

# Impact of Surrounding Audio-Visual Complexity on Symptomatology of Laryngeal Dystonia: A Virtual Reality Study

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**Introduction:** Laryngeal dystonia (LD) is an isolated focal dystonia characterized by involuntary spasms in laryngeal muscles selectively impairing speech production. Anecdotal observations reported the worsening of LD symptoms in stressful or vocally demanding situations [1, 2]. We examine the impact of surrounding audio-visual on Laryngeal Dystonia (LD) symptomatology to better understand its phenomenology.

**Material, Methods, and Results:** We developed well-controlled virtual reality (VR) environments of real-life interpersonal communications to investigate how different levels of audio-visual complexity may impact LD symptoms. The VR experiments were conducted over five consecutive days, during which each patient experienced 10 hours of 4,100 experimental trials in VR with gradually increasing audio-visual complexity. Daily reports were collected about patients' voice changes, as well as their comfort, engagement, concentration, and drowsiness from using VR.

After a weekly exposure, 82% of patients reported differences in their voice symptoms related to changes in audio-visual complexity. Significant differences in voice symptoms were found between the first two levels of the audio-visual VR challenge, independent of study sessions or scenes. Self-reported changes in voice symptoms were significantly positively correlated with scene level.

**Conclusion:** This study demonstrated that LD symptoms are impacted by audio-visual background across various virtual realistic settings. These findings should be taken into consideration when planning behavioral experiments and evaluating the outcomes of clinical trials in these patients. Moreover, VR presents a reliable and useful tool for providing real-life assessments of the impact of various experimental settings, such as during the testing of novel therapeutic interventions in these patients.

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