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Can singing with rasp be a healthy practice?

Cantar "rasgando a voz" pode ser uma prática saudável?

Cantar "rasgando la voz" puede ser una práctica sana?

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Abstract

Singing with a distorted or raspy voice as it is most popularly known is usual in many forms of singing besides rock. The so-called intentional voice distortions have been present in music for many years and in the most diverse human cultures. Even so, these types of production still run into prejudices in the sense of considering, without scientific evidence, that they are harmful to vocal health. The goal of this communication was to reflect on the intentional voice distortions in singing in a dialogue between Music and the fields that study the singing voice as Speech Language Pathology and Laryngology. In order to expand the knowledge on these types of vocalizations and to relate the researches that investigated the subject.

Keywords: Singing; Voice quality; Voice training.

Resumo

Cantar com a voz distorcida ou rasgada como é mais conhecido popularmente é comum em diversas formas de canto e não apenas no *rock*. As chamadas distorções vocais intencionais estão presentes na música há muitos anos e nas mais diversas culturas humanas. Mesmo assim esses tipos de produção ainda esbarram em preconceitos no sentido de se considerar, sem comprovação científica, que são prejudiciais à saúde vocal. O objetivo desta comunicação foi refletir sobre as distorções vocais intencionais no canto em um diálogo entre a Música e os campos que estudam a voz cantada como a Fonoaudiologia e a Laringologia. Na perspectiva de expandir o conhecimento sobre essas formas de emissão e relacionar as pesquisas que investigaram o assunto.

Palavras-chave: Canto; Qualidade da voz; Treinamento da voz

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Resumen

Cantar con la voz distorsionada o rasgada como es más conocido popularmente es común en diversas formas de canto y no sólo en el rock. Las llamadas distorsiones vocales intencionales están presentes en la música desde hace muchos años y en las más diversas culturas humanas. Sin embargo, estos tipos de producción todavía tropiezan en prejuicios en el sentido de considerar, sin comprobación científica, que son perjudiciales para la salud vocal. El objetivo de esta comunicación fue reflexionar sobre las distorsiones vocales intencionales en el canto en un diálogo entre la Música y los campos que estudian la voz cantada como la Fonoaudiología y la Laringología. En la perspectiva de expandir el conocimiento sobre esas formas de emisión y relacionar las investigaciones que investigaron el asunto.

Palabras claves: Canto; Calidad de la voz; Entrenamiento de la voz

Introduction

Elza Soares[1], a famous Brazilian singer, Tibetan monks[2] and Freddie Mercury[3], the lead vocalist of the British rock band Queen, share the use of distorted voices. When acoustically analyzed they present different degrees of noise and/or subharmonics in the spectrographic tracings[1]. Another common characteristic among them is that these effects are not a result of vocal disorders, but are otherwise skills developed and used deliberately.

These forms of voice use are popularly referred to through different expressions such as growl, rasp, scream, guttural, among others that usually do not have a specific origin. Such voice modes are produced by distinct configurations of the larynx and the vocal tract structures of singers[2] and may be classified as intentional vocal distortions (IVDs)[1], an umbrella term for all the distorted sounds made for the performer by choice.

All three examples, the voices of Elza Soares, the Tibetan monks and Freddie Mercury, do not provide the same sonority, not even the same musical genre. Studies [3–5] carried out in recent decades reveal how these types of phonations are produced and why singers using IVDs sound so different one from another. Much has already been found, but there is still a lot to be investigated. It is still usual to find among the lay public or even among voice professionals those who will state that distortions are harmful modes of singing, although studies offer no evidence that IDVs practiced in a controlled and conscious manner can cause any damage [2,6,7].

Thus, this communication aims at reflecting on intentional vocal distortions establishing a dialogue among Music studies and the scientific fields that undertake singing voice research, such as Speech Therapy and Laryngology. It will be possible, therefore, to demonstrate that although these types of vocalizations sound like vocal disorders, these voice settings do not cause harm to the properly prepared singer.

The Intentional Vocal Distortions throughout history

Many still believe that distorted voices effects are produced only by rock and heavy metal singers. The origin of such ways of singing is not entirely clear, but it is known that several cultures have made and still make use of these sonorities [5]. In speech, unintentional distorted sounds are present in moments of greater emotion, be it a manifestation of ecstasy or cry of pain, hatred, and despair. Dramaturgy, on its turn, makes use of these effects deliberately to improve characterizations and in order to move or impress the audiences of plays, films or television soap operas[8].

In folk and traditional music, these vocalizations are identified in tribes of South Africa, Kenya, Mongolia and Tuva Republic (throat singing) and southern Siberia [9,10] as well as in the Nordic tribes during the Vikings' era. They are also found in native tribes' songs from Brazil, in Oceania's Maori

1. A Carne – Elza Soares (Official Videoclipe). YouTube video. Published in 3 July 2017; Access in 19 March 2018. Available at: https://www.youtube.com/watch?v=yktrUMoc1Xw.
2. WildFilmsIndia. Tibetan monks throat-singing – Specialized form of chanting. YouTube video. Published in 5 March 2013. Access in 19 March 2018. Available at: https://www.youtube.com/watch?v=JvyhxY54M3I&t=39s
3. ANDREA, Mauro. Freddie Mercury How Can I Go On Solo. YouTube video. Published in 19 March 2018; Access in 19 March 2018. Available at: https://www.youtube.com/watch?v=mBD9QbtBU2g

war cries and in North America with the Inuit peoples' vocal games - in which two players face each other while making distorted sounds with the aim of causing laughter at the opponent and win the match[11]. It is also usual to find intentional distorted voices in Arabic singing, including the Islamic call to prayer as much as in the flamenco songs and in the *canto a tenore*, traditional from the Italian region of Sardinia[12].

The Negro spiritual, genre originated from the enslaved peoples' resistance in the United States, is characterized by religious songs that, in addition to praising, served as forms of protest, addressing the anguish of life without liberty and encouraging the escapes and rebellions. Distorted voices, which can embody aggressiveness[13], play the function of expressing extreme pain, sorrow and rebellion. American gospel music is one of the genres inspired by the Negro spiritual in which the voice is often explored in intense ways, with inflamed speeches and calls to praise; the gospel singers and reverends still use IVDs for this purpose.

From the tradition of American black music merging African rhythms, Negro spirituals and gospel emerged popular genres such as jazz, blues, soul, boogie woogie. Later, when these genres were combined with the country culture of the inner lands of the United States, rock music was born[14]. The influence of the exaggerated voices is present in most of the genres described. Considering the blues tradition, for example, the intention of expressing sadness and suffering finds in the IVDs a very useful tool, as much as the insurgency of the rock generation would find.

Artists such as Lavern Baker, Etta James, Wilson Pickett, Little Richard, Elvis Presley, Screaming Jay Hawkings, Joe Cocker and John Lennon were known for the extensive use of IVDs, conforming within the rock tradition and its subgenres the mode of singing that most dived into the possibilities of distorting the voice. One of these subgenres is heavy metal, which also has numerous subgenres in itself, such as death metal, black metal, thrash metal, power metal, glam metal and more extreme strands such as grindcore metal, nu metal and post hardcore. Each one of them has specific characteristics of instrumentation, subject for the lyrics and ways of using the voice.

On the verge of this variety of styles, songs with extreme voices emerged,[15] producing quite aggressive sonorities that even remind the roars and grunts of animals. Some of these vocals present an almost unintelligible articulation of words, as the type of voice known as pig-squeal, and forms of singing without defined pitch, such as the one known as fry scream [1].

Currently, IVDs are present in almost all music worldwide, like in funk *carioca*, Brazilian Pop Music (MPB), *axé* music, country, among others. In Broadway musical theater, the pop/rock voices are already a trend. Japanese soundtracks and popular music from countries of all continents also make use of these vocal adjustments. In classical singing, experimentalists like to explore many of these effects by the name of extended techniques or extended voices[16], and even in classical operatic arias it is possible to find IVDs[4].

It is worth of notice, therefore, that vocal distortions are a part of the musical culture of different regions of the globe and they have been found in different periods of time, long before the books and treatises on singing that ruled the techniques of singing and the concepts of rights and wrongs for a good voice. These concepts were largely based on aesthetic standards considering specifics needs of the various types of classical singing, like the *Bel Canto*. Thus, a relevant research on this subject should identify which factors contributed to the use of vocal distortions in so many cultures by countless singers and musical genres rather than discussing whether or not should such techniques be adopted. That still happens in some traditional singing classes or some vocal health clinics, even without research following this path. To think that such singing modes are harmful often reveals lack of information on how distortions are actually produced. In any case, it is essential to study what practices should be indicated as preparation, vocal health care, or what level of physical/vocal conditioning should be expected from a singer to be able to proper sing distortedly.

Different ways of producing Intentional Vocal Distortions

The popularization of distorted singing caught the attention of voice researchers who began to

4. SPACEBLN. Puccini: Tosca - finale (with scream) - Renata Tebaldi. YouTube video. Published in 14 May 2011; Access in 06 November 2018. Available at: https://www.youtube.com/watch?v=XIOYS9rrN7Y

investigate its characteristics. Subsequently, the singers who were using the techniques joined scientific research to better understand what they were doing and then teach their students, and in some cases, the subjects themselves were the authors[7,17,18]. In the field of voice studies, the interest in investigating rough sounds had on dysphonia and the pulse register, the vocal fry, its initial focus. It was only then that the first studies on the intentionally distorted voice emerged. One of them evaluated a creaking voice, but unlike fry, it had a distinct fundamental frequency[19]. Ingo Titze [20] used the expression "intentional distortion" for voices that were different from a baby's cry or a yell, mentioning singer Louis Armstrong.

Study[18] carried out by singing researchers found vibration on supraglottic structures during the performing of Tibetan monk's chant. The same result was found during the observation of the techniques of the singers of Tuva Republic and Mongolia[10,21]. The first study[3] able to differentiate the production modes of the different types of intentional vocal distortions characterized three ways of producing these phonations according to the laryngeal sphincters (glottic, ventricular and aryepiglottic). Another singer and researcher assessed the voice in rock music and observed the movement of the structures above the vocal folds that created subharmonics in the spectrographic tracings of the voice[7]. Four variations of IVDs and their effects on vocal health were also studied and no alteration was found in the voice of the 20 subject singers [22].

There is still much to be studied on the subject, but it is possible to argue that the way each singer uses his/her vocal apparatus is what determines the characteristics of each distorted sound in each musical style. According to what is known today, IVDs can be produced by the multiperiodic or aperiodic vibration of the vocal folds [23], the vibration of the vestibular folds in different proportions to the vocal fold vibrations [3,4,10], the arytenoid cartilages [7,22], the aryepiglottic folds, the epiglottis and even of the uvula [22], and it can be made in an exhaled or inhaled form [1,23]. It is also known that when performed with proper technique, it is not responsible for damaging singers' voices [2,6,7,24]. Many of these laryngopharyngeal configurations also appear in sounds of some languages such as American English, German, Danish and Arabic [25].

The way each variation of physiological settings affects sound and how much a singer can control them during his/her practice still needs to be further investigated. This information is relevant so that the expressiveness desired by the interpreter is achieved assuring that problems are avoided, and the vocal longevity preserved. The complete understanding of each type of IVD is still a technological challenge, since there is often an important supraglottic closure, preventing the visualization of what occurs indeed. Still, in some cases, evaluation methods such as the stroboscopy are not able to offer satisfactory results, thanks to the aperiodicity or multiperiodicity of the analyzed phenomena.

Despite the existence of many physiological possibilities of distorting the voice, it is still necessary to deepen the assessment of the acoustic output that each of these changes induce. If we endorse the authors who claim that each movement in the structures of the larynx and pharynx produce the same types of sounds every time [3,22,23], it is possible to state that the maneuver of these adjustments is similar to what occurs with the articulators during the production of vowels and consonants, then for a given type of IVD it will be necessary to master one or more movements of specific laryngeal structures. Currently, this is how some vocal methods focus on vocal distortions development and it is undeniable that they are successful in the results obtained with the singers.

The teaching of Intentional Vocal Distortions

The development of research on the physiology of IVDs has improved with the engagement of singers and singing teachers in the projects that in the 1990s began to seek for a better understanding of the factors involved in their vocal behaviors.

These singers, from a variety of music genres, have been associated with renowned researchers such as Johan Sundberg [7,18] or even became investigators themselves of the singing voice, as it is the case of the main author of this communication, that from singer, became a teacher of singing and today undertakes investigations in voice science.

Nowadays, it is usual to find singing teachers who are interested in presenting evidence-based tools to their students, in addition to practices of higher quality and efficiency. These professionals

try to reinforce and provide scientific basis for their proposed activities by including studies and researches in their teaching methods.

The Danish singing teacher Cathrine Sadolin is the creator of a singing method called Complete Vocal Technique (CVT), one of the first to organize vocal distortions according to their modes of production, naming them as vocal effects. According to their publications, these effects can be: creak or creaking, created in the vocal folds; distortion, produced by the vibration of the ventricular folds together with periodic vibration of the vocal folds; rattle, generated from the vibration of the arytenoid cartilage, uvula, base of the tongue or by the accumulation of saliva. There is also the growl, carried out by the vibration of the epiglottis against the arytenoid cartilages and the grunt, which moves the whole larynx, and can be done with or without vocal fold contact, that is, with or without a distinct fundamental frequency (f_0).

The CVT presents a website[5] that provides images and information about the research involving the method, which were mostly performed by the English otolaryngologist Jullian McGlashan[22]. In the United States, there are at least two exponents of vocal distortion teaching: Melissa Cross and Jamie Vendera. Melissa Cross is the author of the Zen of Screaming DVDs and was famous for working with singers especially in the subgenres death metal and nu metal, but not only, in which the voice sounds more extreme, often with noise only, without a perceptible pitch.

Melissa Cross also engages in scientific research, and in 2017 conducted a workshop in the congress of the Pan American Voice Association (PAVA) together with the voice scientist Ingo Titze. On the occasion, four variations of intentional vocal distortions were presented, as the researcher recovers: extreme one - fry scream; extreme two - false chords; extreme three - death; and extreme four - hybrid. In the hybrid level (extreme four) it is perceptible that there is asymmetry in the form of vibration in the anterior and medial portions of the vocal folds, producing both pitch and aperiodic noise at the same time. Such a relationship between singing performers and scientific research is important in order to demonstrate that IVDs do not cause hoarseness or any other undesired effect if well performed.

In Italy, the phoniatrician and heavy metal singer Enrico di Lorenzo carries out studies[15,26] on what he calls extreme singing, mainly with the so-called types growl and scream. In 2017, he presented a study in the United States [23] with observations made with a high speed digital camera on the following variations of IVDs: diplophony, tense vibration of the vocal folds with double period; false low phonation, vibration of ventricular folds and supraglottis; ingressive phonation, aspirated sound with vocal folds movement, but without contact; growl, with a great activity in the supraglottic structures and a reduced glottic contact; scream, in which the vocal folds create a periodic sound and the supraglottis vibrates in a multiperiodic pattern; soft supraglottic phonation, with great supraglottic activity and no contact of the vocal folds.

In Brazil, the singing teacher and psychologist Ariel Coelho teaches workshops and classes that emphasize rock and its subgenres specially focusing IVDs, which are called in his method as "vocal drives", a usual term for distortions in Brazil. According to Coelho, the practices are scientifically verified and present variations of distortions according to each muscle being activated in each of the voice settings. The results of such research are not published yet, though the teacher offers online courses, formation classes and workshops presenting more than 20 types of IVDs. These distortions were first divided among: glottic, produced at the vocal folds level; supraglottic, produced above the vocal folds; and composite drives, where there is action of both the vocal folds and the upper structures.

With the major intent of sharing the knowledge that vocal distortions are healthy practices, that depend on the study and technique of those who use them, since 2014 the city of São Paulo holds an annual meeting, the National Congress of Rock Vocal Professionals, that brings together people interested in the practices of rock singing. In 2017 it grew into the 1st International Symposium on Vocal Distortions[6], including lectures by voice professionals from different specialties and states of Brazil, as well as a Chilean guest who

5. CVT research website. Access in 19 March 2018. Available at: https://cvtresearch.com/

6. IV Congresso Brasileiro de Profissionais da Voz Rock. Access in 15 December 2017. Available at: https://www.facebook.com/events/129908541000360/

also participates in the researches [24], besides video conferences with Melissa Cross, Enrico di Lorenzo and Johan Sundberg.

These and many other professionals involved in the proper practice of distorted voices contribute to the upcoming researches on IVDs technical mastery, training and preparation. Intentional vocal distortions can be considered just one more among many other available options for singers to explore in their repertoires. It is likely to undertake the same scientific trajectory as the belting technique, suffering the same type of prejudice and being compared to yelling. Today belting is largely studied, and it is already a common understanding that it is a technique that can be learned and that only causes problems if it is poorly executed, the same case with IVDs.

When studying vocal health in relation to these phonation types, it is important to consider that numerous singers have aged maintaining a high level of vocal quality even after performing using IVDs for decades. Names such as Ronnie James Dio, Screaming Jay Hawkings, Bruce Dickinson, Rob Halford, Etta James, Aretha Franklin, Steven Tyler and Elza Soares are few of the examples of voice longevity. In cases of lesser success, factors such as lifestyle, alcohol and drug abuse, overuse of voice or even the level of technical control and vocal awareness should be considered before blaming on the distortions for the disorders.

Considering the increasing alternatives for learning and practicing IVDs and the greater the number of professionals interested in being able to use it safely. Therefore, it is important to point out that such methods are becoming more and more widespread and should grow while many singing students enter the market as trained professionals. When they obtain commercial recognition, they end up promoting the methods and teachers that helped them, creating a cycle of promotion of intentional vocal distortions driven training. Voice professionals who insist that IVDs are harmful settings do only propagate outdated prejudices.

Final Considerations

Intentional vocal distortions (IVDs) are aesthetic and interpretive tools that have been used for countless centuries in music and its origin are difficult to trace. They are currently common in contemporary commercial music in genres such as rock, blues, jazz, rhythm and blues, gospel, metal, musical theater, country, Brazilian sertanejo, samba and even pop music or classical singing. Understanding the origin and diversity of these sounds is fundamental to avoid any kind of aesthetic bias directed to any kind of musical genre, as well as avoiding the common sense that distorted emissions are an aggressive practice for the voice.

The human being uses these voices to communicate with animals, divinities and with nature[9] and applies it in music for a particular interpretative purpose or as characteristics of the music genre[1]. Each IVD must be understood in its entirety, it is essential to comprehend how they are created in the vocal tract and only then teachers will be able to improve their own teaching procedures. When the sound making is known and mastered it will not cause any kind of loss.

The speech language pathologist and the singing teacher usually have different ways of hearing a vocal distortion, the goal of the speech therapist is usually a voice without alterations, by a neutral voice. Even when the singer uses an expressive interpretive resource, such as breathiness or roughness, this can be perceived as something that will end in trouble. This question becomes even more difficult for a professional who has very restrict standards of normal and abnormal for the Speech Language Pathology to understand that a distortion can result in an altered sound and be produced in a way that will not cause harm to a singer. In the case of the specialized singing teacher, who brings a greater knowledge of the artistic conception, it is he who often works with the technique development that will help the singer to produce these distorted vocals.

Although voice science has advanced in the last decades, there is still much to be researched in the field, whether distorted or not. Singers have a lot to gain from deepening their knowledge of the production of different IVDs and the possible variety they may have and how to work such variations. It is in this direction that the discussions on such subject should be driven, widening and deepening the investigations on these vocal settings. It is worth emphasizing how fundamental it is that performers who make use of intentional vocal distortions know and comprehend what and how they create such emissions and that we professionals who study these sound effects, speech therapists, singing teachers and otolaryngologists can provide them with such knowledge.

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