Muscle Tension Dysphonia (MTD) is defined as a voice problem in the absence of known underlying structural or neurologic abnormalities. MTD accounts for an estimated 40%-70% of voice clinic caseloads. Muscle tension dysphonia (MTD) is theorized to involve excessive or improper balance of muscle tension associated with phonation. Intrinsic and extrinsic laryngeal muscle tension patterns have been intimated as causative factors for this condition.

However, abnormal tension/coordinative patterns are thought not just to be at the laryngeal level but across respiratory and laryngeal subsystems of phonation. Abnormal chest wall movement in patients with MTD. Patients with MTD have also been shown to phonate at low lung volumes requiring more physical work than phonation at moderately higher volumes.

Despite such claims, the literature lacks clear physiologic descriptions of presumed respiratory-phonatory disruptions. High resolution esophageal manometry (HRM) can detect transmitted variation in intrathoracic pressures. Little is known regarding the thoracic pressure changes and activation of intrinsic laryngeal muscles during different types of phonation (pressed, as is often associated with MTD vs. healthy voice production).

**Objective:** To characterize pressure and muscle activation patterns during pressed and healthy voice production using HRM and bipolar hook-wire laryngeal electromyography (LEMG).

**Methods and Materials**

HRM and LEMG were performed during 2 trials of a spoken all-voiced sentence (“we were away a year ago”) which was repeated in triplicate using (a) pressed and (b) healthy phonation, with dB SPL kept constant.

Healthy phonation was operationalized as being produced with both flow and resonant voice.

**HRM measures:** pressures (mmHg) from the upper esophageal segment (UES), esophageal body (intrathoracic), lower esophageal segment (LES), and intra-abdomen were obtained.

**LEMG measures:** On a different session, trans nasal flexible endoscopy, voice samples and hook-wire LEMG of right unilateral cricothyroid (CT), bilateral thyroarytenoid/lateral cricoarytenoid complex (TA/LCA), cricopharyngeus (CP), and left unilateral posterior cricoarytenoid (PCA) muscles were obtained.

**Results**

- Laryngoscopic and audio-perceptual analysis confirmed differences between pressed vs. healthy phonation.
- LEMG revealed statistically significant increases in CT and CP activation during healthy phonation vs. pressed phonation.
- No statistically significant change in TA-LCA complex or PCA was observed between the two phonatory productions.
- HRM data showed higher pressures during pressed vs. healthy phonation in the intra-abdominal (89.2 ± 0.1 vs. 15.3 ± 1.1mmHg), LES (18.7 ± 4.2 vs. 12.4 ± 3.5mmHg) and intrathoracic (6.2 ± 1.2 vs. 3.4 ± 1.1mmHg) regions as shown in the graph.
- UES pressures were lower during pressed as compared to healthy phonation (71.3 ± 5.4 vs. 82.4 ± 8.1mmHg).

**References**