Being active after total laryngectomy

Atos Medical series of educational events
New research on post-laryngectomy issues
Patients desire to get their lives back and enjoy the physical and social activities they engaged in before surgery.

• They are limited due to capacity in breathing: 51% of patients have removed their HME to catch their breath
• They are limited by weather conditions: 45% have felt irritation in their windpipe from dry air or air particles

These issues are caused by physiological changes in breathing resistance and filtration when inhaled air bypasses the upper airways.

A solution could be to use an HME with lower breathing resistance when active and an HME combined with an electrostatic filter when in need of extra protection.

Source: Red Associates, 2019
David can’t spend a long time outside – e.g. shoveling snow or playing golf because he has a hard time breathing. In fact, David stopped golfing because he couldn’t breathe easily with all the pollen and dust in the air.


Contents:

• What do patients experience when they try to live an active life after total laryngectomy?
• Factors that impact the ability of patients to be physically active
• Factors that impact the ability of patients to cope with environmental circumstances
• Benefits of living an active life
Quantitative patient research confirms David’s issues and shows that 51% of patients remove the HME to catch their breath

Source: Red Associates, 2019

I have become short of breath while running, exercising, playing sports or dancing
I have become short of breath while doing chores, housework, or manual labor
My adhesive has come loose because of sweat
I have taken my HME out to catch my breath

I have encountered crowded environments that may have germs
I have encountered places with pollution
I have encountered situations with dirt, dust, or irritating particles
I have felt irritation in my windpipe from dry air or air particles (sand, flour, dust, dirt, etc.)

Source: Red Associates, 2019
Patients report having the highest degree of trust in their clinician for advice, however, 50-60% are not speaking about their issues of being active.

What do patients experience when they try to live an active life after total laryngectomy?

- If I become short of breath while exercising or doing moderate physical activity: 39% yes, 60% no, 11% don't know
- If I have irritation in my windpipe from air particles (dirt, dust, air pollution, etc.): 29% yes, 60% no, 11% don't know
- If there are activities I can’t do that I would like to do: 33% yes, 58% no, 11% don't know

Source: Red Associates, 2019
The anatomy of the respiratory system in a healthy individual allows for adjustment of airflow needed based on activity level.

**Normal breathing**

- Airflow needed can be adjusted by alternating nasal and mouth breathing
- Airways expand to lower breathing resistance when more oxygen is needed

**Nasal breathing**

Nasal breathing provides a degree of resistance which leads to an increased gas exchange: more oxygen inhaled; more carbon dioxide exhaled.

**Nasal and mouth breathing**

When physically active, there is a statistically significant increase in nasal volume. Also, mouth breathing will complement nasal breathing and the trachea will expand for additional air intake.

Source: Fonseca et al., 2006; Lorenz, 2013; Keck et al., 2005; Motley, 1963; Mueller et al., 1970; Schmidt et al., 1975; Scheenstra et al., 2010
Post laryngectomy, the ability to adjust the airflow needed based on activity level is impaired

Breathing post laryngectomy

- Breathing through an HME
- Non-adjustable airflow resistance

Factors that impact the ability of patients to be physically active

Breathing through an HME

Clinical evidence shows that compliant HME use has a positive effect on pulmonary health. Breathing through an HME leads to higher resistance and increased tidal volume.

Breathing through an open stoma

Decreased breathing resistance leads to reduced transpulmonary pressure, increasing the tendency for alveoli to collapse and leads to a reduction in tidal volume. Breathing unconditioned air also has a negative effect on cilia and pulmonary health.

Source: Lorenz, 2013; Keck et al., 2005; Motley, 1963; Mueller et al., 1970; Schmidt et al., 1975; Scheenstra et al., 2010

80% of the patients found their HME comfortable while resting, 51% found it uncomfortable during exercise because of the high breathing resistance

Source: Jones et al., 1997
Factors that impact the ability of patients to cope with environmental circumstances

Nasal breathing
Filtration mainly takes place in the upper airway, mostly the nose

Breathing through an open stoma
Filtration is highly reduced since it no longer takes place in the upper airways.

Therefore laryngectomized patients are expected to have a much higher deposition of particles in the lower airways.

This will increase the risk of pulmonary complaints and respiratory infections.

Breathing through an HME
Provides a logical barrier for gross airborne material.

An HME combined with a bacterial and viral filter, such as Provox Micron, filtrate ≥99% (Nelson lab) and it also reduces the transfer of particulate matter.

Source: Lorenz, 2013; Keck et al., 2005; Motley, 1963; Mueller et al., 1970; Schmidt et al., 1975; Scheenstra et al., 2010
When exposed to air particles, patients should use an HME combined with an electrostatic filter to partly restore the normal nasal properties.

**Difference between HME and filtering HME**

**HME**
- Helps to restore physiological temperature and moisture levels
- Has large pores and less mechanisms to help capture particles

**HME combined with an electrostatic filter**
- Effectively filters the air of bacteria, virus and particulate matter, such as dust and pollen

**Filtration capacity HME vs filtering HME**
- Provox Micron HME  $\geq 99\%^{**}$
- Provox XtraMoist HME  70\%$^*$
- Provox XtraFlow HME  50\%$^*$

**1/3 of the respondents had a reduction in respiratory symptoms when using Provox Micron HME**

Source: Brook et al., 2013

$^{**}$Data on file
$^*$Data on file

Source: Lorenz, 2013; Keck et al., 2005; Motley, 1963; Mueller et al., 1970; Schmidt et al., 1975; Scheenstra et al., 2010
Benefits of living an active life

• Mishra et al., 2012 discovered that exercise may impact: body image/self-esteem, emotional well-being, sexuality, sleep disturbance, social functioning, anxiety, fatigue, and pain

• Sammut et al., 2014 performed a literature review of all the significant benefits of physical activity on cancer patients’ overall quality of life and noted patients are living longer and state that we must focus on QoL before, during, and after treatment

• Exercise for cancer patients is associated with a 41% reduction in mortality (Sammut et al., 2014)

There is a clear need to address patients’ desire of being active to improve laryngectomized patients’ quality of life. A solution could be to use an HME with lower breathing resistance when active and an HME combined with an electrostatic filter when in need of extra protection.
References:


Atos Medical
series of educational events

This material is part of a series of educational events to present new research on post-laryngectomy issues. The series also include:

**Maintaining pulmonary health after total laryngectomy**
Hear more about pulmonary issues in laryngectomized patients and how to manage these issues

**Maintaining peristomal skin health after total laryngectomy**
Learn more about the mechanics of skin irritation and how it impacts the health of laryngectomized patients

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