



Review Article

Is Physical Exercise Harmful to Liver Transplantation Recipients? Review of Literature[☆]



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A B S T R A C T

Liver transplantation is a treatment that significantly improves the patients' quality of life. However, we should be more ambitious and seek an improvement in their fitness through training protocols allowing them to fully return to daily activities.

English and Spanish-language articles on PubMed and the Cochrane Library were searched until 2014. Articles were reviewed by 2 of the authors to determine if they were suitable for inclusion.

It is shown a compilation of studies that included patients who have participated in aerobic, strength, or both combined training programmes, without implying a risk for the graft function. There is a lack of studies with high scientific evidence that establish a proper exercise programme methodology, supervised by specialists in physical activity and sports.

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¿Es perjudicial el ejercicio físico para el trasplantado de hígado? Revisión de la literatura

R E S U M E N

El trasplante hepático es un tratamiento que ha permitido mejorar de manera significativa la calidad de vida de los pacientes. Sin embargo, se debe ser más ambiciosos y buscar una mejora de su condición física a través de protocolos de entrenamiento que permitan una reincorporación total a las actividades de la vida diaria.

Se buscaron artículos en los idiomas español e inglés, en las bases de datos PubMed y Cochrane, hasta el año 2014. Todos los artículos fueron revisados por 2 autores para determinar si eran apropiados para su inclusión.

Palabras clave:

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Se muestra una recopilación de estudios donde se consiguen mejoras en el estado físico de pacientes que han participado en programas de entrenamiento aeróbico, de fuerza, o en combinación de ambos, sin que esto suponga un riesgo para el injerto. No obstante, existe una falta de trabajos de alta evidencia científica, que establezcan una correcta programación del ejercicio, tutorizada por especialistas en la actividad física y el deporte.

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Introduction

In recent years, society in general has shown growing interest in health through physical activity and sport, while greater attention has been given to physical and psychological wellbeing. This is due to both the health effects of regular exercise as well as the relationship between lack of exercise and the development, continuity and severity of several chronic diseases.¹ An active lifestyle has verifiable social importance due to the benefits seen in individuals and in society itself.² Promoting physical exercise should be fundamental, not only in the prevention and promotion of wellbeing among the healthy population,³ but in groups with some sort of special need, such as liver transplant recipients.

Orthotopic liver transplantation (OLT) is considered the only treatment possible for patients with terminal liver disease.⁴ In spite of the immense surgical complexity, this operation has become a common procedure in our country. As reports indicate, survival is very high, with a one-year survival rate of around 80%.⁵ Although providing a cure for these patients is the essential achievement, we need to be more ambitious. While patients' health-related quality of life (HRQOL) is improved,^{6,7} it may be insufficient for patients to completely recuperate their normal daily lives. To this end, some research groups are already including physical exercise programmes as a complementary therapy to standard treatment after transplantation.⁸⁻¹⁴

The objective of this article is to determine the physical condition of patients before transplantation, the changes that are caused by the intervention itself and whether exercise programmes adapted to their physical condition accelerate the physical recovery process, without negatively affecting liver function or the state of the graft.

Methodology

We conducted a search of the medical literature in Spanish and English in the PubMed and Cochrane databases up to the year 2014. Search terms (in different combinations) included: liver cirrhosis, liver transplantation, physical exercise, physical activity, physical training programme, aerobic training, strength training, and physical therapy. All the articles were reviewed by at least 2 authors to determine whether they were appropriate for inclusion.

Results

Correlation Between Physical Condition and the Patient Prior to Transplantation

Before transplantation, patients experience a long period of weakness due to a decline in their physical condition by several variables. The level of disease in this phase seems to correlate with the level of physical condition.¹⁵ Patients with liver cirrhosis have affected proteostasis, resulting in problems in aerobic and muscle response¹⁶ related with the decrease in the quantity of adenosine triphosphate, phosphocreatine and total magnesium in the skeletal muscles, causing deficient strength in the extremities⁷⁻²⁰ and in respiratory muscle capacity.²¹ These factors limit the functional capacity for daily activities, causing a decline in HRQOL and sociability.¹⁷

The parameter that has most often been associated with HRQOL is cardiorespiratory condition or aerobic capacity, represented by maximum oxygen uptake (VO_{2max}).²² To assess the importance of this variable, it can be stated that a reduction of 10% from reference variables compared with healthy subjects of the same age is associated with an increased risk for mortality of 12% in the general population.²³ In patients who are about to receive a transplant, VO_{2max} is reduced by between 60% and 78%²⁴⁻²⁶ compared to reference values. This technique, in combination with others, defines what state the patient is in before transplantation and provides data that indicate his/her future after the procedure,²⁷⁻²⁹ which makes it an excellent predictor of post-transplantation disease and death. In fact, in a study about mortality during the first 100 days, Epstein et al.¹⁸ found that the patients with a lower aerobic capacity within the 15 months prior to the intervention had a higher risk for death *a posteriori*. Another predictive test of waiting list and post-transplantation mortality is the 6-min walk test, which is able to calculate the aerobic capacity of patients when it is not possible to do so under laboratory conditions. Each 100 m increment in the test is associated with a decrease in post-transplant mortality by 52%.³⁰ This test can be conducted in a hospital corridor measuring 20 m in length.³¹

To diminish these negative effects on the physical condition of patients, Ritland et al.^{32,33} defend the need for physical exercise. To determine the effect of physical training in patients with hepatitis, the same author³⁴ carried out a study with 9 participating patients in 3 test periods to define their VO_{2max} : one at the start of training, another after

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