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Short communication

P 142 – Plantar pressure distributions in patients with chronic obstructive pulmonary disease

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1. Introduction

Chronic obstructive pulmonary disease (COPD) is associated with a limp, a shuffle or other walking abnormalities which are appeared parallel with COPD severity. One of the possible explanation of these reported disorders during walking could be related with poor peripheral muscle strength which is commonly seen in this population. It is not only led to disturb biomechanical aspects of normal walking, it may also alter plantar pressure distribution which is essential for proper co-contraction mechanisms of lower extremity muscles [1–3]. However, the literature is lacking in this field and therefore we aimed to investigate whether COPD alter plantar pressure distributions during walking.

2. Research Question

Does COPD alter plantar pressure distributions during walking?

3. Methods

34 participants were recruited to the study. The patient group consisted of 18 individuals diagnosed with COPD (51–78 years old, mean age: 62.3 ± 7.6 years). 16 healthy volunteers with same age group (45–69 years old, mean age: 49.19 ± 6.95 years) were included as a control group. Plantar pressure parameters for both feet were assessed by using EMED pedobarography device (Novel, Munich, Germany). The subjects were asked to walk barefoot 5 times for each foot. Data was analysed by dividing into 3 zone; hindfoot, midfoot and forefoot. Maximum force (normalized to BW) and peak pressure were calculated. Mann Whitney U test was performed to determine whether differences were present between the 2 groups.

4. Results

Although there were differences between the COPD group and the control group on maximum force and peak pressure, only midfoot peak pressure was statistically significant in both feet (right midfoot, left midfoot; $p = 0.001$, p:0.005, respectively) (Table 1).

5. Discussion

Our results showed that plantar pressure on mid foot region of the patients with COPD was less than the control group. This changes especially in the midfoot can be resulted from poor medial arch support, that is weak muscle strength. Abnormal plantar pressure distribution may cause to deteriorate optimum tension/length ratio of

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Table 1
Comparing the Foot Pressure Values of the COPD Group with the Control Group.

Foot Pressure Values		Right Side		z	p	Left Side		z	p
		COPD Group Mean ± SD	Control Group Mean ± SD			COPD Group Mean ± SD	Control Group Mean ± SD		
Max Force (%BW)	Forefoot	81.56 ± 10.27	83.44 ± 7.33	−0.2	0.83	85.39 ± 9.69	83.13 ± 10.26	−0,44	(
	Midfoot	20.33 ± 8.55	21.94 ± 5.24	−0.29	0.76	22.22 ± 9.84	21.06 ± 10.75	−0.39	(
	Hindfoot	58.94 ± 15.75	58.75 ± 8.74	−1.02	0.31	62.22 ± 12.08	61.44 ± 9.68	−0.62	(
Peak Pressure (kPa)	Forefoot	322.78 ± 111.49	370.31 ± 116.09	−1.13	0.25	343.56 ± 125.2	374.06 ± 177.1	−0.57	(
	Midfoot	112.78 ± 29.14	152.5 ± 21.60	−3.75	0.001	116 ± 27.54	144.81 ± 30.5	−2.78	(
	Hindfoot	247.94 ± 79.37	257.81 ± 77.97	−0.81	0.41	248.6 ± 77.81	285 ± 91.5	−1.29	(

lower extremity muscles. Thus, energy consumption which is a vital parameter for COPD is affected. More studies should be design to further analyses in plantar pressure distribution and effect of arch supports in this special patient population which is need optimum energy consumptions should be evaluated.

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