Oral presentation 1 : Type II thyroplasty

Type II Thyroplasty Changes Cortical Activation in Patients with Spasmodic Dysphonia

Ichiro Tateya, M.D., Ph.D.

Department of Otolaryngology- Head & Neck Surgery,
Kyoto University, Japan

Spasmodic Dysphonia (SD) is a complex neurological communication disorder characterized by a choked, strain-strangled vocal quality with voice stoppages in phonation. Its symptoms are exacerbated by situations where communication failures are anticipated, and reduced when talking with animals or small children. Symptoms are also reduced following selected forms of treatment. It is reasonable to assume that surgical alteration reducing symptoms would also alter brain activity, though demonstration of such a phenomenon has not been documented. The objective of this study is to reveal brain activity of SD patients before and after surgical treatment. We performed type II thyroplasties on 3 adductor SD patients and compared pre- and post-operative positron emission tomography recordings made during vocalization. Pre-operatively, cordal supplementary motor area (SMA), bilateral auditory association areas, and thalamus were activated while reading aloud. Such activity was not observed in normal subjects. Type II thyroplasty was performed according to Isshiki's method and the strained voice was significantly reduced or eliminated in all 3 patients. Post-operative PET showed normal brain activation pattern with a significant decrease in cordal SMA, bilateral auditory association areas and thalamus, and a significant increase in rostral SMA compared with pre-operative recordings. This is the first report showing that treatment to a peripheral organ, which reverses voice symptoms, also reverses dysfunctional patterns of the central nervous system in patients with SD.

Oral presentation 2 : Type II thyroplasty

Long-Term Voice Handicap Index After Type II Thyroplasty Using Titanium Bridges for Adductor Spasmodic Dysphonia

Tetsuji Sanuki, M.D., Ph.D.

Department of Otolaryngology- Head & Neck Surgery, Kumamoto University, Japan

Objectives: To determine the long-term functional outcomes of type II thyroplasty using titanium bridges for adductor Spasmodic Dysphonia (AdSD) by perceptual analysis using the Voice Handicap Index-10 (VHI-10) and by acoustic analysis.

Methods: Fifteen patients with AdSD underwent type II thyroplasty using titanium brides between August 2006 and February 2011. VHI-10 scores, a patient-based survey that quantifies a patient's perception of his or her vocal handicap, were determined before and at least 2 years after surgery. Concurrent with theVHI-10 evaluation, acoustic parameters were assessed, including jitter, shimmer, harmonic-to-noise ratio (HNR), standard deviation of F0 (SDF0), and degree of voice breaks (DVB).

Results: The average follow-up interval was 30.1 months. No patient had strangulation of the voice, and all were satisfied with the voice postoperatively. In the perceptual analysis, the mean VHI-10 score improved significantly, from 26.7 to 4.1 two years after surgery. All patients had significantly improved each score of three different aspects of VHI-10, representing improved functional, physical, and emotional well-being. All acoustic parameters improved significantly 2 years after surgery.

Conclusion: The treatment of AdSD with type II thyroplasty significantly improved the voice-quality of life and acoustic parameters 2 years after surgery. The results of the study suggest that type II thyroplasty using titanium bridges provides long-term relief of vocal symptoms in patients with AdSD.

Keywords: VHI-10, adductor Spasmodic Dysphonia, type II thyroplasty, acoustic analysis

Special lecture 1 :

Surgical Trials for the Management of Adductor Spasmodic Dysphonia: Radiofrequency TA (Thyroarytenoid) Myothermy

Hong-Shik Choi, M.D., Ph.D.

Department of Otorhinolaryngology, the Institute of Logopedics & Phoniatrics, Yonsei University College of Medicine, Seoul, Korea

Adductor Spasmodic Dysphonia is a well-recognized form of Dysphonia. Repeated injections of botulinum toxin remain the gold-standard treatment at many centers worldwide.

Several surgical trials for management of adductor Spasmodic Dysphonia were reviewed.

Radiofrequency ablation of the TA muscles might be an alternative surgical method for patients with adductor Spasmodic Dysphonia. It is simple, less invasive and does not result in a surgical scar on the neck.

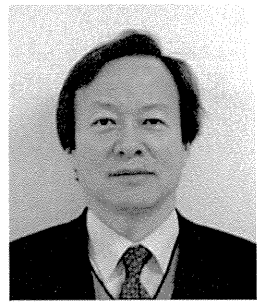
Twenty women diagnosed with adductor Spasmodic Dysphonia were enrolled in this study. The radiofrequency ablation was carried out on both of the thyroarytenoid muscles under general anesthesia. The control unit (Dr. Oppel ST-501, Someteck, Seoul, Korea) was set to 30 W (lever level 6) and the timer for a single application was set at a 1 second duration. The bipolar ENT Laryngeal Probe was inserted into two points on the true vocal folds.

The stroboscope examination, the perceptual voice analysis, the aerodynamic study, the acoustic analysis, and the Voice handicap index- 30 were measured before, 2, 6, and 12 months after the radiofrequency ablation.

All measured parameters improved 2 months after the ablation. However, after six months there was a reduction of the improvements. Ten patients (50%) required an additional ablation or botulinum toxin injection at the end of the one-year follow-up. Some modification of the surgical procedure is needed.

Key Words: Radiofrequency, Myothermy, Adductor Spasmodic Dysphonia, Thyroarytenoid muscle

CURRICULUM VITAE



Name: Hong-Shik Choi, M.D., Ph.D. (Professor)

Address: Dept. of Otorhinolaryngology,
Gangnam Severance Hospital
Yonsei University College of Medicine,
Yonsei University Health System
712 Eonjuro, Gangnam-gu,
135-720 Seoul, Korea
Phone: 82-2-2019-3461 (office)
Fax: 82-2-3463-4750
e-mail: hschoi@yuhs.ac

Education:

Medical School: Yonsei Univ. College of Medicine
Seoul, Korea
Mar 1972-Feb 1978

Graduate School: Yonsei Univ. the Graduate School
Mar 1979-Aug 1981, Master Degree
Doctorate Course, Yonsei Univ. the Graduate School
Sep 1981-Aug 1986, Doctor of Medical Science(PhD)

POST-GRADUATE TRAINING

Mar 1978-Feb 1979: Internship, Severance Hospital,
Yonsei Medical Center,
Seoul, Korea

Mar 1979-Feb 1983: Residency in the Dept. of Otorhinolaryngology,
Severance Hospital, Seoul, Korea

PROFESSIONAL AFFILIATIONS

May 1986-Feb 1988: Research Instructor, Dept. of Otorhinolaryngology,
Yongdong Severance Hospital
Mar 1988-Feb 1989: Instructor, Dept. of Otorhinolaryngology,
Yonsei Univ. College of Medicine
Mar 1989-Feb 1994: Assistant Professor, Dept. of Otorhinolaryngology
Yonsei Univ. College of Medicine
Apr 1991-Feb 1993: Visiting Scholar, Laryngeal Lab. Division of H&N Surgery,
UCLA, School of Medicine, U.S.A.
Mar 1993-present: Working at the Dept. of Otorhinolaryngology
Gangnam Severance Hospital
Mar 1994-Feb 1999: Associate Professor, Dept. of Otorhinolaryngology
Mar 1999-present: Professor, Dept. of Otorhinolaryngology
Mar 2000-present: Director, Institute of Logopedics & Phoniatrics

MEMBERSHIP and Society Activities:

Member of Korean Otolaryngological Society certified by Korean Otolaryngological Board in 1983
Member of Korean Bronchoesophgological Society (1983)
Member of International Association of Logopedics and Phoniatrics(1986)
Member of Korean Association of Logopedics and Phoniatrics(1986)
Member of Korean Voice & Speech Research Group (1988)
Member of Korean Head and Neck Cancer Society (1987)
Member of Korean Head and Neck Study group (1988)
Member of International Association of the Phonosurgeons(1994)
Member of East Asian Association of Phonosurgeons (1994)
Member of International Association of Stuttering Research (2000)
Member of Voice Foundation (USA) (2006)
President, Korean Association of Speech Sciences (2003)
President, Korean Society of Logopedics & Phoniatrics (2004)
Congress President, 5th East Asian Conference on Phonosurgery(2006)
Congress President, 4th World Voice Congress, Seoul, Korea (2010)

Interests:

Laryngology, Voice disorder, Head & Neck Surgery, Phoniatrics, Spasmodic Dysphonia

Special lecture 2 :

Diagnosis and Treatment of Spasmodic Dysphonia

Seth H. Dailey, M.D.

University of Wisconsin School of medicine and Public Health
-Department of Surgery, Madison, USA

Spasmodic Dysphonia (SD) is thought to be a focal dystonia affecting the larynx during speech tasks. It generally presents in the fifth decade of life, affecting women approximately 2/3 of the time. The onset of disease has been noted after upper respiratory tract infections or stressful life episodes although no reliable trigger for disease onset has been identified. The measles vaccine has been found to be protective against the presence of SD. In long term follow up approximately 12% of patients progress to have a regional dystonia in the face or neck and approximately 12% are found to have a family history of dystonia. Furthermore approxiamtely 30% of SD patients have simultaneous laryngeal tremor. The predominant disease type is ADductor type wherein the vocal folds spasm together during speech tasks, typically on vowels at the beginning of words, symptoms include a strangled or strained voice quality. ABductor type, usually thought to constitute less than 10% of patients experience separation of the vocal folds during a voiced sound giving rise to a breathy voice quality. A mixed AD/ABductor type also exists and some authors believe that all patients have a mix with a predominance of one type over the other. Diagnosis is made by history, physical examination of the larynx with flexible transnasal laryngoscopy and by voice tasks that elicit symptoms during set sentences.

Treatment options include observation, voice therapy, thyroarytenoid myectomy or cautery, myoneurectomy, recurrent laryngeal nerve (RLN) section, type II thyroplasty, injection of Botulinum toxin type A (Btx) into laryngeal muscles or deinnervation of the anterior RLN branch and reinnervation with the ansa cervicalis. In the United States Btx injections are judged to be first line therapy. These injections can be delivered transorally, transnasally, or transcervically. When delivered transcervically electromyographically guided injections are often used to confirm the presence of the needle tip in laryngeal muscles. Duration of effect with Btx is approximately 15 weeks with apprximately three days of notable breathy voice for thyroarytenoid injections and noted coughing on thin liquids. The safety of Btx injections is well established but its administration does not constitute a cure and patient counseling about the effects and side effects is critical.

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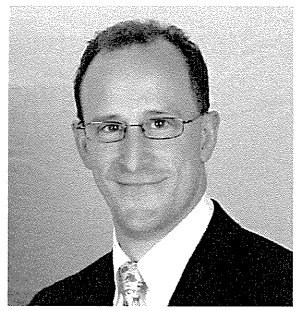

Name: Seth Hammond Dailey M.D.

Address: K4/7 Clinical Science Center
600 Highland Ave
Madison, WI 53792-7375
USA

Phone: (608)263-0192 (office)

Fax: (608) 252-0925

e-mail: dailey@surgery.wisc.edu

Education:

College: Columbia University
New York, NY
1991 — B.S.

Medical School: New York University School of Medicine
New York, NY
1996 — M.D.

Internship: St. Luke's-Roosevelt Hospital Center
New York, NY
1996-1997 — General Surgery

Residency: Albert Einstein College of Medicine, Yeshiva University
Bronx, NY
1997-2001 — Otolaryngology-Head and Neck Surgery

Fellowship: Massachusetts Eye and Ear Infirmary, Harvard Medical School
Boston, MA
2001-2002 — Laryngology

POSITIONS HELD

2002-2004: Instructor
Harvard Medical School
Boston, MA

2004-2010: Assistant Professor
University of Wisconsin School of Medicine and Public Health
Madison, WI

2008-present: Laryngeal Fellowship Director
University of Wisconsin School of Medicine and Public Health
Madison, WI

2010-present: Associate Professor
University of Wisconsin School of Medicine and Public Health
Madison, WI

Keynote lecture

Therapeutic Principle and Practice Against Spasmodic Dysphonia ; The Key Issues

Nobuhiko Isshiki, M.D., Ph.D.

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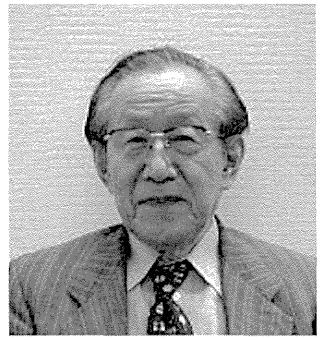

Name: Nobuhiko Isshiki,M.D.,Ph.D.

Educational and Professional career:

1954:	Graduated from School of Medicine, Kyoto University, Doctor of Medicine
1956-1960:	Staff Member at ENT, Kyoto University
1962-1964:	Research Fellow (Laryngeal Research) UCLA
1965-1977:	Assistant Professor, ENT, Kyoto University
1977-1980:	Associate Professor of Plastic Surgery, Kyoto University
1981-1993:	Professor of Plastic Surgery, Kyoto University
1993~ :	Emeritus Professor, Kyoto University
1993- 2011:	Isshiki Clinic at Kyoto Voice Surgery Center, for Plastic Surgery and Otolaryngology
2011-to date:	HIROSHIBA ENT Clinic

Awards:

Kyoto News Paper Award for clinical research of Cleft Lip and Palate

1971:	Gould Award for Laryngeal Research
1980:	Gutzmann's Award for Clinical Laryngeal Work
1991:	Honorary Member of Hungarian Society of Phoniatrics and Logopedics
1998:	Honorary Fellow of American Laryngeal Rhinological and Otological Society
1999:	The Acta Oto-laryngologica Prize, for Phonosurgery and voice rehabilitation
2011:	Isshiki Award (founded by Royal College of Surgeons of England),The first recipient of the award.

Special Lecture:

1998: Special Guest Lecture:101st Annual Meeting of the American Laryngeal Rhinological and Otological Society, Palm Beach, Florida

1999: Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum, Opening Lecture in commemoration of the Acta Prize, Lyon

Saudi Arabia (Riyardh)

Workshop:

1996,1996,1998:
The 1st,2nd and 3rd Annual Laryngeal Framework Surgery Courses: At the Free University, Amsterdam

1997,1998,2000,2003,2005,2007
The 1st,2nd Workshop on Thyroplasty: Theory and Practice. Mayo Clinic, And in many other countries such as India, Turkey, Korea, Chilie, Saudi Arabia, Italy, Brazil and many other countries

Representative Original papers in English (122 papers):

Isshiki N., et al: A new Type of Phonosurgical Technique. Acta Otolaryngol. 1974.78:451-457.
Isshiki N: Progress in laryngeal framework surgery. Acta Otolaryngol. 2000;120-127.
Isshiki N, Yamamoto I, Fukagai S: Thyroplasty type2 for Spasmodic Dysphonia: Fixation using a Titanium bridge. Acta Otolaryngol. 2004

Books:

Isshiki, N.: Phonosugery: theory and practice. Springer-Verlag Tokyo 1989
Isshiki, N., Tsuji, Domingos H. Sennes Luiz U.: Tireoplastias: Ficha catalografica SP, Brazil 1999

Patent:

Titanium bridge (USA, and Japan)

Auris Nasus Larynx 41 (2014) 285–289

Contents lists available at ScienceDirect

Auris Nasus Larynx

journal homepage: www.elsevier.com/locate/anl

Long-term Voice Handicap Index after type II thyroplasty using titanium bridges for adductor spasmodic dysphonia

Tetsuji Sanuki *, Eiji Yumoto, Narihiro Kodama, Ryosei Minoda, Yoshihiko Kumai

Department of Otolaryngology Head and Neck Surgery, Kumamoto University School of Medicine, Kumamoto, Japan

ARTICLE INFO

Article history:
Received 30 July 2013
Accepted 22 November 2013
Available online 25 December 2013

Keywords:
VHI-10
Adductor spasmodic dysphonia
Type II thyroplasty
Acoustic analysis

ABSTRACT

Objectives: To determine the long-term functional outcomes of type II thyroplasty using titanium bridges for adductor spasmodic dysphonia (AdSD) by perceptual analysis using the Voice Handicap Index-10 (VHI-10) and by acoustic analysis.
Methods: Fifteen patients with AdSD underwent type II thyroplasty using titanium brides between August 2006 and February 2011. VHI-10 scores, a patient-based survey that quantifies a patient's perception of his or her vocal handicap, were determined before and at least 2 years after surgery. Concurrent with theVHI-10 evaluation, acoustic parameters were assessed, including jitter, shimmer, harmonic-to-noise ratio (HNR), standard deviation of F0 (SDF0), and degree of voice breaks (DVB).
Results: The average follow-up interval was 30.1 months. No patient had strangulation of the voice, and all were satisfied with the voice postoperatively. In the perceptual analysis, the mean VHI-10 score improved significantly, from 26.7 to 4.1 two years after surgery. All patients had significantly improved each score of three different aspects of VHI-10, representing improved functional, physical, and emotional well-being. All acoustic parameters improved significantly 2 years after surgery.
Conclusions: The treatment of AdSD with type II thyroplasty significantly improved the voice-related quality of life and acoustic parameters 2 years after surgery. The results of the study suggest that type II thyroplasty using titanium bridges provides long-term relief of vocal symptoms in patients with AdSD.

1. Introduction

Spasmodic dysphonia (SD) is a focal laryngeal dystonia. In its most common form, adductor spasmodic dysphonia (AdSD), abnormal contraction of the thyroarytenoid (TA) and lateral cricothyroid (LCA) muscles results in excessive spasm and disproportionate glottal closure [1]. Consequently, the voice is characterized by stoppages and a strained/strangled quality.

There are two major methods of treatment for AdSD currently: pharmacotherapy and surgery. The most common of the former are botulinum toxin injections, which have been used to treat SD with good temporary results and minimal morbidity. They have become the standard treatment in the world. However, botulinum toxin injections have two major disadvantages: the effects last approximately 3–4 months on average, and the relationship between dosage and response is unpredictable [2–4].

Surgical treatments include RLN denervation and reinnervation [5], thyroarytenoid muscle myectomy [6], and type II thyroplasty [7] for permanent relief from the voice symptoms.

Previously, we reported the outcome of type II thyroplasty using a patient postoperative questionnaire and objective perceptual, aerodynamic, and acoustic analysis [8–10]. Type II thyroplasty provides relief from voice strangulation in patients, but none of these methods quantifies the effects of AdSD on a patient's quality of life (QOL).

The Voice Handicap Index (VHI) is a questionnaire that measures self-perceived voice problems by evaluating related functional, physical, and emotional aspects. The 10 most robust items in the VHI were selected to construct an abbreviated version of the questionnaire, called the VHI-10 [11]. As the VHI-10 is shorter, it requires less time to answer and is easier for subjects to use.

In this study, we evaluated the long-term functional outcomes after type II thyroplasty using titanium bridges for AdSD by perceptual analysis using the VHI-10, and by acoustic analysis.

* Corresponding author at: Department of Otolaryngology Head and Neck Surgery, Kumamoto University School of Medicine, 1-1-1 Honjyo, Kumamoto 860-8556, Japan. Tel.: +81 96 373 5255; fax: +81 96 373 5256.
E-mail address: otostl0319@fc.kuh.kumamoto-u.ac.jp (T. Sanuki).

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http://dx.doi.org/10.1016/j.anl.2013.11.001

2. Methods

2.1. Subjects

Ethical approval for this study was obtained from the Institutional Review Board of Kumamoto University Hospital. Twenty consecutive patients with AdSD underwent type II thyroplasty using titanium bridges between August 2006 and February 2011 at Kumamoto University Hospital, Kumamoto, Japan. Five patients, however, were excluded due to the circumstance that patients were not followed up for the requisite time. The diagnoses were made by otolaryngologists and were based mainly on the presence of a strained or strangled voice with phonatory breaks and on the patient's clinical history. All patients underwent speech therapy for over 3 months to distinguish SD from functional dysphonia. Only one patient had received botulinum toxin injections before the surgery. It should be noted that these injections are not the primary treatment for SD in Japan because the national health insurance system does not cover their cost. Therefore, our study included 15 patients (mean age 35.9 years; range 20–76 years) who were followed up for more than 2 years (mean 30.1 months; range 24–40 months) (Table 1).

2.2. Type II thyroplasty

The patients underwent type II thyroplasty, as described elsewhere [7,12,13]. Briefly, under local anesthesia, a horizontal neck skin incision was made of about 3 cm in length. The thyroid cartilage was incised at the midline, leaving the underlying soft tissue intact. During phonation, the incised thyroid cartilage edges were pulled apart by 2–5 mm (mean, 3.5 mm), to evaluate the best voice changes. To maintain the separation, two titanium bridges were placed below and above the level of the anterior commissure. Each bridge was fixed to the cartilage with four sutures of 4-0 nylon thread. The procedure was usually completed within 90 min. The patients were required to maintain voice rest for several days after surgery.

2.3. Self-perception analysis

Patients completed the VHI-10, a patient-based survey that quantifies a patient's perception of his or her vocal handicap, and responded to questions regarding their condition in the previous 2 weeks. The VHI-10 is a shortened version of the VHI, which is a patient-based self-assessment tool developed by Jacobson et al. [14] consisting of 30 questions covering the functional, physical, and emotional aspects of voice disorders. Patients are asked to rate each statement on a scale of 0–4 (0 = strongly disagree, 4 = strongly agree), for a possible total score of 40. Patients were given the VHI-10 at the same time they visited our outpatient clinic before surgery and at scheduled clinical follow-ups of 1, 3, 6, 12, 18, and more than 24 months following surgery. In this study, the surveys conducted preoperatively and two years following the surgery have been chosen for long-term functional evaluation.

Table 1
Clinical histories of patients with adductor spasmodic dysphonia (AdSD).

Patient no.	Sex	Age (Y)	Age at onset of AdSD (Y)	Duration of AdSD (Y)	Postoperative follow-up (mo)
1	F	29	25	4	40
2	F	26	20	6	36
3	F	27	21	6	28
4	F	76	66	10	30
5	F	42	40	2	30
6	F	34	29	5	30
7	F	20	15	5	26
8	F	29	23	6	34
9	F	69	67	2	29
10	F	47	43	4	33
11	F	33	23	10	30
12	F	24	16	8	27
13	F	32	17	15	28
14	F	22	19	3	27
15	F	29	24	5	24

2.4. Acoustic measurements

The voice recording methods have been described in detail previously [10]. The acoustic signals were processed digitally using the software program CSL3700 with MDVP (Kay-Pentax, Tokyo, Japan). For the sample, 5 s from the midpoint of the sustained vowel were analyzed. The following acoustic measures were recorded: (1) shimmer, i.e., cycle-to-cycle variation in signal amplitude; (2) jitter, i.e., cycle-to-cycle variation in frequency; (3) harmonic-to-noise ratio (HNR), i.e., the ratio of acoustic energy in the harmonic versus the noise components contained in the acoustic spectrum; (4) standard deviation of F0 (SDF0), i.e., the square root of the variance around the mean fundamental frequency; and (5) degree of voice breaks (DVB), i.e., the total duration of the breaks between the voiced parts of the signal divided by the total signal duration.

2.5. Statistical analysis

The data indicated unequal variances across measurement variables and subject groups; therefore, nonparametric statistical procedures were applied. The Wilcoxon signed-rank test for paired samples was used to compare the data before and two years after surgery. In addition, patients completed the VHI-10 survey at five intervals postoperatively, the results of which were analyzed using paired *t*-tests.

3. Results

The average follow-up interval was 30.1 (range 24–40) months. The average age of the onset of AdSD symptoms for our cases was 29.9 years. All patients had received and failed voice therapy before the surgery.

No patient had strangulation of the voice, and all were satisfied with their voices postoperatively.

3.1. VHI-10 scores

Twelve patients were available for VHI-10 analysis, as three patients did not complete the questionnaire. The mean VHI-10 score improved significantly, from 26.7 to 4.1 ($P < 0.0001$; Tables 2 and 3). Improvement was seen for every question of the VHI-10. Preoperative VHI-10 scores ranged from 13 to 33, and 24-month postoperative VHI-10 scores were <10 for 84.6% of patients and <20 for 100%. The preoperative VHI-10 domain scores were 12.1 ± 3.5 (functional), 9.6 ± 2.4 (physical), and 5.0 ± 2.0 (emotional). After surgery, the scores improved to 2.4 ± 1.9 (functional), 1.9 ± 1.4 (physical), and 1.1 ± 1.2 (emotional; Table 4). All VHI-10 domain scores improved significantly ($P < 0.0001$).

Twelve patients completed the VHI-10 questionnaire at intervals of 1, 3, 6, 12, 18, and more than 24 months. Postoperative VHI-10 scores after the first 1 month showed almost no variation when compared with scores from 24 months after the surgery (Fig. 1).

Table 2
Summary of vocal function.

Patient no.	VHI-10		Jitter (%)		Shimmer (%)		HNR (dB)		SDFO (Hz)		DVB (%)	
	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op	Pre-op	Post-op
1			5.3	0.8	20.0	8.6	3.2	6.7	13.3	4.3	69.6	0
2			3.9	0.9	13.6	9.7	4.3	5.8	37.1	2.3	0	0
3			2.7	1.5	15.8	3.4	5.0	8.6	10.9	3.7	5.5	0
4	13	0	6.1	0.6	19.4	6.5	2.0	7.8	27.2	2.6	14.7	0
5	25	1	0.9	1.3	6.0	6.4	7.1	7.3	15.7	7.5	0	0
6	25	9	1.3	1.5	8.1	6.7	6.4	8.2	5.8	4.1	1.8	0
7	28	3	3.9	1.2	15.7	6.5	1.8	8.5	39.8	3.9	1.4	0
8	30	11	8.5	6.5	31.8	21.0	1.8	1.4	40.5	5	74.6	0
9	22	2	5.7	2.5	13.8	12.9	1.9	6.2	34.1	5.5	4.5	0
10	28	4	4.0	0.5	12.3	4.1	3.3	8.6	39.2	2	7.3	0
11	33	1	8.0	5.2	25.2	18.9	1.5	4.2	51.8	27.1	39.4	0
12	21	1	2.5	1.8	8.0	5.4	2.2	8.1	15.6	5	0	0
13	26	10	12.5	5.6	21.5	17.2	1.2	5.9	44.9	11.2	20.4	0
14	37	4	5.9	6.5	13.2	17.7	4.5	4.0	54.3	35.1	0	0
15	32	3	2.9	0.6	13.9	11.5	5.4	5.3	4.4	2.4	0	0
Mean ± SD	26.7 ± 6.3	4.1 ± 3.8	4.9 ± 3.1	2.5 ± 2.2	15.9 ± 6.8	10.4 ± 5.8	3.4 ± 1.9	6.4 ± 2.1	29.0 ± 16.8	8.1 ± 9.7	15.9 ± 25.2	0

3.2. Acoustic measurements

The mean jitter values at each time point are shown in Fig. 2A and Table 2. The mean values were 4.9 ± 3.1% preoperatively and 2.5 ± 2.2% postoperatively, reflecting significant improvement after surgery ($P = 0.0006$).

The mean shimmer values also improved significantly ($P = 0.0012$), form 15.9 ± 6.8% preoperatively to 10.4 ± 5.8% postoperatively (Fig. 2B and Table 2).

Table 3
Voice Handicap Index-10 scores.

		Pre-op	2 year after
F1	My voice makes it difficult for people to hear me	3.2 ± 0.9	1.0 ± 0.9
F2	People have difficulty understanding me in a noisy room	3.3 ± 1.2	1.0 ± 0.9
F8	My voice difficulty restricts personal and social life	1.3 ± 0.4	0.1 ± 0.3
F9	I feel left out of conversations because of my voice	3.1 ± 0.8	0.3 ± 0.5
F10	My voice problem causes me to lose income	1.3 ± 1.9	0.1 ± 1.3
P5	I feel as though I have to strain to produce voice	2.9 ± 1.2	0.5 ± 0.7
P6	The clarity of my voice is unpredictable	3.3 ± 1.3	0.7 ± 0.7
E4	My voice problem upsets me	3.1 ± 1.2	0.3 ± 0.5
E6	My voice makes me feel handicapped	1.9 ± 1.2	0.1 ± 0.3
P3	People ask, "What's wrong with your voice?"	3.4 ± 0.5	0.2 ± 0.4
	Mean total	26.7	4.1
	Range total	13–33	0–11
	Standard deviation of total	6.3	3.8
	Total mean score improvement	–	22.6

Ratings: 0 = strongly disagree; 1 = disagree; 2 = undecided; 3 = agree; 4 = strongly agree.

Table 4
Difference in VHI-10 scores before and after type II thyroplasty.

	Mean VHI-10 scores		
	Functional (items 1–5)	Physical (items 6, 7, 10)	Emotional (items 8, 9)
Pre-op	12.1	9.6	5.0
Post-op	2.4	1.9	1.1

The mean HNR was 3.4 ± 1.9 dB preoperatively and 6.4 ± 2.1dB postoperatively (Fig. 2C and Table 2), indicating significant improvement after surgery ($P = 0.00063$).

The mean SDF0, 29.0 ± 16.8 Hz preoperatively and 8.1 ± 9.7 Hz postoperatively (Fig. 3A and Table 2), was also significantly improved after surgery ($P = 0.0001$).

The mean DVB was 15.9 ± 25.2% preoperatively and 0% postoperatively, indicating significant improvement after surgery ($P = 0.028$; Fig. 3B and Table 2).

4. Discussion

Botulinum toxin injections have been used to treat SD with good temporary results and minimal morbidity. Since their inception, these injections have become the standard treatment for AdSD. However, intralaryngeal botulinum toxin injections are usually required once every 3–4 months and may result in initial temporary dysphonia caused by incomplete glottic closure. Permanent relief from the voice symptoms due to AdSD is needed.

Type II thyroplasty differs from previous treatments in that this surgery does not include intervention involving the laryngeal muscle, nerve, or vocal fold. Type II thyroplasty follows the thinking that intervention in the thyroid cartilage is unrelated to the underlying lesion. This appears contrary to the common logic of surgery, in which a disease is usually approached directly, and may be likened to conducting an operation without knowing what to remove or where the lesion is located. Therefore, this surgical procedure has been regarded with some suspicion. In fact type II thyroplasty is intended to prevent the spasmodic tight glottal closure at the terminal stage of phonation, which is a purely mechanical process, leaving untouched the lesion or structures directly involved [7–9]. Type II thyroplasty can be performed under local anesthesia to allow voice changes to be monitored. Previously, based on a postoperative voice quality questionnaire and aerodynamic and acoustic analyses, we reported that type II thyroplasty using titanium bridges improves voice symptoms in patients with AdSD [8,10]. As traditional clinical laryngological examinations cannot measure the impact of a voice disorder on the quality of life (QOL), the VHI-10 is the most frequently administered test for this purpose. In the present study, we used VHI-10 scores to quantify the detrimental effects of AdSD and the therapeutic effects of type II thyroplasty.

Novakovic et al. [15] used the VHI-10 to assess longitudinal outcomes of 133 patients with AdSD who were treated with botulinum toxin and reported a mean preinjection VHI-10 score of 22.3, with a mean best VHI-10 score of 12.7 during the injection

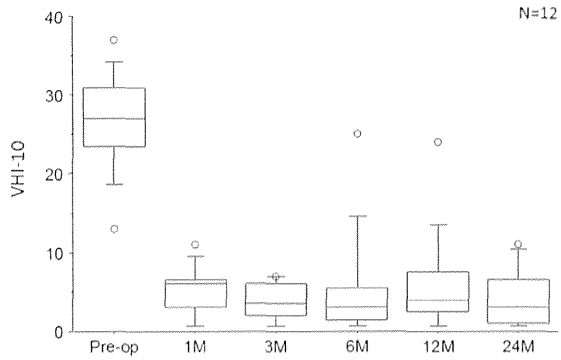

Fig. 1. VHI-10 scores before and after type II thyroplasty. There were no significant differences between the results of the survey completed at 24 months and those of other follow-up periods.

cycle. Courey et al. [1] found that although their patients showed improvement in all domains of the VHI scale, 27.3% of respondents showed no improvement in overall post-treatment scores, with a prolonged breathy voice being the reason cited for a poor outcome.

In 1999, Berke et al. [5] described selective laryngeal adductor denervation-reinnervation surgery. This procedure specifically denervates the laryngeal adductors and spares the abductors. Advantages of the procedure include a permanent outcome and less breathiness due to the maintenance of vocal fold tone from the ansa cervicalis. Positive surgical outcomes in 46 patients were indicated by significantly improved mean VHI-10 scores, from 35.6 to 12.7, with improved VHI-10 scores in 83% of patients [16].

A transoral partial thyroarytenoid muscle myectomy and neurectomy technique has been reported [6,17]. This technique has been described as relatively safe, effective, and technically simple, although a postoperative breathy voice was given as the greatest disadvantage of this method. When Tsuji et al. [17] assessed the vocal quality of patients undergoing partial myectomy, they found a clear difference between VHI scores before and after surgery. However, they assessed only six patients.

Previously, Chan et al. [18] reported rather poor results for type II thyroplasty. After a 12-month follow-up period, only 22.2% and 33.3% of patients showed moderate to good improvement in symptom severity and vocal effort, respectively. However, they did not discuss possible causes for the failure of the study. Inadequate techniques, such as performing the surgery under general anesthesia, incising the thyroid cartilage using an oscillating saw, and their use of T-shaped silastic shims to maintain separation, may have resulted in poor outcomes and potentially hindered the acceptance of this procedure. The success of surgery depends entirely on whether the incised cartilage edges are held apart at the precise spot for the best vocal output with no excessive speech effort, and whether they remain adequately separated over time. The use of local anesthesia and an appropriate device for maintaining the separation, such as a titanium bridge, is essential.

Our results are promising regarding type II thyroplasty as a long-lasting cure for AdSD symptoms. In general, patients were very satisfied with the surgical outcome which was attended by significant improvements of VHI-10 scores and its functional,

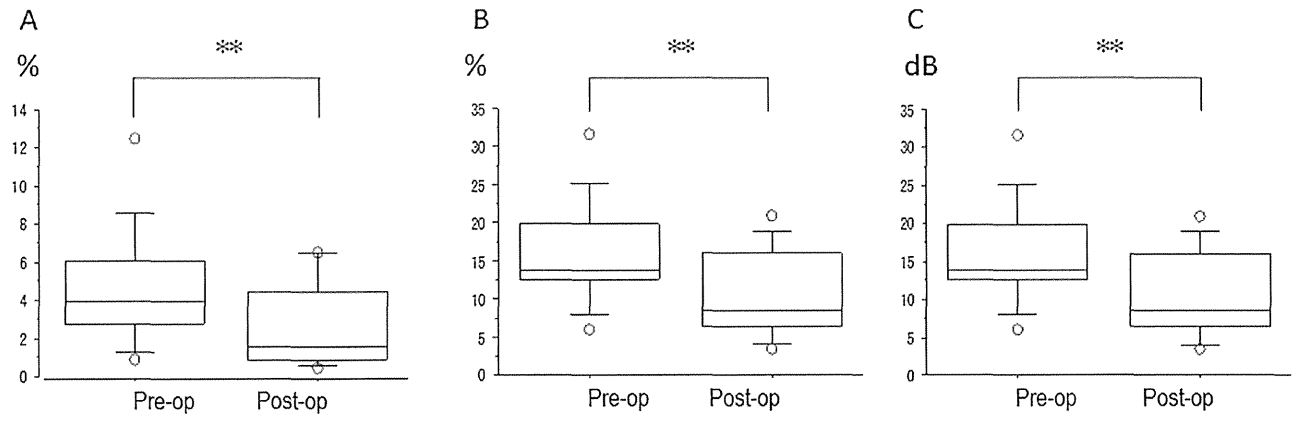

Fig. 2. Acoustic data: jitter (A), shimmer (B), and harmotic-to-noise ratio (C). $^{**}P < 0.01$

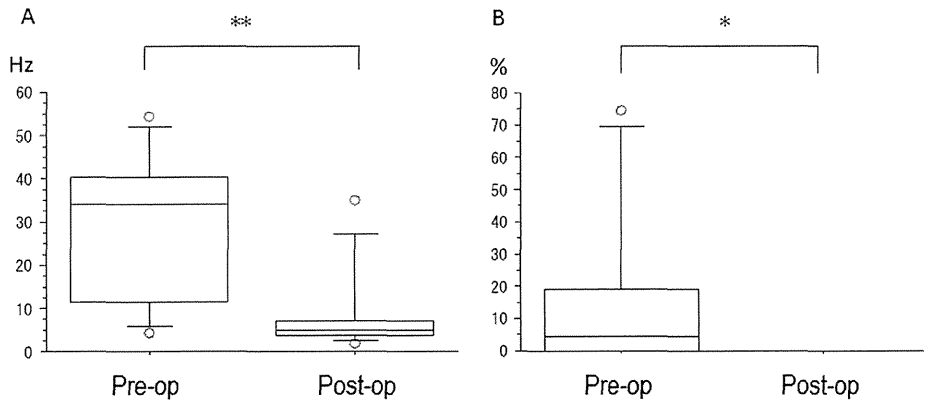

Fig. 3. Acoustic data: standard deviation of F0 (A) and degree of voice breaks (B). $^{**}P < 0.01$, $^{*}P < 0.05$

physical, and emotional aspect (Table 4). Morzaria and Damrose reported that pretreatment of VHI domain scores were significantly decreased after botulinum toxin injections [19]. Comparatively, in this study, the three domains decreased further still after type II thyroplasty. Acoustic analysis is useful for documenting the severity of spasmodic dysphonia and monitoring the response of patients to treatment [20]. Five characteristic acoustic parameters were used in this study: jitter, shimmer, and HNR to assess voice hoarseness, and SDF0 and DVB to assess AdSD symptoms. Previously, we reported that these parameters improved significantly to within near-normal ranges after type II thyroplasty [8], indicating that the procedure created no breathy voice, as can occur with botulinum toxin injections, recurrent laryngeal nerve section, or thyroarytenoid muscle myectomy. The acoustic data in our current cases reinforces the results of the previous study.

Two (16.7%) of the 12 patients (nos. 8 and 13) improved less than the other patients. They noticed a slightly breathy voice at work (both worked as receptionists) after the surgery, although they experienced complete relief from their strangled voices. In addition, none of our cases experienced any recurrence of AdSD symptoms. With those patients who rely on their voices as a primary tool of trade, VHI-10 scores may be affected by unrealistic patient expectations. Professional voice users report experiencing a greater voice handicap when compared with non-professional voice users [21].

5. Conclusion

The treatment of AdSD using type II thyroplasty significantly improved voice-related quality of life and acoustic parameters in our patients. The results of this survey suggest that type II thyroplasty with titanium bridges provides long-term relief of symptoms in patients with AdSD.

Conflict of interest

None.

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音声言語医学 55：284―290，2014

短　報

日本音声言語医学会音声情報委員会報告―推奨版 VHI および V-RQOL の作成と検証

推奨版 VHI および V-RQOL 作成と質問紙のアンケート調査
――多施設共同研究――

折舘　伸彦[1,2]　城本　修[1,3]　生井友紀子[1,2]
田口　亜紀[1,4]　田村　悦代[1,5]　溝口　兼司[6]
渡邊　雄介[1,7]　大森　孝一[1,8]　湯本　英二[1,9]

要　約：【目的】日本音声言語医学会推奨版 VHI および V-RQOL を用いて声に関する問題をもつ患者の状態を評価することの有用性を検証すること．

【方法】音声情報委員会委員が所属する全国 8 施設の音声障害患者 173 名からなる音声障害群と健常者 105 名からなる健常群の両群に日本音声言語医学会推奨版 VHI および V-RQOL とそれぞれの質問紙記入に関してのアンケート調査を前向き観察研究として実施した．

【結果】アンケート調査の結果，両群ともに VHI，V-RQOL の内容の適切性およびわかりやすさについてはおおむね良好な反応であった．ただし，VHI の質問項目数についてはやや多すぎるという回答が認められた．

【結語】日本音声言語医学会推奨版 VHI ならびに V-RQOL は声に関する問題をもつ患者を対象としたアンケート調査結果から，その自覚的評価における有用性が示された．

索引用語：音声障害の自覚的評価尺度，VHI (Voice Handicap Index)，V-RQOL (Voice-Related Quality of Life)，アンケート調査

第 1 著者および第 2 著者は，本論文作成にあたり同等の貢献をした．

日本音声言語医学会音声情報委員会[1]：〒112-0004 東京都文京区後楽 2-3-10　白王ビル 5F
横浜市立大学[2]：〒236-0004 横浜市金沢区福浦 3-9
県立広島大学[3]：〒723-0053 広島県三原市学園町 1-1
愛媛大学[4]：〒791-0295 愛媛県東温市志津川
東海大学東京病院[5]：〒151-0053 東京都渋谷区代々木 1-2-5
北海道大学[6]：〒060-8638 札幌市北区北 15 条西 7 丁目
東京ボイスセンター[7]：〒107-0052 東京都港区赤坂 8-10-16
福島県立医科大学[8]：〒960-1295 福島市光が丘 1 番地
熊本大学[9]：〒860-8556 熊本市本庄 1-1-1
[1]The Voice Information Committee of the Japan Society of Logopedics and Phoniatrics: 2-3-10 Koraku, Bunkyo-ku, Tokyo 112-0004, Japan
[2]Yokohama City University: 3-9 Fukuura, Kanazawa-ku, Yokohama, Kanagawa 236-0004, Japan
[3]Prefectural University of Hiroshima: 1-1 Gakuen-cho, Mihara, Hiroshima 723-0053, Japan
[4]Ehime University: Shitsukawa, Toon-shi, Ehime 791-0295, Japan
[5]Tokai University Tokyo Hospital: 1-2-5 Yoyogi, Shibuya-ku, Tokyo 151-0053, Japan
[6]Hokkaido University: Kita 15-jo, Nishi 7-chome, Sapporo, Hokkaido 060-8638, Japan
[7]Tokyo Voice Center: 8-10-16 Akasaka, Minato-ku, Tokyo 107-0052, Japan
[8]Fukushima Medical University: 1 Hikarigaoka, Fukushima City 960-1295, Japan
[9]Kumamoto University: 1-1-1 Honjo, Kumamoto City 860-8556, Japan

2014 年 3 月 11 日受稿　2014 年 4 月 23 日受理

Practicality of the Japan Society of Logopedics and Phoniatrics Version of VHI and V-RQOL as Assessed by Questionnaire
——A Multi-Center Study——

Nobuhiko Oridate[1,2], Osamu Shiromoto[1,3], Yukiko Ikui[1,2], Aki Taguchi[1,4], Etsuyo Tamura[1,5], Kenji Mizoguchi[6], Yusuke Watanabe[1,7], Koichi Omori[1,8] and Eiji Yumoto[1,9]

Abstract: Aim: The aim of this study was to assess the practicality of the Japan Logopedics and Phoniatrics version of VHI and V-RQOL for evaluating patients who have voice-related problems.

Methods: The study population consisted of 173 individuals with voice disorders and 105 normal adult volunteers from eight ENT clinics in Japan. The participants completed the Japan Logopedics and Phoniatrics version of VHI and V-RQOL as well as questionnaires regarding VHI and V-RQOL.

Results: The study population showed favorable responses to the Japan Logopedics and Phoniatrics version of VHI and V-RQOL. Most of the participants thought that both VHI and V-RQOL had good potential to represent their voice-related problems. Some felt that VHI had too many question items.

Conclusions: The results of this study revealed that the use of the Japan Logopedics and Phoniatrics version of VHI and V-RQOL is practical for evaluating patients who have voice-related problems.

Key words: patient perceptional scale, VHI (Voice Handicap Index), VHI-10, questionnaire, practicality

はじめに

患者音声の自覚的評価法として米国で考案された Voice Handicap Index (VHI)[1], Voice-Related Quality of Life (V-RQOL)[2] があるが，多くの外国語に翻訳され使用されている．日本語版については，VHI には田口ら[3]，城本ら[4] の先行研究が，V-RQOL には城本ら[4]，折舘ら[5] の先行研究があるが，日本語としての用語が統一されていないのが現状である．施設間の成績を比較するには統一された文章で質問を構成することが望ましく，質問文を標準化することで，声の自覚的評価法の普及に寄与することが期待される．本稿では日本音声言語医学会音声情報委員会が作成したそれぞれの日本語訳推奨版について，その有用性について検討したのでその結果を報告する．

日本音声言語医学会推奨版 VHI ならびに V-RQOL の作成過程

平成 23 年 9 月本学会理事会において，患者の自覚的評価法における用語の推奨版を本学会で作成することが決定され，音声情報委員会での検討が委託された．当委員会では VHI，V-RQOL の日本語訳であったそれぞれ田口原案，折舘原案をひな形として，音声情報委員会委員が質問項目（英文原文）日本語訳試案を作成した．この際，VHI，V-RQOL 英文原文の直訳ではなく日本語に即した訳とすることを原則とした．平成 24 年 3 月の第 2 回委員会にて，とりまとめ役の窓口委員に送付された各委員からの試案の一覧から修正を検討，質問項目の日本語訳を最終決定した．一例として V-RQOL 質問項目 1 の英文原文，翻訳原案，各委員案 5 案，最終決定案を示す．質問項目 1 では委員会での検討で委員案 5 が最終決定案として採用された．

英文原文：I have trouble speaking loudly or being heard in noisy situations.

翻訳原案：うるさいところで話していると聞き返されたり，大きな声で話さなければならないので大変です．

委員案 1：騒々しいところで話していると聞き返されたり，大きな声で話さなければならないので大変です

委員案 2：うるさいところでは聞き返されたり，大

きな声で話さなければならないので大変です.

委員案3：大声で話すことや騒々しい場所で話すことは苦痛です.

委員案4：うるさいところでは，大声で話したり聞き返されたり，話すのが大変です.

委員案5：さわがしい所では，聞き返されたり，大きな声で話さなければならなかったりと大変です.

最終決定案：さわがしい所では，聞き返されたり，大きな声で話さなければならなかったりと大変です.

このようにして作成された最終決定案を窓口委員がとりまとめ，全文の案を再度作成し，各委員からの微調整を加味した音声情報委員会案を平成24年の音声言語医学会理事会に提出した．理事会承認後，平成24年10月の本学会総会にて日本音声言語医学会推奨版案として承認された．併せて音声言語医学会のホームページに掲載し，2週間パブリックコメントを求めた後，平成24年11月13日日本音声言語医学会推奨版として公開された（http://www.jslp.org, 表1）.

日本音声言語医学会推奨版 VHI および V-RQOL の有用性の検証

日本音声言語医学会推奨版 VHI および V-RQOL を用いて声に関する問題をもつ患者の状態を評価することの有用性を前向き観察研究として検証した.

方法：音声情報委員らが所属する全国8施設の音声障害患者173名からなる音声障害群と健常者105名からなる健常群の両群に V-RQOL と V-RQOL 質問紙記入に関してのアンケート調査（表2）を実施した.

主要評価項目は下記の質問による有用性評価である.

①「質問紙が声の問題をあらわすのに適していると思いますか」

副次的評価項目は以下の追加質問による実用性評価である.

②「この質問紙の質問（項目）の数は多すぎますか」

③「この質問紙にある質問項目は，わかりやすかったですか」

なお，このアンケート調査の実施に際しては，各参加施設の倫理委員会での承認を得た.

結果

①主要評価項目「質問紙が声の問題をあらわすのに適していると思いますか」に対しては，VHI および V-RQOL において音声障害群・健常群ともに「まあまあ適している」が最多であった（図1）.

②副次的評価項目「この質問紙の質問（項目）の数は多すぎますか」に対しては，VHI において音声障害群では「ちょうどよい」が最多であったが，健常群では，「ちょっと多い」が最多であった．一方，V-RQOL においては音声障害群・健常群とも「ちょうどよい」が最多であった（図2）.

③副次的評価項目「この質問紙にある質問項目は，わかりやすかったですか」に対しては，VHI において音声障害群・健常群ともに「わかりにくいところもあった」が最多であった．一方，V-RQOL においては音声障害群・健常群とも「とてもわかりすい」が最多であった（図3）.

④ VHI においてわかりにくいとされた質問項目を下記に挙げる.

4-6名の音声障害患者が以下の質問項目をわかりにくいと指摘していた．さらに13の質問項目に関しては，健常者もわかりにくいとする回答が多く寄せられた.

9. People seem irritated with my voice. 私の声のせいで，他の人がイライラしているように感じます.

13. My Voice sounds creaky and dry. 私の声はカサカサした耳障りな声です.

17. The clarity of my voice is unpredictable. 声を出してみるまで，どのような声が出るかわかりません.

29. My voice makes me feel incompetent. 声のせいで無力感を感じます.

⑤ V-RQOL においてわかりにくいとされた質問項目を下記に挙げる

1. I have trouble speaking loudly or being heard in noisy situations. さわがしい所では，聞き返されたり，大きな声で話さなければならなかったりと大変です.（9名）

3. I sometimes do not know what will come out when I begin speaking. 話し始めた時に，どんな声が出るのかわかりません.（4名）

4. I am sometimes anxious or frustrated (because of my voice). 声のせいで，不安になったりイライラしたりします.（3名）

7. I sometimes get depressed (because of my voice). 声のせいで，仕事（家事・学業）に支障をきたしています.（3名）

9. I have to repeat myself to be understood. 自分の言うことをわかってもらうまで何度も繰り返して言わなければなりません.（4名）

10. I have become less outgoing (because of my

表1 声に関する質問紙

日本音声言語医学会推奨版 VHI

声の問題であなたの日頃の生活がどのように影響を受けているかについて教えて下さい．この質問紙には声に関して起こりうる問題が記載してあります．この2週間のあなたの声の状態について以下の質問に答えて下さい．以下の説明を参考に該当する数字に○をつけて下さい．

0＝全く当てはまらない．問題なし
1＝少しある　2＝ときどきある
3＝よくある　4＝いつもある

1. 私の声は聞き取りにくいと思います．	0 1 2 3 4
2. 話していると息が切れます．	0 1 2 3 4
3. 騒々しい部屋では，私の声が聞き取りにくいようです．	0 1 2 3 4
4. 1日を通して声が安定しません．	0 1 2 3 4
5. 家の中で家族を呼んでも，聞こえにくいようです．	0 1 2 3 4
6. 声のせいで，電話を避けてしまいます．	0 1 2 3 4
7. 声のせいで，人と話すとき緊張します．	0 1 2 3 4
8. 声のせいで，何人かで集まって話すことを避けてしまいます．	0 1 2 3 4
9. 私の声のせいで，他の人がイライラしているように感じます．	0 1 2 3 4
10.「あなたの声どうしたの？」と聞かれます．	0 1 2 3 4
11. 声のせいで，友達，近所の人，親戚と話すことが減りました．	0 1 2 3 4
12. 面と向かって話していても，聞き返されます．	0 1 2 3 4
13. 私の声はカサカサした耳障りな声です．	0 1 2 3 4
14. 力を入れないと声が出ません．	0 1 2 3 4
15. 誰も私の声の問題をわかってくれません．	0 1 2 3 4
16. 声のせいで，日常生活や社会生活が制限されています．	0 1 2 3 4
17. 声を出してみるまで，どのような声が出るかわかりません．	0 1 2 3 4
18. 声を変えて出すようにしています．	0 1 2 3 4
19. 声のせいで，会話から取り残されていると感じます．	0 1 2 3 4
20. 話をするとき，頑張って声を出しています．	0 1 2 3 4
21. 夕方になると声の調子が悪くなります．	0 1 2 3 4
22. 声のせいで，収入が減ったと感じます．	0 1 2 3 4
23. 声のせいで，気持ちが落ち着きません．	0 1 2 3 4
24. 声のせいで，人づきあいが減っています．	0 1 2 3 4
25. 声のせいで，不利に感じます．	0 1 2 3 4
26. 話している途中で，声が出なくなります．	0 1 2 3 4
27. 人に聞き返されるとイライラします．	0 1 2 3 4
28. 人に聞き返されると恥ずかしくなります．	0 1 2 3 4
29. 声のせいで，無力感を感じます．	0 1 2 3 4
30. 自分の声を恥ずかしいと思います．	0 1 2 3 4

日本音声言語医学会推奨版 V-RQOL

声の問題であなたの日頃の生活がどのように影響を受けているかについて教えて下さい．
この質問紙には声に関して起こりうる問題が記載してあります．この2週間のあなたの声の状態について以下の質問に答えてください．以下の説明を参考に，該当する数字に○をつけて下さい．

1＝全く当てはまらない．問題なし
2＝少しある　3＝ときどきある
4＝よくある　5＝これ以上ないぐらい悪い

1. さわがしい所では，聞き返されたり，大きな声で話さなければならなかったりと大変です．	1 2 3 4 5
2. 話していると息が切れて何度も息継ぎしなければなりません．	1 2 3 4 5
3. 話し始めた時に，どんな声が出るのかわかりません．	1 2 3 4 5
4. 声のせいで，不安になったりイライラしたりします．	1 2 3 4 5
5. 声のせいで，落ち込むことがあります	1 2 3 4 5
6. 声のせいで，電話で話すときに困ります．	1 2 3 4 5
7. 声のせいで，仕事（家事・学業）に支障をきたしています．	1 2 3 4 5
8. 声のせいで，外でのつきあいは避けています．	1 2 3 4 5
9. 自分の言うことをわかってもらうまで何度も繰り返して言わなければなりません．	1 2 3 4 5
10. 声のせいで，前ほど活発ではなくなりました．	1 2 3 4 5