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Stress and distress in non-organic voice disorders

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Summary

Non-organic voice disorders are characterised by an impaired voice sound, and/or reduced vocal capacity, and/or laryngeal sensory disturbances, all in the absence of causal organic laryngeal pathology. Psychogenic causes, a "psychological disequilibrium", and an increased tension of the laryngeal muscles are presumed to be one end of the spectrum of possible factors leading to the development of the disorder.

In making a diagnosis, perceptive and acoustic methods for voice analysis are used in addition to the ENT-examination and the laryngostroboscopy. An assessment of the degree to which the patient feels him/herself subjectively affected by the voice disorder also plays an important role. If the history reveals any indication of psychosocial stress or conflict, the patient is offered psychological consultations. These conflicts seem less often to be deep rooted psychopathological problems but rather daily anxieties, failures, injuries, annoyances, disappointments regarding the sufferer him/herself and others, the non-fulfilment of desires, feelings of inadequacy and of lack of self-confidence. The patients may find it difficult to speak about conflicts and feelings, and they follow social conventions to an excessive extent. In frustrating situations patients tend to react aggressively towards themselves rather than towards others and are too quick in seeking a solution to any problem that may arise.

The role of the voice as a "barometer of emotion", where a disorder may be regarded as a sign of emotional stress, has to be taken into consideration before starting a therapy: If the non-organic voice disorder is obviously due to vocal misuse and muscle tension, a more symptom-orientated voice therapy may be favoured. If psychosocial stress seems to play a greater role, additional counseling may be necessary.

Only by using this approach can the patient be offered a therapy which goes into the causes and thereby addresses the whole person.

Key words: non-organic voice disorder; dysphonia; psychosocial conflict; psychosomatics

Introduction

At the centre of an intended communication is the message which a speaker wishes to transmit to a receiver [1]. In human oral communication the message is normally formulated in words. But when expressed the message consists not only of the words but also of paralinguistic phenomena, eg, body language, tone, rhythm, speech velocity, pauses etc. [2].

The human voice is highly relevant here, as it influences the attitude of a listener towards his partner in communication. While this attitude is only 7% dependent on the content of the speech, it is 55% dependent on facial expression and 38% dependent on the sound of the voice [3]. In evaluating a speaker's personality, listeners are influenced by the speaker's tone of voice more than by the content of the words [4]. Patients with a harsh-breathy voice are evaluated more negatively with regard to both personality and appearance than patients without a voice disorder [5]. There is nothing new about this knowledge. Two thousand years ago Cicero wrote in his work "De oratore" ("The speaker"): "Atque, ut latine loquamur, … etiam lingua et spiritus et vocis sonus est ipse moderandus." ("To speak correctly, … we must as well regulate the tongue, the breath and the sound of the voice.") [6].

In addition to personality, the voice reflects the emotional status of the speaker: the voice has been called the "barometer of emotion" [7–9]. Conversely, this means that if changes and disturbances occur in the voice they can be understood as a reaction to emotional stress [10].

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Definition of non-organic voice disorders

Aronson [8] postulates that a voice disorder exists when "quality, pitch, loudness or flexibility differs from the voices of others of similar age, sex and cultural group". In the western world voice disorders are primarily connected with hoarseness and range from mild hoarseness to complete voice loss [11].

There is a distinction between organic and non-organic voice disorders. Examples of organic voice disorders include malformations of the larynx, acute or chronic inflammation of the vocal cords, trauma, vocal cord paralysis, benign or malignant tumors. Non-organic voice disorders are defined as an impaired voice sound, and/or reduced vocal capacity, and/or laryngeal sensations in the absence of causal organic laryngeal pathology [8, 12]. Non-organic voice disorders are often also called functional or psychogenic voice disorders (or dysphonia) [13].

Differential diagnosis of non-organic voice disorders

The basal diagnosis "non-organic voice disorder" can be established by excluding the existence of an organic voice disorder. The differential diagnosis extending to the type of non-organic voice disorder involved (eg, hyperfunctional dysphonia, contact granuloma, vocal cord thickening, mutation voice disorder) can be made by phenomenological features, but these do not give clues as to their cause.

In an attempt to attribute the different non-organic voice disorders to different causes, many specialists rely on terms like "psychogenic", "psychosomatic", "somatoform disorder" or "somatisation disorder" [8, 14]. But these terms are used too inconsistently and their definitions are not clear cut; it is therefore much more useful to regard all non-organic voice disorders as situated on a continuum, ranging from "psychogenic aphonia" at the top (i.e. where the role of psychosocial factors in the causality is greatest) via "psychogenic dysphonia" etc. to "professional dysphonia" at the bottom. The latter often stems not only from vocal misuse but also from problems of dissatisfaction at work or from conflicts in private life.

Even in spasmodic dysphonia (previously seen as a purely psychogenic disorder, but today a disorder with mainly neurogenic causes) psychosocial factors are likely to be causally involved. Aronson therefore proposes that all non-organic voice disorders should be understood as "psychogenic" and that they should be so designated [8]. As an alternative to "psychogenic", the term "psychosomatic" has been suggested [15].

Frequency of non-organic voice disorders

Information of the prevalence of voice disorders varies enormously in the literature. There are estimates of between 0.65% and 15% of the general population [16], between 6% [17] and 46% [18] in childhood and between 12% and 35% of the elderly [11]. In a recent epidemiological study with more than 1200 participiants Roy et al. [16] report that 28.8% of the adult population has suffered at least once in their lives from a voice disorder, that at the time of the enquiry 6.2% of the adult population was suffering from a voice disorder and that 5.5% had had medical attention for a voice disorder. The proportion of non-organic voice disorders in these cases is estimated to be 70–80% [15].

Aetiology of non-organic voice disorders

The aetiology of non-organic voice disorders is controversially discussed, a fact that is reflected by the different terminology used. On the one hand these disorders are thought to be of psychogenic origin, "as a manifestation of psychological disequilibrium" [8]. On the other hand, increased muscle tension, eg, with vocal abuse, is thought to play an important role in their genesis [19]. This may not be a contradiction, as the extrinsic and intrinsic laryngeal muscles are probably exquisitely sensitive to emotional stress [8].

For the development of non-organic voice disorders both hypotheses – psychological disequilibrium and increased muscle tension – may represent the ends of a wide spectrum of causal factors: Whether a voice disorder is due more to vocal misuse and muscle tension or more to psychosocial stress is more a "*question of degree* to which the un-

Figure 1

Aetiopathogenesis of non-organic voice disorders (modified from [12]).

derlying emotional stresses contribute to onset and perpetuation of the excessive laryngeal tension" [13]. The interaction of the different aetiological factors are shown in figure 1. These factors are:

– excessive demands made of the voice
– stress suffered by the individual with or without chronic distress
– the vocal organ as a "locus minoris resistentiae" is often a region of special sensitivity

What is important, however, is not only the sensitivity *of* the vocal organ, but also sensitivity *towards* the vocal organ, in other words, the patient's particular awareness of the "voice" phenomenon [8]. This may be eg, the professional use of the voice, the fact that the family attaches particular importance to speaking and singing or voice disorders in the social environment.

The voice disorder often becomes apparent when an "event" occurs which triggers the symptom of dysphonia. This may be an acute laryngitis, an episode of gastroesophageal reflux, acute vocal abuse or merely an acute stress situation in the relationship, family, work place etc. In consequence of a non-organic voice disorder secondary morphological alterations of the vocal folds can occur, such as initially a hyperaemia, later on oedema, noduli, polyps or granulomas. If a voice disorder persists, psychosocial consequences can result, eg, a feeling of being ill, feelings of inadequacy, carcinophobia, and even existential fear especially in patients whose professions depend on their voice [12]. So the voice disorder will lead to emotional consequences and in this way reinforce the vocal distress [20], which again – like a vicious circle – can lead to a worsening of the vocal function. A "secondary neurotisation" can however be excluded as a significant aetiologic factor when the history has shown that voice-relevant neurotical structures were present long before the beginning of the voice disorder. The so-called "third-factor-problem" – namely the fact that psychological changes and deficient voice quality may both be the result of an underlying disorder – must be taken into account, by considering whether potential primary disorders of a somatic or psychogenic kind (eg, multiple sclerosis, Parkinsons disease, major depression etc.) are present.

Diagnosis of non-organic voice disorders

History

The history includes the current problems which led to the consultation plus a detailed medical history. Whilst taking the history the interviewer pays particular attention to hints or brief mention of current psychosocial conflicts, to the way in which the patient shows emotions and to his own emotional reactions toward the patient. From this information the interviewer tries to understand the subjective importance which the voice disorder may have for the patient at this stage of his/her life.

Figure 2

Video-laryngostroboscopy.

ENT examination

A complete ENT-examination is performed, followed by an audiometry if necessary.

Laryngostroboscopy

Laryngostroboscopy is based on the method of indirect laryngoscopy inaugurated by Garcia in 1855. It is possible to view the larynx and the vibrating vocal cords with the rigid 90° or 70° scope or with the flexible endoscope. Using stroboscopy the pitch of the voice is measured with a microphone, which varies in male voices between G (g2, 98 Hz) and c (c3, 131 Hz) and in female voices between c (c3, 131 Hz) und c1 (c4, 262 Hz). If the regularly vibrating vocal cords are illuminated by short flashes of light with the same frequency as the vibrations, the vocal cords will appear immobile. If the frequency of the light flashes is slightly higher or lower than the frequency of the vibrating vocal cords, this will produce an illusion of vibration in slow motion [21, 22]. Amplitudes and mucosal waves of the vibrating vocal cords as well

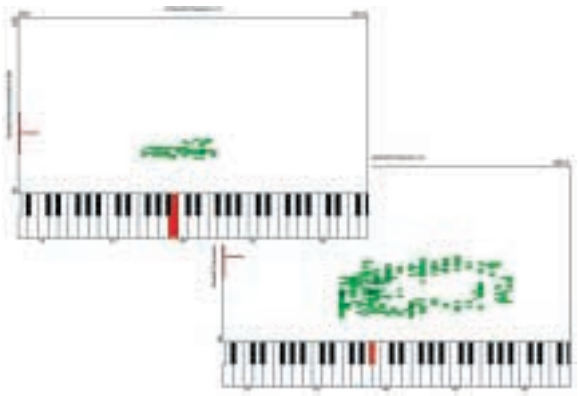

Figure 3

VRP of a 53yr old female patient suffering from non-organic voice disorder before (left) and after (right) voice therapy.

as their regularity and their closure can be assessed. In non-organic voice disorders in particular this method makes it possible to identify muscular tension [23]. But even in the diagnosis of organic voice disorders laryngostroboscopy can be useful: for example, an intact mucosal wave can rule out extensive vocal cord invasion [24]. A great advantage of this method is that it is possible to connect a video player or a multi-media PC to the laryngostroboscope and thus to document the findings, to analyse them afterwards or to use them for teaching or research purposes (fig. 2).

Perceptive voice analysis

The perceptive voice analysis is based on perception by the examiner's ear. The severity of hoarseness is described by the different parameters of the GRBAS-Scale [25]. The overall voice quality is characterised by the parameter grade (G), the two main components of hoarseness are roughness (R) and breathiness (B). Roughness is the impression of the irregularity of the vibration of the vocal cords and breathiness is the audible impression of turbulent air leakage through insufficient glottic closure [26]. These parameters are also included for the RBH-Scale described by Nawka and Anders [27]: Roughness, in German "Rauhigkeit" (R), Breathiness "Behauchtheit" (B), and Hoarseness "Heiserkeit" (H), of which the latter corresponds to grade (G) of the GRBAS-Scale. The parameter asthenicity (A) and strain (S) of the GRBAS-scale have been proved to be of less importance.

The parameters are usually quantified using a 4-point scale:

0 = no deviance
1 = slight deviance
2 = moderate deviance
3 = severe deviance

The auditive rating is made based on conversional speech (during history-taking) or on the reading of a short defined text, eg, the "Rainbow passage" (in English) or "Wind und Sonne" ("wind and sun", in German, French, Italian).

Acoustic voice analysis

Relevant parameters for acoustic voice analysis are fundamental frequency which is pitch of the voice sound, jitter and shimmer and noise to harmonic ratio (NHR) or normalised noise energy (NNE).

Jitter is defined as period to period variability of fundamental frequency, shimmer as variability of peak to peak amplitude. NHR is the average ratio of energy of the non-harmonic components within the frequency range of 1.5–4.5 kHz to the harmonic components extending from 70 to 4500 Hz [28]. Jitter and shimmer are presumed to correlate with the quality and regularity of the vibration of the vocal cords and NHR or NNE with the closure of the vocal cords during phonation [29]. When the acoustic and the perceptive data are compared, jitter and shimmer seem to reflect more the roughness, whereas NHR reflects more the breathiness of the voice [28].

These parameters can be registered by different voice analysis programs, eg, the Multidimensional Voice Program (MDVP) of Kay Elemetrics Ltd. (USA) or the Goettingen Hoarseness Diagram [30]. Both methods allow a quantitative description and graphic representation of the different voice characteristics and a comparison at different points in time eg, during therapy of a voice disorder. The advantage of the non-invasiveness of the method is counterbalanced by the disadvantage that parameter values are widely distributed [31].

Voice Range Profile (VRP)

The voice range profile (VRP), often called the "phonetogram", offers another possibility to describe the voice quantitatively. The VRP provides a two dimensional representation of the minimum and maximum fundamental frequency (pitch in Hz, x-axis) and sound pressure level (loudness in dB, y-axis).

The physiological VRP showing the extreme ranges of frequency and amplitude of the voice should be differentiated from the musical VRP which shows the voice range usable for singing. The VRP is age and sex dependent and can be performed even in children of primary school age [32]. The performance of the examination is standardised [33].

The VRP is used in the clinical evaluation of voice disorders and makes it possible for example to document the recovery or improvement of the voice after an operation or voice therapy (fig. 3) [34, 35].

Dysphonia severity index (DSI)

The Dysphonia severity index (DSI) combines different parameters of voice description. It contains in a mathematical algorithm the highest frequency and lowest intensity of the voice from the VRP, jitter in per cent and the maximum phonation time (MPT) in seconds. To measure the latter, the patient is asked to breathe in deeply and during expiration to phonate an /a:/ for as long as possible. The MPT is the arithmetic mean of three repeated measurements.

The DSI varies between +5 for perceptually

normal voices and –5 for severely hoarse voices. The index expresses in a single number a multidimensional description of the voice based on aerodynamics, voice range and acoustic measurements, and therefore makes it possible to compare results before and after therapy [36].

Voice handicap index (VHI)

These methods of examination using both apparatus and the examiner's own perception make it possible to produce a very precise description of the voice and its pathology. But in order to establish the degree to which the patient regards his/her voice disorder as a disease, it is essential to take into account the patient's subjective judgement about his/her voice and the impact of the voice disorder in his/her daily life.

A systematic subjective evaluation of the voice can be carried out by using the voice handicap index (VHI), which exists both in German and in English. The original version is divided into 3 sections with a total of 30 questions and statements covering possible problems caused by the voice disorder or aimed at charting restrictions or handicaps arising from the disorder [37, 38]. The 3 sections of the American original version cover:

– the psychological factor: contains statements about feeling ill at ease when speaking and about the patient's own perception of his/her voice
– the functional factor: the impact of the voice on his/her daily life,
– the emotional factor: the affective reactions of the patient caused by the voice, and its consequences for his/her social environment.

The 10 most robust items are summarised in an abbreviated version as VHI-10. The VHI-10 has a high correlation to the original VHI and has the advantage that it takes a shorter time to complete [39]. However, the VHI-questionnaire in no way replaces the extensive medical history and the doctor-patient conversation.

Psychological consultation

A referral to the psychologist is made in the case of all patients who report special psychosocial stress situations, in patients who seem to be psychologically conspicuous, and in patients with psychogenic aphonia, contact granuloma or mutation voice disorder. The psychological examination consists of three consultations and comprises an extended examination of the patient's psycho- and family-dynamic history, the Picture Frustration Test (PFT) and a detailed final discussion of the findings.

The PFT makes it possible to assess the patient's way of dealing with aggressive impulses. This test has also proved to be useful in several studies in patients with non-organic voice disorders [40–42].

Confirmation of the diagnosis

A non-organic voice disorder can be assumed if the patient complains of subjectively felt symptoms of a voice disorder, and if these can be objectivised eg, by means of the above mentioned diagnostic methods and if a potential organic reason for these symptoms can be ruled out laryngostroboscopically.

Therapy of non-organic voice disorders

The aim of therapy for a non-organic voice disorder is not necessarily a "normalisation" of the vocal function [43] but to maximise vocal effectiveness relative to the existing laryngeal disorder and to reduce the handicapping effect of the voice problem [11].

If the non-organic voice disorder is due more to vocal misuse and muscle tension, a symptom-orientated voice therapy may be of greater importance. If psychosocial stress – especially in patients with one or more of the personality traits described above – seems to play a greater role, additional counseling may be necessary.

In symptom-orientated voice therapy non-physiological tension is reduced, while sufficient physiological tension has to be built up. The primordial aspects here are perception, regulating tension in the body, the regulation of respiration and improvement of phonation and articulation. A further aim is to bring about a change in behaviour: a reduction of strain on the voice, a reduction of stress in the individual. In many cases it is possible to treat the non-organic voice disorder effectively by these means. If this therapeutic approach is not sufficient to achieve long term recovery, this indicates that the causes of the voice disorder may go deeper and/or that there may be a persistent vulnerability when psychological distress occurs.

Thus Roy et al. [44] showed that emotional adjustment problems persist in a great number of patients even after successful voice therapy. Without parallel counseling these led to a high rate of relapse.

In the psychological discussion the patient can attempt to detect possible causes for the voice disorder which influence not only the voice but the mood as well. Only if these causes – which often go back to deep-rooted experiences in the patient's life – can be removed, can the way be cleared for a therapy that treats the causes of the voice disorder. Looked at in this way, the voice disorder can be understood as a somatic signal which points to an underlying emotional conflict. If the relationship between these factors in the development of a

non-organic voice disorder is taken into account, the voice therapy will take a holistic approach addressing functional, personal and emotional aspects.

An output-orientated analysis of the effectiveness and efficiency of the therapy of patients with non-organic voice disorders is very difficult. In the first place, the figures for successful treatment quoted in the literature refer mostly to phenomenological changes in the sense of an amelioration of the vocal function. These results are therefore in no way helpful concerning the above mentioned psychosomatic causal factors. In the second place, the figures differ vastly from author to author depending on the patient population – even with an identical diagnosis – and on the therapeutic procedure to which they refer.

The therapeutic functional result of a non-organic voice disorder must be precisely objectivated by pre- and post-therapeutic videoendoscopic examinations and suitable acoustic analyses [43]. At the same time it is essential to document any changes in the conflict which may lie behind the voice disorder. Therefore it is necessary to fix a standard for further studies which includes not only the amelioration of the symptom "hoarseness" or "laryngeal sensation", but also psychosocial aspects. A start has already been made with the establishment of the "basic protocol" of the European Laryngological Society [26]; however, this instrument does not take into account the psychosomatic causal components of the voice disorder.

Features of patients with non-organic voice disorders

The important influence of emotions and personality on the voice and the role of the voice as an aspect of personality and as a means of expressing emotions have led to a number of studies which have tried to illuminate these correlations especially with regard to voice disorders. Methodological differences make a comparison of these studies difficult; nevertheless some common characteristics are recognisable in patients suffering from non-organic voice disorders.

Increased anxiety is one of the most frequently mentioned features of patients with non-organic voice disorders. Patients are described as being socially anxious, non-assertive with a tendency to self-restraint [45], and anxious concerning everyday lifestyle [46]. Anxiety may be a character trait, combined with indecisiveness and tenseness [44]; on the other hand anxiety is described more often as a feeling of being under threat in stress situations rather than as a permanent trait [47]. More stress, a higher level of general psychological distress [48] or problems coping with stress [19] can reinforce anxiety in association with stress. There is a close temporal relationship between stressful events, unresolved conflicts [46] or difficulties in a family relationship [49], and the onset of a non-organic voice disorder [47]. The causes of such conflicts seem to be not so much deep rooted psychopathological problems but rather daily anxieties, failures, injuries, annoyances, disappointments over him- or herself and others, the non-fulfilment of desires, feelings of inadequacy and of lack of self-confidence [50]. In these situations patients have difficulty in describing or speaking about their feelings [46, 48], they show a poor ability to deal with own or other people's feelings and emotions [50, 51].

This phenomenon is also reflected in the fact that the patients show a lower degree of openness [47, 52]: weaknesses cannot be openly admitted to. Patients try to please everyone, they cannot say no and avoid trouble for the sake of peace. The unwritten rules of respectability are obeyed to an excessive extent. [50]. At the same time patients are rigid and inflexible in their behaviour and have difficulty in accepting any changes once they have set themselves a goal [53]. The faculty of self criticism is poorly developed [52–54].

To sum up, the personality of patients with non-organic voice disorders can be described as somewhat anxious, shying away from conflict and over-respecting social norms, with emotional adjustment problems and difficulty in self-assertion and expressing of feelings. It appears that individuals with these traits seem to be especially susceptible to non-organic voice disorders, rather than that changes of personality are a consequence of a voice disorder.

These specific traits, however, are not necessarily a prerequisite for a non-organic voice disorder. In cases where the patient uses his/her voice professionally, the strain on the voice may initially play a greater role than personality, but it is only in conjunction with the specific personality and perhaps other factors (allergy, nicotine, gastro-esophageal reflux etc.) that a voice disorder will result [55].

Special forms of non-organic voice disorders

The interplay of these factors will be demonstrated in two striking examples of special forms of non-organic voice disorders: Psychogenic aphonia occurs mainly in females, whereas contact granuloma occurs exclusively in males.

Psychogenic aphonia

Patients with psychogenic aphonia typically communicate by whispering. Indirect laryngoscopy is normal, coughing during examination sounds clear and resonant and a regular movement of the vocal cords can be seen. Throat clearing is also voiced. The beginning of the aphonia may be sudden or there may be a progressively worsening hoarseness over a period of time.

Case history

A 38 year old female was referred by her general practitioner with a diagnosis of persisting hoarseness after upper airway infection. At the time of the first phoniatric examination she had been suffering from aphonia for 8 weeks. The larynx was normal laryngoscopically, during coughing the movement of the vocal cords was regular, coughing sounded clear and voiced. The patient had 3 children aged between 12 and 15 years. She had previously had a caesarean section and a knee operation. She was taking thyroxine for hypothyroidism. The rest of the history was unremarkable.

During the psychological consultation she reported that her childhood was dominated by unrelenting housework. Her father was unable to work because of illness and had constantly nagged his children. Her mother had to go out to work to support the 5 children.

The patient trained as a hairdresser but subsequently worked as a nursing assistant in a hospital. She had had a number of health problems in the previous few years: cancer of the uterus, a rheumatic disease, severe stomach reaction to the antirheumatic drugs and weight gain.

In addition, the patient's mother was becoming more and more demanding. She wanted attention and was constantly summoning the patient, but not her siblings, even for very minor matters. Along with her part-time job, housework and looking after the children everything was becoming too much for her.

A course of voice therapy and psychological counseling was started. After 4 sessions of voice therapy the first voiced sounds were audible in conversation. After 6 sessions of voice therapy and 7 psychological consultations the patient had recovered a normal speaking voice. During one of these consultation sessions the patient said: "It seems to me that the fact that I can speak less at the moment enables me to hear myself more …. I would say it has some positive aspects." The patient recognised that up until that time she had not dared to ask her siblings for help in looking after their demanding mother. But she had now arranged this.

Characteristics of patients with psychogenic aphonia

Patient histories usually give indications of acute or chronic emotional stress with voice loss being of symbolic significance; these histories show an emotional immaturity, neurotic life adjustment, and mild to moderate depression [8]. Patients feel tense and overburdened, they show a lower degree of openness, cannot admit to weaknesses and attach great importance to social conventions. Overall, patients with aphonia are more conspicuous than patients with other non-organic voice disorders, but the amount the voice is used seems to be of minor importance [52]. Patients with recurrent aphonia reported a higher number of problems in their private lives, their coping was characterised by a higher escape tendency [56].

Contact granuloma

In contact granuloma a development of granulation tissue at the processus vocalis of the arytenoid cartilage can be seen (figure 4). Subjectively this form of voice disorder is characterised mainly by sensations in the throat, sometimes accompanied by frequent throat-clearing and slight hoarseness.

Figure 4

Contact granuloma at the processus vocalis of the right arytenoid cartilage.

Case history

The 50 year old male patient was seeing an ENT-specialist because of recurrent attacks of coughing and laryngeal sensations. The ENT-specialist noticed a tumorous lesion at the right processus vocalis, he suspected a contact granuloma and referred the patient for phoniatric consultation.

In taking a detailed history the patient, who as the owner of a women's clothing shop in a small town was obliged to use his voice frequently, reported increasing hoarseness even after short periods of speech. His medical history was unremark-

able: no diseases, no operations, no medication, no noxae. He lived together with his second partner and her two children and two adult children from his first marriage.

The ENT-examination was inconspicuous. At laryngostroboscopy a contact granuloma of the right processus vocalis could be distinguished. The mobility of the vocal cords was symmetric, the region between the arytenoid cartilages slightly oedematous. Amplitudes and mucosal waves were stroboscopically normal and closure was complete, but the movement was irregular. The speaking voice showed slight roughness, no breathiness and no hoarseness (R1 B0 H0). The pitch of the speaking voice was about A (a2, 110 Hz), the voice range covered D – a1 (d2 – a4, 73 Hz – 440 Hz), 32 semitones.

Voice therapy and psychological counseling started. Proton pump inhibitors were prescribed.

In addition to advice on vocal hygiene, the voice therapy focussed on intensive breathing exercises including expanding the chest and regulating breathing, and exercises to loosen the breathing muscles, to soften voice onset and to improve resonance.

During psychological counseling it became clear that the patient was under high job-related pressure. He had to contend with competition from mail order businesses and from boutiques in the larger towns. On one occasion the patient said that he could not fight for customers in his daily work, he had to court them gently: "my capital is courtesy," he once remarked.

He was the youngest of 4 siblings and even as a small child he had to adapt himself to the demands of others. He said his three older sisters had been very dominant and sometimes he had felt so constrained that he could hardly breathe. He had never been asked whether he wanted to take over the shop from his father. It had been a matter of course. Shortly before the coughing attacks and the laryngeal sensations started he had realised that his shop had run into debt because his financial adviser had for some years been giving him bad advice.

During the psychological consultations the relationship between trust and mistrust was discussed intensively. The patient recognised that it was sometimes important to express his own needs clearly and that this was worth even risking a quarrel.

8 months after the first medical consultation the patient felt satisfied, he only rarely experienced laryngeal sensations, the tiredness of the voice had greatly decreased. At laryngostroboscopy the contact granuloma was no longer distinguishable. Three years after the first consultation the contact granuloma had not reappeared. The patient reported that his debt problem had been solved, and he was content with his situation.

Characteristics of patients with contact granuloma

Three main factors are presumed to be responsible for the development of contact granulomas:

- vocal abuse leading to a mechanical irritation of the arytenoid cartilages in a "hammer and anvil" effect [57, 58],
- gastroesophageal reflux [59], and
- psychosomatic influences [60, 61].

Patients suffering from contact granuloma are typically adult males who show personality traits of anxiety (62). Often they are employees in middle-management positions. They have a certain amount of responsibility, but at the same time they also have a direct superior, so they are in what might be called a "sandwich-position" [60].

As far back as 1956 contact granuloma was characterised by Moses as "neurosis of the vocal cord" [7]. He described emotional conflicts as often going hand in hand with this disorder. Predisposing factors are presumed to include personality traits such as emotional lability, sensitivity to stress, inhibition combined with feelings of social anxiety and a tendency to somatisation [60]. Mans et al. [61] classify half of the patients with contact granuloma as belonging to the psychosomatic function type, who cope with impaired self-esteem through hypochondriac anxiety, diffuse states of somatic tension and an inability to speak about emotions (alexithymia). Anankastic and depressive elements also play a role. Fear of physical lesions and of appearing in public, impulsiveness, strain and low extraversion were found to be high risk factors as well as high or low achievement orientation [62].

PFT-diagnostics

In both the above voice disorders co-causation due to psychogenic factors is assumed. Therefore the question arises whether there are similarities between the two patient groups. For this reason 27 patients from the division of phoniatrics in Berne – 7 females suffering from aphonia and 20 males with contact granuloma – were examined using the Picture Frustration Test (PFT). The age of the females varied between 23 and 67 years (mean = 45.3 years), the age of the males between 38 and 64 years (mean = 50.1 years). The respective diagnosis was established by videolaryngostroboscopy.

The PFT contains 24 drawings showing situations in which one person says something which should provoke frustration in the second person. The patient has to answer in lieu of the frustrated

Figure 5
Example of a cartoon situation from the PFT. The patient has to answer for the person experiencing the frustation (printed with kind permission of the Hogrefe-Verlag, Goettingen).

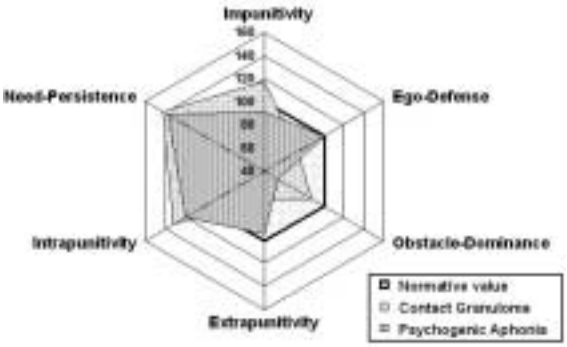

Figure 6
Diagram of PFT. The 100%-line symbolises the normative values of the test, the higher percentages mean a higher, the lower percentages a lower value of the respective characteristic.

person by filling out an empty speech bubble (fig. 5). The answers are assigned to the 3 different reaction types "obstacle-dominance", "ego-defense", "need-persistence", and the 3 directions for aggression: "extrapunitivity", "intropunitivity", and "impunitivity" [63].

The results are shown in a surface diagram (fig. 6). The 100%-line represents the normative values of the test, the higher percentages mean a higher, the lower percentages a lower value of the characteristic in question.

In dealing with frustrating situations women with psychogenic aphonia and men with contact granuloma show an increased intrapunitivity, that is a high tendency to direct aggressive impulses against themselves (self-reproach, guilt feelings). Both patient groups also show an increased need-persistence, which means an inclination to immediately seek or to propose a solution to any problem that may arise.

In addition in the male patients with contact granuloma an increased impunitivity is observed, meaning an increased tendency to avoid aggression, and a lowered extrapunitivity, namely suppressed expression of anger. Blame is not so much directed outwards as towards the patient himself (ie, diminished ego-defense).

Women with psychogenic aphonia show a lowered obstacle-dominance. Frustration is at the center of this reaction. The patients are not particularly sorry for themselves and have little self-pity.

So in both groups noticeable patterns in dealing with anger and aggression can be detected: Anger and aggression are mostly suppressed or are directed towards the individual him- or herself.

The most noticeable finding in both groups, however, is the increased need-persistence, the inclination to immediately seek a solution. Instead of recognising that the causes of a conflict lie with the partners in their interaction and with the social (and biographical) circumstances, the frustration is simply accepted as something unavoidable. This approach to solving conflicts can sometimes be a helpful characteristic, but if it is taken to extremes it leads the patient to abandon conflict situations before their genesis can be understood. At the same time patients reduce the chance of distancing themselves from frustrating situations. The therapy should therefore include giving the patients a greater understanding of the reasons why they act in this way and working out alternative behaviour patterns.

Critical discussion on the nature of non-organic voice disorders

A modern critical discussion of the nature of non-organic voice disorders requires reference to a theoretical scientific position of constructivism. This means that all our concepts of reality are constructs of our perception and of our thinking and feeling and that therefore the search for absolute truth cannot lead to the desired goal. For patients – especially for those suffering from non-organic voice disorders – this means that their own history and the way in which they understand it has an important impact on their disorder. For medical scientists this means that the "subjective truths" of their patients must also be considered as aetiological factors.

Therefore it is quite essential to use research methods not only from the natural sciences but also from the humanities (hermeneutic, idiographic). The aetiological power of subjective theories of disease and disorders cannot be proved by scientific methods alone but must also be verified by qualitative research. This approach should be given more importance in future studies in the field of communication disorders.

Conclusion

In diagnosis and therapy of non-organic voice disorders all potentially important aetiological factors have to be taken into account. In addition to the organic voice examinations carried out using technical equipment, sufficient time must be allotted during the medical consultation to discover the subjective meaning of the voice disorder for the particular patient. The role of the voice as "barometer of emotion" needs to be taken into consideration: only in this way can patients be offered a treatment which deals with the whole person.

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References

1 Schulz von Thun F. Miteinander Reden. Reinbek: Rowohlt, 1997.
2 Watzlawick P, Beavin JH, Jackson DD. Menschliche Kommunikation. 4 ed. Bern, Stuttgart, Wien: Hans Huber, 1974.
3 Mehrabian A. Silent Messages. Belmont, California: Wadsworth Publishing Company, Inc., 1971.
4 Yogo Y, Ando M, Hashi A, Tsutsui S, Yamada N. Judgments of emotion by nurses and students given double-bind information on a patient's tone of voice and message content. Percept Mot Skills 2000;90:855–63.
5 Blood GW, Mahan BW, Hyman M. Judging personality and appearance from voice disorders. J Commun Disord 1979;12: 63–8.
6 Cicero MT. De oratore / Über den Redner. 3 ed. Stuttgart: Philipp Reclam Jun., 1997.
7 Moses PJ. Die Stimme der Neurose. Stuttgart: Georg Thieme Verlag, 1956.
8 Aronson AE. Clinical Voice Disorders. 3 ed. Stuttgart, New York: Georg Thieme Verlag, 1990.
9 Roy N, Bless DM. Personality Traits and Psychological Factors in Voice Pathology: A Foundation for Future Research. J Speech Lang Hear Res 2000;43:737–48.
10 Bauer HH. Zur Definition psychogener Stimmstörungen. Laryngo-Rhino-Otol 1991;70:102–4.
11 Olson Raming L, Verdolini K. Treatment Efficacy: Voice Disorders. J Speech Lang Hear Res 1998;41:S 101–S 116.
12 Pascher W, Bauer HH. Differentialdiagnose von Sprach-, Stimm- und Hörstörungen. 2 ed. Frankfurt am Main: Wötzel, 1998.
13 Baker J. Psychogenic voice disorders-heroes or hysterics? A brief overview with questions and discussion. Log Phon Vocol 2002;27:84–91.
14 Kinzl J, Biebl W, Rauchegger H, Weissbacher S, Hinterhuber H. Funktionelle Aphonie – ein Konversionssymptom zur Angstabwehr. Psychother Med Psychol 1988;38:347–51.
15 Kiese-Himmel C, Kruse E. Gibt es eine psychosomatische Dysphonie? Sprache Stimme Gehör 1996;20:20–5.
16 Roy N, Merrill RM, Thibeault S, Parsa RA, Gray SD, Smith EM. Prevalence of Voice Disorders in Teachers amd the General Population. J Speech Lang Hear Res 2004;47:281–93.
17 Kittel G. Dysphonie im Kindesalter. Laryng Rhinol Otol 1984;63:208–11.
18 Silverman EM, Zimmer CH. Incidence of chronic hoarseness among school-age children. J Speech Hear Dis 1975;40:211–5.
19 Morrison M, Nichol H, Rammage LA. Diagnostic criteria in functional dysphonia. Laryngoscope 1986;94:1–8.
20 Rubin JS, Greenberg M. Psychogenic Voice Disorders in Performers: A Psychodynamic Model. J Voice 2002;16:544–8.
21 Schönhärl E. Die Stroboskopie in der praktischen Laryngologie. Stuttgart: Georg Thieme Verlag, 1960.
22 Kitzing PMD. Stroboscopy – a pertinent laryngological examination. J Otolaryngol 1985;14:151–7.
23 Schneider B, Wendler J, Seidner W. The relevance of stroboscopy in functional dysphonias. Folia Phoniatr Logop 2002;54:44–54.
24 Colden D, Zeitels SM, Hillman RE, Jarboe J, Bunting G, Spanou K. Stroboscopic assessment of vocal fold keratosis and glottic cancer. Ann Otol Rhinol Laryngol 2001;110:293–8.
25 Hirano M. Clinical Examination of Voice. Wien, New York: Springer-Verlag, 1981.
26 Dejonckere PH, Bradley P, Clemente P, et al. A basic protocol for functional assessment of voice pathology, especially for investigating the efficacy of (phonosurgical) treatments and evaluating new assessment techniques. Eur Arch Otorhinolaryngol 2001;258:77–82.
27 Nawka T, Anders LC, Wendler J. Die auditive Beurteilung heiserer Stimmen nach dem RBH-System. Sprache Stimme Gehör 1994;18:130–3.
28 Jaeger M, Fröhlich M, Hertrich I, Ackermann H, Schönle PW. Dysphonia Subsequent to Severe Traumatic Brain Injury: Comparative Perceptual, Acoustic and Electroglottographic Analyses. Folia Phoniatr Logop 2001;53:326–37.
29 Kruse E, Michaelis D, Zwirner P, Bender E. Stimmfunktionelle Qualitätssicherung in der kurativen Mikrochirurgie der Larynxmalignome. HNO 1997;45:712–8.
30 Fröhlich M, Michaelis D, Strube HW, Kruse E. Acoustic Voice Analysis by Means of the Hoarseness Diagram. J Speech Lang Hear Res 2000;43:706–20.
31 Pützer M. Multiparametrische Stimmqualitätserfassung männlicher und weiblicher Normalstimmen. Folia Phoniatr Logop 2001;53:73–84.
32 Wuyts FL, Heylen L, Mertens F, et al. Effects of age, sex, and disorder on voice range profile characteristics of 230 children. Ann Otol Rhinol Laryngol 2003;112:540–8.
33 Schutte HK, Seidner W. Recommendation by the Union of European Phoniatricians (UEP): Standardizing Voice Area Measurement/Phonetography. Folia phoniat 1983;35:286–8.
34 Hilgenheger C, Sarfati J, Reyt E, Sittel C, Eckel HE. Valeur du phonetogramme relatif (PR) dans l'evaluation des dysphonies organiques. Rev Laryngol Otol Rhino (Bord) 1999;120:231–7.
35 Ikeda Y, Masuda T, Manako H, Yamashita H, Yamamoto T, Komiyama S. Quantitative evaluation of the voice range profile in patients with voice disorder. Eur Arch Otorhinolaryngol 1999;256:51–5.
36 Wuyts FL, De-Bodt M, Molenberghs G, et al. The Dysphonia Severity Index: An Objective Measure of Vocal Quality Based on a Multiparameter Approach. J Speech Lang Hear Res 2000; 43:796–809.
37 Jacobson BH, Johnson A, Grywalski C. The Voice Handicap Index (VHI): Development and validation. Am J Speech Lang Pathol 1997;6:66–70.
38 Nawka T, Wiesmann U, Gonnermann U. Validierung des Voice Handicap Index (VHI) in der deutschen Fassung. HNO 2003;51:921–9.
39 Rosen CA, Lee AS, Osborne J, Zullo T, Murry T. Development and Validation of the Voice Handicap Index-10. Laryngoscope 2004;114:1549–56.
40 Schäuble HH, Schlünder M, Bernhard P, Lamprecht F. Psychosomatische Aspekte der funktionellen Dysphonie. Prax Klin Verh Med Rehab 1988;1:34–7.
41 Nienkerke Springer A. Die Kinderstimme – Ein systemischer Förderansatz. Neuwied, Kriftel, Berlin: Luchterhand, 2000.
42 Rauchfleisch U. Handbuch zum Rosenzweig Picture-Frustration Test (PFT). Bern: Huber, 1979.
43 Kruse E. Gestörte Stimme – Konservative Verfahren. Laryngo-Rhino-Otol 2005;84(Suppl.):S192–S200.

44 Roy N, McGrory JJ, Tasko SM, Bless DM, Heisey D, Ford CN. Psychological Correlates of Functional Dysphonia: An Investigation Using the Minnesota Multiphasic Personality Inventory. J Voice 1997;4:443–51.
45 Roy N, Bless DM, Heisey D. Personality and Voice Disorders: A Superfactor Trait Analysis. J Speech Lang Hear Res 2000;43: 749–68.
46 Mc Hugh-Munier C, Scherer KR, Lehmann W, Scherer U. Coping Strategies, Personality, and Voice Quality in Patients with Vocal Fold Nodules and Polyps. J Voice 1997;4:452–61.
47 Freidl W, Friedrich G, Egger J. Persönlichkeit und Stressbearbeitung bei Patienten mit funktioneller Dysphonie. Folia phoniatr 1990;42:144–9.
48 Deary IJ, Scott S, Wilson IM, White A, MacKenzie K, Wilson JA. Personality and psychological distress in dysphonia. Br J Health Psychol 1997;2:333–41.
49 Butcher P, Elias A, Raven R, Yeatman J, Littlejohns D. Psychogenic voice disorder unresponsive to speech therapy: psychological characteristics and cognitive-behaviour therapy. Br J Disord Commun 1987;22:81–92.
50 Winkler F. Psychogene Stimmstörungen. HNO 1987;35: 242–5.
51 Demmink-Geertman L, Dejonckere PH. Nonorganic Habitual Dysphonia and Autonomic Dysfunction. J Voice 2002;4:549–59.
52 Freidl W, Friedrich G, Egger J, Fitzek T. Zur Psychogenese funktioneller Dysphonien. Folia phoniatr 1993;45:10–3.
53 Pfau EM. Zur Psychologie der funktionellen Dysphonie. Folia phoniatr 1973;25:251–69.
54 Friedrich G, Fitzek Th, Freidl W, Egger J. Screening psychogener Faktoren bei funktionellen Dysphonien. HNO 1993;41: 564–70.
55 Roy N, Bless DM, Heisey D. Personality and Voice Disorders: A Multitrait-Multidisorder Analysis. J Voice 2000;4:521–48.
56 Gunther V, Mayr-Graft A, Miller C, Kinzl H. A comparative study of psychological aspects of recurring and non-recurring functional aphonias. Eur Arch Otorhinolaryngol 1996;253: 240–4.
57 Sieron J, Johannsen HS. Das Kontaktgranulom: Symptomatik – Ätiologie – Diagnostik – Therapie. Laryngo-Rhino-Otol 1992;71:193–7.
58 Shin T, Watanabe H, Oda M, Umezaki T, Nahm I. Contact granulomas of the larynx. Eur Arch Otorhinolaryngol 1994;251: 67–71.
59 Wani MK, Woodson GE. Laryngeal Contact Granuloma. Laryngoscope 1999;109:1589–93.
60 Kiese-Himmel C, Kruse E. Das laryngeale Kontaktgranulom – ein psychosomatisches Störungsbild? Folia Phoniatr Logop 1994;46:288–97.
61 Mans EJ, Kühn AG, Lamprecht-Dinnesen A. Persönlichkeitsmerkmale von Patienten mit Kontaktgranulom. Laryngo-Rhino-Otol 1993;72:225–30.
62 Kiese-Himmel C, Pralle L, Kruse E. Psychological profiles of patients with laryngeal contact granulomas. Eur Arch Otorhinolaryngol 1998;255:296–301.
63 Hörmann H, Moog W. Der Rosenzweig P-F Test, Form für Erwachsene. Göttingen: Hogrefe, 1957.