

**REVIEW**

# Fascia Focused Manual Therapy Interventions-Proposed Treatment for Post-COVID Syndrome

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## ABSTRACT

The novel virus identified as severe acute respiratory syndrome coronavirus [SARS-CoV-2] has resulted in the Coronavirus disease [COVID-19] worldwide pandemic. Confirmed cases of COVID-19 has surpassed 57 million people globally and numbers are exponentially increasing weekly. Significant numbers of recovering patients are reporting long-term, on-going painful soft tissue and respiratory complications. While the total number of deaths directly associated with COVID-19 has exceeded 1million people worldwide, a more accurate figure is estimated to be significantly higher due to limited testing and issues around accurately attributing cause of death. Since its earliest emergence experts have identified the primary source of entry to the body being the nasal and oral cavities via aerosol droplets proliferating across the respiratory tract. Similar Coronaviruses have typically caused mild enteric symptoms including nausea, vomiting, diarrhoea, and respiratory diseases including the common cold. In contrast, COVID-19 has been shown to cause acute fatal pneumonia, systemic out-of-control inflammatory responses, over-production of hyaluronan, cytokines, chemokines and C-reactive protein [CRP], leaky blood vessels, clot-causing antibodies leading to coagulation of blood, and resulting blood clots. Recorded high levels of serum Interleukin 6 [IL-6], Interleukin 8 [IL-8] as well as Tumour necrosis factor alpha [TNF- $\alpha$ ] and IL-1 $\beta$  have been observed in COVID-19 patients all contributing to connective tissue damage. The connective tissue fascia has been described as “the universal singularity” due to its ubiquitous nature and has been identified in virtually every organ and structure within the body. Based on available evidence this paper suggests that the Corona virus travels upon the highway that is the fascial singularity whence it permeates cells on a local and global level. A significant number of post-COVID-19 [SARS-CoV-2] patients will experience on-going fascia related pain and a wide range of functional issues. Based on current research this short report proposes that appropriate fascia focused manual and movement therapy interventions will assist patients in recovering from the COVID-19 [SARS-CoV-2]. Fascia focused therapeutic interventions are shown to reduce pain and support a re-establishment of function while providing safe, effective and appropriate non-invasive therapy.

A comprehensive search was conducted to systematically review research/reports and professional opinions related to post-COVID-19 syndrome. Surveying appropriate research and reports provided unique detail concerning fascial tissue involvement and underlying disease mechanisms including long-term after-effects of the novel Coronavirus disease [COVID-19].

**KEYWORDS:** Coronavirus. Fascia. Post-COVID Syndrome. Long-term COVID, post-COVID-19 syndrome. Hyaluronan. Angiotensin-converting enzyme 2 [ACE2]. Cytokines.

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## INTRODUCTION

According to the European Centre for Disease Prevention and Control the number of confirmed cases of COVID-19 is in excess of 69.1 million people globally with 44.6 million in recovery. Of this number, in mid-December of 2020, 15.5 million accounted for the USA while the number of COVID-19 cases across Europe [in millions] was 69.1, UK 1.77, Brazil 6.73, Russia 2.52, France 2.32 and India was 9.77 reflecting the impact this pandemic continues to be inflicting on our local and global communities. A significant number of patients recovered from COVID-19 have reported long-term, on-going

unresolved soft tissue and respiratory issues, a condition being called “long COVID” or “post-COVID syndrome” [1, 2]. A sample group used to attain this data had a median age of 47 years with the majority having no previous health issues [2]. Debilitating symptoms such as sleep apnoea, disorientation, tachycardia, extreme fatigue, rash, blurred vision and impaired autoimmune issues have been shown to have a direct correlation with increased cytokines [3]. Of special interest to the manual and movement therapist unresolved symptoms include restricted painful motion, body-wide muscular and joint pain, impaired physical

function and dyspnoea [2]. The exact molecular mechanisms for transporting SARS-CoV-2, via the eyes, mouth and nose, are under continual investigation [2]. However, the essential binding receptor allowing entry into the body has recently been identified as the protective protein angiotensin-converting enzyme 2 or ACE2 [4, 5]. Fascial tissue contains ACE2 mRNA within nasal and oral mucosa, nasopharynx, lungs, stomach, small intestine, colon, skin, lymphatics, blood vessels, thymus, bone, spleen, liver, kidney, and brain [4].

In addition, ACE2 is present in arterial and venous endothelial cells and arterial smooth muscle cells. ACE2 is abundantly present in the lung alveolar epithelial cells and small intestine epithelia as well as the cardiovascular system [4, 7].

This epithelial expression, together with the presence of ACE2 in vascular endothelium, provides early data helpful in understanding the pathogenesis of the main SARS disease manifestations such as inflammation [27]. ACE2 is also acknowledged for its role in controlling and maintaining blood pressure [6]. Based on previous research it is proposed that changes in fascia tissue densification, architectural changes, fibrotic formation and dehydration due, in part, to increased hyaluronan can result in local and global pain mechanisms [8]. Reduced tissue gliding coupled with faulty breathing mechanisms can induce pain along with changes in sensations as the result of dyspnoea [9]. It has been reported that 36.4% of recovering COVID-19 patients develop neurological symptoms that include headaches [10]. Due to the ubiquitous nature of fascia it has been described as the universal singularity and is now recognised as one of the body's most neurologically rich sources of sensory nerves [28, 29]. Due to the complexity of post-COVID-19 issues it has been stated that post-COVID-19 patients will dominate medical practice for the foreseeable future [11]. Fascia-focused manual therapy interventions have been shown to be effective in the treatment of inflammatory mediated pain and non-specific pain mechanisms and, therefore, it is proposed, can provide effective and welcomed therapeutic interventions for alleviating and managing 'post-COVID syndrome' [9, 21, 22, 23, 24, 25, 26]. Incorporating qualified therapists, who are trained in the treatment of fascia, as part of the multidisciplinary team will provide much needed support in alleviating already over-stressed healthcare systems and their workers [31]. Additionally, the integration and use of telehealth patient-centred consultations will provide pre, post and "between session" therapy guidance, advise and recommendations valuable in supporting the goal of improved quality of life [13].

Failure in the ability of fascia to glide relative to deeper or more superficial tissue is now recognised as a significant contributor to myofascial pain and inflammation, as well as contributing to changes in sensations [12, 14]. Inflammation has been shown to promote the production of glycosaminoglycans, especially hyaluronan and

bradykinins, within the extracellular matrix leading to leaky blood vessels, coagulation and possible clotting [15]. Histological investigations of cadaver lung tissue sections from patients who had COVID-19 supported previous findings of a significant increase in hyaluronan, as much as 20 times that of a healthy lung [15]. Hyaluronic acid or hyaluronan is naturally present in the skin, eyes and synovial joints [34]. A number of studies have confirmed the continuity of the fascia singularity [17, 18, 19] and clearly demonstrate how pain in one region can be due to morphological, structural, tensional or chemical changes at a local or distant anatomical site [20]. Manual Therapists trained to specialise in the provision of fascia focused treatments are ideally placed to provide appropriate therapeutic interventions to help resolve resulting adhesive effects of respiratory and vascular secretions [16]. Studies support the efficacy of fascia focused manual interventions which not only improve gliding of tissues but also restore normal levels of hyaluronan [32,33].

This review identified a connection between fascia and serum interleukins IL-6, IL-8, tumour necrosis factor [TNF]- $\alpha$  and IL-1 $\beta$ , hyaluronan and the pathophysiology of severe acute respiratory syndrome [SARS] [21, 22] and, importantly, an under-reported aspect of COVID-19, the development of inflammation of the superficial fascia due to an abnormal amassing of eosinophils [30]. Although there is little research on the topic a recent study showed a significant improvement of eosinophil levels using a combination of interdisciplinary pain management combined with physical therapies involving massage and appropriate physical activity [35].

A comprehensive assessment is the key to ensuring a 'person centred' approach to the provision of long-Covid/post-COVID-19 fascia focused manual and movement therapeutic interventions. While all long-Covid/post-COVID-19 patients share the experience of having contracted and survived COVID-19 each case must be considered on an individual basis [23]. While similarities abound, no two patients are ever the same [24] and no two treatments will be identical.

## CONCLUSION

Following the arrival of the Coronavirus [COVID-19] worldwide pandemic buoyed by the inevitable and widely held opinion that "we are never going back to normality", the overwhelming evidence suggests that a new era of healthcare is rapidly dawning. Now is the time for effective steps to integrate qualified therapists with specific skills and knowledge related to myofascial therapies into the multidisciplinary team. A move away from the dominant musculoskeletal model towards a fascia focused model now not only seems inevitable but is of vital necessity. Failure to not include therapists appropriately trained in fascia focused therapy as an important member of the multidisciplinary team will increase stress on hospitals and the healthcare system as a whole.

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## COMPETING INTERESTS

The author declares no competing interests with this case.

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