

THE
FEMALE VOICE



THE FEMALE VOICE

JEAN ABITBOL, MD





5521 Ruffin Road
San Diego, CA 92123

e-mail: information@pluralpublishing.com
Website: <http://www.pluralpublishing.com>

Copyright © 2019 by Plural Publishing, Inc.

Typeset in 11/13 Garamond by Flanagan's Publishing Services, Inc.
Printed in the United States of America by Integrated Books International.

All rights, including that of translation, reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, recording, or otherwise, including photocopying, recording, taping, Web distribution, or information storage and retrieval systems without the prior written consent of the publisher.

For permission to use material from this text, contact us by
Telephone: (866) 758-7251
Fax: (888) 758-7255
e-mail: permissions@pluralpublishing.com

Every attempt has been made to contact the copyright holders for material originally printed in another source. If any have been inadvertently overlooked, the publishers will gladly make the necessary arrangements at the first opportunity.

NOTICE TO THE READER

Care has been taken to confirm the accuracy of the indications, procedures, drug dosages, and diagnosis and remediation protocols presented in this book and to ensure that they conform to the practices of the general medical and health services communities. However, the authors, editors, and publisher are not responsible for errors or omissions or for any consequences from application of the information in this book and make no warranty, expressed or implied, with respect to the currency, completeness, or accuracy of the contents of the publication. The diagnostic and remediation protocols and the medications described do not necessarily have specific approval by the Food and Drug administration for use in the disorders and/or diseases and dosages for which they are recommended. Application of this information in a particular situation remains the professional responsibility of the practitioner. Because standards of practice and usage change, it is the responsibility of the practitioner to keep abreast of revised recommendations, dosages, and procedures.

Library of Congress Cataloging-in-Publication Data

Names: Abitbol, Jean, author.

Title: The female voice / Jean Abitbol.

Description: San Diego, CA : Plural Publishing, [2019] | Includes bibliographical references and index.

Identifiers: LCCN 2018032436 | ISBN 9781597569361 (alk. paper) | ISBN 1597569364 (alk. paper)

Subjects: | MESH: Voice--physiology | Sexual Development | Women's Health

Classification: LCC QP306 | NLM WV 501 | DDC 612.7/8082—dc23

LC record available at <http://lcn.loc.gov/2018032436>



Contents

<i>Acknowledgments</i>	<i>vii</i>
<i>Introduction</i>	<i>ix</i>
1 Where Does the Voice Come From?	1
2 Birth of the Mother's Voice to Her Offspring	23
3 The Female Voice Instrument	35
4 From the Voice to the Words: Male Versus Female	59
5 What Hormones Tell Us	71
6 Sex Hormones and the Voice	89
7 The Voice and the Hormonal Cycle	101
8 Treatment of the Premenstrual Voice Syndrome (PMVS)	125
9 Pregnancy and Voice	133
10 The Voice at Menopause	137
11 Voice Disorders and Gynecological Disease	149
12 Specific Pathologies and the Female Voice	153
13 The Castrato to the Diva: What Is the Link?	175
14 Transgender People and the Voice	181
15 Madame: Keep Your Voice Fit	191
16 The Female Voice and Seduction	223
<i>Conclusion</i>	<i>237</i>
<i>Index</i>	<i>239</i>



Acknowledgments

Beatrice, gynecologist, who shared my passion on the female voice and gave me the spark to create and write this book.

Patrick, otolaryngologist, my son, who was able to give me filial and professional advice with pertinence and affection.

Delphine, pediatrician, my daughter, who has been a precious help with tender affection, patience, understanding, and attentive listening.

Robert T. Sataloff, professor, Chairman of the Voice Foundation, for his friendship, his enlightened spirit, his always-kind advice, and his wisdom.

Mary J. Hawkshaw, professor, for her support and her relevant and friendly guidance.

Thomas Murry, CCC-SLP, professor, for suggestions and advice in the scientific, medical, and artistic world of the voice.

Michael S. Benninger, professor, doctor, and Chairman of the Cleveland Clinic, with whom I travel through the voice world. Find here the testimony of my amity.

Peak Woo, professor, Mount Sinai NY, find here the recognition of your benevolence and your mind.



Introduction

Like a ship on the waves, the woman's voice travels through the space-time of our emotions. Its beauty, its fragility, and its impressive impact on our behavior—these pitfalls and these strengths—are the mysteries that I will help you discover.

The cycle of the woman's voice is a reflection of the cycle of our lives! Is not this the voice we hear in our fetal life? Our DNA, life itself, pulsates with the vibrations of the universe. How to define the female voice signature? Her imprint is her personality, the reflection of her soul. Her voice is her power and her seduction. *The voice is the quintessence of the present.*

Have you ever wondered how you “perceive” the female voice, a magical and sensual instrument? What constitutes it? How did her voice affect how she appears to you? What is the role of genetics? Why is the voice sexed? A woman's voice, the female voice, and the transgender voice—what does each signify? What is the influence of the stamp? Is she seen as masculine or just serious?

WHY DID I CHOOSE THE FEMALE VOICE?

What is so special about the female voice? Why this passion for the voice of the woman? The woman is judge and stakeholder of her own voice. Her voice is a weapon of seduction or attack, of strength or sweetness. Many of my patients consider their voice as an independent entity. This individuality of the voice, considered as outside of herself, is rare in the man except for artists and lawyers. The male vocal experience seems more based in logic, in understanding, and in analysis than in feeling. If the man is the Spartacus of the voice, Athena is the woman where the voice is the instrument between emotion and reason. The woman speaks about her voice in the third person: she talks to, judges, insults, or adores “her.” I have heard women say, “My voice is good”; “today, my voice deserted me”; “I must go gently with her”; “she betrayed me”; “my voice

annoys me”; or “I can’t count on her anymore.” The most incredible statement I’ve ever heard was, “Since the death of my mother, my voice has come from beyond the grave.”

The female voice is emotional and any emotional aggression can hurt her own hormonal cycle. The female voice is the life she listens to—a vibrant part of herself and what she would like to be. Between a mother and her child there is nothing more touching than this dialogue where the silence in a look will speak more than words.

MY STORY BEGINS IN JANUARY 1992

After nearly three years of examining female teachers and singers who displayed voice problems regularly, I began recording the dates of their dysphonia. For many of them, the results were quite surprising: the problem appeared always 3 to 4 days before their menstruation. I thought they might have had a psychological problem at this period of the menstrual cycle. But I was not satisfied with my rapid conclusion because the psychological aspect can be a too-easy explanation. Consequently, I performed a pragmatic study and a prospective study for seven years, a study I called “the premenstrual voice syndrome (PMVS).” The analysis was carried out on more than 100 female singers aged 21 to 37 years, non-menopausal, taking no contraception, and menstruating regularly. I chose singers because the acute precision needed to produce musical notes and the fragility of their voices were a matter of great concern. The clinical analysis included an otolaryngologist “voice” and gynecological evaluation. One-third of these patients had premenstrual dysphonia.

As we learned during internship in medical school, the larynx is an organ affected during puberty by the sex hormones. I decided that the best way to study the hormonal effects on the vocal folds mucosa was to perform a smear test of the vocal folds. On the same day of the smear test, a gynecologist also took a smear of the cervix. This smear test should be obtained two to three days before menstruation. For the gynecologist, it is simple. For the laryngologist, the best technique would be to use a video fiberscope with an operating channel.

I performed the smear of the vocal folds with a brush passed through the operating channel. The parallelism between the larynx and the cervix/uterus smear results was amazing: the vocal folds have a “menstrual cycle” just like the cervix. I performed laryngeal smears of menopausal women. The results showed what I expected: parallelism between the larynx and uterus smear test.

Then I questioned the entity of the female voice: Does this voice have specific pathologies, fragilities, and effects related to specific hormones? And how does the female voice change throughout the lifespan of women? What is its impact on others, the fetus, and their children?

EVE AND THE FIRST VIBRATIONS OF HUMANITY

In the universality of space-time and the infinite, the cycle of Eve's voice became the source of our life. The female voice changes through the space-time continuum. Females have a lunar cycle, which is the cycle of life.

The feminine voice has exerted its charms over millennia. In Greek civilization, Apollo and Orpheus discussed the merits of the athlete's worship of the body and of the power of a siren's voice to soothe emotions and to seduce Ulysses.

As a ship on the waves of the sea of life, the voice will travel through the wind of hormones and emotions. The voyage I propose to you follows the voice's changes through the voyage of the hormonal storm of our being—its path, challenges and limitations, and emotional impact. This voyage challenges us to understand how the cycle of life, the spiral of the hormones, can leave scars on the female voice more than on the male voice. I will review the passage of the voice from childhood to adult, from adult to aging voice. The alchemy between mind, body, and hormones creates our unique voice more than our fingerprints. In the chaotic logic of life vibrations, the voice is the link between your persona and your soul. This precious gift, your voice, is an emotional amplifier that we must save from harm.

CHANGING YOUR VOICE: DOES IT CHANGE YOUR PERSONALITY?

On an afternoon in April 2012, Mrs. H, 37 years old, comes in my office. I did not know yet what would happen that afternoon and what an amazing story would come out of this visit. Mrs. H spoke with a thin, faint voice, without force. I asked her to cough. Her cough made no sound. This was an unusual symptom because a cough is normally audible when the two vocal folds touch each other and in effect “smack” together.

My patient said she lost her voice suddenly at the age of 13 after coming down with the flu, and it was never the same again. She became used to her altered voice, a whispered and a breathy voice. She wished to recover her “normal” voice. But in fact, she didn't know what her “normal” voice was. She stated:

I have two children, aged seven and nine. Their bedroom is on the second floor. To call them, I have to ring a little hand bell or else press a service bell in the kitchen. And talking on the phone is just beyond me today. Thankfully, I can use the SMS (texting) now.

When I observed her larynx, I found that the right vocal fold was mobile and moved inward to join the medial part of the glottal space. But the left vocal fold was paralyzed, stuck far off from the glottis center. When the vocal folds can't come together, the voice is barely perceptible. I suggested a procedure that would enable the vocal folds to come together during phonation. For that, I inflated the vocal folds in such a way that the right vocal fold could come into contact with the left: thus producing an efficient vibration. This procedure was to medialize the left vocal fold. She decided to undergo microlaryngeal surgery. It was performed under general anesthesia through the oral pharyngeal space with a laryngoscope. Five to 10 days later, her voice was back to "normal" or at least what she expected would sound normal. She recovered a beautiful voice and tone. She made an incredible admission: "I never got to know my grown-up voice! Now I really feel that I am a woman."

A fortnight later, however, Mrs. H. came back with her husband and her two children. "I can't recognize my mother anymore," the older child complained. "This isn't the woman I married. I don't recognize her either," stated Mr. H. As far as her relatives were concerned, her feeble vocal tonality was her normal voice, and I had metamorphosed her. Changing her voice was changing her personality. She had an amazing reply for them: "Now I really feel that I am not only your mother, not only your wife, but myself, a woman." I had to work hard to reassure them and to convince them that they would eventually get used to her voice. Still, the family's dismay was perfectly understandable, especially the children's distress: they had to deal with both the loss of their mother's old voice and the switch to a substitute new voice. But who is right? I'll let you think about that.

Voice is immanence and transcendence; this precious gift, your voice, is an emotional amplifier that we must save from harm. Look at a picture of somebody you loved, and you feel sad. But listen to the voice, and you cry.

The period of the female voice through the time continuum is amazing: at childhood, at puberty, and during the menstrual cycle at premenopausal and menopausal phase. The voice is life: it reflects our physical and psychological health. One might even ask, are the injuries of the voice the scars of our life? The voice carries the imprint of our personality.

DID YOU EVER ASK YOURSELF, HOW DO I PERCEIVE WHAT CONSTITUTES "A FEMALE VOICE"?

The first indication of this perception comes via your phone: "Hello"; "Yes, hello Madame." In short, you have a notion of what constitutes a female voice. We have other such criteria for determining other voices: Is the voice a child's, an adult's, or an older person's. My point being that there are grounds for analyzing the voice of woman: Can we define it and study it?

As you can tell, the discovery of the female voice is a fantastic voyage, and I wish to share that voyage with you. I will take us through the changes in the voice during its crossing of the hormonal storm of its being, its path, its challenges, its limitations, and its emotional impact. We will follow the passage of the voice of childhood to adulthood, and from adulthood to old age. Voice is the fruit of the alchemy between spirit, body, and the spiral of hormones. Voice is in the chaos of the vibrations of life. This precious gift of our voice is an emotional amplifier that we must protect from all ills. Our challenge is to understand how and why the female voice is marked by the cycle of life.



1

Where Does the Voice Come From?

The evolution of the human species moves in one direction—forward. To reverse the direction is impossible.

The cycle of the female voice is the reflection of the cycle of life! We are the dust of stars. Vibrations in the universe lead to the vibrations in our DNA, to the vibrations of life. Where is the link with the female voice? The link can be found in genetics, epigenetics, a mother's impact, hormones, and the events of a lifetime—all will drive the voice.

Let's consider the biology. Every cell in a living sexual organism possesses two N chromosomes that make possible the birth of a gamete with N chromosomes and give life to a new living organism, which contains these two N chromosomes. A human has 46 chromosomes: 44 autosomes chromosomes and two sex chromosomes XY or XX: in a man that means 44 chromosomes + the XY sex chromosomes; in a female that means 44 chromosomes + the XX sex chromosomes. The gametes are the basic unit of procreation. The spermatozoon of a man contains 22 autosomes (numbered 1 to 22), plus a sex chromosome with two types of gametes: X or Y. A woman has only one type of gamete: the ovum (with 22 autosomes and the X chromosome). The coupling of the two gametes, one from the mother, the other one from the father (23 + 23) will produce a male if the Y spermatozoon penetrates the ovum; it will produce a female if the X spermatozoon prevails to make a 46-chromosome cell.

Men and women are not equal whether it is in their evolution, in their lives, or in their voices. In our current times, this sentence is considered politically incorrect. Yet, it cannot be denied that women's voices are different from men's. And there are genetics that document other differences. For instance, it is well known that osteoporosis and Alzheimer's disease affect rather more women, more than cardiovascular diseases affect men.¹ And although it has been shown that different treatments for men and women are sometimes efficacious in dealing with different diseases, even the time of day when the treatment is applied can make a difference. In sum, the chronobiology of men and women is not always the same.

There is not a day when the media does not talk about gender equality and gender theory. These debates are numerous. The differences between sexes when dealing with biological issues are different. Those issues may depend on: the age of the onset of the issue; whether the issue is due to the prevalence of certain diseases or the metabolism of the individual; and whether the issue is a response to certain drugs. The voice, a reflection of our health, is different; here the hormonal differences are the master of games. In a woman, this path through the hormonal landscape is amazing but also marked with pitfalls. We have to make a distinction: when we talk about gender, we are referring to social behavior; when we talk about sex, we mean a biological/physiological characteristic that will during our lifespan.

In the 21st century, the fields of genetics and epigenetics have given us the “epigenome,” which shows us the interplay between the social effects of our biological world on our cells. For instance, women account for 30% more drug-related secondary side effects than men.² Women seem much more intuitive, much more emotional. There is no conflict regarding man and woman about biological equality: of course they are different! A difference does not mean inequality. Quite the contrary, it means having specific and profound qualities in different areas that are necessary and complementary for humankind.

To quote Simone de Beauvoir in 1956: “one is not born, but rather becomes, a woman”—a quote often claimed by women to be inaccurate. But a significant note: This simple sentence sums up the explosive content of Simone de Beauvoir’s masterpiece, *The Second Sex*, whose release in 1949 was accompanied



Genes and voice.

by a great scandal (and inserted in 1956 in the Index of Forbidden Books). If we ask ourselves, in 2018, almost 70 years later, what is the legacy of feminist philosophy, we notice the influential nature of her thought. The denial of the biological basis of the female being is predominant in feminism. But the main reason for the current interest in *The Second Sex* is based precisely in existentialist philosophy. This interest centers on the question of freedom, and it is precisely heard as Simone de Beauvoir heard it—not as the sum of rights or opportunities, but rather as a free and original way of defining her own presence in the world.

In fact, when the fertilized egg nestles in the uterus of its mother and has only a hundred cells, it is already noted that at this stage nearly 30% of the genes have been expressed. There is already a significant difference between males and females. The small male embryo has an accelerated growth and is distinguished from the small female embryo. It is assumed, then, that it is the paternal chromosomes that will determine the sex of the child because the sperm brings the sex chromosome X or Y, whereas the mother always brings only the X chromosome. Incredible yet true: in many cultures, women are blamed for not producing sons, but, in fact, the father generates the difference.

The voice of woman shows an impressive evolution in feminine life. The 23,000 DNA genes associated with histone proteins are distributed on our 46 chromosomes, allowing us to inherit the genome of our parents. But after, since intrauterine life, the genome seems to transmute during our lifespan: such changes are called epigenetic. This genetic plasticity leaves us to ask, think: In transsexual women, does epigenetics have a role? What role do epigenetics play at the molecular level? Thanks to enzymes, affixed on the DNA and the histones (proteins around the DNA) do not change the sequence of the DNA but allow two things: (1) the first to stimulate and activate, and (2) to suppress or disable certain DNA genes. There are brands that specifically “epigenetize” the behavior of our organism to sex. Indeed, the sexual “tattoo,” XX or XY, is present in all the cells of our body. This explains the sensitivity that we each have to external environmental aggression whether it is chemical, bacterial, nutritional, and of course sentimental and emotional. In the progression of our evolution, our life, our experiences, our scars—our epigenetic “marks”—establish different networks to our chromosomal sexuality. The X chromosome contains more than 153 million base pairs, the building blocks of DNA. In women, the X chromosome represents almost 5% of the total DNA; in men, who have only one X chromosome, it represents about 2.5% of the total DNA. Men inherit the X chromosome they have from their mother and the Y chromosome from their father, whereas women inherit one X chromosome from the mother and the other from the father. There are approximately 2,000 genes located on the X chromosome and 78 genes on the Y chromosome.³ The factors that count in the male-female difference are of course those of the Y chromosome, which is expressed only in the male cells but also by the X genes, which, in the female escape the inactivation and expression of Y. Hormonal impact is essential and fundamental, yet even if complete castration is practiced before the age of 10,

the difference between male and female voices is not completely eliminated. The genetic role exists. The stimulation of the Y chromosome is fundamental but not sufficient: the action of our hormones is essential.

FOXP2: GENE OF THE HUMAN VOICE

The Forkhead Protein Box P2 (FOXP2) is an amazing, incredible gene required for the proper development of speech and language. In fact, we know that the combination of the four essential molecular units: adenine, guanine, cytosine, and thymidine dictate their “law.” One could almost say that “it’s a case of language creating man rather than man creating language,” as was claimed dramatically by the Nobel Prize winner Jacques Monod on November 3, 1967, at the Collège de France. Could the discovery of the FOXP2 gene be the first stepping-stone toward this scientific and philosophical possibility? Is it the link with our origins, our DNA, with our voice?

The story of the discovery of the FOXP2 gene begins in the 1990s with the work of Anthony Monaco’s team at Oxford.⁴ The team studied three generations of an English family, the KE family, half of whose members—men, women, sons, and daughters—suffered or have suffered from a rare disease affecting articulated language. They found the presence of a single dominant mutant allele of an autosomal gene at the origin of the disease. This is the FOXP2 gene place in the 7q31 region of chromosome 7. A point mutation was then identified in the KE family members with this disorder; it substituted adenine for guanine in exon 14 of this long-fragmented gene, which made it possible to incorporate a histidine into their gene. The FOXP2 protein instead of arginine was found in all unaffected members of the family, as well as in 360 people from the general population recruited as controls.

The FOXP2 gene, which is expressed in all tissues, activates or inhibits the expression of many genes linked to an articulated language and phonological input. In 2002, a research team determined that this gene was purportedly specific to language.⁵ This gene is apparently located on both alleles of chromosome 7. In other words, a binary copy of FOXP2 is necessary for the development of normal speech and language. The great apes lack this feature. This gene is seemingly indispensable for the development of the voice, and thus of articulated speech, with its required control over the larynx, the mouth, and the other elements of the voice box. These studies by the Max-Planck Institute in Leipzig and by Oxford University provide the missing link in evolution, which is none other than the mutation of a gene that became indispensable for human speech. The importance of this gene had already been recognized in the case of certain anomalies of the voice, such as dyslexia. This mutation would seem to have been the starting point for speech for the entire human race on our planet. It seems that epigenetics did have a real role.

Once again, our DNA, in this instance mitochondrial DNA rather than nuclear DNA, enables us to track down our original mother. The bottleneck in the evolution of the species is addressed in a theory developed by Alan Wilson and his collaborators.⁶ These researchers examined the mitochondrial DNA of 147 women deemed to be representative of the female specimen on our planet. But what are mitochondria? They are organelles found in large numbers in most cells in which the biochemical processes of respiration and energy production occur. There are two hypotheses about the origin of mitochondria: endosymbiotic or autogenous. The endosymbiotic hypothesis suggests that mitochondria were originally prokaryotic cells (ie, a cell without a nucleus) capable of implementing oxidative mechanisms that were not possible for eukaryotic cells; they lived inside an eukaryote cell. In the autogenous hypothesis, mitochondria were born by splitting off a portion of DNA from the nucleus of the eukaryotic cell at the time of divergence with the prokaryotes; membranes, which could not be crossed by proteins, would have been enclosed in this DNA portion.

EVE'S MITOCHONDRIA

If humans go back to a single original mother, we must all have the same mitochondria. And, indeed, this is what the theory of the mitochondrial Eve demonstrated because humans taken from five different continents all turned out to have similar mitochondrial DNA when considering DNA's clock. The concept of a DNA clock is simple: the number of DNA letter differences between the sequences of two species indicates how much time has elapsed since their last common ancestor was alive. But for estimates to be correct, geneticists need one crucial piece of information: the pace at which DNA letters change.

It's worth noting here that mitochondrial DNA has only 37 genes distributed over 16,569 nucleotides; this is meager compared with nuclear DNA, which contains 3 billion nucleotides and some 23,000 genes!

In the 1990s, a human skeleton, approximately 9,000 years old was found in the small English town of Cheddar. According to Bryan Sykes in *The Seven Daughters of Eve* (W.W. Norton and Company, 2001), a mitochondrial analysis of the skeleton was possible. The same analysis carried out on a female teacher at the local school revealed a mitochondrial DNA profile that was almost identical. The mind boggles at such a close hereditary match, nearly 9,000 years apart!

Several scenarios unfold from this study. First, we all descend from the same original mother, who herself had no ancestors. Her existence was due to a DNA mutation. However, this doesn't explain the existence of human fossils that are 200,000 years older according to the DNA clock. Thus, this first hypothesis hardly seems credible.

The second scenario is worthy of a science fiction film. The human race was wiped out except for one couple that survived. We're all survivors from