

# Electrical stimulation to improve muscle strength in chronic respiratory conditions, chronic heart failure and chronic kidney disease

Interventional procedures guidance  
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[www.nice.org.uk/guidance/ipg677](http://www.nice.org.uk/guidance/ipg677)

## 1 Recommendations

1.1 Evidence on the safety of electrical stimulation to improve muscle strength in chronic respiratory conditions, chronic heart failure and chronic kidney disease shows no major safety concerns.

- For people who are having an acute exacerbation of their chronic condition and are unable to exercise, evidence of efficacy is adequate to support the use of this procedure provided that standard arrangements are in place for clinical governance, consent and audit. Find out [what standard arrangements mean on the NICE website](#).

- For people who are able to exercise, evidence on efficacy is inadequate in quality. Therefore, this procedure should only be used in the context of research. Find out [what only in research means on the NICE website](#).

1.2 Further research should include long term, suitably powered and appropriately controlled randomised trials. These should report details of patient selection, and type and duration of treatment. Outcomes should include quality of life, social functioning and physiological measures.

## 2 The condition, current treatments and procedure

### The condition

2.1 Chronic respiratory conditions, chronic heart failure and chronic kidney disease can cause impaired muscle function and weakness.

### Current treatments

2.2 Rehabilitation is described in [NICE's guidelines on rehabilitation after critical illness, chronic obstructive pulmonary disease and chronic heart failure](#). Management for muscle weakness or dysfunction caused by chronic respiratory conditions, chronic heart failure or chronic kidney disease includes lifestyle change, medication (including oxygen therapy), rehabilitation (such as pulmonary rehabilitation or cardiac rehabilitation) and treating the underlying conditions.

### The procedure

2.3 Electrical stimulation produces muscle contractions that aim to mimic exercise training. Small electrical impulses are applied to nerves supplying groups of muscles typically in either the arms or legs, using self-adhesive electrodes applied to the skin and connected to an electrical stimulator. This causes the muscles supplied by the nerve to contract and relax. A typical programme consists of 30 to 60 minutes of

stimulation.

## 3 Committee considerations

### The evidence

- 3.1 NICE did a rapid review of the published literature on the efficacy and safety of this procedure. This comprised a comprehensive literature search and detailed review of the evidence from 12 sources, which was discussed by the committee. The evidence included 6 systematic reviews and/or meta-analyses, and 6 randomised controlled trials. It is presented in [table 2 of the interventional procedures overview](#). Other relevant literature is in the appendix of the overview.
- 3.2 The professional experts and the committee considered the key efficacy outcomes to be: quality of life, mood, muscle strength and function, and social functioning.
- 3.3 The professional experts and the committee considered the key safety outcomes to be: muscle pain or discomfort, and skin reactions to electrodes.
- 3.4 Patient commentary was sought but none was received.

### Committee comments

- 3.5 The committee noted that the procedure may be contraindicated in patients who have an electronic implant (such as a cardiac pacemaker or defibrillator).
- 3.6 The committee noted that there was only limited evidence that the procedure produced an additional benefit in patients who had successfully undertaken a physical rehabilitation programme.
- 3.7 The committee noted that electrical stimulation may be used in conjunction with physical exercise, but it should not be used as an

alternative to a formal exercise programme if this is possible.

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## Endorsing organisation

This guidance has been endorsed by [Healthcare Improvement Scotland](#).

## Accreditation

