the medical team treating you have established a good regime.

The secret to the treatment working is for the diabetic patient to keep to the regime!

Diabetes and Diving

What is diabetes

Put simply:

Your body does not regulate or utilise glucose in the correct way, so it accumulates in the blood and can't be used as energy. ...this increased blood glucose also causes damage to the body's tissues.



So in simplistic terms – diabetes is about the body not making the right use of glucose which then accumulates in the blood, causing you to suffer a loss of energy. This increased blood glucose also damages the body's tissues such as kidney damage, damage to the retina (back of the eye), damage to the nerves and blood vessels, and it increases the risk of heart attacks and strokes.

Diabetes and Diving

Treating diabetes

The aim of treatment is to normalise elevated blood sugar

BUT: Some treatments have the potential side effect of decreasing the blood sugar too much

This can cause.. Confusion, slurred speech, visual problems, decreased consciousness and ultimately coma.



The primary aim of the treatment regime for diabetes is to achieve normal blood sugar levels. But of course like many medications sometimes there are side effects, and occasionally some treatments decrease the blood sugar too much and this may then cause other symptoms such as slurred speech, and even in extreme cases coma.

Diabetes and Diving

Diving with diabetes

Why is it important for divers to understand the basics of diabetes if there is a diver with diabetes in the club/school?

Someone with diabetes may suffer from a “hypo” (hypoglycemia) and needs this to be recognised and acted upon

What is a hypo?

A hypo is when blood sugar levels fall too low. This may be caused by too much medication, too little food or diving itself



So why is it so important for divers – irrespective of whether they have diabetes or not to learn about diabetes and have a basic understanding of the implications surrounding diving safety?

If someone with diabetes suffers a hypo it means their blood sugar levels fall below an acceptable level – and that can be potentially dangerous.

Diabetes and Diving

Diving with diabetes

What are the symptoms of a hypo?

Symptoms vary from one person to another. Diabetics who dive should be able to recognise when these symptoms are happening:

- Feeling tired, confused, and/or moody
- Heart beating quickly, fuzzy vision, feeling hot & sticky
- Tingling lips, feeling weak and shaky
- Looking pale
- Feeling hungry



The symptoms vary from one person to another, but the bottom line is that all these symptoms, along with the subsequent loss of energy and potential altered level of consciousness, can result in a serious risk for diver safety – both for the diver with the diabetes and also their buddies.

Therefore it is *really* important for the diabetic diver to have a good management of his/her condition, and equally important for the diver's buddy and fellow divers to understand the basics and what to do in the event of a problem.

Diabetes and Diving

Diving with diabetes

There have been reservations and debate over the years as to whether divers with diabetes should be allowed to dive?

Research has looked at 3 key areas:

- Selection and Surveillance of diabetic divers
- Scope of diving
- Glucose Management on the Day of Diving



Over the years there has been a huge amount of debate as to whether divers with diabetes should be allowed to dive, and this has caused a great deal of confusion and upset to some divers in the past. As a result in 2005 there was a major workshop held in the USA to try and come up with a set of guidelines that everyone could agree to.

Over 50 clinicians and researchers from seven countries met and discussed the peer reviewed literature (studies that have been published in scientific/medical journals ie. the BMJ), they exchanged views and thoroughly debated the subject.

The result was a document “Diabetes and recreational diving: guidelines for the future”

Diabetes and Diving

Diving with diabetes

Selection and Surveillance

A diabetic may be able to dive if they are:

- Aged 18 years or over (unless in special circumstances)
- Have good long term diabetic control
- Are stable on their medication
- Manage their diabetes themselves without secondary complications or the need for hospital admissions
- Are reviewed regularly by their doctor



Broadly speaking, certain conditions have to be met in order to dive with diabetes.

Under 'Selection and Surveillance':

You must be aged 18 or over, the age can be lowered but there would have to be a special training program organised for that person, who would be expected to fulfil certain standards.

It is also important to have good long term management of diabetes. There should be no evidence of damage to other parts of the body caused by the diabetes (secondary complications).

If there is a start or change in medication – then diving should temporarily stop to allow the new medication regime to be established.

There should be no episodes of poor blood glucose control requiring intervention from a third party for at least one year.

There should also be an annual review by the patient's physician/diabetologist.

Diabetes and Diving

Diving with diabetes

Scope of Diving

Diving should be planned to *avoid*:

- depths >100 fsw (30 msw)
- durations >60 minutes
- compulsory decompression stops
- overhead environments (ie. cave, wreck etc)
- situations that may increase the risk of hypoglycemia (ie. prolonged, cold or arduous dives)

Dive leader and buddy should be informed of diver's condition and have instructions in case of a problem

Dive buddy should not have diabetes



Under 'Scope of Diving', dives should be planned to:

Avoid more than 30 msw, last longer than one hour, avoid compulsory deco stops, overhead environments, and dives which may increase the risk of a hypo such as very cold and/or strenuous dives.

Additionally, the dive leader and dive buddy should be fully informed of the diver's condition and know what to do if there is a problem.

Lastly, the dive buddy should not have diabetes either!

Diabetes and Diving

Diving with diabetes

Glucose Management on Day of Diving

The diver should:

- Be able to self-assess their own fitness to dive on the day
- Have their intended blood glucose level stable or rising, before entering the water (check blood glucose levels before and after the dive)
- Carry readily accessible oral glucose during all dives
- Have a medication called glucagon available at the surface
- Check their blood sugar frequently for 12-15 hours after diving
- Log all their dives including blood glucose levels



The third point deals with glucose management on the day of diving and centres around the diabetic diver being able to assess their own fitness to dive and manage their diabetes before, during, and after the dive.

It also mentions the importance of having emergency treatment available for 'hypos', informing their dive buddies of their condition and logging the dives.

Keeping a record of how good the blood glucose control has been on dives is important in the planning of future safe diving.

Diabetes and Diving

Diving with diabetes

What to do if you suspect hypoglycaemia in your buddy while underwater:

- The diver should ingest glucose
- The diver should make a controlled ascent (with their buddy)
- Establish positive buoyancy
- Leave the water



Identifying hypoglycaemia during a dive is very important and if suspected, the buddy pair should use the rescue medications, make a controlled ascent, surface, establish positive buoyancy.

With a good understanding of what to do for the diver with diabetes - any risks can be minimised.

Diabetes and Diving

Diving with diabetes

The *full guidelines* can be obtained from:

<http://home.vicnet.net.au/~dandoc/pdfdoc/Guidelines%20for%20Diabetes2005.pdf>

The *full report which also includes the guidelines “Diabetes and recreational diving: guidelines for the future” Proceedings of the Undersea and Hyperbaric Medical Society/Divers Alert Network 2005 June 19 Workshop. Durham, NC.* is available from:

http://dspace-dev.rubicon-foundation.org/xmlui/bitstream/handle/123456789/5538/UHMS-DAN_Diabetes_Diving2005.pdf?sequence=1

The DAN diving medicine site:

<http://www.diversalertnetwork.org/medical/articles/index.asp>



For those who want only the guidelines these are available from the first website on this slide, and for those who would like to read the whole report which are the entire proceedings of the workshop, then this can be obtained from the Rubicon Foundation website at the bottom of this slide.

Additionally the diving medicine section on the Divers Alert network website provides some additional reading,

Who and What is DDRC Healthcare?

Not for profit charitable organisation
Founded over 30 years ago
Emergency recompression
Fitness to dive advice
Medicals
Education
Research
Hyperbaric oxygen therapies



DDRC Healthcare would like to thank you for using this presentation and hope that you have found it informative. If so, please tell your diving friends about us, the work we do, and the services we provide.

All our diving research relies on funding from our charitable status, so we would appreciate you, or your club/school, making a donation for the use of this presentation, if you feel able.

Thank you so much!

DDRC Healthcare is a registered charity (No 279652)