



# Compensatory movement strategies during movements of the upper quadrant in patients with COPD

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## Abstract

**Introduction:** Musculoskeletal dysfunctions in patients with COPD may lead to compensatory movement strategies to minimise functional decline, although this may increase the effort to perform daily activities and predispose to pain syndromes in the long term. This study investigated the presence of compensatory movements of the upper body quadrant during physiological movements in patients with COPD.

**Methods:** A secondary analysis from a study aiming to compare postural alignment and mobility variables of the upper body quadrant in patients with COPD (n=15) and healthy controls (n=15) (Morais N. *et al.*, Braz J Phys Ther 2016, 20:345-54) was conducted to assess movements in the adjacent segments when performing maximum head retraction/protraction ( $H_{r/p}$ ), thoracic spine flexion/extension ( $TS_{f/e}$ ), and arm elevation ( $0^\circ$  or forward shoulder position [FSP],  $90^\circ$  and full shoulder flexion).

**Results:** Movements in the adjacent segments were found in both groups when moving head, arm and thoracic spine (Figure 1). Differences between groups were not significant.

Segment	Movement performed	Magnitude (mean±sd, in degrees) of movements in the adjacent segments (COPD)	Mean differences (95% CI) (COPD vs. controls)	P-value
Head	Retraction/Protraction	FSP=15.6±17.0°	0.8°(-11.5°-13.2°)	.892
		Upper TS <sub>90°</sub> =17.9±5.3°	-0.6°(-5.5°-4.2°)	.800
		Lower TS <sub>90°</sub> =12.5±4.1°	-3.2°(-7.2°-0.8°)	.111
Arm	Shoulder flexion (90° and full)	H <sub>1/2-90°</sub> =2.5±11.7°	-0.4°(-11.8°-11.0°)	.946
		FSP <sub>90°</sub> =20.5±23.7°	-8.6°(-24.7°-7.5°)	.285
		Upper TS <sub>90°</sub> =4.2±4.7°	0.3°(-3.4°-4.0°)	.852
		Lower TS <sub>90°</sub> =3.0±3.8°	1.3°(-2.8°-5.4°)	.339
		Upper TS <sub>full</sub> =12.6±5.7°	-0.7°(-5.5°-3.3°)	.742
Thoracic spine	Extension/Flexion	Hr/p=41.8±17.3	5.9°(1.3°-13.0°)	.103
		FSP=17.9±13.4°	5.7°(-5.1°-16.1°)	.298

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**Conclusion:** Patients with COPD have shown compensatory movements during physiological movements of the upper body quadrant similarly to healthy peers. However, because joint mobility is impaired in these patients (e.g., full arm elevation), addressing movement strategies should be considered in rehabilitation programs to optimize movement-related functions.

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