# Correlation between peripheral muscle strength and breathing tube removal outcome

Submission date	Recruitment status No longer recruiting	[X] Prospectively registered		
01/05/2019		Protocol		
Registration date	Overall study status Completed	Statistical analysis plan		
30/05/2019		[X] Results		
Last Edited	Condition category	Individual participant data		
10/08/2021	Other			

### Plain English summary of protocol

Background and study aims

Peripheral muscle weakness is common in critically ill patients with mechanical ventilator. Evidence from previous studies showed that peripheral muscle strength is associated with weaning outcome. However, the predictive value of peripheral muscle strength on extubation outcome from mechanical ventilation has not been investigated. The purpose of this study was to evaluate the relationship between peripheral muscle strength and extubation failure among patients in an intensive care unit (ICU).

### Who can participate?

ICU patients who are mechanically ventilated for more than 48 hrs and planning to wean according to standard protocol can participate.

What does the study involve?

Evaluation of the patient's biceps and quadriceps muscle strength

What are the possible benefits and risks of participating?

Benefits: We use peripheral muscle strength to predict patient extubation outcome. It might help the patient to decrease the extubation failure rate.

Risks: Maybe when the patient performs maximum isometric contraction, the blood pressure will increase. However, if the patient can not tolerate the test, we will stop the test and keep follow the patient's vital sign until stable

Where is the study run from? Landseed International Hospital, Taoyuan City, Taiwan

When is the study starting and how long is it expected to run for? July 2019 to June 2020

Who is funding the study? Landseed International Hospital, Taiwan Who is the main contact? Dr Tsung-Hsien Wang wth75529@gmail.com

# Contact information

# Type(s)

**Public** 

#### Contact name

Dr Tsung-Hsien Wang

#### **ORCID ID**

https://orcid.org/0000-0001-5096-1131

### Contact details

No.452, Huanqiu Rd Luzhu District Kaohsiung City Taiwan 82144 +886 912-956-122 wth75529@gmail.com

# Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### ClinicalTrials.gov (NCT)

Nil known

#### Protocol serial number

Nil known

# Study information

### Scientific Title

Peripheral muscle strength at the time of extubation may be a valuable predictor for extubation outcome

### Study objectives

Peripheral muscle strength at the time of extubation may be a valuable predictor for extubation outcome

### Ethics approval required

Old ethics approval format

### Ethics approval(s)

Approved 02/05/2019, Landseed International Hospital ethics institutional research committee (Pingzhen District Taoyuan City Guangtai Road 77, Taiwan), ref: IRB-19-017

### Study design

Prospective observational study

### Primary study design

Observational

### Study type(s)

Screening

### Health condition(s) or problem(s) studied

Mechanical ventilation

#### **Interventions**

ICU patients who were mechanically ventilated for more than 48 hrs and were planning to wean according to standard protocol were enrolled in this study. Limb muscle strength was assessed using the hand-held dynamometer (MicroFET) on the day of planned extubation.

The MicroFET (Fet stands for Force Evaluating & Testing) is an electronic hand-held dynamometer which fits perfectly in the palm of the hand. It is the most cost effective and ergonomically designed hand-held dynamometer which is available on the market. It was designed to be a standalone gauge for capturing individual force measurements for any muscle test.

For testing isometric quadriceps femoris muscle force, the patient was placed in semi-Fowler position with knee extension and the transducer was placed on the anterior surface of the lower leg proximal to the ankle.

For testing isometric biceps muscle force, the patient was placed in semi-Fowler position with elbow slight flexion and the transducer was placed on the anterior surface of the wrist. Examiners demonstrated and verbally explained the task before testing. Instruction and encouragement were given to have the patient gradually apply maximum force against the transducer pad of the microFET2 over three seconds. At least three repetitions were performed until results were reproducible.

Follow-up continued until the patient was transferred to the general ward.

### Intervention Type

Other

# Primary outcome(s)

- 1. Limb muscle strength assessed using the hand-held dynamometer (MicroFET) on the day of planned extubation.
- 2. Extubation failure rate, defined as the need for reintubation within 72 hours after extubation (determined by the attending physician observation)
- 3. Extubation rate (calculated as extubation failure participants divided by all participants)

# Key secondary outcome(s))

1. In-hospital mortality defined as death occurring during the hospital stay

### Completion date

30/06/2020

# Eligibility

### Key inclusion criteria

ICU patients who were mechanically ventilated for more than 48 hrs and were planning to wean according to standard protocol

### Participant type(s)

**Patient** 

### Healthy volunteers allowed

No

### Age group

Adult

#### Sex

All

### Total final enrolment

52

## Key exclusion criteria

- 1. Brain death
- 2. Ventilator dependent
- 3. Tracheostomy
- 4. Patients unable to perform the test were excluded (any rheumatologic conditions, previously known abnormal limitations of strength, amputations, muscular disease)

### Date of first enrolment

01/07/2019

### Date of final enrolment

30/06/2020

# Locations

### Countries of recruitment

Taiwan

# Study participating centre Landseed International Hospital

Departments of Critical Care Medicine No. 77 Guangtai Road Pingzhen District Taoyuan City

# Sponsor information

### Organisation

Landseed International Hospital

### **ROR**

https://ror.org/006arvw77

# Funder(s)

# Funder type

Hospital/treatment centre

### Funder Name

Landseed International Hospital

# **Results and Publications**

# Individual participant data (IPD) sharing plan

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request

# IPD sharing plan summary

Available on request

# Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		09/08/2021	10/08/2021	Yes	No
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes