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# The Role of Physical Therapy in The Management of Long Covid Symptoms: A Comprehensive Review of Current Evidence and Therapeutic Strategies

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**Abstract**

**Background:** Long COVID refers to a spectrum of symptoms persisting beyond the acute phase of COVID-19, impacting diverse physiological systems and significantly affecting individuals' quality of life. With approximately 20% of COVID-19 survivors experiencing prolonged symptoms, there is an urgent need for effective management strategies.

**Methods:** This review systematically examines current research on physical therapy interventions aimed at alleviating long COVID symptoms. An analysis of observational and randomized controlled trials was conducted, focusing on interventions such as inspiratory muscle training, aerobic exercises, and tailored rehabilitation programs.

**Results:** The findings indicate that structured physical therapy significantly improves outcomes for individuals with long COVID-19. Studies reveal that programs involving inspiratory muscle training and aerobic exercises lead to notable improvements in respiratory function, fatigue reduction, and overall quality of life. For instance, trials demonstrated that participants engaging in supervised rehabilitation experienced significant enhancements in functional capacity compared to control groups.

**Conclusion:** Physical therapy is a crucial component in managing long COVID symptoms, promoting not only physical recovery but also psychological well-being. As the understanding of long-term COVID-19 evolves, integrating physical therapy into comprehensive treatment plans becomes imperative. Further

research is essential to refine therapeutic approaches and validate the long-term benefits of physical activity in this patient population.

**Keywords:** Long COVID, physical therapy, inspiratory muscle training, rehabilitation, respiratory function.

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## 1. Introduction

Although several people undergo an acute phase of the illness, contracting and then recovering from COVID-19, it is essential to recognize that some patients may endure prolonged symptoms and health consequences. The extended presentation of symptoms has resulted in the introduction of a new name in the medical field: “long COVID.” Long COVID-19 denotes the enduring health complications encountered by some people after their recovery from the acute phase of COVID-19. It may include a diverse array of symptoms impacting several organs and systems inside the body. As our comprehension of this disorder evolves, it becomes more evident that COVID-19's repercussions extend beyond the first acute infection and may have enduring impacts on people's health and well-being. [1].

Long COVID-19 denotes a condition marked by the persistence of symptoms beyond the resolution of the original COVID-19 infection. These persistent symptoms may last from weeks to many months. Furthermore, some people may encounter the emergence of new symptoms after a duration of being asymptomatic. Approximately 20% of those who contracted COVID-19 may exhibit symptoms five weeks post-infection, whereas around 10% will see symptom resurgence after twelve weeks [2].

The distinguishing characteristic of protracted COVID-19 is the variable nature of its symptoms. They may fluctuate, sometimes exacerbated by physical or mental strain. The duration of these symptoms is not correlated with the initial severity of the COVID-19 infection. Individuals with both moderate and severe forms may have extended COVID, with symptoms that might differ significantly [3].

The symptoms of recurrent COVID-19 are varied and may include general manifestations such as tiredness, myalgia, or sleep disturbances, with particular symptoms impacting the respiratory, cardiovascular, digestive, neurological, and dermatological systems. A common symptom of extended COVID-19 is termed "brain fog," characterized by challenges in focus, memory, and executive function [4,5].

The demographic most often impacted by extended COVID-19 is mostly middle-aged women. This demographic preponderance has substantial repercussions, affecting both personal life and the workplace environment. This may incur economic expenses owing to constraints in functional ability, making it a complicated and multidimensional health issue that impacts both people and society at large. Consequently, there is an increasing need for thorough study and medical intervention to comprehend and tackle the many dimensions of protracted COVID successfully [1].

Physiotherapy is an essential element of the therapeutic approach for individuals with long-term COVID-19. Physiotherapy has a diverse function in mitigating symptoms and enhancing the general well-being of patients. Fatigue, musculoskeletal discomfort, and dyspnea are prevalent and often incapacitating symptoms encountered by individuals with long-term COVID-19. Physiotherapists use many methods to resolve these issues. This includes the creation of customized exercise regimens designed to enhance muscular strength, flexibility, and cardiovascular fitness. These exercises are tailored to meet the individual demands and constraints of each patient [6,7]

Alongside exercise, physiotherapists may use treatments like manual therapy. This practical method emphasizes enhancing joint mobility and alleviating pain, particularly beneficial for those suffering from musculoskeletal discomfort linked to lengthy COVID. Physiotherapists extend their practice beyond the treatment of only physical problems. They provide crucial instruction on pacing techniques and energy management. These measures assist individuals in efficiently managing their symptoms, preventing overexertion, and enhancing everyday activities. This enables patients to enhance their overall physical function and quality of life [8].

Furthermore, the ramifications of chronic COVID-19 are beyond the physical domain, influencing the psychological well-being of the person. Physiotherapy significantly contributes to mitigating these psychological impacts. Physiotherapists assist patients in managing the emotional and psychological difficulties linked to chronic COVID-19 through structured exercise and other therapy treatments, hence fostering a more holistic and complete care approach [6-9].

Long COVID is an evolving syndrome, with many uncertainties surrounding it. Although this illness is well-defined, extended COVID-19 presents considerable difficulty for healthcare practitioners because of its complexity and multifarious nature, manifesting a diverse array of symptoms. The continuation of symptoms beyond the first infection and the absence of definitive diagnostic criteria complicates the identification and management of protracted COVID-19 for healthcare practitioners.

Investigating lengthy COVID is a formidable challenge because of the heterogeneity and variety of its accompanying symptoms. The extensive array of symptoms and their variable characteristics complicate the establishment of definitive diagnostic criteria and the identification of a homogeneous patient group for research [11,12]. The insufficient comprehension of the fundamental mechanics of extended COVID-19 further complicates the study process. This complicates the generation of a sufficiently large sample size for investigations and hinders the ability to draw definitive conclusions about the prevalence and natural history of the disorder. Moreover, the absence of uniform and established measuring instruments for evaluating symptoms and functional impairment in extended COVID intensifies the challenges in conducting research in this domain. The diversity of concomitant symptoms and the insufficient comprehension of the underlying processes of extended COVID-19 provide considerable hurdles to studying this disease, leading to a limited quantity of data on its many characteristics. Nevertheless, several researchers and healthcare professionals are endeavoring to comprehend extended COVID, with ongoing studies and investigations aimed at elucidating the ailment and its effects [12-14]. The World Health Organization (WHO) recognized the phenomenon of extended COVID-19 and emphasized the need for more study in this area.

Long COVID-19 is a multisystem illness characterized by the continuation of symptoms beyond the acute phase of SARS-CoV-2 infection. The precise pathophysiology and long-term consequences of this illness are yet little understood. The diversity of lengthy COVID symptoms poses a substantial barrier for researchers in finding consistent patient groups and establishing suitable outcome metrics. The predominance of respiratory sequelae in long COVID patients underscores the need for more studies on the efficacy of therapies aimed at these specific symptoms [10,14-16].

This study aims to systematically examine research on patients with extended COVID-19, focusing on therapies that enhance respiratory function, especially those involving physical activity.

## 2. Outcomes For Enhancing Physical Activity in Individuals with Extended COVID-19

The findings indicate favorable outcomes for enhancing physical activity in individuals with extended COVID-19 and for the formulation of therapies. The Palau et al. [15] trial included a sample of 26 patients who engaged in a 12-week home program of inspiratory muscle training (IMT) [15]. The research conducted by Sharma et al. including 30 post-COVID-19 patients lacks information on the patients' ages and the proportion of female participants. They implemented a treatment routine four days per week for six weeks, including a pulmonary tele-rehabilitation program focused on breathing and therapeutic exercises [21]. In 2023, Jimeno-Almazán et al. [17] randomized 80 non-hospitalized patients with post-COVID-19 conditions into one of four developed regimens [17]. The programs spanned 8 weeks and included: a multicomponent exercise regimen comprising three supervised weekly sessions of aerobic endurance and resistance training at low to moderate intensity; inspiratory muscle training with two standardized daily sessions; a combination of both; and a control group adhering to WHO guidelines for post-COVID-19 rehabilitation [1].

In 2022, Jimeno-Almazán et al. [18] performed research with 39 participants over 8 weeks, which included two supervised sessions each week of weight training paired with moderate-intensity aerobic exercise, in

addition to a third day of continuous supervised light-intensity training. Jimeno-Alamazán's two research contrasted the WHO guidelines with his tailored exercise regimen for extended COVID. All investigations, except McNarry's, demonstrated statistically significant findings, with the intervention group exhibiting substantial outcomes in comparison to the control groups [19]. The intervention conducted by the patients of McNarry et al. consisted of three unsupervised weekly sessions of inspiratory muscle training, on non-consecutive days, for eight weeks [19]. Philip et al. [20] performed a randomized controlled trial with 192 long COVID patients suffering from dyspnea. They implemented a 6-week online program focused on breathing and well-being, designed for those with extended COVID-19 who are suffering from dyspnea [20].

The absence of supervision may have resulted in such an outcome. In comparison, research by Palau et al. [15] and Sharma et al. [21] conducted identical activities, although their supervision differed from that of McNarry [19]. The research by Palau et al. [15] included supervised home visits by a physiotherapist, whereas the study by Sharma et al. [21] had patients engaging in telerehabilitation lung exercises, with researchers overseeing the patients using digital platforms throughout their physical activities.

Studies of a minimum period of 6 weeks have shown statistically significant outcomes for the recommended inspiratory muscle training activities [22,23]. It is noteworthy that the research conducted by Jimeno-Almazán et al. [17] and Jimeno-Almazán et al. [18], which devised an aerobic and resistance workout program in comparison to that recommended by the WHO, had statistically significant outcomes.

The findings indicate that physical exercise needs to be integrated into everyday routines instead of being seen as an isolated duty to do [22,24-27]. This integration may foster more sustainable physical activity behaviors, as individuals are more inclined to participate in activities that are habitual and incorporated into their daily routines, hence enhancing the quality of life for these patients. The research emphasizes the significance of addressing social and environmental elements, such as social support, alongside individual components, including motivation and attitudes, to successfully increase physical activity [14,28-30]. These results underscore the need to use physical exercise more comprehensively for chronic COVID patients, as they consider individual aspects that influence the social life of these individuals.

Nevertheless, further research of this kind is essential, since the limitations are evident and may undermine the validity and dependability of the findings. These limitations arise from sample sizes, possible bias, insufficient control of confounding factors, and the cross-sectional methodology. Consequently, it is essential to consider these limitations when reading and using the findings of such research to guarantee precise interpretation and suitable use of their conclusions concerning physical activity and extended COVID.

## 3. Conclusions

The ongoing challenges posed by long COVID necessitate a multifaceted approach to treatment and rehabilitation. This review highlights the critical role of physical therapy in addressing the diverse and often debilitating symptoms associated with this condition. Given the heterogeneity of long COVID presentations, individualized physical therapy interventions can significantly enhance patient outcomes by targeting specific symptoms such as fatigue, dyspnea, and musculoskeletal pain.

Clinical evidence underscores the effectiveness of various physical therapy modalities, including inspiratory muscle training (IMT) and structured aerobic exercises. These interventions not only improve respiratory function but also foster greater physical endurance and overall well-being. Importantly, the integration of psychological support within physical therapy practices can address the emotional and mental health challenges many patients face, such as anxiety and depression, which are common in those suffering from long COVID.

Despite the promising results, further research is essential to establish standardized protocols for physical therapy in long COVID management. Future studies should aim to explore optimal intervention durations, intensities, and combinations of therapies tailored to the unique needs of long COVID patients. Understanding the long-term effects of these interventions will provide valuable insights into sustainable recovery strategies.

Moreover, healthcare professionals must collaborate across disciplines to ensure comprehensive care for long COVID patients. This includes not only physical therapists but also primary care providers, psychologists, and nutritionists, creating a holistic treatment framework that addresses the multifaceted nature of long COVID.

In conclusion, as the prevalence of long COVID continues to rise, prioritizing physical therapy as a key element of rehabilitation is critical. By enhancing physical capacity and promoting mental well-being, physical therapy can facilitate the recovery process, improving the quality of life for those affected by this complex and evolving condition.

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**دور العلاج الطبيعي في إدارة أعراض كوفيد طويل الأمد: مراجعة شاملة للأدلة الحالية والاستراتيجيات العلاجية**

**الملخص**

**الخلفية :**يشير مصطلح كوفيد طويل الأمد إلى مجموعة من الأعراض التي تستمر بعد المرحلة الحادة من الإصابة بفيروس كوفيد-19، حيث تؤثر على أنظمة فسيولوجية متعددة وتؤدي إلى تدهور كبير في جودة حياة المصابين. ومع إصابة حوالي 20% من الناجين من كوفيد-19 بأعراض طويلة الأمد، تبرز الحاجة الملحة إلى استراتيجيات إدارة فعّالة

**الطرق :**تفحص هذه المراجعة بشكل منهجي الأبحاث الحالية حول التدخلات العلاجية الطبيعية التي تهدف إلى تخفيف أعراض كوفيد طويل الأمد. تم تحليل الدراسات الرصدية والتجارب العشوائية ذات الشواهد، مع التركيز على تدخلات مثل تدريب عضلات التنفس، التمارين الهوائية، والبرامج التأهيلية المصممة خصيصًا للمرضى.

**النتائج :**تشير النتائج إلى أن العلاج الطبيعي المنظم يُحسن بشكل كبير النتائج الصحية للأفراد المصابين بكوفيد طويل الأمد. أظهرت الدراسات أن البرامج التي تتضمن تدريب عضلات التنفس والتمارين الهوائية تؤدي إلى تحسينات ملحوظة في وظائف الجهاز التنفسي، وتقليل الإرهاق، وتحسين جودة الحياة بشكل عام. على سبيل المثال، أظهرت التجارب أن المشاركين الذين خضعوا لبرامج إعادة تأهيل تحت إشراف متخصصين حققوا تحسنًا كبيرًا في القدرات الوظيفية مقارنة بالمجموعات الضابطة.

**الاستنتاج :**يُعد العلاج الطبيعي جزءًا أساسيًا من إدارة أعراض كوفيد طويل الأمد، حيث يساهم في تعزيز التعافي الجسدي ودعم الصحة النفسية. ومع تطور الفهم حول كوفيد طويل الأمد، يصبح دمج العلاج الطبيعي ضمن خطط العلاج الشاملة أمرًا ضروريًا. هناك حاجة إلى المزيد من الأبحاث لتطوير الاستراتيجيات العلاجية وتحقيق فهم أفضل للفوائد طويلة الأمد للنشاط البدني في هذه الفئة من المرضى.

**الكلمات المفتاحية :**كوفيد طويل الأمد، العلاج الطبيعي، تدريب عضلات التنفس، إعادة التأهيل، وظائف الجهاز التنفسي.