



## INHALER TECHNIQUES IN ASTHMA CONTROL

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### ABSTRACT

Asthma refers to the condition which the respiratory system gets affected by various episodes of difficulty in breathing. The airway of the susceptible person shows inflammation and thereby it produces air flow obstruction which is reversible either spontaneously or with the treatment. There are various treatments available for Asthma. One of the mostly utilized techniques is inhalational therapy, which is very helpful in controlling asthmatic attacks. Various medicaments like inhalation corticosteroids,  $\beta_2$  adrenoreceptor antagonist can be delivered through inhalation therapy. Various inhalers like Pressurized metered dose inhalers (pMDI), Metered dose inhalers (MDI), Soft mist inhalers, Breathe actuated metered dose inhalers(BA-MDI)etc... are available now a days.

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## INTRODUCTION

Asthma is one the most commonly occurring respiratory diseases now a days. The term "asthma comes from a Greek verb which is "aazien" which means to breathe noisily. As per National Asthma Education and Prevention Program [NAEPP] Expert panel report-3 Asthma can be defined as a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role : in particular mast cells, eosinophil, T-lymphocytes, macrophages, neutrophils and epithelial cells. In susceptible individuals, this inflammation cause recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in early morning. These episodes are usually associated with widespread but variable airflow obstruction that is often reversible either spontaneously or with treatment<sup>[1]</sup>. It is estimated that over 300 million of the world population is being affected by asthma. It a serious condition that effect all age groups. Effective control is needed in the management of asthma to reduce the burden and also to decrease the cost of treatment<sup>[2]</sup>. Inhalation therapy is widely used for faster recovery from the acute attacks.

### Inhalers Techniques

Inhaler techniques are mostly preferred by almost all worldwide accepted guidelines for the management of asthma. Even though the systemic as well as the oral therapies are

available for the management inhalational techniques are widely used due its advantages over them. The advantages include very low dose of medicament is needed, rapid onset of action is achieved and fewer number of side effects. As they directly directed to lung the faster symptom control is achieved. The delivery rate of drug to lung is associated with the particle size, nature of propellant, type of device etc<sup>[3,4]</sup>... Correct usage of the device should be ensured for proper compliance with the treatment. Proper patient counseling should be given before prescribing inhalers.

### History of Inhaler Devices

The first used inhaler was created on 1778 by an English physician John Mudge. It was known by the name Mudge Inhaler. It consist of a tankard where it hold the liquid which have a lid. After pouring liquid, the lid was closed and the steam is inhaled through a flexible tubing. It was used to inhale opium vapours to treat catarrhus cough, a type of cough with thick mucous. The idea of Mudge inspired the scientist Nelson to put forward his idea to use a teapot with medicament inhale through the sprout. This was the turning point for the invention of Nelson's inhaler.<sup>[4]</sup>

### Types of Inhalers

A wide range of various inhalers are available now a day. It can be broadly catergorised into the following categories

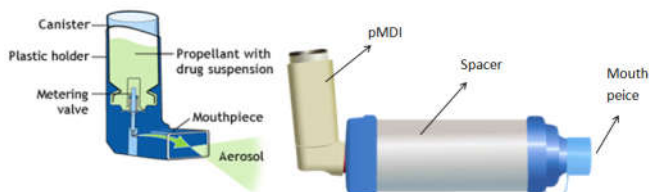
- ✓ Pressurized meter dose inhalers (pMDI).
- ✓ Dry powder inhalers (DPI)
- ✓ Breath- actuated meter dose inhalers (BA-MDI)
- ✓ Soft mist inhalers

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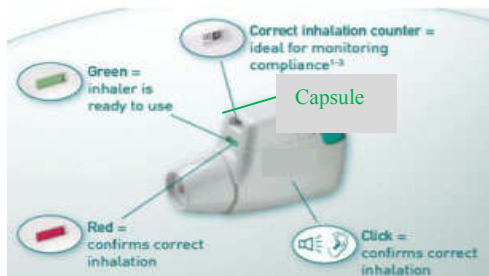
### Pressurized Meter Dose Inhalers (pMDI)

It's the most widely used type of inhalers. They are very cheap compared to other types. They can deliver medicament in multi dose manner [5]. It's having a part called as canister, which on applying pressure by pressing, deliver drug to throat. Medicine such as inhaled corticosteroids and bronchodilators or combination of both such as salbutamol, budesonide, terbutaline, ipratropium bromide can be effectively delivered by pMDIs [6,7]. Its more helpful when as spacer is attached to the mouth piece of the pMDI. Researches says that the use of spacer can increase the compliance because they can act as a reservoir of medicament, it will also help to decrease the velocity of drug particles released [8].



### Dry Powder Inhalers

Dry powder inhaler is those inhalers which use dry powder medications in form of capsules. Once the capsule is inserted to the inhaler, they pressure is exerted on it to deliver the medicine. Mainly corticosteroids are given via this type inhalers.[9] The main advantage over pMDI is that aerosol pressure is not needed in DPI. The major problem associated with less compliance is due to incorrect usage of inhalers by the patient which include, improper positioning of the device, failure to hold breathe [10,11].



### Breathe Actuated Metered Dose Inhalers

They were developed by considering the mechanism of pMDIs. The only difference is that the drug get dispensed only if patient inhales through the inhaler.[12] The advantage is that it ensure that the drug disposition to lung happens correctly. The major disadvantage is that the patient should produce enough inspiratory flow rate to dispense medicament.[13]

### Soft Mist Inhalers

They are innovative method which do not need inspiratory flow to generate aerosol. The aerosol is created by the spring in the liquid formulation resulting in suspension of the medicament as soft mist or fine drug particle [14].

### Choosing Correct Inhaler

It's very important to choose the correct type of inhaler for the patient for maximum effectiveness and control over the symptoms. One of the important points to be taken into consideration is the inspiratory flow rate of the patient. It should be enough for the actuation of the device.[15] There are no specific guidelines or recommendations provided for

choosing the inhaler type. The American College of Asthma, Allergy and Immunology have provided some useful pieces of information on choosing inhalers for the patients.[16] They say that some important factors are to be considered before prescribing inhaler for patients. It includes patient's inspiratory capacity, ease of availability of the medicament, patient's satisfaction, durability of device and ease of use [17,18].

### Evaluating the Usage of Inhalers

The adherence to the inhalers must be assessed periodically to ensure the patient compliance. To detect incorrect use of the inhalers each patient should be asked to demonstrate the procedure of using the device in front of the health care professional who is attending them [19]. A pre-prepared checklist can be used by the healthcare professional to evaluate the correctness of usage of the device. If incorrect application of the device is found immediately correct it by giving proper counseling for the patient. Because incorrect use of the inhaler can lead to increased mortality and morbidity rates and failure of the therapy. [20]

### CONCLUSION

Asthma is considered as one of the most commonly occurring respiratory tract infection. The appropriate use of correct medications can be very helpful in controlling the frequents asthmatic attacks. The very effective treatment of choice is inhalation therapy. The inhalation therapy helps the medicament to reach the respiratory tract rapidly and it produced rapid onset of action. This technique is very convenient for the user because of its ease of use. Choosing the correct inhaler type inhaler and using it properly can be very useful in decreasing the frequency as well as recurrent asthmatic attacks.

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