



## Low Blood Sugar Impacts Athletic Performance in Kids with Diabetes

### What is this research about?

Type 1 diabetes (T1DM) is a chronic disease, often affecting youth, in which the body produces very little or no insulin—the hormone that helps to control glucose, lipid, and protein metabolism. Poorly controlled diabetes is one of the main causes of heart attacks, and can lead to blindness and kidney disease. People with T1DM often experience high and low levels of blood sugar. (High levels are called hyperglycaemia, low levels hypoglycaemia.) As a result, people with T1DM need to take insulin via injections or by an insulin infusion device (or pump) in order to maintain a proper balance. But it can be hard for young people to do so since their insulin needs are always changing.

Physical activity, like exercise and sports, can pose a particular challenge to kids with T1DM. Although exercise and sports have important benefits, they also have an impact on blood sugar levels. After exercising, a child's blood sugar may be low because the child has taken too much insulin or not eaten enough carbohydrates for the insulin given. Symptoms of hypoglycemia may include trembling, an accelerated heart rate, sweating, and increased hunger. On the other hand, if not enough insulin is taken or because of elevations in stress hormones, an individual's blood sugar may rise during some forms of vigorous physical activity.

Thus, exercise may cause either hypo or hyperglycaemia, depending on the intensity and

### What you need to know:

Low blood sugar has a negative effect on the athletic ability of adolescents with type 1 diabetes. It also affects their ability to respond to visual stimuli.

timing of the activity. A child may feel tired or dehydrated, or may even have blurred vision. Unfortunately, the symptoms of high and low blood sugar are often hard to detect when a child is engaged in exercise and sports. Many of these symptoms, after all, look like the normal signs of vigorous exercise. It's important, then, for active children and adolescents with T1DM to keep a close eye on their blood sugar.

But the degree to which high and low blood sugar levels affect a child's sports performance is unclear. Very few studies have looked at how these levels impact physical activity in those with T1DM.

### What did the researchers do?

Researchers at York University and the Hospital for Sick Children looked at how blood sugar levels affect the physical activity of children with T1DM. This was the first study that examined sports performance as it relates to different levels of blood sugar in adolescents with type 1 diabetes. This was also the first study to measure non-endurance type sport performance in people with T1DM. Children and adolescents, between the ages of 9 and 17, were

recruited from the 2009 York University Diabetes Sports Camp and fitted with continuous glucose monitors (GCM) for 3-5 days during which they performed various sports.

### What did the researchers find?

Low blood sugar levels decrease the ability of children and adolescents with T1DM to carry out basic sports skills. Only one of the 28 adolescents studied performed better with low blood sugar than with normal blood sugar. The rest showed a decrease in their athletic performance on average by about 20%. However, it's clear that this decrease in ability is highly individual; some children with low blood sugar performed better than others. In contrast to this finding, the researchers found that neither high blood sugar nor a prior bout of low blood sugar significantly affects sports skill performance.

Past research shows a similar decrease in math performance scores, caused by low blood sugar. As a result, the researchers decided to look at how the kids they were studying did in terms of cognitive processing. They found that low blood sugar impairs the ability of adolescents to respond to visual stimuli including colour recognition and word naming.

### How can you use this research?

Children with T1DM who engage in athletic activities need to be vigilant in paying attention to their blood sugar levels. This will help them to maintain their health and maximize their capacity to compete. In addition, any obvious decrease in athletic ability – such as poor passing or failed serves – should be a warning sign to young athletes with diabetes to check for low blood sugar.

More research is needed on the prevention of hypo and hyperglycaemia caused by exercise in adolescents with T1DM.

### About the Researchers

Michael C. Riddell is Associate Professor in the School of Kinesiology & Health Science at York University and an Adjunct Professor at the Hospital for Sick Children. Jill K. Hamilton is a paediatric endocrinologist at the Hospital for Sick Children. Dylan Kelly is an undergraduate student at McMaster University, funded through the Natural Sciences & Engineering Research Council of Canada.

[mriddell@yorku.ca](mailto:mriddell@yorku.ca)

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### Keywords

Diabetes, Type 1 diabetes, T1DM, Glucose, Blood sugar, Canada

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[kmbunit@yorku.ca](mailto:kmbunit@yorku.ca)

[www.researchimpact.ca](http://www.researchimpact.ca)

