

Vocal fold nodules; surgical vs. non-surgical interventions

Lx 180Deg 210.0Hz 79.3dB



Mette Pedersen
MD, FRSM, Dr. Med. Sci.
ear- nose- throat surgeon, consultant phoniatician.

The Medical Centre

Østergade 18

Copenhagen

Denmark

Phone: +45 33 15 96 00

Postal Code: DK-1100

E-mail: m.f.pedersen@dadlnet.dk

Fax: +45 33 13 77 05

Lx 180 Deg 210.0Hz 79.3dB



www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology

Abstract

Introduction

There is no evidence of any kind of treatment that has an effect on vocal nodules. The problem is that until now no high quality prospective randomised blinded studies have been carried out, as shown in a Cochrane review 2000. No evidence based results of speech therapy and/or surgery was found.

Methods and results

Two prospective pilot studies of vocal nodules were made based on the Cochrane review.

In one study Voice-Related-Quality-Of-Life (VRQOL) was shown to be better after voice related treatment of infections, allergy and reflux, a small improvement was also seen after high quality medical voice hygiene advice. In the other (case – control) study, voice related medical treatment in Zagreb was compared with medical treatment in Copenhagen to show eventual geographical differences of the medical approach of treatment of related infections, allergy and reflux. GRBAS perception test and the Multi-Dimensional-Voice-Program as well as VRQOL were better after treatment in both places compared to controls.

Conclusion

It is necessary to re-evaluate the whole area of diagnosis and treatment of benign voice disorders because new measurement- and medical treatment-possibilities have been developed.

The result in the **Cochrane review** from 2000 will be summed up.

Thereafter the results of the two pilot studies based on the Cochrane review from 2000 will be summarised.

They appear/ed in in the

**European Archives of Oto-Rhino-Laryngology 2003,
and European Review of ENT 2005.**

Titles:

Surgical Versus Non-Surgical Interventions for Vocal Cord Nodules

Dysphonia: medical treatment and a medical voice hygiene approach. A prospective randomised pilot study.

Medical treatment and medical quantitative measurement of vocal cord nodules, a prospective case-control study.

We suggest laboratories related to systematic diagnosis of voice disorders.

Cochrane review:

In the Cochrane review a total of 659 studies were identified through electronic searching, hand searching of more than 250 pre-1966 papers was carried out. No randomised controlled trials were identified.

The twenty (18 retrospective and two prospective) studies on intervention that had a methodological structure could roughly be divided into three groups:

1. **microsurgery** and postoperative voice therapy (Wendler 1971; Motta 1986; Bouchayer 1988; Cornut 1989; Kleinsasser 1991; Keilmann 1997)
2. **voice therapy** alone (Böhme 1969; Lacina 1972; Yamaguchi 1986; Yotsukura 1988; McFarlane 1990; Koufman 1991; Fex 1994; Benninger 1995)
3. **voice therapy** combined when evaluated necessary (without inclusion criteria) with microsurgery (Nagata 1983; Lancer 1988; Murry 1992; Krecicki 1993; Ford 1994; Remacle 1999).

No control groups were mentioned.

Cochrane review

The six studies describing microsurgery and postoperative voice therapy included 644 patients with good result in 613. Eleven had recurrence out of 163 patients that had responded to the request for follow-up evaluation.

The eight studies concerned with voice therapy alone included 465 patients 282 of which had a good result.

However 25 out of 134 responding to the request for follow-up evaluation had recurrence.

Voice therapy and eventual secondary microsurgery was carried out in six studies. Out of the 895 patients 666 had good results. There were 37 recurrences out of the 348 patients followed up.

A few trends were noted:

with the studies over time.

In the later studies:

1. **stroboscopy** is used for confirming the diagnosis
2. researchers are more likely to identify **compounding factors such as infections, allergy, acid reflux and environmental factors**
3. pre- and post treatment **quantitative voice analysis** was more likely to have been performed.

European Archives:

Medical treatment vs. medical voice hygiene advice

Medical treatment was based on the scientific approach that once a micro-organic disorder caused by:

reflux, infection, allergy or environmental irritants (e.g., dust or noise in the workplace) was discovered by:

Very careful anamnesis and systematic objective routine analyses and was treated effectively, with documentation:

The non-organic voice disorder disappeared, as e.g., in the case of a diagnosis and treatment of helicobacter pylori.

The reason is that the mucosal swelling/dysfunction of the vocal cords is secondary.

Medical voice hygiene advice

(training by the doctor for 5-15 minutes of

1. position of the body,
2. accents of the diaphragm muscle,
3. intonation pattern of the larynx
4. relaxation of the jaw and resonance)

European Archives

Voice related quality of life questionnaire, results of the randomised prospective pilot study of the new patients with follow-up after 1 month

	Medical group				Medical voice-hygiene group			
	No 9	Before therapy	After therapy	Difference	No.7	Before	After	Difference
Main score								
Social emotional domain		74.3	87.5	13.2		69.9	76.8	7.1
Physical functioning domain		63.9	84.7	20.8		64.9	73.8	8.9
Overall voice related quality of life		68.1	85.8	17.8		66.8	75.0	8.2

Lx 180Deg 210.0Hz 79.3dB



www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology


European Review of ENT

The study comparing treatment prospectively in a case - control study between Copenhagen and Zagreb with medical treatment and medically ordered voice hygiene advice included the

questions:

(from ref. J Voice 2000;14:378-386)

Lx 180Deg 210.0Hz 79.3dB



www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology

Physical functioning:

I have trouble speaking loudly or being heard in noisy situations

I run out of air and need to take frequent breaths when talking

I sometimes do not know what will come out when I begin speaking

Psychological functioning:

I am sometimes anxious or frustrated (because of my voice)

I sometimes get depressed (because of my voice)

Social functioning:

I have trouble using the telephone (because of my voice)

I have trouble doing my work or practicing my profession (because of my voice)

I avoid going out socially (because of my voice)

I have to repeat myself to be understood

I have become less outgoing (because of my voice)

1= none, not a problem

2= A small amount

3= A moderate (medium) amount

4= A lot

5= Problem is as “bad as it can be”

European Review of ENT

The questionnaire for VRQOL is relevant in an ENT clinic
 We accepted that a statistical calculation on scores is very difficult and therefore the original scores for the VRQOL are presented before and after, all better.

Voice-related quality of life questionnaire (V-RQOL), results of the prospective case-control pilot study of the new patients before medical treatment and after treatment, one month later, compared with normal controls (100% scores).

Patients Copenhagen													Patients Zagreb																	
BEFORE	0	age (years)	MF	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	social	social	0	age (years)	MF	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	social	
	1	44	f	nod1	3	3	4	5	2	1	2	1	2	1		1	27	f	nod1	3	2	1	1	1	1	3	1	1	1	
	2	26	f	nod1	1	1	1	5	1	3	3	1	1	1		2	18	f	nod1	1	1	1	1	1	1	1	1	1	1	
	3	26	f	nod1	3	3	1	3	2	3	2	1	3	1		3	49	f	nod1	2	3	2	3	2	1	2	1	2	1	
	4	28	f	nod1	3	4	5	1	1	2	3	1	2	1		4	55	f	nod1	2	2	3	1	1	1	1	1	2	1	
A	5	25	f	nod1	2	4	2	2	1	1	1	1	3	1		5	27	f	nod1	3	2	1	1	1	1	3	1	1	1	
	6	20	f	nod1	3	2	4	2	2	3	3	1	2	1		6	55	f	nod1	1	1	1	1	1	1	1	1	1	1	1
	7	45	f	nod1	1	1	1	5	1	1	1	1	1	1		38,5														
	8	37	f	nod1	1	2	1	5	5	1	1	1	4	1						2	1,8	1,5	1,3	1,2	1	1,8	1	1,3	1	
	9	49	f	nod1	4	2	1	1	1	1	1	1	1	1																
	10	27	f	nod1	1	1	1	3	2	1	1	1	3	1																
		32,7			2,2	2,3	2,1	3,2	1,8	1,7	1,8	1	2,2	1																
AFTER	0	age (years)	MF	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	social	0	age (years)	MF	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	social	social	
	1	44	f	nod2	1	3	3	5	1	1	1	1	1	1		1	27	f	nod2	2	1	1	1	1	1	2	1	1	1	
	2	26	f	nod2	1	1	1	5	1	3	3	1	1	1		2	18	f	nod2	1	1	1	1	1	1	1	1	1	1	
	3	26	f	nod2	3	2	3	3	1	1	5	1	1	1		3	49	f	nod2	1	2	2	2	1	1	1	1	2	1	
	4	28	f	nod2	3	4	5	1	1	2	3	1	2	1		4	55	f	nod2	2	2	2	1	1	1	1	1	2	1	
	5	25	f	nod2	1	1	1	1	1	1	1	1	1	1		5	27	f	nod2	2	1	1	1	1	1	2	1	1	1	
	6	20	f	nod2	2	1	1	1	1	1	1	1	1	1		6	55	f	nod2	1	1	1	1	1	1	1	1	1	1	1
	7	45	f	nod2	4	1	3	1	1	1	4	1	1	1		38,5														
	8	37	f	nod2	2	2	1	1	1	1	1	1	1	1						1,5	1,3	1,3	1,2	1	1	1,3	1	1,3	1	
	9	49	f	nod2	1	1	1	1	1	1	1	1	1	1																
	10	27	f	nod2	1	1	1	3	2	1	3	1	2	1																
		32,7			1,9	1,7	2	2,2	1,1	1,3	2,3	1	1,2	1																

Normal controls of Voice Related Quality of Life (V-RQOL)

Controls Copenhagen														Controls Zagreb														
BEFORE	0	age (years)	M/F	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	0	age (years)	M/F	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social		
	1	36	f	Control	1	1	1	1	1	1	1	1	1	1	1	55	f	Control	1	1	1	1	1	1	1	1	1	
	2	37	f	Control	1	1	1	1	1	1	1	1	1	1	2	49	f	Control	1	1	1	1	1	1	1	1	1	
	3	41	f	Control	1	1	1	1	1	1	1	1	1	1	3	37	f	Control	1	1	1	1	1	1	1	1	1	
	4	26	f	Control	1	1	1	1	1	1	1	1	1	1	4	17	f	Control	1	1	1	1	1	1	1	1	1	
B	5	50	f	Control	1	1	1	1	1	1	1	1	1	1	5	27	f	Control	1	1	1	1	1	1	1	1	1	
	6	49	f	Control	1	1	1	1	1	1	1	1	1	1	6	50	f	Control	1	1	1	1	1	1	1	1	1	
	7	36	f	Control	1	1	1	1	1	1	1	1	1	1	7	44	f	Control	1	1	1	1	1	1	1	1	1	
	8	25	f	Control	1	1	1	1	1	1	1	1	1	1	8	42	f	Control	1	1	1	1	1	1	1	1	1	
	9	27	f	Control	1	1	1	1	1	1	1	1	1	1	9	49	f	Control	1	1	1	1	1	1	1	1	1	
	10	65	f	Control	1	1	1	1	1	1	1	1	1	1	10	41	f	Control	1	1	1	1	1	1	1	1	1	
	11	63	f	Control	1	1	1	1	1	1	1	1	1	1	11	26	f	Control	1	1	1	1	1	1	1	1	1	
	12	42	f	Control	1	1	1	1	1	1	1	1	1	1					39,7		1	1	1	1	1	1	1	1
	13	24	f	Control	1	1	1	1	1	1	1	1	1	1														
	40,1				1	1	1	1	1	1	1	1	1	1														
AFTER	0	age (years)	M/F	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social	0	age (years)	M/F	diagnosis	voice	voice	voice	psycol	psycol	social	social	social	social		
	1	36	f	Control	1	1	1	1	1	1	1	1	1	1	1	55	f	Control	1	1	1	1	1	1	1	1	1	
	2	37	f	Control	1	1	1	1	1	1	1	1	1	1	2	49	f	Control	1	1	1	1	1	1	1	1	1	
	3	41	f	Control	1	1	1	1	1	1	1	1	1	1	3	37	f	Control	1	1	1	1	1	1	1	1	1	
	4	26	f	Control	1	1	1	1	1	1	1	1	1	1	4	17	f	Control	1	1	1	1	1	1	1	1	1	
	5	50	f	Control	1	1	1	1	1	1	1	1	1	1	5	27	f	Control	1	1	1	1	1	1	1	1	1	
	6	49	f	Control	1	1	1	1	1	1	1	1	1	1	6	50	f	Control	1	1	1	1	1	1	1	1	1	
	7	36	f	Control	1	1	1	1	1	1	1	1	1	1	7	44	f	Control	1	1	1	1	1	1	1	1	1	
	8	25	f	Control	1	1	1	1	1	1	1	1	1	1	8	42	f	Control	1	1	1	1	1	1	1	1	1	
	9	27	f	Control	1	1	1	1	1	1	1	1	1	1	9	49	f	Control	1	1	1	1	1	1	1	1	1	
	10	65	f	Control	1	1	1	1	1	1	1	1	1	1	10	41	f	Control	1	1	1	1	1	1	1	1	1	
	11	63	f	Control	1	1	1	1	1	1	1	1	1	1	11	26	f	Control	1	1	1	1	1	1	1	1	1	
	12	42	f	Control	1	1	1	1	1	1	1	1	1	1					39,7		1	1	1	1	1	1	1	1
	13	24	f	Control	1	1	1	1	1	1	1	1	1	1														
	40,1				1	1	1	1	1	1	1	1	1	1														

Lx 180Deg 210.0f



European Review of ENT

Since scores from a mathematical point of view not can be averaged (the distance between each score not being measured, nor secured) the scores for the GRBAS test are also presented.

The GRBAS voice perception test in patients and normal persons in Denmark and Croatia on a visual scale from 1-100 (1=best, 100=worst)

Patients Copenhagen									Patients Zagreb								
BEFORE	age [years]	MIF	diagnosis:nod 1	overall sev	Roughness	breathiness	strain		age [years]	MIF	diagnosis	overall sev	Roughness	breathiness	strain		
	1	44 f	nod1	50	50	25	50		1	27 f	nod1	60	56	90	60		
	2	26 f	nod1	75	75	25	75		2	18 f	nod1	35	1	35	35		
	3	26 f	nod1	40	40	40	40		3	49 f	nod1	40	90	60	50		
	4	28 f	nod1	70	70	25	70		4	55 f	nod1	60	90	74	62		
A	5	25 f	nod1	50	75	25	75		5	27 f	nod1	60	56	90	60		
	6	20 f	nod1	70	70	25	70		6	55 f	nod1	1	1	20	1		
	7	45 f	nod1	25	25	1	50					42,7	49	61,5	44,7		
	8	37 f	nod1	50	75	25	80										
	9	49 f	nod1	25	25	1	50										
	10	27 f	nod1	50	75	25	50										
	32,7			50,5	58	21,7	61										
AFTER	age [years]	MIF	diagnosis:nod 1	overall sev	Roughness	breathiness	strain		age [years]	MIF	diagnosis	overall sev	Roughness	breathiness	strain		
	1	44 f	nod2	1	1	1	25		1	27 f	nod2	40	40	70	50		
	2	26 f	nod2	75	75	25	75		2	18 f	nod2	35	1	35	35		
	3	26 f	nod2	25	25	1	40		3	49 f	nod2	30	80	50	40		
	4	28 f	nod2	70	70	25	70		4	55 f	nod2	50	70	60	62		
	5	25 f	nod2	25	25	1	25		5	27 f	nod2	40	40	70	50		
	6	20 f	nod2	25	1	1	1		6	55 f	nod2	1	1	1	1		
	7	45 f	nod2	30	30	30	30					32,7	38,7	47,7	39,7		
	8	37 f	nod2	1	1	1	1										
	9	49 f	nod2	1	1	1	25										
	10	27 f	nod2	25	25	1	40										
	32,7			26,8	23,4	6,7	31,2										

Normal controls of GRBAS test

Controls Copenhagen									Controls Zagreb							
	age [years]	MIF	diagnosis	overall sev	Roughness	breathiness	strain		age [years]	MIF	diagnosis	overall sev	Roughness	breathiness	strain	
BEFORE	1	36 f	Control	1	1	1	1		1	55 f	Control	1	1	1	20	
	2	37 f	Control	1	1	1	1		2	49 f	Control	1	1	1	1	
	3	41 f	Control	1	1	1	1		3	37 f	Control	1	1	1	1	
	4	26 f	Control	1	1	1	1		4	17 f	Control	1	1	1	1	
	B	5	50 f	Control	1	1	1	1		5	27 f	Control	1	1	1	1
		6	49 f	Control	1	1	1	1		6	50 f	Control	1	1	1	1
		7	36 f	Control	1	1	1	1		7	44 f	Control	1	1	1	1
		8	25 f	Control	1	1	1	1		8	42 f	Control	1	1	1	1
		9	27 f	Control	1	1	1	1		9	48 f	Control	1	1	1	1
		10	65 f	Control	1	1	1	1		10	41 f	Control	1	1	1	1
		11	63 f	Control	1	1	1	1		11	26 f	Control	1	1	1	1
		12	42 f	Control	1	1	1	1			35,7		1	1	1	2,7
		13	24 f	Control	1	1	1	1								
		40,1			1	1	1	1								
AFTER	1	36 f	Control	1	1	1	1		1	55 f	Control	1	1	1	1	
	2	37 f	Control	1	1	1	1		2	49 f	Control	1	1	1	20	
	3	41 f	Control	1	1	1	1		3	37 f	Control	1	1	1	1	
	4	26 f	Control	1	1	1	1		4	17 f	Control	1	1	1	1	
	5	50 f	Control	1	1	1	1		5	27 f	Control	1	1	1	1	
	6	49 f	Control	1	1	1	1		6	50 f	Control	1	1	1	1	
	7	36 f	Control	1	1	1	1		7	44 f	Control	1	1	1	1	
	8	25 f	Control	1	1	1	1		8	42 f	Control	1	1	1	1	
	9	27 f	Control	1	1	1	1		9	48 f	Control	1	1	1	1	
	10	65 f	Control	1	1	1	1		10	41 f	Control	1	1	1	1	
	11	63 f	Control	1	1	1	1		11	26 f	Control	1	1	1	1	
	12	42 f	Control	1	1	1	1			35,7		1	1	1	2,7	
	13	24 f	Control	1	1	1	1									
	40,1			1	1	1	1									

Lx 180Deg 210.0Hz 79:3



European Review of ENT

The hope for the future is that quantitative measures can take over from scores evaluation, because scores are too difficult to handle well statistically. One of the options has been jitter and shimmer % in the MDVP by Key-Elometrics.

Lx 180Deg 210.0Hz 79.3dB



www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology

The multi dimensional voice program (MDVP) acoustical analysis: mean jitter% and shimmer% of /a/ and /i/ at the first and second examination with one month's interval.

The first measurement (MDVP) and second measurement of all patients compared with controls in a case-control study. A reduction of shimmer% /i/ was found between the first and second examination ($p < 0.02$). For shimmer% /a/ the same tendency was seen but not significant ($p = 0.053$).

1. EXAMINATION	Denmark		Croatia	
	patients	controls	patients	controls
	n=10	n=13	n=6	n=11
jitter% /a/	2.9	1.1	2.0	1.4
jitter % /i/	2.4	1.8	2.5	1.3
shimmer% /a/	12.3	3.5	11.0	4.9
shimmer % /i/	11.3	4.6	7.7	3.4
sentence jitter%	6.1	4.3	3.5	4.2
<hr/>				
2. EXAMINATION	patients	controls	patients	controls
jitter% /a/	2.9	1.1	2.0	0.9
jitter % /i/	2.8	1.8	2.0	1.1
shimmer% /a/	7.2	4.4	5.0	2.0
shimmer % /i/	7.2	5.6	5.0	2.3

www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology

We still think based on the experiences in our laboratory, that the suggestions made in Oxford at the Int. Conf. of Paediatrics ENT 2002 , and at the European conf. of phoniatics 2003 are relevant:

A division for 3 kinds of voice labs: standard clinical labs, optimal clinical labs and research labs

Lx 180Deg 210.0Hz 79.3dB



Physiological Area

Standard equipment:

Stroboscopy

Airflow measurements (MFR and Phonation time)

Videokymography

Optimal equipment:

Electroglottography

Respiratory measurements (long & short time)

Air pressure

Electromyography

Articulographic measurements (three-dimensional magnetic sensor)

Future equipment:

Videostrobolaryngoscopy with quantitative computing

Instrumentation for brain stem-, brain flow- and other brain activity measurements

Ultrasounds scanning

www.mpedersen.org

XXIX Congress of the Nordic Association of Otolaryngology

Acoustical Area

Standard equipment:

Recording procedure: Audio tape (analogue recording)

Fundamental frequency with jitter

Intensity with shimmer

Signal-to-noise ratio & signal-to-harmonics ratio, nasality

Spectral analysis (FFT, spectrography, LTAS, power spectrum)

Optimal equipment:

Recording procedure: DAT or DVD (digital recording)

Phonetograms (2- or 3-dimensional) for speech, singing and shouting

Phonation index, diplophonia, voice breaks

Simultaneous video- and sound recording (for analysis)

Future equipment:

Stroboscopy combined with phonetography (averaging of phonetograms)

Motor speech profile measurements

Voice efficiency measurements www.mpedersen.org (airflow and acoustic signal)

Perceptual and Psychological Area

Standard methods:

Listening standards (including Grab test)

Voice quality test (including nasality)

Standardized methods for registration of patients' subjective statements of illness

Optimal methods:

Objective speech acoustics related perception

Objective musical acoustics related perception

Video- and acoustic recording of speech and voice behavior (e.g. by stuttering)

Future methods:

Objective registrations of moods at the physiological and acoustic level

