How Physical Therapy Improves Functioning and Assists in the Recovery Process for COVID-19 Survivors

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Abstract

Physical therapy (PT) is the treatment of disease, injury, or deformity by physical methods such as massage, heat treatment, and exercise, rather than by drugs or surgery (Physical Therapy, 2017). PT has been used in the recovery process from surgeries, to prevent surgery, and to regain or maintain mobility in the body (Physical Therapy, 2017). There have been many uses, applications, and benefits of PT and there are still more ways it can be implemented today, such as with COVID-19 survivors. The COVID-19 pandemic has been an ongoing outbreak since December 2019 when it was first identified in China (WHO, 2020). COVID-19 has a wide range of symptoms and effects on those diagnosed with it, including loss of taste and smell, fever, dry cough, fatigue and difficulty breathing or shortness of breath (WHO, 2021). Those who survive may be burdened with several lasting effects, such as prolonged fatigue and shortness of breath, and face a very long road to recovery. In this comprehensive literature review, the functions and benefits of PT will be explored in regard to COVID-19 survivors through the analysis of past implementations of PT following other serious illnesses. With the implementation of PT, it is hypothesized that the recovery process can be shortened, and the lasting effects lessened. Anyone who has survived COVID-19 and suffers from lasting effects may benefit from the results of this project. This is because positive results may indicate that PT is a viable option, as it could improve mobility after the illness or hospital stay as well as aid in improving some of the lasting effects, such as breathing problems.

Introduction

Physical therapy (PT) is care that aims to ease pain and help people function, move, and live better using methods such as massage, heat treatment, and exercise, rather than by drugs or surgery (Physical Therapy, 2017). People of all ages can benefit from PT for all sorts of different ailments. PT can restore function after a surgery, and in some cases, if started soon enough, it can even prevent a surgery from having to be done (Physical Therapy, 2017). PT can be applied in many different ways to aid in the rehabilitation and recovery process of many health conditions, though its impact on COVID-19 survivors has not been fully explored.

The COVID-19 pandemic was first identified as COVID in China in December 2019, and quickly became a global pandemic affecting 18 countries outside of China by the end of January 2020 (World Health Organization, 2020). A few common symptoms are cough, shortness of breath, and loss of taste or smell (CDC, 2021). More severe symptoms include pain in the chest, new confusion, and discolored lips or skin (CDC, 2021). While the recovery process varies with severity of symptoms, age, and overall health, symptoms like fatigue, headache, and trouble breathing have been seen to linger (Bhargava, 2020).

Past research has examined the impact of PT on immune function, cognitive function, and general physical function of the body. One study by Johansson (2017) examined the effects of breathing treatments on chest mobility of patients with sensory hyperreactivity. The study showed that with a structured breathing program, there can be significant improvements in chest mobility, symptoms, and cough sensitivity (Johansson, 2017). Another study by Callahan (2017) discussed the use of PT to restore physical function after being released from the Intensive Care Unit (ICU). There can be serious repercussions to long-term health and mobility after being sedentary for an extended period of time during an illness. This study showed benefits to the use

of PT after ICU stays (Callahan, 2017). Another study by Siemonsma (2018) determined the effectiveness of PT and exercise in the prevention of functional decline in older adults. This study showed that PT and exercise can slow down the functional decline in older persons with existing activity limitations (Siemonsma, 2018). Given the known benefits of PT, it is reasonable to hypothesize that it can be implemented in and greatly improve the recovery process for COVID-19 survivors.

Though extensive research has been conducted on the benefits and implementations of PT, a gap exists in its possible implementation and benefit with COVID-19 survivors. Due to the novelty of COVID-19, research is limited regarding the long-term effects it has on survivors or the things that can be done to limit those effects. Lung damage, breathing problems, and heart complications have been observed as some of the lasting effects in COVID-19 survivors (CBS News, 2021). This comprehensive literature review will attempt to fill the gap in knowledge of COVID-19 survivors suffering lasting effects and the possible benefits of implementing PT in the recovery process. With the implementation of PT, the recovery process may be accelerated and lasting health problems may be reduced.

Past Uses of PT

To fill this gap, an understanding of how PT has been used in the past must first be gained. PT has been used in the recovery from a variety of ailments ranging from minor tears to a stroke or debilitating illness (Smith, 2022). There are a variety of areas in the field of PT that specialize in these different ailments. The three studies referenced above all used PT to aid in the recovery from and prevention of different ailments and therefore require different specialties of PT to treat them. The study by Johansson in 2017, mentioned previously, was on patients with sensory hyperreactivity and improved chest mobility through breathing treatments. This study falls in the area of cardiopulmonary PT. Cardiopulmonary PT helps the body to become more efficient at using oxygen which leads to less shortness of breath and improves quality of life (Szanto, 2021).

A study done with cancer patients evaluated the use of PT on cardiopulmonary performance and cancer-related fatigue (Hutchison et al, 2019). The study compared baseline-to-discharge scores from a 6-minute walk test to measure if there was an improvement in cardiopulmonary performance. Results showed a significant improvement in cardiopulmonary performance and cancer-related fatigue, as well as pain reduction (Hutchison et al, 2019).

Another type of PT used for general pain management, mobility, and recovery from surgery is orthopedic PT (Flanagan, 2020). People can have pain occur anywhere without a prior injury or reason for its onset. Pain can be more prevalent from surgery, lingering effects of illness, or being in a hospital bed for a long time. Past studies have been done about patient survivorship and rehabilitation after ICU stays. Patients coming out of the ICU have decreased physical and psychological capabilities (Parry et al, 2017). To improve these capacities and patient outcomes after critical illness, exercise and physical activity were used. This included

mobilization, exercise training, rehabilitation, and general activities of daily living (Parry et al, 2017). All of these things fall under orthopedic PT which can be used to help patients through their recovery process by working on flexibility, range of motion, and strength in order to get people back on their feet again (Flanagan, 2020).

PT is also used to treat neurological disorders. Neurologic PT can be used to treat Alzheimer's disease, muscular dystrophy, stroke, migraines, and traumatic brain injury (Caceres, 2020). Patients with any of these and many more neurologic disorders can benefit from the use of neurologic PT. Therapists can treat migraines by performing manual therapy on the muscles of the head and neck to improve mobility. They can also treat the effects of traumatic brain injuries through gait training and other exercises that will retrain the brain and muscles to do what the patient needs (Caceres, 2020).

Lasting Effects of COVID-19

Over the past two years, COVID-19 has affected everyone, whether they have contracted the virus or not. For those who have contracted the virus and have survived, they may be burdened by the lasting effects it can leave on their body. The lasting effects of COVID-19 can range from mild to severe including shortness of breath, fatigue, chest pain, and muscle pain (Covid 'long-haulers': Long Term Effects of COVID-19, 2021). Long term lung problems are a major lasting symptom of more severe cases of COVID-19 and can take months to begin to heal (Covid 'long-haulers': Long Term Effects of COVID-19, 2021).

The lungs are one of the first organs affected by COVID-19 (Learn about covid-19, 2022). Our lungs protect us from bacteria through a filtration system. This system is broken down by the COVID-19 virus therefore allowing harmful substances into our lungs and affecting our ability to breathe (Learn about covid-19, 2022). When the lungs get damaged it is extremely difficult to recover and takes a significant amount of time. This remains true for COVID-19 survivors.

It is still early in the existence of the COVID-19 virus so there is not much knowledge on how long these lasting effects can linger in survivors. The organization COVID Survivors for Change has stories from survivors about how this virus has affected them and their families (COVID Survivors for Change, 2022). One story is about a woman who contracted COVID-19 while she was 29 weeks pregnant. They had to deliver her baby early and she was put in a coma and on a ventilator and extracorporeal membrane oxygenation (ECMO), which pumped and oxygenated her blood outside her body allowing her heart and lungs to rest (UCSF Health, 2020). She could not meet her son for a month after he was born. Now, over six months later, she says she still has the lasting effects of lower back pain, migraines, and trouble concentrating

(Pearce, 2022). Another survivor story is about a father of three. He was only in the hospital for a week, but has had lasting effects for the past 15 months. He struggles with breathing and blood pressure issues, weakness, a decrease in stamina, and dizziness (Neese, 2021). A third survivor story is even more extreme and is about a man who passed out and was in the ICU because he had developed pneumonia in addition to COVID-19. Since being in the ICU, this man has suffered brain damage that causes seizures, lung damage that hinders his ability to exercise, and liver damage (Trevino, 2021). All survivors have a story specific to them and will experience the lasting effects of COVID-19 differently. There are countless stories like these where survivors are still struggling with these lasting effects for months after initially recovering from the disease. Due to the novelty of COVID-19, these survivors do not have many resources available for treatment or management of their lasting symptoms.

Effects of PT in the Recovery Process

As the COVID-19 virus progresses in the world and more people recover, there will be more information on the lasting effects as well as on how they can be lessened. PT has only just begun to be explored as a treatment in the recovery process from COVID-19. Due to past uses of PT, it is likely that its implementation in the recovery process from COVID-19 will be beneficial. Cardiopulmonary PT is already used to treat chronic obstructive pulmonary disorder (COPD), chronic bronchitis, and pulmonary hypertension (Szanto, 2022). Each of these has similar symptoms and lasting effects to COVID-19.

COPD causes air flow blockage and other breathing related problems (CDC, 2021). Chronic bronchitis is long term inflammation of the bronchi which leads to difficulty breathing and shortness of breath (Chronic bronchitis, 2022). Pulmonary hypertension is narrowing of the arteries carrying blood from the heart to the lungs resulting in less oxygen in the blood. This leads to difficulty breathing, fatigue, and chest pain (CDC, 2019). All of these symptoms are also seen in COVID-19 survivors. Using past research and current implementations of cardiopulmonary PT for people with COPD, chronic bronchitis, and pulmonary hypertension, COVID-19 survivors may benefit from the use of PT in the recovery process.

As more people contract and survive the virus, more treatments become available. Team Rehabilitation Physical Therapy is an orthopedic PT clinic that already has a Post COVID-19 recovery program. This program helps patients recover strength, restore breathing capacity, and resume participation in activities of daily living (Post covid-19 recovery program, 2021). To ensure patients' safety, they are monitored while they are in the clinic and their heart rate and oxygen saturation are taken regularly.

There is a recent study about patient survivorship after COVID-19 ICU stays. Prior studies of survivorship after ICU stays show that patients often face long-lasting physical and cognitive impairments. It is suggested that critically ill patients with COVID-19 may experience these same complications in their recovery process (Hosey et al., 2020). Physical impairments seen after the virus are joint contractures, muscle wasting and weakness, and respiratory failure. This study also states that a combination of critical care interventions and rehabilitation programs beginning in the ICU and continuing after discharge may help to optimize COVID-19 recovery. Furthermore there are cognitive impairments seen after COVID-19 such as traumatic brain injuries (Hosey et al., 2020). As discussed above, orthopedic, cardiopulmonary, and neurologic PT currently treat individuals with these symptoms and may all be extremely beneficial in the recovery process from COVID-19.

Conclusion

Based on the past uses of PT and the lasting effects of COVID-19, it is hypothesized that PT may be useful in the recovery process from COVID-19 to help lessen its lasting effects. The lasting effects of COVID-19 most severely impact the muscles, heart, lungs, and brain. To target these specific effects, orthopedic, cardiopulmonary, and neurologic PT may be the most beneficial approaches in the recovery from COVID-19.

The COVID-19 pandemic has been ongoing for the past two years. Within these two years, the number of people surviving the disease has continued to increase as well as the number of people continuing to suffer long-lasting health problems due to COVID-19. The physical and cognitive impairments resulting from COVID-19 can lead to persistent fatigue, chronic pain, sleep dysfunction, and reduced quality of life (Hosey et al., 2020). Survivors of COVID-19 may struggle with these lasting effects for months or years after initially recovering from the disease.

Over the past two years, COVID-19 recovery programs have begun to pop up along with research supporting the use of PT in the recovery process from COVID-19. Rehabilitation programs may greatly improve survivors' physical and cognitive abilities and their quality of life (Hosey et al., 2020). Through this literature review, it has been shown that the implementation of PT in the recovery process may be beneficial to aid survivors in recovering from the lasting effects of COVID-19.

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