The outcome of the Accent method of voice therapy as an initial treatment of patients with benign vocal fold lesions

Original Article

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ABSTRACT

Objectives: This study was conducted to assess the outcome of the use of the Accent method of voice therapy as an initial approach for patients with benign vocal fold lesions.

Patients and Methods: This experimental prospective study was conducted on 30 patients (10 females and 20 males), aged 18 - 60 years (mean age: 40.6) with benign vocal fold lesions. Auditory perceptual analysis, videolaryngoscopic examination of the larynx, acoustic analysis and Voice handicap index (VHI) were performed for all patients before and after voice therapy.

Results: Auditory perceptual assessment and voice handicap index (VHI) done for patients with benign vocal fold lesions before and after voice therapy revealed significant improvement (*p value 0.003*: *p value 0.000* respectively). The acoustic parameters for the different group of benign vocal fold lesions pre-therapy in comparison to the acoustic values post voice therapy revealed significant improvement in the fundamental frequency (*p value >0.001*). Videostroboscopic examination revealed complete recovery in 6 cases of vocal fold nodules, mild improvement of 5 cases of vocal fold polyp with complete cure of one case. There was mild improvement of all cases of vocal fold cysts, contact granuloma and Reinke's edema without complete cure except for complete cure of two cases of Reinke's edema.

Conclusion: The Accent method of voice therapy may lead to an improvement in the perceived voice quality in some patients with benign vocal fold lesions, and this could make surgical intervention unnecessary.

Key Words: Accent method, acoustic analysis, benign vocal fold lesion, videostroboscopic examination.

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INTRODUCTION

Benign vocal fold lesions (BVFLs) are a common cause of dysphonia[1]. Benign fold lesions develop secondary to vocal behavioral inefficiencies[2]. The effect of these functional insufficiencies often persists even after surgical removal of the lesion. Apart from nodules, BVFLs are managed by combined approach of phonosurgery followed by voice therapy. Surgical correction aims at smoothing the edges of the vocal folds to free their mucosa. This helps to achieve optimal closure of the glottis and eliminate the phonatory gap[3].

The erroneous vocal behaviors are then corrected by various techniques of voice therapy such as resonant voice therapy, flow phonation, laryngeal massage, supraglottic relaxation, jaw, neck and shoulder relaxation exercises, semioccluded vocal tract exercises (SOVTEs) or the Accent Method of voice therapy[4]. SOVTEs help mainly to reduce subglottic pressure and to a lesser extent to increase the strength and volume of the thyroarytenoid muscle. These effects are thought to reduce the increased stress at the midpoint of the vocal folds[5].

On the other hand, the Accent Method of voice therapy (AM) helps to restore the controlled production of voice and speech through a holistic approach. It encompasses abdominal breathing with open throat posture and easy phonation, in a rhythmic fashion, together with specific body movements. These combined mechanisms produce accentuated rhythmic expiratory support that helps to improve the Bernoulli Effect at the glottis[6]. In clinical practice, voice therapy is often recommended in patients with lesions of small dimensions such as vocal fold nodules. In addition, voice therapy has been offered to patients who cannot tolerate surgery, or patients who have already received surgery for vocal fold granulomas, polyps, or cysts[7]. The rationale for a non-surgical approach lies in the fact that voice therapy minimizes detrimental vocal behaviors that increase the stress at the mid-membranous vocal folds, and may lead to better voice quality and voice performance that is sufficient to cope with everyday vocal load[8]. Studies, which introduced voice therapy as an initial treatment, reported an improvement in the perceived voice quality in some patients[9]. However, few studies provided objective measures for the outcome. Also, they rarely use the Accent method because it needs longer duration of

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therapy. Therefore, this study was conducted to assess the outcome of the use of the Accent method of voice therapy as an initial nonsurgical approach for patients with benign vocal fold lesions.

AIM OF THE STUDY:

The aim of this study is the evaluation of functional outcome of the Accent method of voice therapy, as a first line of treatment of benign vocal fold lesions in order to reduce the need to surgical interference.

PATIENTS AND METHODS:

This experimental prospective study was conducted on 30 patients (10 females and 20 males), in the age range of 18 - 60 years with mean age 40.6 (±SD=12.1) with benign vocal fold lesions attending the outpatient clinics at the Hearing and speech Institute and Al Zahraa University Hospital. The approval of the local ethics committee of the National Hearing and Speech Institute was obtained, and a written informed consent was signed by the patients before participating in the study.

The inclusion criteria of this study were:

(1) Presence of benign vocal fold lesions.

(2) Persistence of this lesion for at least 3 months after its onset.

(3) Patient's rating of the severity of dysphonia is not less than 2/4 [The patient's own grading of severity of his/her voice dysfunction on a 5-point scale (4 = severe to 0 = normal)][10].

Patients with accompanying organic lesions of the larynx or abnormal laryngeal sphincteric function were excluded from the study.

Patients of the study group were divided equally into 5 groups as follow: 6 patients with vocal fold polyp, 6 patients with vocal fold cyst, 6 patients with Reinke's edema, 6 patients with bilateral vocal fold nodules and 6 patients with contact granuloma.

All patients underwent comprehensive evaluation through history taking, general examination, and otorhinolaryngological examination. Voice handicap index (VHI)[11] was used to assess the psychosocial impact of dysphonia. It consists of 30 items that cover the three domains of functional, physical, and social aspects of voice. Each domain is represented in 10 items and the scores of each item ranges between zero and four (zero means never, 1 means almost never, 2 means sometimes, 3 means almost always, and 4 means always). Statements of the functional domain represent the impact of voice disorders on the patient's daily activities, whereas, the statements of the physical domain represent patient's self perception of laryngeal discomfort and voice quality. Statements of the emotional domain reflect the patient's affective response to his voice. The Arabic version of VHI has been validated by Malki *et al*.[12] with excellent test re test reliability of the total and individual scores of it. Auditory perceptual assessment (APA) was done using the modified GRBAS scale and the degree of dysphonia is given a score from 0 (normal) to 3 (severe)[10].

Videolaryngoscopic examination of the larynx was done using telescopic orolaryngoscopy (Laryngoscope, 6mm, 70o, autoclavable, HM, Henke-sass wolf, Germany) (Endo-stroboscopy Light source, LED 200, SN 20013028, supply voltage 110-240v, made in United Kingdom). Acoustic analysis of voice was done using the voice analyzer (PreSonus Audio Electronic, 2009, 24-bit/48k USB audio recording interface, 48v phantom power, 2balanced TRS output, MIDI input/output, powered via USB, Users' manual, version 2.0).

In a quite room, the patient was asked to sustain the vowel /ɑ/ for 3-4 seconds at a comfortable pitch and loudness after he/she was instructed to clear the throat. A dynamic microphone (Shure prolouge 14H) was positioned at a constant mouth-to-microphone distance of 20 cm. A 2-second midvowel segment was selected and analyzed (Hartl *et al*., 2001). The voice signal was considered adequate if it was free of overloads (red signals on the screen) and audible variations in pitch and loundess.

The following acoustic measures were then obtained: Average Fundamental frequency (Fo-avg), Minimum Fundamental frequency (F0-Min), Maximum Fundamental frequency (F0-max), Fo Standard Deivation (F0-St Dev), Number of semitones between F0-Max and F0-Min (STN), Absolute Jitter (Jt-abs), Jitter percentage (Jt-perc), Fo Coefficient of Variation (F0-cvar), Absolute Shimmer (Sh-abs), Shimmer percentage (Sh-perc), Amplitude Coefficient of Variation (Am-CVAR), Harmonics to Noise Ratio (HNR).

All patients received voice therapy for 25 sessions using the Accent method of voice therapy. The Accent Method (AM) is a holistic process for voice therapy developed by Svend Smith (1936) for improvement of stuttering and voice disorders. The Accent method entails a dynamic integration of: Abdomino-diaphragmatic breathing, Accentuated rhythmic vowel play (phonation) and, later, articulation, and body and arm movements[13]. The patients were re-evaluated by APA, VHI, and acoustic analysis of voice.

STATISTICAL ANALYSIS:

Statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp., Armonk, New York, USA) release 22 for Microsoft Windows. Data were statistically described in terms of mean ± SD. Comparison between the study groups was done using a Wilcoxon signed-rank test. *P value* less than 0.05 was considered statistically significant.

RESULTS:

The study was conducted on 30 patients (10 females and 20 males), in the age range of 18 - 60 years with mean age 40.6 (±SD=12.1) with benign vocal fold lesions. Auditory perceptual assessment done for patients with benign vocal fold lesions before and after voice therapy revealed significant improvement as shown in (Table 1). There was also significant improvement in the voice handicap index (VHI) after voice therapy as revealed in the same table (Table 1).

Table 1: Auditory perceptual assessment and voice handicap index values pre and post voice therapy.

		Pre voice therapy	Post voice therapy	Paired sample t test (*P value*)
Mean±SD	APA	2.13± 0.62	1.73±1.04	t=3.25
Range		2.0 (1-3)	3 (0.0-3)	*P=0.003**
Mean±SD	VHI	1.36± 0.54	1.11±0.64	t=4.74
Range		2.0 (0.5-2.5)	2.75 (0.0-2.75)	*P=0.000**

*Statistically significant difference (*P<0.05*). APA: Auditory perceptual assessment; VHI: Voice handicap index.

Acoustic analysis was performed for all patients before voice therapy and after voice therapy. In patients with vocal fold polyps, jitter improved from 395 ± 305 : 368 ± 221 after voice therapy and from 395 ± 305, shimmer improved from 1.6 ± 0.5 : 1.47 ± 0.4 after voice therapy, HNR improved from 2.5 ± 4.4 : 3.97 ± 4.2 after voice therapy, fo improved from 178.4 ± 71.4 : 152.8 ± 42.5 after voice therapy (table 2). The table shows significant improvement of Fo coefficient of variation, Shimmer percentage after voice therapy.

Table 2: Changes in fundamental frequency, Jitter, Shimmer and energy balance in vocal fold polyp

	Pre voice therapy	Post voice therapy	Paired t	*P value*
Fundamental frequency F0	6.3 ± 2.1	6.5 ± 1	0.44	0.66 (NS)
F0 average	178.4 ± 71.4	152.8 ± 42.5	1.78	0.11 (NS)
F0 minimum	86.4 ± 25.3	92.6 ± 48.6	0.578	0.58 (NS)
F0 maximum	998.6 ± 7.3	1012.9±50.3	0.751	0.43 (NS)
F0 – st Dev	241.4 ± 110	220.6 ± 60.5	0.69	0.51 (NS)
STN	43.2 ± 5.2	42 ± 7.7	0.83	0.43 (NS)
Jiiter				
Jt-abs	395 ± 305	368 ± 221	0.67	0.54 (NS)
Jt-perc	5.5 ± 2.97	5 ± 2.1	0.57	0.58 (NS)
F0-cvar	55.5 ± 29.3	70.5 ± 32.5	3.4	0.01 (S)
Shimmer				
Sh-abs	1.6 ± 0.5	1.47 ± 0.4	0.79	0.45 (NS)
Sh-per	16.1 ± 5.9	13.3 ± 3.4	2.1	0.07 (S)
Am-cvar	41.3 ± 6.8	46.8 ± 2.4	1.93	0.09 (NS)
Energy balance HNR	2.5 ± 4.4	3.97 ± 4.2	1.19	0.27 (NS)

S: significant; NS: Non-significant. Fo-avg :Average Fundamental frequency; F0-Min: Minimum Fundamental frequency; F0-max:Maximum Fundamental frequency; F0-St Dev : Fo Standard Deivation, STN: Number of semitones between F0-Max and F0-Min; Jt-abs :Absolute Jitter; Jt-perc: Jitter percentage, F0-cvar: Fo Coefficient of Variation; Sh-abs :Absolute Shimmer; Sh-perc ; Shimmer percentage, Am-CVAR; Amplitude Coefficient of Variation; HNR: Harmonics to Noise Ratio .

Table (3) shows improvement of jitter in patients with Reinke's oedema from 846.6 ± 36.1 : 676.3 ± 57 after voice therapy, shimmer improved from 2.2 ± 0.1 : 1.67 ± 0.05 fo improved from 148.9 ± 0.9 : 122.7 ± 5.7. The table shows significant improvement of Average fundamental period, Maximum Fundamental frequency, Fo Standard Deivation, Number of semitones between F0-Max and F0-Min, Absolute Shimmer, F0 Coefficient of Variation, Absolute Jitter in cases of Reienke's oedema after voice therapy.

Table 3: Changes in fundamental frequency, Jitter, Shimmer and energy balance in Reinke's oedema

	Pre	Post	Paired t	*P*
Fundamental frequency F0	6.6 ± 0.1	7.8 ± 0.7	6.3	0.00146 (S)
F0 average	148.9 ± 0.9	122.7 ± 5.7	12.6	< 0.001 (HS)
F0 minimum	58.7 ± 1	63.1 ± 1.5	20.5	< 0.001 (HS)
F0 maximum	928.3 ± 99	973.8 ± 16	3.2	0.02 (S)
F0 – st Dev	364.5 ± 11	318.4 ± 28.3	3.8	0.012 (S)
STN	44.8 ± 5.5	45.6 ± 5.4	5	0.004 (S)
Jiiter				
Jt-abs	846.6 ± 36.1	676.3 ± 57	5.4	0.002 (S)
Jt-perc	9.6 ± 0.5	8.2 ± 0.2	7.9	< 0.001 (HS)
F0-cvar	86.4 ± 1.7	96.6 ± 5.1	5.97	0.001 (S)
Shimmer				
Sh-abs	2.2 ± 0.1	1.67 ± 0.05	5	0.004 (S)
Sh-per	24.8 ±0.5	18.4 ± 0.5	3.6	< 0.001 (HS)
Am-cvar	36.3 ± 0.5	47.3 ± 2	11.3	< 0.001 (HS)
Energy balance HNR	0	0	0	1 (NS)

S: significant; NS: Non-significant; HS: highly significant.

In patients with vocal fold cysts, jitter improved from 145.6 ± 19.8 : 78.8 ± 23.7 after voice therapy, shimmer improved from 0.9 ± 0.05 : 0.43 ± 0.05 after voice therapy, HNR improved from 6 ± 0.05 : 5.6 ± 0.1 after voice therapy and, fo improved from 211.7 ± 2.5 : 211.8 ± 1.6 after voice therapy (table 4). It shows significant improvement of Maximum Fundamental frequency, Absolute Jitter, Harmonics to Noise Ratio after voice therapy.

Table 4: Changes in fundamental frequency, Jitter, Shimmer and energy balance in vocal fold cyst

	Pre	Post	Paired t	*P*
Fundamental frequency F0	4.7 ± 0.1	4.73 ± 0.05	0	1 (NS)
F0 average	211.7 ± 2.5	211.8 ± 1.6	0	1 (NS)
F0 minimum	75.8 ± 7.8	154 ± 5.4	14.6	< 0.001 (HS)
F0 maximum	938 ± 68.6	966.9 ± 51.9	4.1	0.009 (S)
F0 – st Dev	152.6 ± 13.7	68.2 ± 1	15.3	< 0.001 (HS)
STN	43.7 ± 2.9	33.3 ± 1.4	5.9	< 0.001 (HS)
Jiiter				
Jt-abs	145.6 ± 19.8	78.8 ± 23.7	4.5	0.006 (S)
Jt-perc	3.3 ± 0.05	1.2 ± 0.1	8.9	< 0.001 (HS)
F0-cvar	66.3 ± 0.2	34.1 ± 2.2	13.1	< 0.001 (HS)
Shimmer				
Sh-abs	0.9 ± 0.05	0.43 ±0.05	0	1 (NS)
Sh-per	9.1 ± 0.9	13.7 ± 2.05	12.1	< 0.001 (HS)
Am-cvar	46.1 ± 0.2	33.1 ± 2.3	13.1	< 0.001 (HS)
Energy balance HNR	6 ± 0.05	5.6 ± 0.1	3.16	0.02 (S)

S: significant; NS: Non-significant; HS: highly significant.

Table (5) shows significant improvement of Average Fundamental frequency, Minimum Fundamental frequency, Maximum Fundamental frequency, Fo Standard Deivation, Number of semitones between F0-Max and F0-Min, Jitter percentage, F0 Coefficient of Variation, Shimmer percentage and Amplitude Coefficient of Variation in patients with vocal fold granuloma after voice therapy. Jitter improved from 119 ± 1.1: 118.7 ± 12.1 after voice therapy, shimmer improved from 0.7 ± 0.1 : 0.825 ± 0.09 after voice therapy, HNR improved from 4.6 ± 0.1 : 4.7 ± 0.5 after voice therapy, fo improved from 133.5 ± 1.6 : 126 ± 4.4 after voice therapy.

Table 5: Changes in fundamental frequency, Jitter, Shimmer and energy balance in vocal fold granuloma

	Pre	Post	Paired t	*P*
Fundamental frequency F0	7.2 ± 0.4	7 ± 3.8	0.85	0.73 (NS)
F0 average	133.5 ± 1.6	126 ± 4.4	6.2	< 0.001 (HS)
F0 minimum	64 ± 1.1	58.5 ± 2.2	6.5	< 0.001 (HS)
F0 maximum	942.2 ± 8.9	845 ± 38.9	5.9	< 0.001 (HS)
F0 – st Dev	88.2 ± 1	72.5 ± 6	6.53	< 0.001 (HS)
STN	46 ± 1.1	44 ± 2.5	3.5	0.01 (S)
Jiiter				
Jt-abs	119 ± 1.1	118.7 ± 12.1	0.85	0.7 (NS)
Jt-perc	1.65 ± 0.1	2.87 ± 0.87	3.5	0.01 (S)
F0-cvar	61.3 ± 0.4	55 ± 9.2	3.76	0.007 (S)
Shimmer				
Sh-abs	0.7 ± 0.1	0.825 ± 0.09	0	1 (NS)
Sh-per	36.2 ± 19.3	29.5 ± 15.2	3.5	0.01 (S)
Am-cvar	28.7 ± 1.4	25.2 ± 0.46	5.5	< 0.001 (HS)
Energy balance HNR	4.6 ± 0.1	4.7 ± 0.5	1.5	0.16 (NS)

S: significant; NS: Non-significant; HS: highly significant.

In the current study all patients with nodules achieved the treatment objectives after voice therapy. Jitter improved from 145.2 ± 10: 129.3 ±14, shimmer improved from 1.4 ±0.2 : 1.2 ± 0.2, HNR improved from 8.6 ± 1.9 : 7.5 ± 1.7, f0 improved from 174.4 ± 5 : 136.7 ± 7.6. Table (6) shows significant improvement of Average Fundamental frequency, Maximum Fundamental frequency, Jitter percentage after voice therapy. However, two of the patients had recurrent nodules again after 9 months.

Table 6: Changes in fundamental frequency, Jitter, Shimmer and energy balance in vocal fold nodules

	Pre	Post	*P*
Fundamental frequency (F0)			
T0-avg	5.5 ± 0.5	5.8 ± 0.7	> 0.05 (NS)
F0-avg	174.4 ± 5	136.7 ± 7.6	< 0.05 (S)
F0-Min	99.1 ± 8.5	110.6 ± 5.5	> 0.05 (NS)
F0-Max	1011.8 ± 13	1219.7 ± 18	< 0.05 (S)
STN	37.3 ± 3	40.7 ± 4	> 0.05 (NS)
Jitter			
Jt-abs	145.2 ± 10	129.3 ± 14	< 0.05 (NS)
Jt-perc	2.3 ± 0.2	2.2 ± 0.2	> 0.05 (S)

F0-CVAR	52.1 ± 10.3	48.96 ± 10.3	> 0.05 (NS)
Shimmer			
Sh-abs	1.4 ± 0.2	1.2 ± 0.2	> 0.05 (NS)
Sh-perc	8.1 ± 1.5	9.3 ± 1.6	> 0.05 (NS)
Am-CVAR	44.6 ± 4	47.3 ± 5.8	> 0.05 (NS)
Energy balance HNR	8.6 ± 1.9	7.5 ± 1.7	> 0.05 (NS)

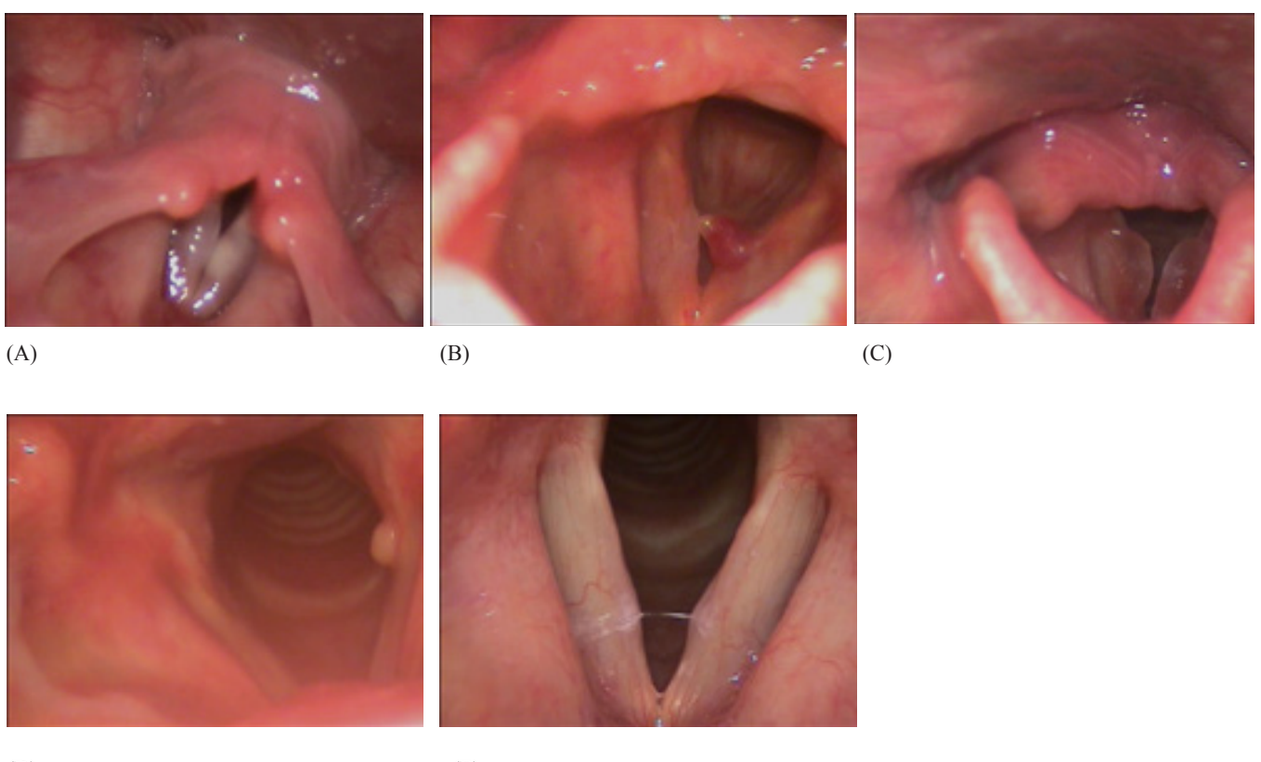
S: significant; NS: Non-significant.

Table (7) summarizes the results of the acoustic values in patients with benign vocal fold lesions pre and post voice therapy. There is significant improvement of the fundamental frequency (F0) (*p value 0.001*)

Table 7: Acoustic values in pretherapy vs. post voice therapy.

	Jitter %		Shimmer %		HNR(dB)		Fo(Hz)	
	A	B	A	B	A	B	A	B
Mean(SD)	6.2(1.36)	6.38(1.28)	20.54(10.88)	17.8(8.9)	4.0(1.3)	3.6(1.38)	166(38.3)	148.2(38.9)
P-value	0.56		0.006		0.012		*0.001*<**	

A: pretherapy; B: post voice therapy;**significant.



(A) (B) (C)

(D) (E)

Fig. 1: Different benign vocal fold lesions (A): left vocal fold cyst; (B): Left vocal fold polyp; (C): Reinke's edema; (D): Left vocal fold granuloma; (E): vocal fold nodules.

In the current study, voice therapy was effective in improving patients' voices regardless of the type of the primary lesion even in cases were complete cure did not occur. Videostroboscopic examination revealed mild improvement of 5 cases of vocal fold polyp and complete cure of one case. It revealed complete recovery in 6 cases of vocal fold nodules. There was mild improvement of all cases of vocal fold cyst without complete cure of any of them. There was mild improvement of 4 cases of Reinke's edema and complete cure of two cases and mild improvement of all cases of contact granuloma without complete cure of any of them after voice therapy (table 8).

Table 8: Summary of results after voice therapy.

	Post voice therapy	
	Improved	Recovery
Polyp	5	1
Cyst	6	0
Reinke's edema	4	2
Nodules	0	6
contact granuloma	6	0

DISCUSSION

Most authors agree that the optimal treatment of benign lesions of the larynx is complex and includes several factors such as good patient compliance, the surgical method applied and pre/ preoperative and postoperative voice therapy post-operative voice therapy[14].

The primary aim of the current study was to assess the outcome of the use of the Accent method of voice therapy in a group of 30 patients as an initial approach for patients with benign vocal fold lesions using a multidimensional assessment protocol including voice handicap index, auditory perceptual assessment, laryngoscopic findings, and acoustic data.

Voice handicap index (VHI) helps both the patient and clinician to assess the degree of disability caused by a voice disorder. Ghandour *et al*.[15] and Shoeib *et al*.[16] found a significant correlation between the scores of VHI and the degree of dysphonia. In this study, there was significant improvement in the voice handicap index (VHI) after voice therapy. These results are in agreement with the study done by Schindler *et al*.[8] that revealed that the VHI total score showed improvement after rehabilitation treatment.

The Auditory perceptual assessment done for the group of patients in this study with benign vocal fold lesions before and after voice therapy revealed also significant improvement. While in comparison to other studies, no clear and significant improvement was observed in aerodynamic and perceptual ratings, while better scores were found on acoustic and self-assessment ratings[8].

The acoustic parameters that were examined in this study included f0, jitter, shimmer and HNR. The acoustic values for the different group of benign vocal fold lesions pretherapy in comparison to the acoustic values post voice therapy revealed significant improvement. Meanwhile, in the study done by Schindler *et al*.[8] general reduction of Fo was found, but the difference was not significant. A clear and significant improvement was visible for the mean values of Jitt% ($p = 0.04$) and NHR ($p = 0.04$).

In the current study, videolaryngosopic examination after a complete course of voice therapy revealed reduction in the size of the primary lesion and its opposing reaction, with improvement of the range of movement of the vocal folds together with optimized glottis closure. The Accent method of voice therapy helps to reduce the extra laryngeal tension and subsequently change the shape of the vocal tract. These changes directly affect the acoustic characters of voice.

Certain groups of patients were more likely to respond to voice therapy than others. Historically, nodules were excised, but with better understanding of the physiology of vocal fold vibration, conservative therapy was recommended. In the current study , all patients with nodules achieved the treatment objectives after voice therapy. However, two of the patients had recurrent nodules again after 9 months and 1 year of cessation of therapy. Patient compliance is an important predictor for recurrence although Holmberg *et al*.[17] claimed that the combination between voice therapy and surgery in patients with nodules decreases the rate of recurrence.

Voice improvement did not necessitate lesion disappearance[18]. In the current study only one polyp resolved. Other polyps and all the cysts persisted. Because reduction of abnormal vocal behavior is an important component of treatment, a trial of voice therapy, regardless of lesion type, has been recommended. Reduction of trauma at the mid-membranous vocal fold can allow some resolution of the lesion and the inflammation associated with it. Furthermore, with the use of voice in a more efficient manner, a patients' voice may improve despite the persistence of the polyp or cyst. In addition, the ability to obtain complete vocal fold closure is important because glottal incompetence leads to leaky voice quality. Voice therapy helps the patient to obtain more competent glottal closure despite of the persistence of cysts and polyps. According to Cohen and Garrett,[18] patients with translucent polyps are more likely to experience improved voice quality. Because vocal fold cysts involve deeper layers of the vocal folds and may be associated with other pathological conditions such as sulcus or localized edema their response to voice therapy was limited[14].

In patients diagnosed at an early stage of reinke's edema, vocal hygiene and voice therapy can provide sufficient improvement. However, in more advanced cases, only limited improvement was obtained after voice therapy and surgery was mandatory. These results were in agreement with the results of Tasar *et al*.[19] who found that surgical treatment of patients with progressive reinke's edema provided more convenient results when compared to voice therapy.

Contact granulomas showed initial improvement after voice therapy with reduction in the size of the mass, but always reaches a plateau where a small mass persists with tendency to recurrence after cessation of voice therapy. Patients with contact granulomas often possess low pitched voice. Low pitched voice is produced with intimate contact between the vocal processes during phonation. Leonard and Kendall[20] declared that 8 out of 10 patients with contact granulomas demonstrated resolution or marked reduction of the pathology after voice therapy.

CONCLUSION

Voice therapy as a first line treatment proved to be effective in improving dysphonia in patients with BVFLs, although complete cure after voice therapy is still far to be obtained in most cases. The Accent method of voice therapy may lead to an improvement in the perceived voice quality in some patients with benign vocal fold lesions, and this could make surgical intervention unnecessary. Further studies are needed to assess the efficacy of the Accent method of voice therapy as an initial nonsurgical approach for patients with benign vocal fold lesions.

CONFLICT OF INTEREST

There are no conflicts of interest.

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