The Endocrinology of the Performance of Classically Trained Singers

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Aims

This presentation aims to contribute to the optimisation of singers’ performances by increasing their awareness of the relationship between sexual hormone variations and voice quality. Variations in sexual hormonal background, such as those occurring during puberty, the menstrual cycle, the menopause, during the use of hormone related medication, and when endocrine imbalances occur, might cause vocal changes which could interfere with the quality of a singer’s performance, and vocal problems which might later lead to vocal injuries. Singers must be aware of these matters, so they may protect their voices and seek a rapid and more accurate diagnosis and effective treatment.

Context

There are several external factors which might interfere with the quality of the musician’s performance, such as performance anxiety, overuse injuries, problems memorising, and poor working conditions. Because the singer’s instrument is within the human body, the singer’s performance is prone to be affected by added factors which might not affect other musicians’ performances. It is within this context that it becomes important for a singer to know that 15% of vocal disorders have an endocrine cause. Receptors for sexual hormones such as oestrogens, progesterone, and testosterone have been found in the larynx, making this organ a “hormonal target organ”.

The castrato voice

The first evidence of this strong connection between sexual maturation and vocal quality was brought to light by castration. This method, used since ancient times, was connected with religious ideologies and beliefs in Western Europe.

The voice of the castrato had a crystalline timbre, an exceptional range, and was extremely powerful. These were the consequence of a paediatric laryngeal structure vibrating in a female register but supported by the breathing power and resonance of a male body.
Puberty

Hormonal variations occurring during puberty, namely the rapid and significant increase in the concentrations of testosterone, especially in boys, constitute more evidence for the strong influence of the sexual hormone milieu on voice quality.

Before the production of testosterone, it is hard to distinguish the sex of one’s voice. However, during puberty, as a consequence of anatomical and physiological changes, the boy’s pitch descends approximately one octave and the girl’s pitch descends about an interval of a third.6

Pubertal changes are commonly more noticeable in boys than in girls not only due to the descent of the vocal pitch, more recognised in male voices, but also the vocal quality. This happens because the production of testosterone is greater for boys than for girls. Girls who are more affected by sexual maturation might have husky voices, whereas boys have breaks in their voices.7

The menstrual cycle

Cyclical sexual hormone variations have been demonstrated to negatively affect the singer’s performance.8 Vocal symptoms, such as dull, colourless, raucous voice, and hoarseness, as consequences of oedema or even haemorrhages in the vocal folds, have been associated with pre-menstrual and menstrual phases and diagnosed as a medical condition, Laryngopathia menstrualis.9 In Eastern Europe, opera houses are aware of the effects of the menstrual cycle on the voices of their female opera singers, meaning that their contracts include three “respect days”, in which a singer can refrain from singing if her voice is affected by hormonal changes.1

Vocal aberrations during the menstrual cycle have been associated with the drop in the concentrations of oestrogen and progesterone, which happens just before menses, leading to a vocal oedema due to fluid retention in the mucosa of the vocal folds.6

Hormone related medication

The oral contraceptive pill (OCP) is one of the most common contraceptive methods used amongst singers; however, the effects of different preparations available in
the market are still not clear. In the past, it has been suggested that the use of OCPs was associated with changes in vocal range and timbre. However, it is important to highlight that these primary preparations contained high doses of synthetic hormones. Recent studies have suggested that the use of low dose combined oral contraceptive pills might contribute to the stabilisation of the voice throughout the menstrual cycle.

Endocrine disorders

Besides the above mentioned occasions on which it was shown that vocal problems might occur because of hormonal changes, there are endocrine dysfunctions that might also affect the quality of the voice. For example, significant endocrine imbalances or functional disorders during puberty might be the cause for these pathological cases, such as a persistent falsetto voice, an incomplete mutation or an abnormally low voice.

Menopause

Research about the effects of the menopause on the female is very recent, since the menopause has been experienced by the majority of women only in the 20th century; before this, the average life time of a woman was too short for the menopause to be reached.

The vocal changes during the menopause are similar to those during the premenstrual phase of the menstrual cycle, except in this case the deficit of oestrogens is permanent, and is boosted by the higher production of androgens. During the menopause the female voice can become deeper, the vocal intensity can decrease with a consequent weakening of the voice, there might be a loss of high notes and voice masculinisation, since the absence of oestrogens allows the influence of androgens on the female voice.

Conclusions

It is clear that there is still a lack of information in the field of the endocrinology of the voice. Further research should be developed, namely concerning the effects of hormone related medication and the impact of certain endocrine disorders on the voice to improve singers’ working conditions and the care of the singer’s voice. Additionally, and
to meet these goals, it is important to revise the concept of “respect days” amongst operatic managers, administrators and concert promoters.

Finally, there is a need to understand the human voice as a holistic musical instrument, i.e. as a physical, psychological and sociological phenomenon. This will only be achieved if interdisciplinary and multi-methodological studies are continually applied, as has happened within other performance domains, such as sports.

References


