

Premenstrual Syndrome and its Effects on Laryngeal Functionality: An Approach for Singers and Pedagogues

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INTRODUCTION

IT IS GENERALLY ACCEPTED that most women experience at least some of the symptoms of Premenstrual Syndrome (PMS). Symptoms identified by psychologists and doctors in *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) include depression, anxiety, emotional sensitivity, irritability, apathy, lethargy or fatigue, increase in appetite and food cravings, insomnia, and a sense of being overwhelmed. There is also a long list of physical symptoms related to PMS—cramps, bloating, breast tenderness, weight gain, and joint and muscle pain. Additionally, it has long been accepted anecdotally that many female singers also experience a variety of difficulties specifically related to their singing while suffering from PMS.

European opera houses have offered female singers “grace days” on the day prior to and the first day of menses, a practice that has not found currency in the United States. Perhaps a belief has arisen from a variety of sources that difficulties in singing at this time are imagined rather than real. Perhaps the women’s movement in America, partially denying fundamental physical differences between men and women, has led female vocalists to believe that they should “push through” this time period in an effort to not show weakness or differences from their male counterparts. Both of the preceding causes are alluded to by anthropologist Alma Gottlieb in her article on American PMS.¹ Perhaps the American belief is that the symptoms are not severe or interruptive enough to address professionally. A possible explanation for the lack of deference the American opera industry has given to women during PMS may be the financial crunches experienced by opera companies that preclude their being able to honor grace days. In addition to financial constraints, the American opera system, with its reliance on the use of guest artists, does not allow for the use of alternate performers or a permanent staff of performing artists who could cover for one another in the case of vocal issues or illness. Whatever the reason, the issue of compromised laryngeal functioning as it relates to PMS has received little attention in America.

Nonetheless, it is undeniable that some women acknowledge a variety of physical complaints associated with the onset of menses. Singers and other voice professionals, naturally being more in tune with their voice and vocal function, may notice additional premenstrual symptoms that would not nec-

essarily be identified by individuals without voice training. It is conceivable that if changes taking place hormonally during this time period are affecting tissues throughout the body, the larynx would also be affected. Researchers have begun to recognize that for female professional voice users, there may be “special problems during the premenstrual phase and voice complaints that are usually not psychogenic or anxiety-related.”²

Historical research also supports the existence of legitimate vocal complaints related to menses. One of the first professional female singers, Caterina Gabrielli, is believed to have suffered from PMS to the extent that she cancelled performances because of her symptoms.³ Based on her personal diaries, researchers now also believe Maria Callas suffered vocal dysphonia because of her menstrual cycle.⁴ Therefore, since both historical and scientific research is now beginning to confirm what many female singers claim to experience, singers and pedagogues alike should become more aware of this issue so that it can be properly dealt with on the stage and in the studio. More research on this subject is needed in order to equip pedagogues and physicians with additional information and pertinent strategies for helping students and patients deal with the symptoms of PMS affecting their singing.

THE STUDIES

Reduced laryngeal functioning is a reality for certain women to the extent that researchers have now given it an official name: Premenstrual Voice Syndrome (PMVS). Other researchers call this syndrome “premenstrual dysphonia,” or “laryngopathia premenstrualis.”⁵ The syndrome or pathology is characterized by vocal fatigue, decrease in range, loss of power, faint hoarseness, loss of range, and loss of agility.⁶ Those experiencing PMVS, which is believed to affect one-third of menstruating females, usually deal with the symptoms for up to five days prior to menstruation.⁷ The reason why the tissues of the vocal folds are especially affected by hormonal fluctuations is not entirely clear; however, recent studies suggest that the vocal folds contain more hormone receptors than most other tissues in the body, with the exception of the sexual organs.⁸ A study by Abitbol et al. in 1989 compared smears of tissues of the larynx and tissues of the cervix, noting several similarities, partic-

ularly the presence of estrogen target cells.⁹ This may, in part, explain why the voice, in both males and females, is affected by hormonal changes around puberty, for example.

In 2004, findings presented by Abitbol et al. were presented to the American Laryngological Association. In the study discussed, 550 female voice professionals were questioned and tested by means of videostroboscopy and spectrography at various points of their menstrual cycle over the course of three cycles.¹⁰ Of the women surveyed and tested, 187 of them were determined to have varying levels of symptoms related to PMVS. In the premenstrual portion of their cycles, the women’s vocal folds showed swelling, resulting in disturbances in muscle function and vibratory patterns. In addition, the mucosal fluids of the larynx were significantly thicker at this phase, decreasing freedom of movement in the vocal folds.¹¹ Interestingly, as a byproduct of the study, the researchers also discovered disturbances during the ovulatory phase of the patients studied, with the main observation being the increase of mucosal production leading to an increase in the throat-clearing activity of the voice professionals.¹² This same study also concluded that possible phonatory time was reduced for 52.5% of those experiencing PMVS symptoms.¹³ This decreased phonatory time was determined to be the result of the comparative lack of mobility in the cricoarytenoid joint.

Another study from 2003 sites similar symptoms, expanding on those results.

During the premenstrual phase, venous dilatation and edema increase vocal cord mass, thus lowering the vocal pitch. In addition, fluctuations in ovarian hormone levels were found to affect laryngeal neuromotor control . . . result[ing] in increased vocal instability, which can be perceived by the listener as pitch and/or amplitude modulations.¹⁴

A study directed by Maree Ryan at the Sydney Conservatorium in 2006 explored the effects of premenstrual syndrome on the voices of trained singers. The study included twenty-two female singers, as well as six male singers for a control. The singers recorded their basal body temperatures, moods, fatigue level, and perceived vocal quality in a daily diary. Three times monthly, during the premenstrual, ovulatory,¹⁵ and luteal phases,¹⁶ the singers were recorded singing part of an aria. The recordings then were analyzed by University of Sydney

voice professionals and students who were asked to listen to the recordings at random, listing whether or not they believed the singer was being affected by premenstrual vocal stress. The purpose of the study was to determine whether or not the results of premenstrual vocal stress experienced and tracked by the singer could be aurally detected by a blind audience.

The result of the fatigue level survey was that there was lowest fatigue on day one of the menstrual cycle, with significant improvement daily until an equilibrium level of fatigue was reached on day seven.¹⁷ The trend for mood shifts, as might be expected, showed darker moods on days twenty-four to four.¹⁸ Surveys of perceived vocal quality in the female subjects, including such aspects as support, fatigue, control, effort, hoarseness, range, control, agility, and pitch, showed a lowered level of vocal quality from days twenty-four of a cycle through day four of the subsequent cycle.¹⁹ Pitch, range, fatigue, and control were the most affected aspects of vocal quality. Fascinatingly, the male control subjects also showed a decline, though much less marked, in these perceived vocal qualities around the same days in their "cycle," but the reason for this slight decline was not investigated.²⁰ This portion of the study was able to correlate poor mood with reduced vocal quality.²¹

The pedagogues' survey of recordings of subjects of the study yielded somewhat surprising results in light of the students' perceptions of their own vocal quality. The pedagogues were not able to tell which recordings took place during the premenstrual phase and which did not.²² The students, when listening to blind recordings of their own voices, could correctly identify with high accuracy which recordings were from a premenstrual phase and which were not. However, these same students could not identify the very same aural anomalies in recordings of their peers.²³

The information gained by this study may indicate that a singer's own mood and perception of her symptoms do, at least to that singer and her own aural and kinesthetic experience, affect her vocal quality. However, those perceived changes in voice quality by participants in this study were not perceived by others, even trained pedagogues, leading to the conclusion that the symptoms of PMVS may be more of an internal physical and emotional struggle rather than one that can be perceived by the singer's audience, teachers, and peers.

A Russian study from 2002 examined fifteen female singers who engaged in vocally abusive activity and fifteen female singers with secure technique to determine the effects of premenstrual laryngeal changes on singing.²⁴ The vocally abusive singers were in their first year of full time, university level study of voice, while the vocally healthy singers were in their final year of university study. The vocal abuses of the first year singers were determined to be a mix of poor technique and overuse of the voice, with overuse predominating.²⁵ The singers of both groups historically had experienced some level of vocal difficulty preceding menses. Laryngoscopy, laryngostroboscopy, and electroglottography were employed on the participants. Upon examination of the vocally healthy group prior to menses, participants manifested slight edema (swelling) and mild erythema (reddening) of the vocal folds. An additional symptom was decreased tension in the vocalis, indicating some amount of hypofunction; however, the closure of the glottis still functioned efficiently. These participants did not voice particular complaints of decreased laryngeal functionality.²⁶

By contrast, the singers in the vocally unhealthy group upon initial examination already presented with more erythema and edema of the vocal folds as well as hypofunctionality of the vocalis muscle.²⁷ Once the subjects reached a premenstrual state, these symptoms increased significantly. In addition, the mucus in the larynx was thicker, clinging to the edges of the vocal folds. The participants of this group, upon reaching premenstruation, complained of discomfort in the larynx while singing and decreased brilliance in the sound.²⁸ When the singers in the vocally abusive group, under the supervision of voice teachers, eliminated the sources of vocal abuse, both their ongoing symptoms and their menses-related symptoms decreased.²⁹

IMPLICATIONS OF THE STUDIES FOR SINGER AND PEDAGOGUE

Based upon the findings presented by Abitbol et al. in 2004, a singer should conclude that the timing of phonosurgery, or for that matter, any surgery requiring intubation, is crucial.³⁰ The vocal folds are already subject to damage by intubation tubes in the most ideal conditions. Increased edema experienced by sufferers of PMVS would make intubation more of a struggle, possibly

increasing postsurgery swelling as a result of the intubation, thereby increasing recovery time following surgery. For those seeking any type of surgery, the researchers concluded the most optimal timing to be between the fifth and twentieth day of the cycle (for those experiencing normal cycle lengths).³¹ The implication for teachers of singers is to bring awareness to possible vocal complications as a result of any surgery elected by the singer, including those related to PMVS.

Pedagogues may resist discussing issues of women's health with their students because women's health issues encompass a variety of personal subjects that many pedagogues feel uncomfortable bringing up in a lesson or simply are ill-equipped to discuss properly and diplomatically. The webpage of the National Center for Voice and Speech may illustrate a less personally invasive way to give information to female students. The webpage, geared toward vocal health for teaching professionals, has subject matter arranged as rooms of a schoolhouse. In the Ladies' Room, teaching professionals have the option of reading how the menstrual cycle can affect vocal function.³² The page contains information related to menses, pregnancy, breast feeding, menopause, and even a picture of both healthy and swollen vocal folds. The subject is handled in a discreet manner, and there is a warning to those entering the Ladies' Room that if they would rather not read about the subject, they are to proceed to another room. A tech-savvy voice teacher may elect to do something similar for his or her own studio, thereby circumventing a potentially awkward conversation while still providing information and opening the door to discussion if the student has concerns specific to her own singing.

Maree Ryan indicates in her study that the contraceptive pill seemed to have a positive effect on the symptoms of premenstrual strain on the voice. Singers taking the contraceptive pill rated higher on voice perception scores and mood with significantly less perceived hoarseness.³³ Dr. Ofer Amir and his colleagues find additional benefits from using modern birth control pills as means to improve vocal quality. Since birth control pills stabilize hormonal levels throughout the menstrual phase, as opposed to the sharp drops and peaks of hormones in a nonregulated menstrual phase, these pills may help to decrease the amount of changes in vocal function which result from more extreme fluctuation. According to the

study, current birth control pills are not fraught with the peril of earlier generations of pills that produced voice changes in certain patients.³⁴ The very low dose of hormones in the new pills has been found, in preliminary studies, to have no negative effects on the voice. Amir's study concludes that birth control pills reduced variations and fluctuations in amplitude and fundamental frequency over the course of several months.³⁵ A more recent study performed by researchers at the University of Sheffield in the United Kingdom also concludes that the use of oral contraceptives reduces the "irregularity of the pattern of the vocal folds during performances of highly trained classical singers."³⁶

Abitbol et al. were able to conclude in their 1989 study that many of the participants who suffered the most severe symptoms of PMVS actually had a luteal deficiency.³⁷ This means that those participants were not producing enough of the hormone progesterone to maintain a pregnancy if one should have occurred, indicating a hormonal imbalance. Singers with PMVS should be advised to discuss possible hormonal testing with their physicians for the purposes of determining if the singer's levels are within acceptable ranges. If not, the singer's physician may choose to prescribe medication for the specific pathology present. The drug prescribed may be a form of birth control, since it has the tendency to control hormonal fluctuations.

Of course, pedagogues cannot prescribe any line of treatment to their students for health or vocal reasons; however, if a student is struggling without much success with the symptoms of PMVS, a suggestion to visit with her doctor about the possibility of hormone management may be appropriate, given the relief in symptoms by use of the birth control pill of some women in the studies cited.

At the same time, the study by Ryan also indicates that the physical struggles that singers experience as a result of premenstrual fatigue, swelling, and mood swings, may not actually affect the end product of sound as heard by others. Therefore, the reason to avoid or cancel performances during the menstrual cycle should not be the singer's perception of reduced vocal quality by others, but rather whether or not she can manage her own self-perceptions and physical discomfort while in a performance situation. Ryan concludes that "singers' education should include information that their per-

ceptions regarding their vocal quality may not adversely affect perceptual quality.”³⁸ This may be perceived as partial comfort to those singers for whom PMVS is a very poignant struggle.

Hormonal imbalances in the body, including those related to the menstrual cycle, should be taken seriously by the singer for another reason. If ignored, hormonal issues could cause a greater tendency for vocal fold hemorrhage. In 1991, a study by researchers at Lennox Hill Hospital in New York concluded that of thirty women who had experienced vocal fold hemorrhage, eight of them had hormonal imbalances caused by abnormal menstrual cycles, use of hormone supplements, and even the use of birth control pills.³⁹ In the majority of the cases, clearing up the cause of the hormonal imbalance brought the body back into equilibrium, and the vocal injury was able to heal on its own.⁴⁰

Chernobelsky was able to conclude from his study in 2002 that vocally healthy singers and voice-abusing singers experienced the affects of PMS on their singing abilities quite differently.⁴¹ While both groups experienced slight swelling and reddening of the vocal folds, it was the voice-abusing groups that showed the more extreme symptoms and were aware of a change in laryngeal functioning. When the voice-abusing singers eliminated the source of vocal stress, their symptoms decreased significantly during all portions of their menstrual cycle, including the premenstrual phase. Therefore, voice-abusing singers may be more susceptible to experiencing the symptoms of PMVS than vocally healthy singers. The implication for the pedagogue here is obvious: improving technique will help all singers, especially voice-abusing singers, cope with any symptoms experienced in the larynx as a result of the menstrual cycle. In addition, if a student complains of moderate to severe menstrual cycle-related issues with her singing, this could potentially indicate that the singer’s technique is not as solid as it perhaps could be. More work should ensue to further solidify technique.

For the singer who does not wish to begin using hormone regulating drugs, there may be other options for dealing with PMVS. Studies both by Chernobelsky and Chae have emphasized the usefulness of some amount of vocal rest. Chae and her colleagues conclude that “women who experience cyclic emotional, physical, and behavioral changes in the premenstrual phase should

take care not to strain their voices excessively as the vocal cords are more prone to changes during this time.”⁴² For singers who can are able, resting or singing for less time a day during this phase may offer some relief. Rest may also help to stave off potential future injuries as a result of overuse during a time when the voice is already somewhat strained.

Since the main presentation of PMVS in the larynx itself is swollen vocal folds, singers should avoid any behaviors that would induce further swelling. Maintaining adequate hydration would assist in this effort, as would avoiding sodium and sugar, caffeine and other diuretics, and avoiding vocally stressful situations such as loud talking or yelling. Drinking water and avoiding caffeine, sugar, and sodium will also help to alleviate thickened mucus in the larynx, a secondary symptom of PMVS cited in this paper.

For sufferers of PMS and PMVS who experience an increased state of anxiety or depression, these two factors will inevitably affect how they perceive their own singing. This was evidenced by the results of the study by Maree Ryan discussed earlier in this article. However, anthropologist Alma Gottlieb points out that there are several cultures in the world that do not in any way associate emotional stresses with the concept of PMS. For those cultures, physical symptoms are the only symptoms attended to by women.⁴³ Gottlieb suggests a certain amount of cultural conditioning may have occurred in American women, causing a tendency to be overly aware of emotions at a time when emotional peaks and valleys have been taught to be expected.⁴⁴ In other words, this may partly be a self-fulfilling prophecy or a way to act out secret desires or purge emotionally for some women. Gottlieb states that “during most of the month, women should [based on cultural expectation] exhibit the positive virtues . . . but during the paramenstruum they are permitted to play out what are perceived widely as disapproved modes of behavior.”⁴⁵ Therefore, even emotional difficulties may need to be approached with understanding but also a certain amount of skepticism. Women can be mindful that they are not the victims of their emotions, but can work to manage them, especially if stress reduction strategies are employed.

Creating a nurturing and encouraging atmosphere in the studio will assist a singer who is already frustrated by her symptoms and their effect on her voice. In fact, since

the voice is such an extension of the person, a deficiency in the voice will often be interpreted as a personal deficiency. Helping the student build solid technique, encouraging good vocal health and personal habits, and having patience with the difficulties related to PMVS will all go a long way toward assuring the student that she has control over much of her situation. It may help to inform the student that as she ages, some symptoms may lessen. A study by the Vicksburg Clinic in Mississippi in 1993 concluded that of those women who historically presented with symptoms of PMVS, by age 35 the symptoms had lessened.⁴⁶

CONCLUSION

This article has illustrated a variety of ways that the hormonal fluctuations in the premenstrual phase physically and emotionally affect the lives and voices of some singers. Swelling in the vocal folds, loss of agility, and other symptoms have been documented by researchers using the scientific method. Singers tracking their own moods and cycles have been able to contribute additional information about how their moods and perceptions of their voice correlate to their cycle. Evidence gained by the studies cited shows that the symptoms of PMVS are not imagined by all singers who claim to have troubles during their premenstrual phase. Given scientific proof of the syndrome and its concurrent difficulties for the singers, this is an issue that should not be ignored by pedagogues. While discussing women's health issues may seem awkward or indiscreet, if a student is in fact a sufferer of PMVS, a voice teacher's refusal to help deal with the situation is pedagogically unsound. Indeed, it would be remiss not to deal with the issue, since symptoms of extreme PMVS may be indicative of other health problems, such as extreme hormonal imbalances.

Research cited here has shown that those singers who have faulty technique may experience more extreme versions of PMVS. Therefore, the pedagogue who can help the student achieve better breath support and energy and a sense of healthy freedom and placement will do much to help the student overcome her difficulties with PMVS. Helping a singer develop strategies for stress management and good vocal and physical health are imperative for a well rounded pedagogic approach. Where technical difficulties and good vocal hygiene do not

entirely resolve the issue for the singer, other physician supervised treatments and hormone regulation may be in order.

NOTES

1. Alma Gottlieb, "American Premenstrual Syndrome: A Mute Voice," *Anthropology Today* 4, no. 6 (December 1988): 10-13.
2. Sung Won Chae et al., "Clinical Analysis of Voice Change as a Parameter of Premenstrual Syndrome," *Journal of Voice* 15, no. 2 (June 2001): 278-283.
3. Filipa La, "Investigating Musical Performance as a Target of Hormone Influence," *Performance Online* 1, no. 1 (2005): 3-4. <http://www.performanceonline.org/uk/edicoes/uk/n1/filipaeng.pdf> (accessed April 25, 2008).
4. Ibid.
5. Maree Ryan, "Effects of Premenstrual Symptoms on Young Female Singers" (Masters thesis, University of Sydney, 2006), 92.
6. News-Medical.Net, "Vocal surgery is now available to maintain performance of the singing voice," News-Medical.Net, Mona Vale, Australia, <http://www.news-medical.net/?id=1011> (accessed April 21, 2008).
7. Ibid.
8. Ryan, 92.
9. Abitbol et al., "Does a Hormonal Vocal Cord Cycle Exist in Women?" *Journal of Voice* 3, no. 2 (June 1989): 157.
10. News-Medical.Net.
11. Ibid.
12. Ibid.
13. Ibid.
14. Ofer Amir et al., "Do Oral Contraceptives Improve Vocal Quality? Limited Trial on Low-Dose Formulas," *Obstetrics and Gynecology* 101, no. 4 (April 2003): 773-777.
15. The ovulatory phase is characterized by hormonal shifts leading to the release of an egg from the corpus luteum of an ovary, usually occurring on or around day 14 of the menstrual cycle.
16. The luteal phase is the time period after ovulation and prior to menstruation, is usually a minimum of 10 days long, and is characterized by a flux of hormones as the body prepares to shed the lining of the uterus if pregnancy is not achieved.
17. Ryan, 68.
18. Ibid., 71.
19. Ibid., 70.

20. Ibid.
21. Ibid., 80.
22. Ibid., 83.
23. Ibid., 84.
24. S. I. Chernoblesky, "A Study of Menses-Related Changes to the Larynx in Singers with Voice Abuse," *Folia Phoniatica et Logopaedica* 54 (2002): 2–7.
25. Ibid., 5.
26. Ibid., 3–4.
27. Ibid., 4.
28. Ibid.
29. Ibid., 5.
30. News-Medical.Net.
31. Ibid.
32. Julie Ostrem et al., "Voice Academy Ladies' Room," National Center for Voice & Speech, <http://www.uiowa.edu/~shcvoice/ladies.html> (accessed April 21, 2008).
33. Ryan, 68.
34. Amir et al., 773–777.
35. Ibid.
36. Filipa La et al., "The Effects of a Third Generation Combined Oral Contraceptive Pill on the Classical Singing Voice," *Journal of Voice* 21, no. 6 (November 2007): 754–761.
37. Abitbol et al., 157.
38. Ibid., 95.
39. Pi-Tang Lin et al., "Risk Factors and Management of Vocal Cord Hemorrhages: An Experience with 44 Cases," *Journal of Voice* 5, no. 1 (1991): 74–77. Abstracted in ScienceDirect database.
40. Ibid.
41. Chernoblesky, 6.
42. Chae et al.
43. Gottlieb, 10.
44. Ibid., 11.
45. Ibid.
46. Clarissa Behr Davis and Michael Lee Davis, "The Effects of Premenstrual Syndrome (PMS) on the Female Singer," *Journal of Voice* 7, no. 4 (December 1993): 337–353. Abstracted in ScienceDirect database.

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