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Title: Chest wall motion and volume changes with and without non-invasive ventilation in patients with amyotrophic lateral sclerosis

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Body: In Amyotrophic Lateral Sclerosis (ALS), inspiratory, expiratory, and bulbar muscles are altered, leading to chronic respiratory failure. Non-invasive ventilation (NIV) can be used to improve gas exchange in this patient population. Aim: to analyze the chest wall motion and operational volume changes in patients with ALS with and without NIV in the supine position. Ten patients with ALS, aged 54 ± 13 years were included. Optoelectronic plethysmography (BTS, Milan, Italy) was used to measure: tidal volume of the chest wall (VtTcw), tidal volume of the pulmonary rib cage (Vtrcp), tidal volume of the abdominal rib cage (Vtrca), tidal volume of the abdomen (Vtab), end-inspiratory (Veicw) and end-expiratory (Veecw) volumes of the chest wall, respiratory frequency (f) and minute ventilation (VE). All patients were evaluated in the supine position with and without NIV for five minutes (Trilogy 100, Respironics, USA) NIV was used in the spontaneous/timed mode, with inspiratory and expiratory pressures of 14 cmH₂O and 4 cmH₂O, respectively. Paired t-tests were used for statistical analyses ($p < 0.05$). Results: Table 1.

Table 1: Chest wall motion and volume changes with and without NIV

Variable	Supine without NIV	Supine with NIV	p-value
Vtcw (L)	0.4 ± 0.2	0.6 ± 0.2	0.025
Vtrcp%	29 ± 15	32 ± 15	0.572
Vtrca%	13 ± 5	11 ± 6	0.180
Vtab%	58 ± 15	57 ± 18	0.830
Veicw (L)	18.9 ± 4	19.4 ± 3.9	0.008
Veecw (L)	18.5 ± 4	18.8 ± 4	0.019
f (irpm)	19 ± 9	21 ± 11	0.212
VE (L/min)	6.9 ± 2.5	10.7 ± 4	0.013

Conclusion: NIV led to significant increases in tidal, end-inspiratory, and end-expiratory volumes, with no changes in the contributions of the three chest wall compartments. Partly supported by FAPEMIG and CNPq.