ScienceDirect

Sports Orthopaedics and Traumatology

Volume 40, Issue 2, June 2024, Pages 120-132

REVIEW

Therapeutic potential of hydrogen in sports orthopaedics and traumatology: A narrative review

Therapeutisches Potenzial von Wasserstoff in der Sportorthopädie und Traumatologie: ein narratives Review

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Summary

This narrative review reports the therapeutic uses of hydrogen. Small-scale studies suggest that hydrogen could offer health benefits, including reducing oxidative stress and improving markers in certain conditions. Hydrogen therapy is utilized by various individuals, including athletes, patients undergoing radiation treatment, and those with metabolic syndrome. Potential applications and benefits of hydrogen therapy in the context of sports orthopedics and traumatology include reducing oxidative stress in muscles, improving muscle fatigue and endurance, supporting injury recovery and rehabilitation, ameliorating joint health, improving fracture healing, speeding up post-surgical recovery, preventing Delayed Onset Muscle Soreness (DOMS), enhance overall recovery and protect against ischemia-reperfusion injury or delivery neuroprotective effects. However, extensive research confirming the therapeutic effects is lacking. While

hydrogen therapy shows promise, larger clinical trials and comprehensive studies are urgently needed to establish its safety, effectiveness, and optimal use in mainstream medical practices. Closing the knowledge gap is crucial as interest in hydrogen therapy grows.

Zusammenfassung

Diese narrative Rezension befasst sich mit therapeutischen Anwendungen von Wasserstoff. Kleinere Studien deuten darauf hin, dass Wasserstoff gesundheitliche Vorteile bieten könnte, darunter die Reduzierung von oxidativem Stress und die Verbesserung der Marker bei bestimmten Erkrankungen. Die Wasserstofftherapie wird von verschiedenen Personen eingesetzt, darunter Sportlern, Patienten, die sich einer Strahlenbehandlung unterziehen, und Patienten mit metabolischem Syndrom. Mögliche Anwendungen und Vorteile der Wasserstofftherapie im Kontext der Sportorthopädie und Traumatologie umfasst die Reduzierung von oxidativem Stress in den Muskeln, die Verbesserung von Muskelermüdung und -ausdauer, die Unterstützung der Genesung und Rehabilitation nach Verletzungen, die Verbesserung der Gelenkgesundheit, die Verbesserung der Frakturheilung, die Beschleunigung der postoperativen Genesung, die Vorbeugung von verzögert auftretendem Muskelkater (DOMS), die Verbesserung der allgemeinen Genesung und den Schutz vor Ischämie-Reperfusions-schäden oder neuroprotektive Wirkungen bei der Abgabe. Es fehlen jedoch umfangreiche Untersuchungen, die die therapeutischen Wirkungen bestätigen. Während die Wasserstofftherapie vielversprechend ist, sind größere klinische Studien und umfassende Studien dringend erforderlich, um ihre Sicherheit, Wirksamkeit und optimale Verwendung in der allgemeinen medizinischen Praxis zu ermitteln. Da das Interesse an der Wasserstofftherapie wächst, ist es von entscheidender Bedeutung, die Wissenslücke zu schließen.

Introduction

In recent years, there has been a growing interest in exploring the therapeutic potential of hydrogen across various medical domains. Preliminary studies have indicated promising outcomes, suggesting that hydrogen could play a role in reducing oxidative stress, enhancing athletic performance, and improving certain blood markers, particularly in individuals undergoing radiation or those with metabolic syndrome. Hydrogen therapy involves the use of molecular hydrogen (H_2) as a medical intervention to potentially provide therapeutic benefits. Molecular hydrogen is the diatomic form of hydrogen, consisting of two hydrogen atoms, and it is often administered in various forms, including hydrogen-rich water, hydrogen gas, or hydrogen inhalation. Therapeutic uses of hydrogen have gained attention in recent years due to its potential as an

antioxidant, anti-inflammatory, and anti-apoptotic agent [32], [34], [58]. Hydrogen can be administered through various methods, including inhalation, drinking hydrogen-rich water, intravenous injection, and hydrogen-rich saline [34], [58]. It has been explored in the treatment of various diseases, such as metabolic diseases, chronic systemic inflammatory disorders, and liver diseases [48], [59]. The therapeutic application of hydrogen has shown positive effects in clinical trials, improving clinical endpoints and surrogate markers [48]. However, there is still limited knowledge about the dosage, administration, and adverse reactions of hydrogen therapy [48]. This study aims to provide a narrative review of the therapeutic potential of hydrogen gas.

Section snippets

Method

A literature review is performed by keyword search in the Google Scholar database. …

Results

Hydrogen can be administered therapeutically in several ways, and its methods of administration depend on the specific therapeutic goals and conditions being targeted [48], [58]. While medical treatment, including hydrogen therapy, should be administered under the guidance and supervision of qualified healthcare professionals, administering hydrogen therapy outside of a hospital or clinical setting is becoming increasingly common. …

Conclusions

While those listed in the previous paragraphs are some promising areas for hydrogen therapy, and some more established delivery methods, the field of hydrogen therapy is still evolving, with more targeted delivery and specific actions being considered. Small studies show that hydrogen could reduce oxidative stress in people undergoing radiation, boost performance in athletes, and improve certain blood markers in those with metabolic syndrome. Still, extensive research confirming its health …

Author contribution

AB collected the information and wrote the manuscript. …

Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. …

CRediT Author Contribution Statement

Alberto Boretti: Conceptualization, Writing - original draft, Writing - review and editing. …

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