



Guilan university of medical sciences

# The effects of covid-19 on musculoskeletal system and treatments

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سمپوزیوم

## اثرات بیماری کووید ۱۹ بر سیستم عضلانی- اسکلتی و روش های درمان آن

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سخنرانان

دکتر محمدرضا اسدی  
دکترای تخصصی فیزیوتراپی  
استادیار دانشگاه علوم پزشکی همدان

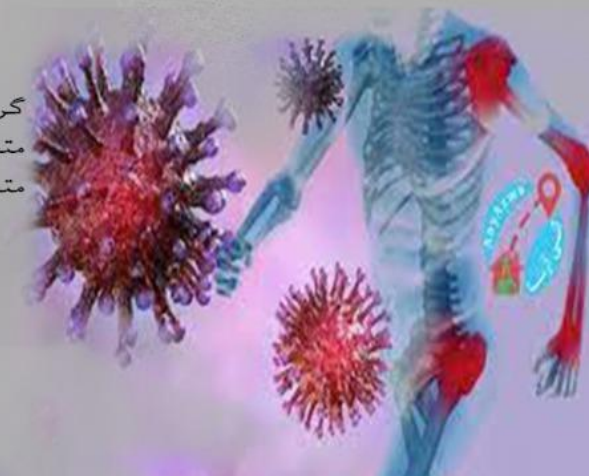
دکتر علی اشرف  
متخصص بیهوشی فوق تخصص ICU  
دانشیار دانشگاه علوم پزشکی گیلان

دکتر کامران عزتی  
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دانشیار دانشگاه علوم پزشکی گیلان

دبیر علمی: دکتر کامران عزتی

گروه هدف: فیزیوتراپیست ها ( کلیه مقاطع )  
متخصصین بیهوشی  
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ثبت نام از طریق سامانه آموزش مداوم  
همراه با ۳ امتیاز بازآموزی



# Introduction

## ► Immobility Vs (Im)mobility

# Introduction

- ▶ Infectious disease outbreaks and human mobility are intrinsically *link*
- ▶ Intense working days in front of the computer

# Introduction

- ▶ “Digital mobilities’: ‘immobile mobility’
- ▶ **High levels** of social, interactive, and collaborative mobility come together with **low levels** of physical/spatial mobility developed

- ▶ Patients who undergo invasive ventilation in ICU have a high risk of developing respiratory and limb muscle weakness (50% prevalence)





- ▶ High proportion of COVID-19 survivors developed ICU acquired muscle weakness, despite early physiotherapy, and **44% were unable to walk 100m 30 days post discharge.**

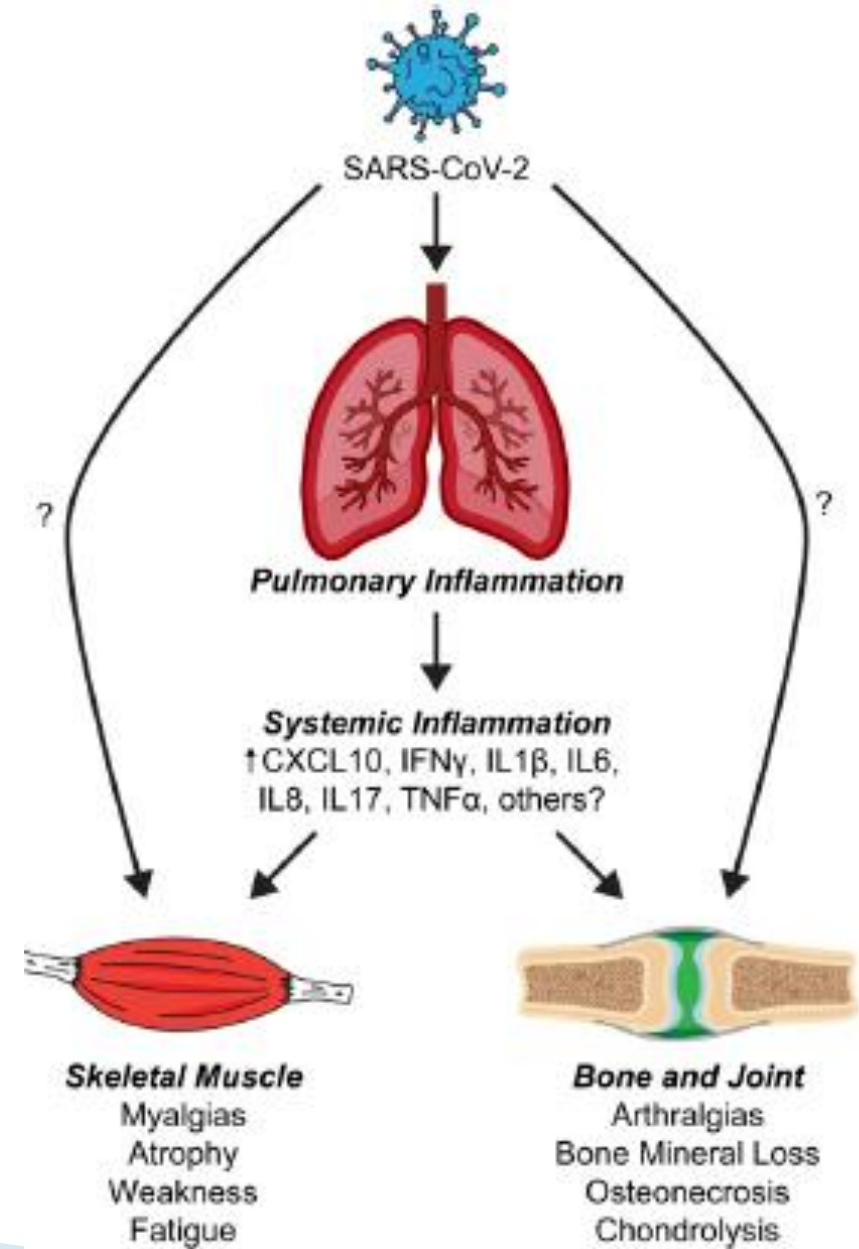


- ▶ The rate of limb muscle weakness: **higher than in patients without COVID-19**





# Indirect and potential direct effects of SARS-CoV-2 infection



# COVID-19 Effects on the Musculoskeletal System

Neuromuscular involvement: neuropathies & myopathies	<ul style="list-style-type: none"><li>• COVID-19 patients admitted to the ICU that have undergone invasive ventilation and pronation cycles are at increased risk of critical illness myopathy (CIM) and critical illness polyneuropathy (CIP), and more rarely Guillain Barre Syndrome.</li><li>• In cases of uncooperative or sedated patients, electromyography and single nerve conduction studies can be used for diagnosis.</li><li>• Management of CIM and CIP includes reducing the time a patient spends in an immobilized state and pulmonary rehabilitation/early mobilization.</li></ul>
Inflammation impact on MSK	<ul style="list-style-type: none"><li>• COVID-19 induced proinflammatory state may lead to inflammatory reactive arthritis, muscle fibrosis, increased bone fragility, tendinopathy, and muscle weakness.</li></ul>
Arthralgias & myalgias	<ul style="list-style-type: none"><li>• Arthralgia and myalgia commonly present early in COVID-19 patients, even in the absence of pulmonary symptoms, with myalgia occurring more commonly.</li><li>• Studies have suggested that arthralgia can precede the onset of fever and pulmonary symptoms in infected patients.</li><li>• Management of myalgia and/or arthralgia in patients with a history of COVID-19 consists of NSAIDs and/or rehabilitation.</li></ul>

# COVID-19 Effects on the Musculoskeletal System

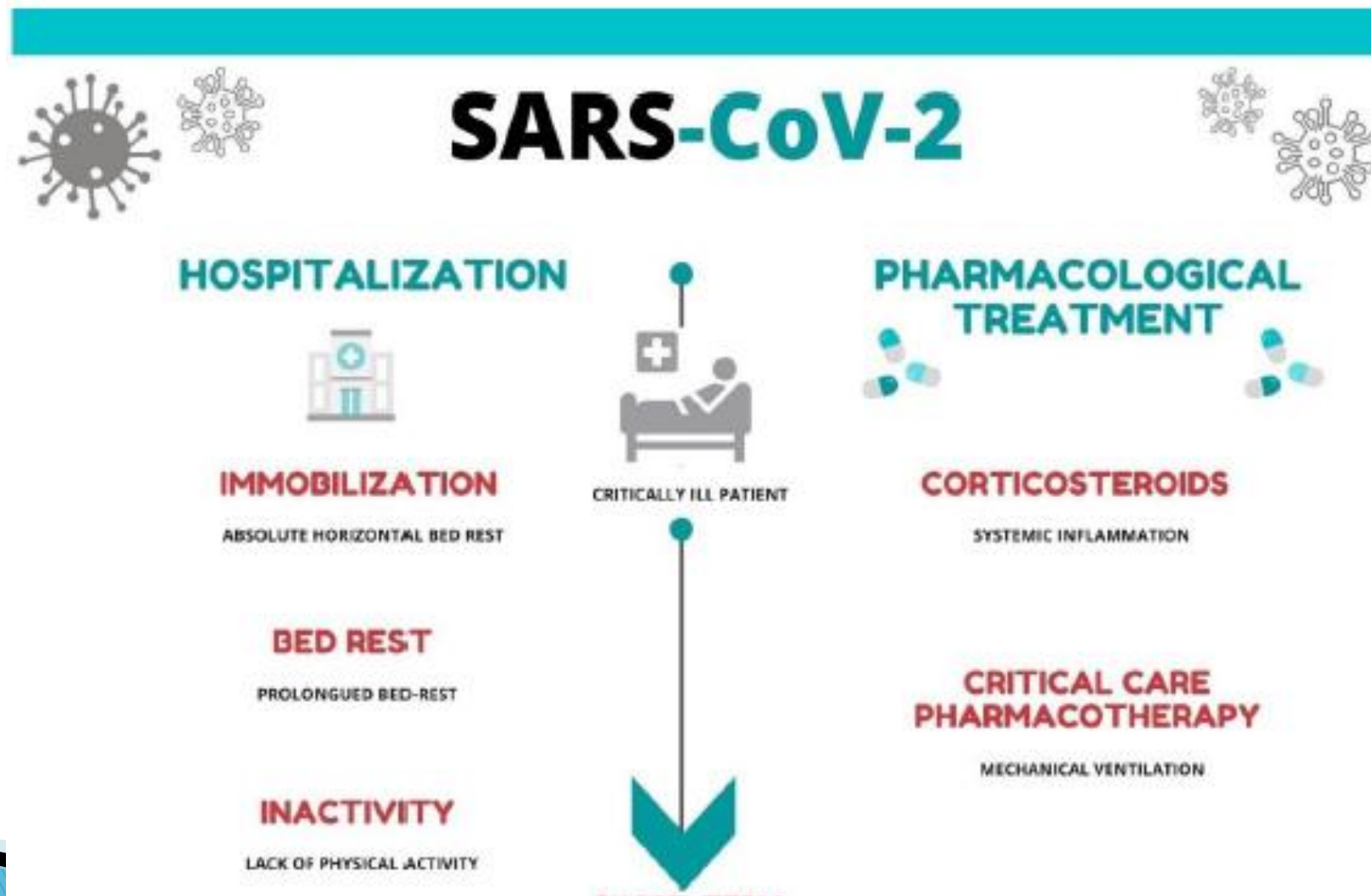
## Musculoskeletal sequelae of COVID therapy

- The use of IFN- $\beta$  and IFN- $\alpha$  as therapy for COVID-19 may be associated with arthralgia and myalgia in patients.
- It has been reported that in patients being treated with ribavirin, >10% of patients reported arthralgia and musculoskeletal pain.
- Care should be given with opioid use, as strong opioid use was associated with higher in-hospital mortality, whereas other pain medications did not show a significant association with in-hospital mortality.
- Prolonged corticosteroid use has been associated with various effects on bone and muscle, including associations with osteonecrosis, reduced bone mineral density, osteoporosis, muscle atrophy, and muscle weakness.

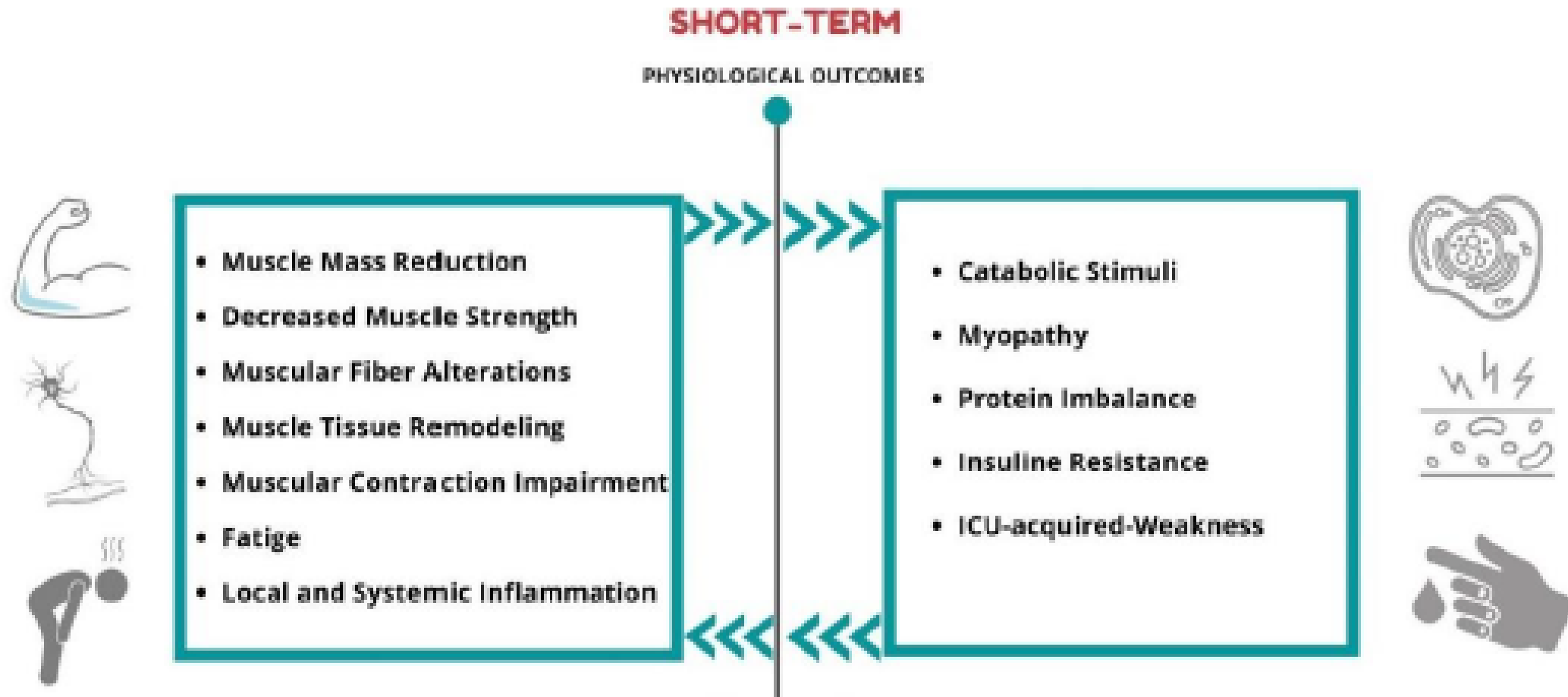
## Rehabilitation and recovery

- Musculoskeletal symptoms may continue to persist following recovery from COVID-19, with the most common complaints including fatigue, back pain, arthralgia, myalgia, low back pain, and neck pain.
- Rehabilitation can improve persistent musculoskeletal symptoms, including exercise training programs and/or physical therapy.
- Prevention of prolonged physical inactivity may assist in minimizing muscle disuse atrophy and loss in functional performance.

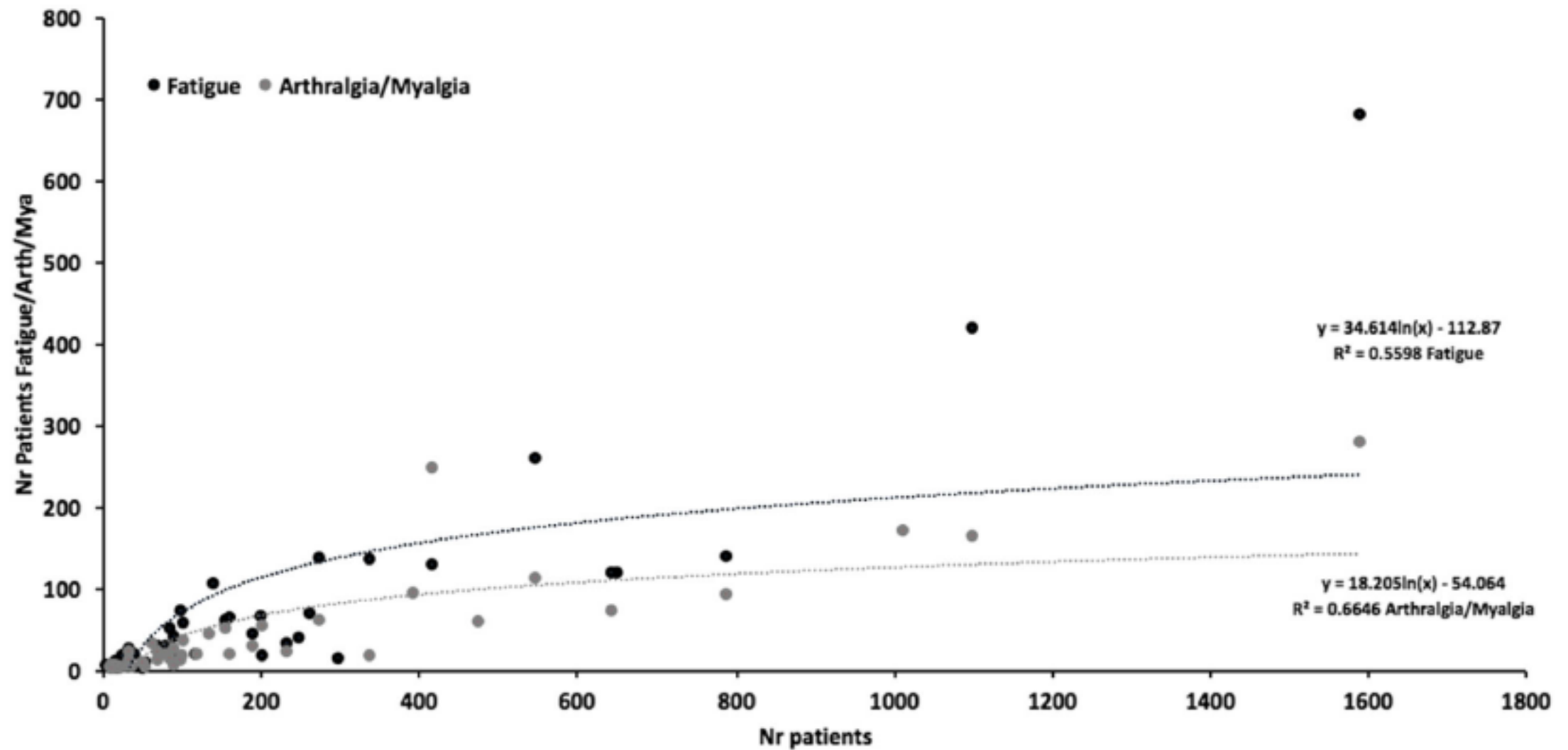
# Short-term effects of covid-19



# Short-term effects of covid-19







**Fig. 1** Relationships of fatigue and arthralgia/myalgia on all patients

# Long-term effects of covid-19



# Early Strength Intervention

- ▶ Physical function reduction in patients hospitalized with chronic diseases is preventable;
- ▶ Advanced age, acute and chronic disease and illness, functional limitations and deconditioning all contribute to older adults' vulnerability to functional decline during hospitalization
- ▶ Strength interventions

# Early Strength Intervention

- ▶ An early intervention during the hospitalization period has been associated with a better recovery.
- ▶ Low to moderate resistance training appears to be the most effective to fight against the loss of muscle mass, strength and functional capacity
- ▶ *2–3 sets of 10 repetitions (3–5 seconds contractions/rep).*

# Neuromuscular Electrical Stimulation

- ▶ The use of **electrical stimulation** is an emerging strategy of intervention with positive effects in seriously ill **hospitalized patients who are unable to perform resistance exercises**
- ▶ **Daily neuromuscular electrical muscle activation** (seven days a week) induced muscle mass preservation in hospitalized geriatric patients



# Heat Therapy

- ▶ The application of heat on the whole body contributes to muscle recovery attenuating cellular damage and protein degradation
- ▶ Heat therapy can be useful for muscular pain and body inflammatory responses producing an analgesic effect for patients during hospitalization and ICU stays

A full-page background image of a waterfall. The water is white and frothy as it falls over dark, layered rocks. The scene is captured with a long exposure, giving the water a soft, silky appearance. The rocks are dark and appear to be covered in moss or lichen. The overall tone is natural and serene.

# THANKS