Efficacy and Safety of Hyperbaric Oxygen Therapy in Ligament and Tendon Injuries: A Systematic Review

Shrinit J. Babel[1], Enrico Camporesi [2]
[1]University of South Florida Morsani College of Medicine, Tampa, FL, [2]University of South Florida Department of Anesthesiology and Perioperative Medicine, Tampa, FL
Email of Presenting Author: shrinitbabel@gmail.com

Abstract
INTRODUCTION:
Ligament and tendon injuries are one of the major health concerns that affect over 1.71 billion people around the world. They cause functional limitations and affect the quality of life of people. As conventional methods have their limitations, hyperbaric oxygen therapy (HBOT) is becoming a potential solution for the improvement and acceleration of the healing process in ligament and tendon injuries. This systematic review aims to evaluate efficacy and safety of hyperbaric oxygen therapy (HBOT) for ligament and tendon injuries.

METHODS: This systematic review provides a comprehensive analysis by following PRISMA guidelines. We looked for articles published between March 1999 and May 2024 across 6 databases. The articles included investigated the use of hyperbaric oxygen therapy to treat ligament or tendon injuries. Animal studies, as well as human studies, were included in this review. Studies were evaluated for HBOT, and if they were not related or with insufficient data, they were excluded. Risk of Bias has been assessed using the ROBINS-I tool. The studies measured outcomes across functional, histological, biomechanical, physicochemical, and even radiological aspects, and were also qualitatively synthesized using a Likert Scale rating (Figure 1).

RESULTS SECTION: A total of 13 studies were included in the review, with 693 participants. This study has analyzed the effectiveness of HBOT in two ways, namely, standalone treatment and combined methods like HBOT and other methods like platelet growth factor, steroid injections, intermittent oxygen therapy, or platelet-rich plasma. The pressure observed in this study is between 1.3 to 2.8 atmospheres absolute. The findings suggest that HBOT, whether used alone or as a complementary treatment, enhanced healing compared to controls. The ROBINS-I tool suggested low risk of bias for the majority of studies. Positive impacts in mechanical and histological outcomes were observed in both animal and human studies, such as increased collagen density, fiber alignment, and synthesis.

DISCUSSION: HBOT seems to be a safe and effective method for speeding up the healing process of tendons and ligaments. But, there is a need for more studies with more number of population for analyzing the effect of HBOT in a long run. It is necessary to make a standard protocol for the HBOT treatment method.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): This project opens the door for evaluating the efficacy of HBOT in tendon and ligament injuries, potentially transforming current treatment protocols. The review highlights the potential of HBOT to especially reduce graft rejection post-ACL reconstruction, enhance functional recovery, and accelerate tendon healing.

IMAGES AND TABLES

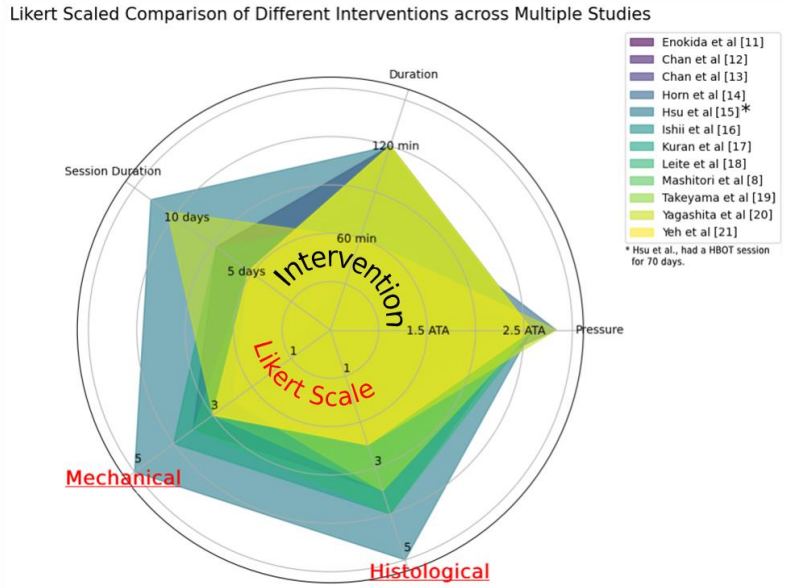

Figure 1. Likert Scale Radar Chart Across Studies. The details of the study interventions are plotted (e.g., HBOT session duration, duration, and pressure) and the Likert-based qualitative ratings of mechanical and histological outcomes are plotted. A rating of '5' is excellent, '3' is good, and '1' is poor

DISCLOSURES
There are no disclosures.