

MUSCLE TENSION DYSPHONIA

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The voice as a finely tuned instrument is capable of wonderful expression. However, it is also the workhorse of every human for day to day communication. People have variable levels of vocal skill for their required tasks. Younger vocal folds are more resilient to poor usage whilst ageing requires more efficient technical ability to maintain "normal" voice. Consequently the passage of time, with its changing physiological and psychological influences, means that poor vocal skills result in diminishing vocal ability. Poor technique requires a compensatory hyperfunction to maintain phonation at a desired level. This increased effort results in fatigue. Frequently, an individual reports that whilst their career and lifestyle have not altered, their voice has deteriorated. Clinical examination is generally "normal" hence the term "functional dysphonia" has been used indicating there is no organic abnormality. A more appropriate term is "muscle tension dysphonia" (MTD) due to excessive tension in the intrinsic and/or extrinsic laryngeal muscles.

Although prevalent in professional voice users, many individuals are at risk of MTD. There is a female predominance. A detailed history of the amount and type of voice use at home, socially and at work is essential. Phonation becomes breathy or harsh with use through the day and recovers with rest. Often this means over the weekend, away from work. It may involve severe vocal restrictions or complete loss of voice by Thursday or Friday, with a weekend barely providing sufficient recovery time. Fine control in the middle vocal frequencies is lost first and whispering or shouting later.

It is important to recall that phonation involves the ordered and integrated control of the respiratory system, larynx (voice box), pharynx (throat) and oral cavities (mouth) by the brain. Loss of control is generally due to some form of environmental stress rather than the effect of the vocal disorder. It evokes a psychomotor disturbance affecting muscle tension and thus posture, respiration and voice control. Organic changes in the vocal cords may occur secondary to such faulty use or overloading.

There are three local causes of laryngeal irritation with discrete signs and symptoms. These are post nasal drip, laryngo-pharyngeal reflux (LPR) and globus. They will be discussed in turn. The sinuses secrete about a litre of mucus a day, which is swallowed and aids lubrication. Complaints about a post nasal drip or a "frog in the throat" with frequent throat clearing are often due to increased awareness of this normal situation. However, both sinus disease and the effects of tobacco smoke on the nasal mucosa do produce thickened mucus.

Laryngo-pharyngeal reflux is common in 10% of the general population, but occurs in 46% of professional voice users. Symptoms include heartburn, acid tastes in the mouth, nocturnal coughing, an unpleasant taste in the mouth in the morning and halitosis (bad breath). Acid irritation causes hypertrophy (swelling) of the laryngeal mucosa with thicker mucus and frequent throat clearing and coughing. Reflux of gastric acid and digestive juices through oesophageal receptors, causes a reflex increase in muscle tension in the pharynx and larynx.

“Globus” is a spasm of the muscles of the lower part of the pharynx and literally means “a lump in the throat”. It is a very common problem causing people a great deal of worry. Symptoms are described in a variety of ways including a sore throat, vague rawness or dry feeling localised to the area of the larynx or below. In severe cases the neck muscles can become tender with the ache extending up the neck muscles to behind the ear. The symptoms resolve during eating because swallowing allows the muscles to relax. Alternatively people have intermittent hoarseness or “voice fatigue”. This varies depending upon the degree of cramping of the muscles. The voice always returns to normal at certain times of the day. Globus can be precipitated by a post nasal drip or LPR.

An understanding of daily behaviour is essential. Whilst MTD can affect anyone, often sufferers belong to a particular group. The following examples illustrate a variety of lifestyles with different effects upon the larynx:

- Teachers are likely to have to speak above background noise in rooms with poor acoustics and dust. Teaching is a stressful job with rising pupil disruption, diminishing resources etc. Smoking may also be a factor. Teachers rarely have received any education about voice care or use despite years of training.
- Singers and actors may have had plenty of voice craft for “work” but they often have a lifestyle with many adverse effects upon voice and health. These include episodic work, living away from home, unsociable hours, late and inappropriate eating (eg. spicy foods before going to bed) and socialising in noisy places with tobacco smoke and alcohol.
- People talking on the telephone all day often use an inappropriate pitch, have few rests or appropriate drinks and limited vocal recovery time. The office atmosphere may be dry due to air-conditioning.
- Aerobics instructors have to shout above the music level to be heard and to motivate. They get dehydrated so have a high water intake, but exercise causes a type of reflux called “water siphonage”.

Examination

Thorough clinical examination is mandatory to exclude organic laryngeal pathology. This includes a voice laboratory analysis, psychological assessment and thorough examination of the upper aerodigestive tract, neck and chest.

Body posture may be poor and there is raised overall body tension (including the neck and laryngeal muscles) with MTD. This tends to be the result of bad habits laid down over the years and accepted as normal. There is elevation of the larynx and hyoid bone due to increased tone in the thyrohyoid and tongue base muscles. Tenderness of the thyrohyoid occurs unilaterally if not bilaterally due to overuse. The increased tone also means it is difficult to move the larynx up and down and from side to side. Laryngeal elevation may occur on phonation. Gentle downward traction on the larynx after massage of the tender areas will bring it to a better position. This

should result in a reduction of the hoarseness and breathy nature of phonation. This is obviously diagnostic. Similarly the cricothyroid muscle between the lower border of the thyroid cartilage and the cricoid is likely to be tense and tender with reduced movement.

Indirect laryngoscopy (mirror examination) will afford a three dimensional view of the larynx. This is essential in order to confirm that the vocal folds are at the same level. Furthermore, it provides the most natural light for assessing mucosal colour and inflammation. Mucosal inflammation may be localized or generalized. When involving the interarytenoid area alone it indicates that there is LPR. Inflammation of the petiole (back of the epiglottis) is associated with excessive coughing. Supraglottic inflammation often indicates a post nasal drip. Generalized inflammation of the laryngeal and hypopharyngeal mucosa may occur with smoking, alcohol and gross reflux.

Videostroboscopic laryngoscopy also involves a peri-oral examination holding the patient's tongue and this limits phonation to a single vowel. However, it allows a detailed assessment of the vocal fold symmetry and regularity of vibration, glottal closure, amplitude of vocal fold excursion, mucosal wave and non-vibrating portions of the vocal folds. It is only with the advent of this great tool that changes like mucosal tethering due to scarring or tumour and vocal sulcus (congenital vocal fold pocket) have been defined. Such changes cause dysphonia which previously would have been mistaken for MTD.

Fibreoptic laryngoscopy via the nose is the best method of providing a clear view of the larynx during normal phonation. The health of the nasal cavities and post nasal space can be verified during this procedure. The vocal range and limits can be assessed, as well as the changing shape of the larynx. Muscle tension dysphonia may be seen in a number of ways on phonation:

- antero-posterior squeezing with arytenoid and epiglottic apposition severely restricting vocal fold output.
- false fold adduction with ventricle compression restricting vocal fold output.
- vocal fold shortening with increased mass and stiffness.
- abnormal vocal fold closure producing breathy and thus inefficient phonation.

There are six types :

1. posterior chink
 2. variable position of glottal opening
 3. elliptical opening or bowing
 4. incomplete closure along most of the length of the fold
 5. hour-glass shape
 6. anterior chink
- increased adductor muscle tone
 - increase in subglottal pressure and expiratory force

Management

A multi-disciplinary team (otolaryngologist, speech pathologist and counsellor at least) is required to deal with the inter-relationship of the precipitating factors. Morrison classifies these into four “platforms”:

1. posture and muscle usage
2. behavioural
3. LPR
4. psychological

1. Posture and muscle usage

The compensatory laryngeal hyperfunction and the causes need to be identified and removed by re-education. The tug of war between the laryngeal elevators and depressors must end. The voice needs to be sustained by correct breath support in a relaxed and unstrained manner. Less laryngeal effort should enable greater vocal efficiency and output. These are achieved by a combination of strategies including:

- a thorough explanation of the anatomy and physiology of the vocal tract with particular reference to the patient’s own laryngeal video.
- reassurance with the patient’s own laryngeal video that there is no serious pathology (ie.cancer)
- laryngeal “deconstriction” exercises in addition to altering the focus of resonance and tongue and mouth placement
- improvement in overall body posture and muscle relaxation particularly in the head, neck, back and shoulders. (ie. Alexander Technique)

2. Behavioural

An understanding of the environmental and behavioural aspects of voice use allows improvements to be made. The environment can be improved to overcome poor acoustics/amplification, dry air, dust or smoke, background or competing noise (bars, sporting arenas, large family gatherings, airplanes and buses), inadequate rest.

Personal behaviour can be adjusted with regard to smoking/alcohol/caffeine, whispering, shouting or screaming (ie. sporting events or night clubs), poor timing or types of eating, throat clearing or coughing, dehydration, voice use at a lower or higher pitch than is comfortable.

3. Laryngo-pharyngeal reflux

Individuals with LPR need a course of an acid reducing drug (ie. Zantac or Losec) and a “lifestyle” advice chart. If symptoms or the laryngeal mucosa fail to respond then the dose needs to be doubled and a gastric emptying drug added (ie. Prepulsid). This is because reflux of gastric digestive fluid (without acid) can have a similar effect on the larynx. Should symptoms persist then dual pH monitoring is indicated. This technique uses a pH probe in the oesophagus and one in the hypopharynx to identify and differentiate between hypopharyngeal and oesophageal reflux. In the presence of documented reflux resistant to medication, surgery to improve the gastro-oesophageal junction (oesophagus to stomach valve) is indicated ie. Nissen fundoplication.

4. Psychological platform

As indicated at the beginning, the psyche and the voice are intimately related. Indeed the voice may be seen as the mirror of the psyche. This is clearly found if one is about to speak to a group of people: there is a lump in the throat, no voice and a desire to attend the bathroom again. A normal stress response. In the bigger psychological picture, life has been described as “walking along dragging a rope over one shoulder. Every now and then one picks up a boulder and ties it into the rope and keeps walking.” Therefore our psychological load gets heavier with each step and the mental energy required to keep walking increases. This may manifest as increased muscle tension. Individuals may benefit from counselling to confront some of their fears or to heal emotional trauma. Some need to know how to identify and understand past behavioural patterning and learn new behaviour. Combined with the release of emotional blocks and negativity, individuals can become relaxed, self-confident and more outgoing. Voice is one of the major beneficiaries.

Conclusion

Muscle tension dysphonia is a common condition in which poor vocal skills and excess muscle tension result in early vocal fatigue. The patient needs reassurance that there is no serious pathology (ie. cancer) which of itself is a stressor. Management demands a broad based multidisciplinary team approach. The multifactorial basis of this condition must be appreciated, with targeted treatment for each individual.

Sources

1. Aronson, A.E. (1990) Clinical voice disorders. New York: Thieme
2. Morrison, M.D., Nichol, H. & Rammage, L.A. (1986) Diagnostic criteria in functional dysphonia. Laryngoscope 94:1

3. Morrison, M.D. (1997) personal communication
4. Damste, P.H. (1987) Scott-Brown's otolaryngology, London: Butterworth
5. Sataloff, R.T. (1995) personal communication
6. Sataloff, R.T. (1991) Professional voice, The science and art of clinical care. Raven Press
7. Hirano, M. & Bless, D.M. (1993) Videostroboscopic examination of the Larynx.
Singular: San Diego
8. Alexander, F.M. (1984) The Use of Self, Centreline Press

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