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REVIEW

Adaptations in limb muscle function following pulmonary rehabilitation in patients with COPD – a review



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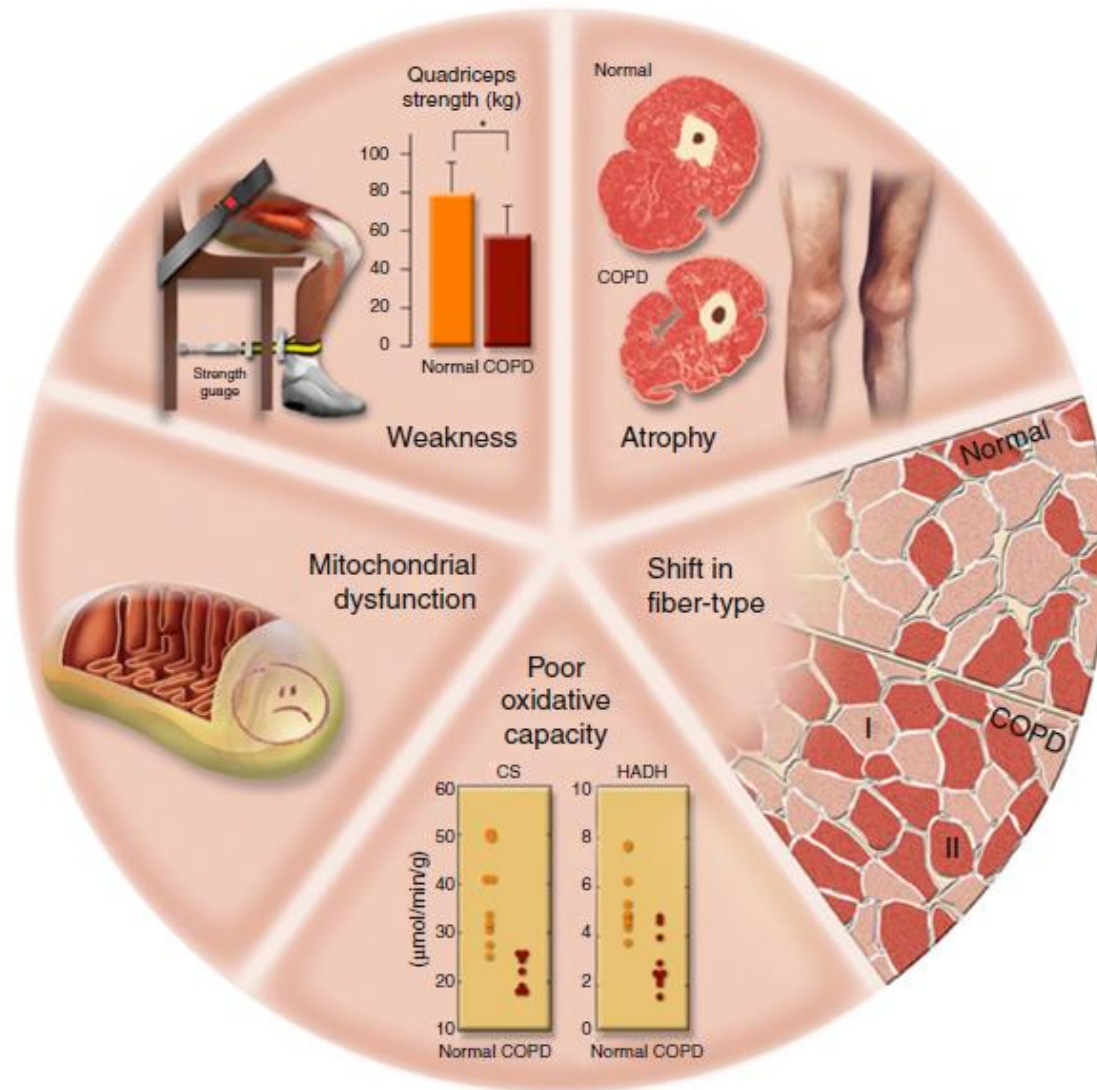


Figure 1 Morphological and structural alterations reported in limb muscles in patients with chronic obstructive pulmonary disease (COPD). CS, citrate synthase; HADH, 3-hydroxyacyl CoA dehydrogenase. Reprinted with permission of the American Thoracic Society. Copyright © 2016 American Thoracic Society.

Table 2 Resistance training recommendations for improving limb muscle function.

	Limb muscle strength	Limb muscle endurance
Muscle actions	Concentric, isometric and eccentric	Concentric, isometric and eccentric
Intensity (loading)	60–70% of 1 RM or fatigue after 8–12 repetitions	15–25 repetitions or more, approximately 45–65% of 1 RM
Volume	1–3 sets	1–3 sets
Exercise selection	Unilateral and bilateral single- and multiple-joint exercises.	Unilateral and bilateral single- and multiple-joint exercises.
Exercise order	Perform large muscle group exercises before small muscle group exercises, multiple-joint exercises before single-joint exercises, higher-intensity exercises before lower-intensity exercises, <i>or</i> rotation of upper and lower body exercises <i>or</i> performing one exercise for a specific muscle group followed by an exercise for the opposing muscle group (agonist–antagonist)	Exercise order is not as important as during limb muscle strength training
Velocity of muscle action	Slow and moderate velocities (1–2 s or higher in concentric and eccentric phase of the movement)	Moderate to fast velocities for high repetitive (15–20 repetitions or more)
Rest periods	2–3 min between sets	1–2 min between sets
Frequency	2–3 days per week	2–3 days per week
Progression	Increase with up to 10% when current workload could be performed for 1–2 repetitions over targeted for two consecutive sessions	Increase with up to 10% when current workload could be performed for 1–2 repetitions over targeted for two consecutive sessions

RM, repetition maximum.

Oddvar Holdten's 関係

速度

>80% RM :
瞬間的

80~65% RM :
呼吸のリズム程度

65~60% RM :
25~30回/分

<60% RM :
できるだけ速く

<60%
負荷/速度

100% — 1

95% — 2

90% — 4 筋力

85% — 7

80% — 11

75% — 16 筋力/持久力

70% — 22

65% — 26 持久力

60% — 30

頻度(反復回数)

