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PREHABILITATION—PREPARING PATIENTS' BODIES AND MINDS FOR AN ORGAN TRANSPLANT

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Preparing for an organ transplant is about more than medical treatment. It is about finding out what the surgery is all about, and how it will be performed by the surgeon and their team. It is also about helping to prepare the patient's body and mind to be as healthy as possible before surgery, and to prepare them to live well with a newly transplanted organ after surgery. Transplant prehabilitation is a lifestyle treatment that involves keeping fit and active, having good mental health, and eating a healthy and balanced diet. In this article, you will learn about the research that has been done to explore prehabilitation, and discover different ways to improve fitness, support good mental health, and eat well so that the body is in the best possible shape for organ transplant surgery.

WHY MIGHT SOMEONE NEED AN ORGAN TRANSPLANT?

ORGAN TRANSPLANT

Where a sick organ is replaced by another healthy organ, through surgery.

Our organs come in various shapes and sizes, and some even come in pairs! Organs do lots of important jobs in our bodies—jobs that are critical for keeping us healthy (Figure 1). If an organ is not working very well and not doing the job it is supposed to do, a person may need to have an **organ transplant**. An organ transplant is an operation in which the sick organ is removed and replaced with a healthy organ from another person. Transplant patients are under the care of an expert team who will give the patient lots of support to try and keep the person as healthy as possible. The lead doctor may talk with the patient and the family (or other care givers), and explain that an organ transplant is the best way to keep the patient healthy in the long term.

Figure 1

The functions of our main organs. These main organs are able to be transplanted through specialist teams.

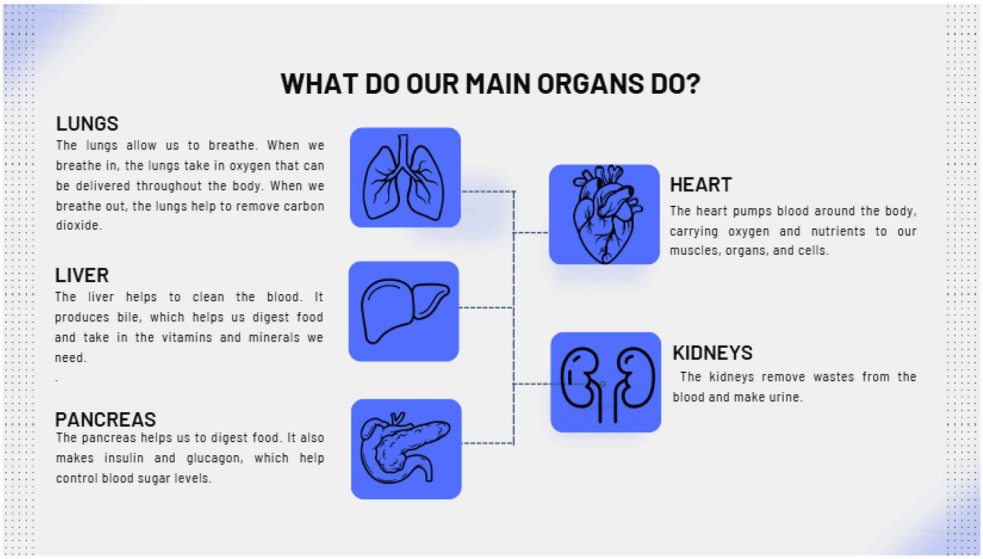

Figure 1

WHAT IS PREHABILITATION?

PREHABILITATION

Preparing the body both physically and emotionally before surgery.

MENTAL HEALTH

How we think, feel, and act.

Prehabilitation means preparing the body, both physically and mentally, before a surgery like an organ transplant [1]. This usually involves three things: keeping fit and active, eating well, and maintaining good **mental health** (Figure 2).

So far, researchers have studied programmes involving exercise, healthy eating, and good mental health *after* people have received a transplant [2]. While these programmes have been shown to be important, in recent years there has been a movement toward looking at how healthcare teams can support people earlier, *before* their surgery, to better prepare them for their organ transplant

Figure 2

The three main components of prehabilitation include exercise and physical activity, eating a healthy diet, and working to keep the best possible mental health.

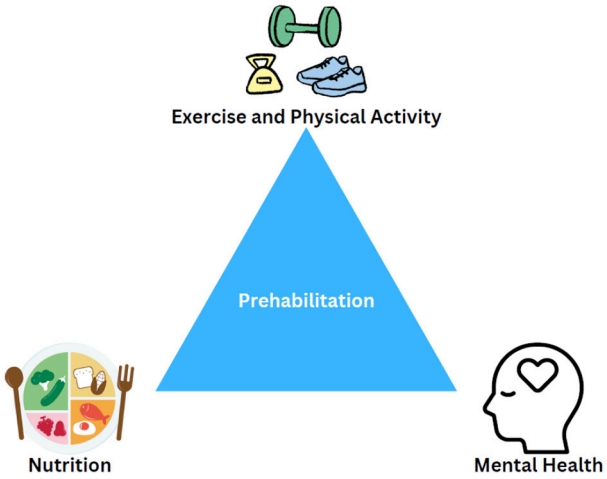

Figure 2

and help them to live well after their transplant [3]. One group of researchers reviewed all the evidence and found that, although more research is needed, prehabilitation is safe and should include all three components—keeping fit and active, eating a good diet, and maintaining good mental health.

Prehabilitation is an important thing for people to do while they wait for an organ transplant—the wait can be quite long. Supporting people to take control of their health before they go in for transplant surgery can help them to recover more quickly, and can help them keep physically and mentally fit once they have their new transplant.

KEEPING ACTIVE AND MOVING THE BODY

Keeping active has lots of benefits for keeping our bodies healthy. For example, physical activity can help keep the heart and lungs healthy, and can keep the muscles strong so that people can continue to enjoy the activities they like to do. Keeping fit is also important for our minds and mental health.

Keeping fit is often hard for people who are living with a long-term medical condition, particularly if they reach the stage of needing a transplant [4]. At that stage, the organ cannot carry out all the tasks it is designed to do. This can result in symptoms, such as feeling tired or out of breath, which can make it difficult to take part in exercise. Research has shown that people who are waiting to have a transplant can struggle to stay active, but the good news is that with support from healthcare professionals, people can learn to take part in physical activity more regularly (Figure 3).

AEROBIC EXERCISE

Activity that increases the heart rate and the body's use of oxygen.

There are two main areas of exercise that people should focus on. First is **aerobic exercise**, which means any activity that raises the

Figure 3

This activity spiral shows that often when a person feels out of breath they stop being as active. This then results in muscles becoming weaker and a feeling of being more unfit. With specialist support to keep active this can stop this "spiral" and help to keep a person fit and active in preparation for their organ transplant.

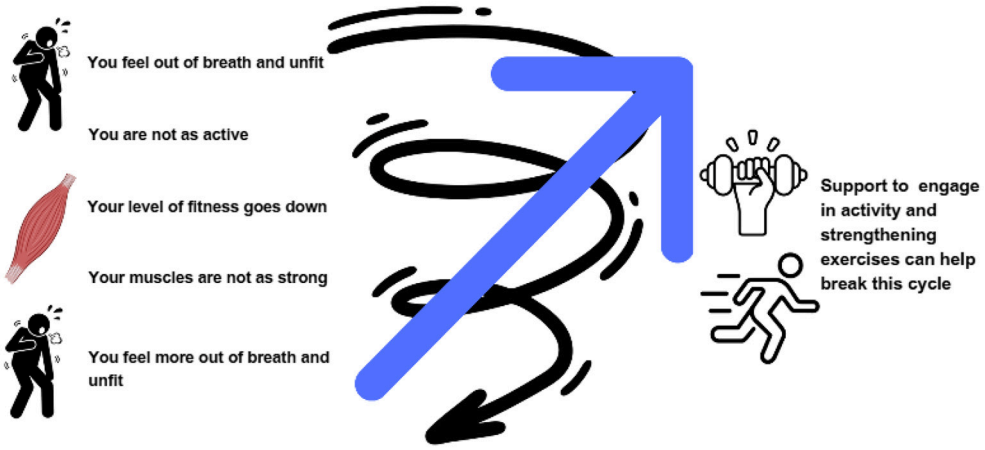

Figure 3

heartrate and makes people feel out of breath by increasing the body's use of oxygen. A good way to think of this is that the word "aerobic" simply means "with oxygen". Aerobic exercise challenges the **cardiovascular system**, which moves blood, oxygen, and nutrients around the body. Examples of aerobic exercises are running, dancing, or playing football.

CARDIOVASCULAR SYSTEM

Includes the heart and lungs, and the blood that it pumped around the body supplying oxygen and nutrients.

The second important area of exercise is strength training. Often, when people reach the stage of requiring an organ transplant, they have less muscle strength. This can often make daily life activities, such as climbing the stairs, more challenging. Strengthening exercises can help to rebuild the muscles, making it easier to carry out daily activities. Examples of strengthening exercises are lifting weights, climbing at the park, or gymnastics.

In prehabilitation, the idea is that improving aerobic fitness and strength can help people to keep their bodies fit and healthy in preparation for surgery, and can also help them to get moving again after the transplant, so they can get back to daily life and the activities they enjoy as quickly as possible.

HEALTHY EATING AND NUTRITION

While waiting for an organ transplant, it can be difficult to eat well and keep the body healthy. Our organs play a big part in helping us to process and manage the foods we eat, and they help to take away waste products our bodies do not need. For example, the kidneys help to remove waste when we go to the toilet and pass urine. This is an important job for an organ that is only the size of a fist! When an organ is not working as well as it should, this can make it difficult for people to keep their bodies healthy through the foods they eat.

Additionally, some people may have to change the foods that they eat to make it easier for their bodies to process foods and obtain nutrients. Some people might also feel less hungry, or perhaps feel sick, which makes it more difficult to eat well.

NUTRITION

What people eat and how the food works in the body.

Good **nutrition** is important while awaiting a transplant. Nutrition includes getting enough of the right vitamins, proteins, carbohydrates, and fats. A good balance of all these nutrients helps people to stay healthy. In prehabilitation, people learn lots of information about how to build healthy eating habits and make good food choices. This might mean eating less sugary foods like sweets and chocolate, or thinking about how many portions of fruits and vegetables to eat each day. Some people may also be told that there are certain foods they cannot eat until after their transplant.

GOOD MENTAL HEALTH

Having a long-term health condition can impact a person's mental health [5]. Mental health refers to how we think, feel, and act. Research has shown that the more developed an illness is, the more it is likely to impact a person's mental health.

It is normal for people's moods, thoughts, and feelings to change in response to things that happen in their lives. However, some people develop symptoms of poor mental health that can last for months or even years. **Depression** is a term that describes when people feel sad or low and stop enjoying the things they normally enjoy, like hanging out with friends. **Anxiety** describes a condition of feeling worried, afraid, or tense for a lot of the time.

DEPRESSION

When a person feels sad, or low in mood and may stop doing the activities they normally enjoy.

ANXIETY

When a person feels worried, afraid, or tense a lot of the time.

Research has shown that a transplant can have a good impact on mental health and can help people to improve their quality of life—that is, improve how healthy they feel and enable them to enjoy daily activities. However, people still report daily-life challenges after having an organ transplant. These challenges could include lots of hospital visits to check on their health, and taking medicines every day to help keep their transplants and their bodies healthy [6].

Prehabilitation aims to give people tips and tools to help them feel as good as possible, for example helping people to set goals to achieve the things they want to do or helping them learn how to sleep well. Looking after mental health can help improve how people feel and can help people feel ready for surgery. Prehabilitation can also help people understand what life may be like when they are living with an organ transplant.

WHERE DO WE GO NEXT?

Some research has already been done to study the effectiveness of prehabilitation, and this work has shown some good results. Benefits include improved fitness and strength, and helping people to get moving quicker and spend less time in the hospital after transplant surgery [7]. However, more work needs to take place to help us understand what kind of support is offered, how the support is best given to people waiting to have an organ transplant, and to understand all of the benefits of prehabilitation. It is especially important that ongoing research includes the voices of young people, so that prehabilitation can meet their specific needs.

Overall, prehabilitation is an important method that can help prepare people who are waiting for an organ transplant. More work needs to be done to develop a clear prehabilitation programme, and hopefully one day prehabilitation will become a routine part of pre-transplant care offered to everyone who is waiting for an organ transplant.

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CONFLICT OF INTEREST: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Liam is a grade 11 student who enjoys watching movies and downhill skiing. He has been participating in research studies since he was 3 months old.

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Hi! I am a 13-year-old science and math enthusiast, and I am really excited to be a reviewer for Frontiers in Young Minds! I love digging into science, exploring the world of math, as well as writing books. When I am not poring over my favorite subjects, you can probably find me singing, probably lost in a good book, or hanging out with my awesome dog. I cannot wait to learn and share more about science with everyone!

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