

A Review on Reversal of Type -2 Diabetes: Myth or Fact

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Received: 20th April 22; Revised 9th May, 22; Accepted: 15th June, 22; Available Online: 25th June, 22

ABSTRACT

Recent clinical and pathophysiological studies have shown type 2 diabetes to be generally a condition caused by surplus, yet reversible, fat accumulation in liver and pancreas. Within the liver, surplus fat worsens hepatic responsiveness to insulin leading to increased glucose yield. Within the pancreas, the beta cell appears to enter a survival mode and fails in its specialized function due to the fat- prevailed metabolic stress. Scrapping of surplus fat from these organs via substantial weight loss can normalize hepatic insulin responsiveness and, in the early vintages post-diagnosis, is associated with beta cell recovery of acute insulin stashing in numerous, perhaps byre-differentiation. Inclusively, these changes can normalize blood glucose strata. The Diabetes Remission Clinical Trial demonstrated in Primary Care that 46 of people with type 2 diabetes could achieve remittal at 12 months intervened by weight loss. This major change in our understanding of the upholding mechanisms of trouble permits a reassessment of advice for people with type 2 diabetes.

Key words: Bariatric Surgery, Gestational diabetes, Hyperglycemia.

A. INTRODUCTION TO DIABETES

Diabetes mellitus is also known as diabetes. Diabetes is a metabolic disease that causes increase in blood sugar. Insulin is the major hormone which helps to move glucose from blood into cells. In patients with diabetes, there body either unable to make enough insulin or cannot effectively use the insulin it does make. If diabetes of patient remains untreated it can damage to patients nerves, eyes, kidneys, and other organs.^{1,2,3}

B. TYPES OF DIABETES:^{3,4,5}

Following are the types of Diabetes:

Type 1 diabetes is a disease. Immune system attack and destroy cell in the pancreas, where insulin is generated.

And About 10 percent of people with diabetes have this type 1.

Type 2 diabetes : this type occurs when patients body becomes resistant to insulin, and glucose increases in blood.

Pre-diabetes : as this type occurs when your blood glucose level is higher than normal level, but it's not high enough for detection of type 2 diabetes.

Gestational diabetes: gestational diabetes is high blood sugar during pregnancy of women. Hormones which are Insulin-blocking action are produced by the placenta cause this type of diabetes.

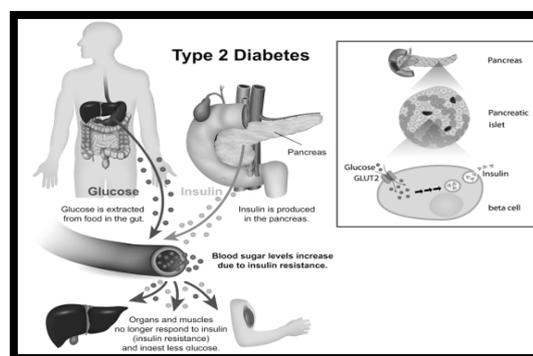
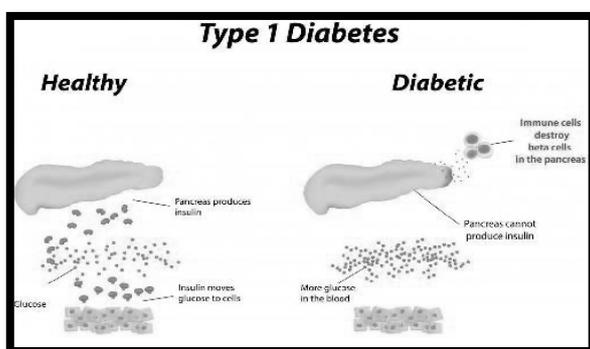


Figure 1 Type One Diabetes mellitus Figure 2 type two diabetes mellitus

A. SYMPTOMS OF DIABETES:^{6,7} Diabetes symptoms are caused by rising blood sugar level, or Hyperglycemia.
General symptoms: The general symptoms of diabetes include:

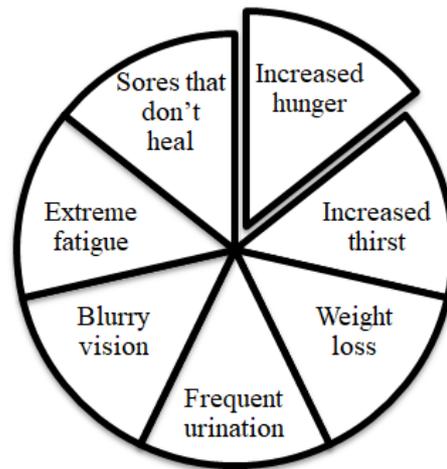


Figure 3 General symptoms of Diabetes

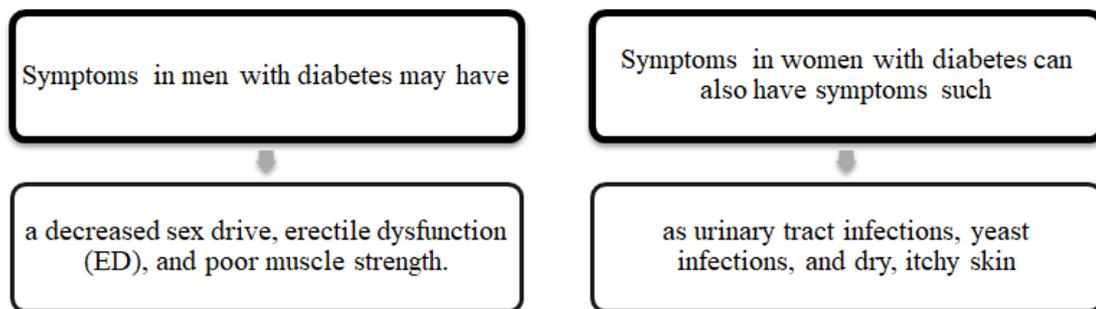


Figure 4 Symptoms of diabetes

B. Diabetes risk factors:^{8,9,10}

Certain factors increase your risk for diabetes.

Type 1 diabetes:

Patients are more likely to suffer from type 1 diabetes since childhood or by birth if they have a parent or sibling with the condition, or they carry certain genes that are linked to the disease.

Type 2 diabetes:

patient risk for type 2 diabetes increases if : patient are overweight, or there age 45 or older, also if patient have a parent or sibling with the same condition, they aren't physically active, had gestational diabetes, have pre-diabetes, have high blood pressure, high cholesterol, or high triglycerides, have African American, Hispanic or Latino American, Alaska Native, Pacific Islander, American Indian, or Asian American ancestry

Gestational diabetes

Patients are at risk for gestational diabetes increases if : They are overweight, they are over age 30, history of had gestational diabetes during a past pregnancy, or have given birth to a baby weighing more than 9 pounds, and have a family history of type 2 diabetes, or polycystic ovary syndrome

Diabetes complications:^{11,12}

High blood glucose damages organs throughout your body. The higher your blood glucose is and the longer patients live with it, the greater more risk for different complications.

Complications which are associated with diabetes include:

neuropathy, nephropathy, retinopathy and vision loss, hearing loss, heart disease, heart attack, and stroke, foot damage such as infections and sores that don't heal, topical bacterial and fungal infections, depression, dementia

Gestational diabetes:^{12,13,27}

Gestational diabetes which is always Uncontrolled can lead to problems that affect both the mother and baby.

Complications affecting the baby can include:

Increased risk for type 2 diabetes later in life, premature birth, low blood sugar, higher-than-normal weight at birth, jaundice, stillbirth

The mother may suffer from complications such as high blood pressure (preeclampsia) & type 2 diabetes. There high chances that She will require cesarean delivery which commonly referred to as a C-section.

A. Pancreatic behavior in Diabetic patient:^{13,14,27}

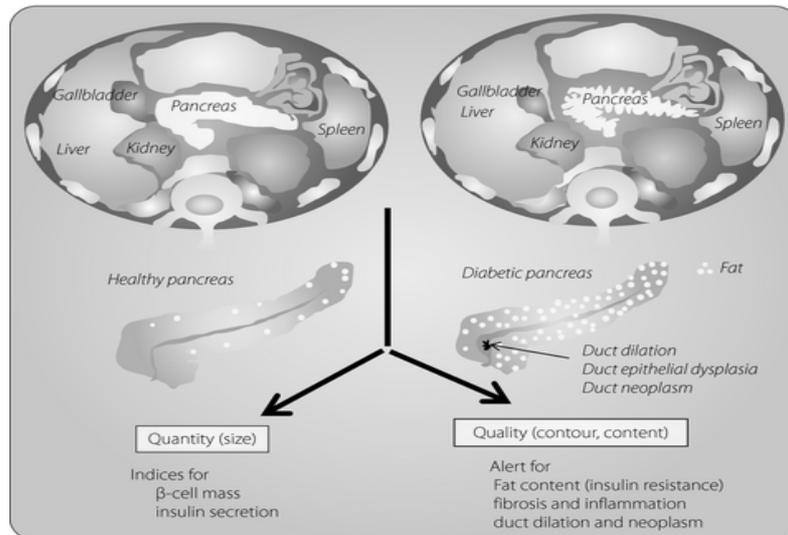


Figure 5: pancreatic behavior of diabetic person

The organ that which produces insulin is known As Pancreas and which plays a major role in regulating blood glucose levels.

Type 1 diabetes occurs when the pancreas does not releases enough or any insulin.

Type 2 diabetes develops when the body unable to use insulin correctly.

In diagram we have shown how the pancreas is involved in diabetes.

Role of The pancreas is to produce digestive enzymes, and pancrease located in the abdomen, behind the stomach.

It major secretes insulin. Insulin is a hormone that regulate blood sugar levels. The cells which secretes insulin is called beta cells. which are located in the islets of Langerhans, a set of structures within the pancreas.

Insulin helps to utilize the carbohydrates in the body for energy. Insulin transports glucose from the blood into the cells. Glucose releases the energy in the cells which they need to do function.

Cells unable to uptake glucose from the blood If there will lesser insulin in the body. And levels of glucose in the blood rise. A condition may refer to this as having high blood sugar or hyperglycemia.

Hyperglycemia is major responsible factor for most of the symptoms and complications of the diabetes.

The patient in **Type 2 diabetes** mainly insulin resistant develops due to fat deposition on pancreatic cell. So there are chances of diabetes reversal in type 2 diabetes.

A. Reversal of Type Two Diabetes:^{15,16,28}

Main reasons for type two diabetes are resistance to generate insulin. The fall in intrapancreatic triacylglycerol in T2DM, which occurs during weight loss, is associated with the condition itself rather than decreased total body fat. We mainly focused on this. What to focus for reversal of diabetic, Overweight, High lipid/fat level in body and blood

How to lose fat and weight:^{17,18,19}



Diet:20,30

Low fat diet Choosing a low fat diet tends to help reduce overall calorie input and to enhance cholesterol rankings.

And To help achieve these ideas a low fat diet should be fittingly balanced to include a healthy quantity of vitamins and minerals.

Normally a low fat diet will include foods correspondent as

Whole grain foods (oats and forward fiber interpretations of pasta, rice and chuck), Skinny flesh (skinless dastard), White fish, Reduced fat dairy (skimmed milk and low fat yoghurt and muck), Vegetables, Lentils, Fruit

Fat carries a forward number of calories per gram than carbohydrates or proteins and so reducing fat can help to reduce your overall calorie input. Whole grain interpretations of foods correspondent as chuck are recommended in preference to non-whole grain interpretations (correspondent as white chuck) partially because they're turned into blood sugar more sluggishly. The fiber and spare nutrients they contain are also healthier than white readings.

Low carb diet:^{21,22,32}

Study shows low-carb diets effective option for treat type 2 diabetes.

In 2019, American Diabetes Association shows in study reducing carbohydrate input was the most effective nutritive strategy for upgrading blood sugar control in those with diabetes.

A meta- analysis from 2017 start that low-carb diets reduced the need for diabetes specific and also upgraded certain bio-markers in people with type 2 diabetes. This included reductions in hemoglobin A1c (HbA1c), triglycerides, and blood pressure; and increases in high-viscosity lipoprotein (HDL) cholesterol, sometimes called the "good" cholesterol.

Further, in an on-randomized trial from Virta Health, the intervention group of subjects with type 2 diabetes followed a really low-carb diet and took remote monitoring by croakers and health trainers. After one vintage, 94 of those in the low-carb group had reduced or stopped their insulin use. Either, 25 had an HgbA1c in the normal range without warranting any specifics, suggesting their trouble was in remittal, and another 35 did the same with only metformin.

At the two- space mark, a high proportion of subjects continued to demonstrate sustained breakthroughs in glycemic control.

Other interventions have also demonstrated efficacy for gaining forgiveness of type 2 diabetes, although there's a lack of thickness with how different trials define "forgiveness."

The DiRECT trial reported severe sweet restriction (eating around 850 calories per day) reacted in 46 forgiveness at one- space.

And bariatric surgery demonstrates between 25 and 50 diabetes forgiveness up to ten- spaces post surgery.

This testimonial suggests that type 2 diabetes doesn't have to be a progressive and irretrievable fever. It's definitely a treatable fever.

Bariatric Surgery:^{18,7,19,20}

In conclusion, Bariatric Surgery determines a prompt reversibility of type 2 diabetes by homogenizing appurtenant insulin keenness and by enhancing- cell keenness to glucose; these changes come about really unseasonably after the operation. Bariatric Surgery operation may affect the enter insular axis by diverting

nutrients out from the proximal gastrointestinal tract and by delivering partly digested nutrients to the ileum. This, in turn, enhances the concealment of GLP-1 in the transposed ileum, while the brush-off of the duodenum and jejunum might be responsible for the down regulation of GIP and of other gut hormones involved in insulin keenness regulation.

A meta- analysis of 174772 participators published in The Lancet in 2021 innovate that bariatric surgery was associated with 59 and 30 reduction in all- cause mortality among lardy grown-ups with or without type 2 diabetes separately. This meta- analysis also innovate that median life- expectance was 9.3 periods longer for lardy grown-ups with diabetes who entered bariatric surgery as compared to routine (non-surgical) care, whereas the life expectance gain was 5.1 periods longer for lardy grown-ups without diabetes. A National Institute of Health panel held in 2013 that epitomized available proof innovate a 29 mortality reduction, a 10- period forgiveness rate of type 2 diabetes of 36, slightest cardiovascular events, and a lower rate of diabetes- related complications in a long-term, non-randomized, matched intervention 15 – 20 period follow-up study, the Swedish Lardy Subjects Study. The panel also innovate correspondent results from a Utah study using else new gastric bypass methodologies, though the follow-up epochs of the Utah studies are only up to seven periods. While randomized controlled trials of bariatric surgery subsist, they're limited by short follow-up eras.

Exercise:^{24,25,31}

There are a uncounted ways that exercise lowers blood sugar Insulin sensitivity is increased, so your muscle cells are better good to use any available insulin to take up glucose during and after exertion.

When your muscles contract during exertion, your cells are good to take up glucose and use it for energy whether insulin is available or not.

This is how exercise can help lower blood sugar in the short term. And when you are active on a regular underpinning, it can also lower your A1C.

Follow the 15-15 rule:

Check your blood sugar.

Notwithstanding, have 15-20 grams of carbohydrate to raise your blood sugar, If your reading is 100 mg/ dL or lower. This may be

- 4 glucose tablets (4 grams per tablet), or
- 1 glucose gel tube (15 grams per gel tube), or
- 4 ounces (1/2 mug) of juice or regular brew (not diet), or
- 1 scoop of sugar or honey

Check your blood sugar again after 15 minutes. However, have another serving of 15 grams of carbohydrate, If it's still below 100 mg/ dL.

Repeat these track every 15 trices until your blood sugar is at least 100 mg/ dL.

Notwithstanding, you'll normally need to take a break to treat your low blood sugar, If you want to continue your training. Check to make sure your blood sugar has come back up above 100 mg/ dl before starting to exercise again. Keep in mind that low blood sugar can happen during or long after physical exertion. It's more likely to

happen if you Take insulin or an insulin secretagogue Skip repasts Exercise for a long time Exercise strenuously Notwithstanding, talk to your healthcare provider about the casual treatment plan for you, If hypoglycemia interferes with your exercise routine. Your provider may

suggest eating a small snack before you exercise or they may make an adaptation to your pharmaceutical (s). For people engaging in long duration exercise, a combination of these two jurisdiction changes may be necessary to obviate hypoglycemia during and after exercise.

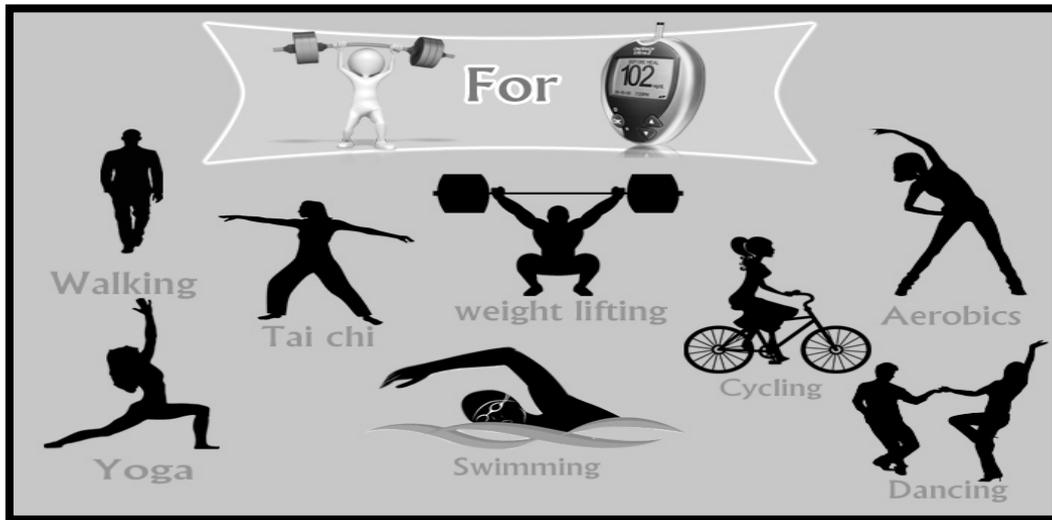


Figure 6 : Exercises

Food Item	Glycaemic index	Serve size g	How does each food affect blood glucose compared with one 4g teaspoon of table sugar?
Basmati rice	69	150	10.1
Potato, white, boiled	96	150	9.1
French Fries baked	64	150	7.5
Spaghetti White boiled	39	180	6.6
Sweet corn boiled	60	80	4.0
Frozen peas, boiled	51	80	1.3
Banana	62	120	5.7
Apple	39	120	2.3
Wholemeal Small slice	74	30	3.0
Broccoli	15	80	0.2
Eggs	0	60	0

Other foods in the very low glycaemic range would be chicken, oily fish, almonds, mushrooms, cheese

Figure 7: Glycemic Index of Some Food

C. Discussion:

Despite the fact that there's no remedy for type 2 diabetes, reads show it's feasible for certain individuals to invert it. Through diet changes and weight reduction, you might have the option to reach and hold typical glucose levels without medicine.

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