An acoustic analysis of Freddie Mercury's voice

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Freddie Mercury, lead singer of legendary rock band, Queen, gave the world one of the most famous and recognisable singing voices in music history. But how did he manage to achieve such vocal range?

A new study in *Logopedics Phoniatrics Vocology* set out with the ambitious task of analysing Mercury's voice. By selecting archive recordings, as well as using a rock singer to imitate, a team of Austrian, Czech and Swedish authors discovered some interesting findings about the voice once described as "a force of nature with the velocity of a hurricane."

There had been speculation that Mercury's range was over four octaves but this could not be substantiated by the study. The lead author on the study, Austrian voice scientist Christian Herbst, states that Mercury's voice range was "normal for a healthy adult – not more, not less." Contrary to his popular image, he was probably a baritone who sang as a tenor with exceptional control over his voice production technique. He is known to have rejected an offer to sing as baritone in an opera duet with singer Montserrat Caballé because he worried that his fans knew him only as a rock singer and would not recognise his voice in baritone.

In many ways, this deeper scholarly interest and analysis of Mercury's voice moves to affirm many of the singer's stage persona traits. In particular, the study examined the intentional distortion Mercury used to produce so-called 'growl' sounds. With a rock singer imitating this special type of singing, the authors filmed his larynx with a high-speed

camera at over 4,000 frames per second, giving them an understanding of what Mercury would have done physiologically while singing these 'distorted' notes. The authors could thus reconstruct how Freddie Mercury, in his flamboyant and eccentric stage persona, drove his vocal system to its limits.

What they found was an intriguing physical phenomenon called subharmonics. This is seen in a more extreme way in Tuvan throat singing where not only the vocal folds vibrate, but also a pair of tissue structures called ventricular folds, which are not normally used for speaking or classical singing. Mercury's more fragile side is also fitting with his hallmark vibrato (a rapid, slight variation in pitch). Most pop/rock singers maintain a regular vibrato, whilst his was more irregular, and unusually fast.

This deeper study into one of the world's best known vocal artists contributes not only to the scholarly understanding of voice but also to Freddie Mercury's continuing legacy.

More information: Christian T. Herbst et al. Freddie Mercury—acoustic analysis of speaking fundamental frequency, vibrato, and subharmonics, *Logopedics Phoniatrics Vocology* (2016). DOI: 10.3109/14015439.2016.1156737

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