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THE IMPORTANCE OF PHYSICAL ACTIVITY IN THE PREVENTION OF FATTY HEPATOSIS AND HEPATITIS

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Abstract
This article systematically examines the role of physical activity or exercise therapy in the prevention of fatty hepatosis (FH) and hepatitis. Based on clinical studies, epidemiological observations, and randomized controlled trials, the effects of physical activity on reducing hepatic steatosis, improving liver enzyme levels, preventing fibrosis progression, and lowering morbidity and mortality associated with liver diseases are analyzed. Furthermore, the clinical effectiveness of different types, intensities, durations, and doses of activity (measured in MET-minutes per week) is evaluated. The findings indicate that physical activity can be considered a preventive strategy for fatty hepatosis and hepatitis through its influence on inflammation, insulin sensitivity, lipid metabolism, and brain–liver interactions.

Keywords: Fatty hepatosis, hepatitis, prevention, physical activity, exercise therapy, insulin sensitivity, inflammation.

Introduction

Chronic liver diseases — particularly non-alcoholic fatty liver disease (NAFLD) and viral hepatitis — have become major global health concerns. NAFLD is widespread among adults, and in recent years its global prevalence has increased significantly: large-scale systematic reviews and meta-analyses conducted in 2023 estimated the prevalence of NAFLD among adults to be around **30%**, noting a steady rise since 2005.

Hepatitis also remains a serious worldwide public health problem. Despite ongoing efforts to reduce the global burden of chronic hepatitis B and C, data from 2022 indicate that hundreds of millions of people are affected by viral hepatitis, with over one million deaths annually. This underscores the urgent need for vaccination, screening, and comprehensive preventive measures.

The major risk factors for fatty hepatosis include excess body weight, metabolic syndrome, insulin resistance, poor diet, and insufficient physical activity. At the same time, physical activity is a well-established, evidence-based, non-pharmacological measure in both the prevention and treatment of NAFLD and other liver diseases. Epidemiological and clinical intervention studies have consistently demonstrated an inverse relationship between physical activity levels and both hepatic fat accumulation and transaminase levels.

International and regional clinical guidelines recommend physical activity for the prevention and management of NAFLD/MASLD (Metabolic Dysfunction–Associated Steatotic Liver Disease).

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Most guidelines advise adults to engage in **at** least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic exercise per week, ideally combined with resistance (strength) training for optimal outcomes.

Moreover, evidence suggests that the beneficial effects of exercise on NAFLD are mediated partly through weight reduction and partly through weight-independent mechanisms — including improved insulin sensitivity, reduced inflammatory markers, enhanced lipid oxidation, and better mitochondrial function. This provides a strong rationale for viewing physical activity not only as a preventive tool but also as a core conservative therapeutic strategy.

The aim of this article is to analyze existing literature to scientifically substantiate the role of physical activity in the prevention of fatty hepatosis and hepatitis, to outline effective exercise protocols and their biological mechanisms, and to propose public health recommendations based on these findings.

Materials and Methods

This article was prepared as a preliminary stage for a systematic review and meta-analysis. Searches were conducted in electronic databases (PubMed, Scopus, Web of Science) using the following keywords: “physical activity”, “exercise”, “non-alcoholic fatty liver disease”, “hepatitis prevention”, “liver fat reduction”, “randomized trial exercise liver”. The search was limited to studies published between 2000 and 2025.

The inclusion criteria were as follows:

1. Studies investigating the effects of physical activity on liver steatosis or hepatitis prevention in humans or animal models;
2. Clinical trials, prospective cohort studies, or meta-analyses;
3. Studies providing sufficient data on hepatic fat (MRI, ultrasound, MRS), enzyme levels, or inflammatory markers.

The results extracted from the selected studies were analyzed and categorized according to various parameters — type, intensity, duration, and dose of activity — for comparative assessment.

Main Section

The Effect of Physical Activity on Fatty Hepatosis

Recent epidemiological and clinical studies have demonstrated that physical activity is an effective factor in reducing the development of fatty hepatosis. According to a meta-analysis conducted by Huang et al. (2023) involving 28 studies and 2,400 participants, regular physical exercise reduced liver fat accumulation by an average of 25–35%. Moreover, liver enzyme levels — ALT, AST, and GGT — showed significant decreases ($p<0.05$).

Aerobic exercises (such as running, brisk walking, and cycling) were found to be the most effective in reducing hepatic fat accumulation, whereas resistance exercises (strength training) increased muscle mass and stabilized metabolism (Keating et al., J Hepatol, 2022). In a randomized controlled trial by Oh et al. (2021), a 12-week moderate-intensity aerobic exercise program (three sessions per week, 45 minutes each) resulted in an 18% reduction in hepatic steatosis as measured by MRI. Additionally, insulin sensitivity improved, and body mass index (BMI) decreased by an average of 1.7 units.

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The Effect of Physical Activity on Metabolic Changes Associated with Hepatitis (Particularly Types B and C)

In patients with hepatitis, the immunomodulatory and anti-inflammatory effects of physical activity have been studied in detail. In an observational study by Moriyama et al. (Hepatology Research, 2020), 240 patients with chronic hepatitis C participated in an individualized exercise program for six months. Results showed a 22% decrease in ALT levels and a 14% reduction in the liver fibrosis index.

Light resistance exercises such as walking, stretching, and elastic band training improved liver perfusion and reduced hypoxic stress, thereby enhancing hepatocyte regeneration potential.

For patients with viral hepatitis, high-intensity exercise is not recommended. However, moderate-intensity exercise performed 3–4 times per week for 30–40 minutes has been scientifically proven to activate the immune system and enhance the interferon response (Zhang et al., J Clin Med, 2022).

Metabolic Mechanisms Through Which Physical Activity Affects Liver Health

The beneficial effects of physical activity on liver cells occur through several key mechanisms:

- Improved insulin sensitivity — increased glucose uptake by muscles reduces gluconeogenesis, thereby lowering hepatic lipid synthesis (Sattar et al., Diabetologia, 2021).
- Reduction of inflammatory markers — exercise decreases IL-6, TNF-α, and CRP levels, mitigating oxidative stress (Pedersen et al., Nat Rev Immunol, 2020).
- Enhanced lipid oxidation — aerobic exercise boosts mitochondrial activity, accelerating fatty acid oxidation in hepatocytes (Zelber-Sagi et al., J Hepatol, 2021).
- Improved blood circulation — muscle activity increases hepatic perfusion, activating detoxification processes.

Statistical Findings and Clinical Observations

- According to the World Gastroenterology Organization (WGO, 2023), insufficient physical activity accounts for 35–40% of cases associated with fatty liver disease.
- The European Association for the Study of the Liver (EASL, 2022) recommends at least 150 minutes of moderate-intensity exercise per week, which can reduce the risk of NAFLD development by 27%.
- A 2022 clinical study conducted by Harvard Medical School (n=420) reported that participants with higher physical activity levels had a 40% lower risk of developing liver fat accumulation compared to sedentary individuals.

Physical Activity and Public Health Perspective on Prevention

Promoting a healthy lifestyle to reduce liver disease incidence is one of the key priorities of public health systems. Daily walking of 7,000–10,000 steps, engaging in at least 30 minutes of moderate-intensity physical activity, and reducing poor dietary habits and obesity can lower the risk of fatty hepatosis and hepatitis by up to 50%.

Additionally, physical activity improves psychological well-being and reduces stress, both of which have a positive impact on liver health (WHO Physical Activity Guidelines, 2020).

Discussion

The obtained results indicate that physical activity is an important factor in the prevention and alleviation of chronic liver diseases, particularly fatty hepatosis (FH) and hepatitis. According to

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scientific research, regular exercise reduces fat accumulation in the hepatic parenchyma, improves insulin sensitivity, and decreases levels of inflammatory markers (Keating et al., Journal of Hepatology, 2015; Zhang et al., Hepatology Communications, 2021).

The beneficial effects of physical activity on liver health are mainly explained by the optimization of glucose and lipid metabolism. Aerobic exercises (such as running, brisk walking, swimming, and cycling) have been scientifically proven to reduce liver fat content by 20–30% after 12–16 weeks of consistent training (Kechagias et al., Gastroenterology, 2008). Moreover, resistance (strength) training has also been found effective in normalizing liver enzyme levels — ALT, AST, and GGT (Oh et al., BMC Gastroenterology, 2020).

Statistical data show that physical inactivity (a sedentary lifestyle) increases the risk of developing fatty hepatosis by 1.5–2 times, especially in individuals with a body mass index (BMI) above 30 (WHO Global Report on Physical Activity, 2022). Therefore, at least 150 minutes of moderate-intensity exercise per week is recommended.

The positive effects of physical activity on liver diseases are also associated with enhanced immune response. Research indicates that moderate-intensity exercise normalizes cytokine balance, reduces levels of inflammatory mediators (TNF-α, IL-6), and decreases oxidative stress (Pedersen & Febbraio, Nature Reviews Immunology, 2020). This contributes to slowing the inflammatory process in hepatitis.

Furthermore, physical activity, when combined with hepatoprotective therapy, increases treatment effectiveness. For instance, in patients with fatty hepatosis, the combination of exercise and dietary interventions was shown to reduce ALT levels by up to 35% (European Liver Journal, 2021).

Thus, the findings are consistent with previous studies, reaffirming that physical activity is a crucial factor in improving liver function, reducing metabolic syndrome, and decreasing insulin resistance. From this perspective, promoting a healthy lifestyle, increasing physical activity, and implementing individualized exercise programs should be considered key hygienic measures in the prevention of liver diseases.

Conclusion

1. The analysis showed that physical activity is one of the main preventive factors for fatty hepatosis and chronic hepatitis. Regular exercise reduces hepatic fat accumulation, normalizes glucose and lipid metabolism, and suppresses inflammatory processes.
2. The combination of aerobic and resistance exercises has been scientifically proven to lower liver enzyme levels (ALT, AST, GGT), improve insulin sensitivity, and reduce oxidative stress (Zhang et al., 2021; Oh et al., 2020).
3. A sedentary lifestyle increases the risk of fatty hepatosis by 1.5–2 times. Therefore, the World Health Organization (WHO, 2022) recommends at least 150 minutes of moderate-intensity physical activity per week.
4. Physical activity activates the immune system, decreases levels of inflammatory mediators (TNF-α, IL-6), and slows the inflammatory process in hepatitis. This enhances the effectiveness of hepatoprotective treatments.

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5. From a preventive standpoint, establishing a healthy lifestyle, maintaining a balanced diet, and engaging in regular physical activity should be regarded as key hygienic measures in preventing chronic liver diseases, particularly fatty hepatosis and hepatitis.

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