

Effectiveness of voice therapy in hyperfunctional dysphonia in adult patients

Erişkin hiperfonksiyonel disfonili hastalarda ses terapisinin etkisi

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Objectives: In this retrospective study, voice therapy results of adult patients with hyperfunctional voice disorders were discussed.

Patients and Methods: Ninety-one adult patients (59 females, 32 males; mean age: 37 years; range 18 to 54 years) who completed their voice therapy sessions between May 2002 and May 2007 were included in this study. The voice therapy plan was focused on developing competence in perception, tonus regulation, physiological breathing and physiological use of voice. Especially Koblenzer, Smith, Fröschels, Höller-Zangenfeind and Pahn techniques were included in the plan. Patients had voice therapy sessions every one or two weeks for about 30-45 minutes. On average, patients had eight sessions. Voice therapy was conducted by the same voice therapy team to the patients. Vocal use and hygiene guidelines were also explained to the patients. In the objective and subjective evaluation of voice, dysphonia severity index (DSI) and voice handicap index (VHI) scores were used respectively.

Results: After voice therapy, DSI increased from -1.4 to 1.1 and VHI decreased from 72 to 43. Voice therapy was found to be succesful clinically.

Conclusion: These results suggest that patients with hyperfunctional voice disorder benefits from voice therapy.

Key Words: Dysphonia severity index; hyperfunctional voice disorders; voice handicap index; voice therapy.

Amaç: Bu retrospektif çalışmada, erişkin hiperfonksiyonel disfonili hastaların tedavi sonuçları tartışıldı.

Hastalar ve Yöntemler: Mayıs 2002-Mayıs 2007 tarihleri arasında ses terapi seanslarını tamamlayan 91 erişkin hasta (59 kadın, 32 erkek; ort yaş: 37 yıl; dağılım 18-54 yıl) çalışmaya dahil edildi. Ses terapisi planı, algılama yeteneğinin geliştirilmesi, tonus regülasyonu, fizyolojik nefes alma ve sesin fizyolojik kullanımı üzerine odaklı yapıldı. Özellikle Koblenzer, Smith, Fröschels, Höller-Zangenfeind ve Pahn teknikleri ses terapi planına eklendi. Hastalara ses terapisi haftada bir veya iki haftada bir 30-45 dakika süreyle uygulandı. Hastalar ortalama sekiz seans terapi gördü. Tüm hastalara ses terapisi aynı ekip tarafından verildi. Sesin kullanımı ve hijyenine ait bilgilendirme de yapıldı. Sesin objektif ve subjektif değerlendirilmesinde sırasıyla disfoni şiddet indeksi (DŞİ) ve ses handicap indeksi (SHİ) skorları kullanıldı.

Bulgular: Ses terapisi sonrasında DŞİ -1.4'ten 1.1'e çıktı ve SHİ'de 72'den 43'e düştü. Ses terapisinin klinik olarak başarılı olduğu bulundu.

Sonuç: Bu sonuçlar hiperfonksiyonel disfonili hastaların ses terapisinden faydalandığını göstermektedir.

Anahtar Sözcükler: Disfoni şiddet indeksi; hiperfonksiyonel ses bozuklukları; ses handicap indeksi; ses terapisi.

In order to produce a normal voice, the laryngeal function must be coordinated, efficient and physiologically stable. Any imbalance in this delicate system affects vocal quality. When the vocal quality deteriorates and both anatomical and neurological etiologic factors are excluded, a functional voice disorder should be suspected. Functional voice disorders account for at least 10% of the cases of dysphonia referred to multidisciplinary voice clinics. They occur predominantly in women.^[1] In hyperfunctional voice disorders, excessive tension of the laryngeal or extralaryngeal muscle or both results in poorly regulated laryngeal muscle tension and unbalanced aerodynamic forces.^[2] Numerous factors may contribute to the development of this disorder, including gastroesophageal reflux, stress, and excessive and loud voice use. Patients with hyperfunctional voice disorders frequently demonstrate significant emotional stress and other symptoms of muscle tension such as neck and shoulder strain are manifest.^[1]

Voice therapy is a behavioral method to change the manner of voice production. It is an effective and appropriate therapy method applied either solely in voice disorders or in conjunction with other treatment modalities.^[3-5]

In this study, voice therapy results of adult patients with hyperfunctional voice disorders are discussed.

PATIENTS AND METHODS

Therapy program

Ninety-one adult patients (59 females, 32 males; mean age 37 years; range 18 to 54 years) were included to this retrospective study. They completed their voice therapy sessions between May 2002 and May 2007. None of the patients had a speech or language disorder, any malignant or premalignant laryngeal lesion, spasmodic dysphonia or psychogenic dysphonia.

In our clinic, the voice therapy plan is focused to develop the competence in perception, tonus regulation, physiological breathing and physiological use of voice. The voice therapy plan was explained in detail in Table 1.^[6] Especially the Koblenzer, Smith, Fröschels, Höller-Zangenfeind and Pahn techniques were also included to the therapy plan.

The diagnosis of the hyperfunctional voice disorders was established through a videolaryngoscopy using a 70° rigid scope, (Karl Storz GmbH, Tuttlingen, Germany) and through a Laryngostroboscopy, 90° using a rigid scope (Xion GmbH, Berlin, Germany). The laryngoscopic evaluation of the patients revealed anteroposterior retractions, false vocal fold approximations or incomplete glottal closures.

Table 1.

Perception and awareness	2. Tonus regulation	3. Breathing (respiration)	4. Use of the voice
Perception of the interaction of posture, voice and mood	Tonus regulation when moving	Physiologically correct breathing in daily life the voice in daily life	Confidence, control and reliability regarding the use of
Perception of own sounds or other sources of sound	Straightening of the body	Muscle relaxation technique & expiration with and without phonation	Economical speaking
Awareness of own posture	Loosening or strengthening of muscles used when breathing or speaking	Physiological breathing rhythm when resting/ when moving	Physiological phonation and articulation
Awareness of muscle tonus	Control of psychological tension and stress	Abdominal breathing, breathing with focus on the diaphragm, breathing with focus on the flanks	Fully developed resonance and workability of the voice
Awareness of emotions	Regulation and control of physical tension and stress	Breathing through the nose	Vocal attack and vocal put-down
Awareness of spaces inside the body		3. ← order	3. done →
		2.	2.
		1.	1.
			X
			X
			X

Awareness of physical contact; 1, 2, 3: Level of difficulty; X, X, X: Already developed areas of competence in a certain area.

All of the patients agreed to follow a therapy plan. Patients took part in voice therapy sessions every one or two weeks with a duration of 30-45 minutes. Patients participated in an average of eight (range 5-12) sessions. The voice therapy to all the patients was conducted by the same voice therapy team. Guidelines for vocal use and hygiene have also been explained to the patients (Table 2).^[3] In the objective and subjective evaluation of voice, the disphonia severity index (DSI) and the voice handicap index (VHI) scores were used respectively.

The Paired samples t-test has been used in the statistical analysis of the study.

RESULTS

The pre- and post-treatment mean values of the voice parameters are shown on Table 3. After the voice therapy, the DSI increased from -1.4 to 1.1 and the VHI decreased from 72 to 43; all the values are statistically significant ($p=0$).

Table 2. Vocal use and hygiene guidelines

- Minimize shouting/yelling.
- Minimize whispering.
- Minimize caffeine and alcohol, as they are diuretics.
- Minimize coughing and throat clearing.
- Minimize grunting or vocalization during exercise.
- Do not compete vocally with noisy environments.
- Eliminate tobacco use and exposure to second-hand smoke.
- Rest voice during periods of excessive fatigue and stress.
- Eat a well-balanced diet.
- Keep hydrated by drinking at least eight glasses of water per day and one additional glass for every serving of caffeine or alcohol consumed. For additional hydration because of environmental dryness, humidifiers, steam inhalers, or both are often recommended.
- Increase awareness of potentially abusive vocal behaviors, and Implement a lifestyle plan that minimizes potentially abusive vocal behaviors. For example, a teacher may need to alter the teaching schedule to minimize vocal demands. This could be as simple as including more films in the lesson plan, selecting a student to teach the class for a day, or changing the teaching format from lectures to small-group discussions.
- Minimize gastroesophageal reflux through behavior and dietary modifications.

In eight patients (8.7%; patient numbers: 4, 17, 41, 49, 52, 61, 64 and 67), an objective deterioration of voice and in three patients (3.2%; patient numbers: 17, 39 and 52), a subjective deterioration of voice was detected.

DISCUSSION

The aims of the voice therapy are to restore the patient's voice in such a way that s/he reports being able to use it for social and occupational needs; to improve the quality of sound of the patient's voice to a more acceptable level; to maintain voice improvement over time and to improve the patient's voice function so that the laryngeal structure and function are normal.^[7] Voice therapy concentrates on managing the contributing and maintaining aspects of the voice problem as well as modifying the aspects of faulty voice production in order to promote appropriate and efficient voice production.^[7] Voice therapy is almost always the treatment modality of choice for voice problems stemming from behaviors that have been identified as misuse or abuse of the laryngeal mechanism.^[8] It is important to look for various physiologic, anatomic, environmental, behavioural and infectious factors that can induce or aggravate non-organic dysphonia, as they can benefit from specific treatment.^[9]

Voice therapy is effective in improving the voice quality as assessed through the self-rated and observer-rated methods.^[10]

However, it is important for both the patient and the clinician to recognize that restoring the voice to the way it previously sounded or to some idealized level may not be possible.^[8] The therapy should gradually move from one step or activity to the next. It is important to give the patient adequate time to practice a technique until s/he masters it.^[8] It is also important to give a technique a chance to work out.^[8]

Table 3. The pre- and post-treatment mean values of the used voice parameters in this study

	Mean (pre-treatment)	Mean (post-treatment)
% Jitter	2.01	1.25
F0-high	388 Hz	427 Hz
I-low	77 dB	73 dB
MPT	9.55 sec	12.56 sec
DSI	-1.4	1.1
VHI	72	43

MPT: Maximum phonation time; DSI: Disphonia severity index; VHI: Voice handicap index, scores were used respectively.

Not all patients are appropriate candidates for a voice therapy approach and that is for reasons other than the nature of the pathology present. Many factors play a role in the consideration of a prognosis. Firstly, the patient must recognize that there is a problem. Secondly, the patient must be willing to follow a therapy plan. Thirdly, there should also be willingness to give up abusive habits and to alter or eliminate some voice use, at least temporarily. Fourthly, the patient's voice disorder must be amenable to change through a voice therapy approach. And because the voice therapy requires full patient participation, it is often difficult to predict its anticipated outcome.^[8]

Hyperfunctional voice disorders, regardless of the presence of an organic lesion (e.g. nodules) involve increased laryngeal and supralaryngeal muscle tension. The goal of a therapy for these disorders is to decrease laryngeal and supralaryngeal muscle tension during voice production in an attempt to improve vocal efficiency. It is likely that a benign vocal fold lesion accompanies the hyperfunctional voice disorders. The therapy must not only target improved vocal efficiency, but also the enhanced resolution of the lesion.^[3]

Pedersen et al.^[11] showed that both medical treatment and medical voice-hygiene advice has a positive effect on dysphonia in non-organic (functional) voice disorders.

Carding et al.^[7] constructed a study directed to the importance of voice therapy in functional voice disorders. Forty-five patients diagnosed with non-organic dysphonia were assigned randomly to one of three groups. Patients in the first group received no treatment and acted as a control group. Patients in the other two groups received a program of either 'indirect' therapy or 'direct with indirect' therapy, respectively. A self-report questionnaire of vocal performance, observed ratings of voice quality, and computer-derived acoustic measurements (signal-to-noise ratio, pitch perturbation and amplitude perturbation) were carried out on all patients before and after treatment to evaluate the changes in voice quality over time. There was a significant difference between the three groups on the self-report questionnaire, voice quality ratings and pitch perturbation measurements. Thirteen out of 15 control patients showed no significant change on any of the measurements. Seven patients who received indirect treatment showed a significant improvement in the voice quality following

the treatment. Fourteen out of the 15 patients who received direct treatment also showed significant improvement in the voice quality.^[7]

Successful results can be obtained using voice therapy techniques in functional voice disorders, which are common in otolaryngology practice and cause difficulties in diagnosis and management.^[4,5] On the other hand, factors that have not been taken into account, such as motivation or smoking habits, may have a greater bearing on the outcome of the therapy.^[12]

When the aim of the voice therapy is restricted to the improvement of communication, perceptual rating may be considered as the only meaningful outcome measure. Indeed, the perceptively abnormal voice is the patient's main problem and his or her major handicap in communication. Therefore, the improvement of voice quality will be the main objective of the voice therapy. But although clear improvements were observed in the laryngostroboscopic or acoustic parameters in several individual patients, this was not the case in their perceptual ratings.^[12] Therefore, in order to evaluate the overall effect of voice therapy, all dimensions must be considered.^[12]

This study employed two main evaluation methods: The DSI and the VHI. It might also be useful to include other evaluation instruments such as the roughness, breathiness and hoarseness.

The main reason for the objective and subjective deterioration of the voice in 11 patients is, we believe, the continuation of the abusive behaviors and the shortcomings in following the vocal hygiene guidelines in spite of their willingness to follow the therapy plan.

In conclusion, these findings suggest that a proper diagnosis of hyperfunctional voice disorders warrants the favorable outcome of a voice therapy.

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