

## Reasons for poor asthma control

### 2: Incorrect choice of inhaler, poor technique

Henry Chrystyn

Head of Pharmacy, School of Applied Sciences, University of Huddersfield, UK

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Problems with inhaler technique are common in clinical practice and can lead to poor asthma control. Indeed, asthma control worsens as the number of mistakes in inhaler technique increases.<sup>1</sup> Applying the basic principles of inhaler device selection and training can help to overcome this frequent obstacle to asthma control.

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#### Improving inhaler technique: basic principles

- There is no clinical difference between inhaler devices when they are used correctly.<sup>2</sup>
- Each inhaler type requires a different pattern of inhalation for optimal drug delivery to the lungs (see below).
- The choice of steroid inhaler is most important because of the need for targeted drug delivery.

#### Key recommendations

- Invest the time to train each patient in proper inhaler technique.
- Recheck inhaler technique on each revisit.
- Take patient preference into account when choosing the inhaler device.
- Simplify the regimen and do not mix inhaler device types.

#### Choosing an inhaler device

The three most common types of inhaler device available are

1. Pressurised metered-dose inhalers (MDIs),
2. Breath-actuated MDIs, and
3. Dry powder inhalers (DPIs).

Available in generic form and the least expensive, MDIs are also frequently used incorrectly, as these devices require coordination between inhalation and actuation of the inhaler. Use of a breath-actuated MDI can improve lung deposition and decrease oropharyngeal deposition (especially those for inhaled steroids that emit ultrafine particles). DPI use instead requires adequate acceleration rate on inhalation to obtain good lung deposition.

## Key features of MDIs and DPIs

Metered-dose inhalers	Dry powder inhalers
<ul style="list-style-type: none"> <li>Require slow and deep inhalation over 5 seconds, with co-ordination between dose release and start of inhalation (good co-ordination not critical if slow inhalation, but dose has to be released after the start of the inhalation)</li> <li>Can be used with spacers, large or small (spacers scored lowest in patient preference)</li> </ul> <p><b>Solving common problems:</b></p> <ul style="list-style-type: none"> <li>Poor coordination of actuation &amp; inhalation → switch to breath-actuated MDI</li> <li>Stopping inhalation when cold spray hits the throat ("cold Freon effect") → add a spacer or switch to inhaler with CFC-free propellant</li> <li>Inhaling too fast → switch to ultrafine particle inhaler</li> <li>Inhaling through the nose → training to inhale through mouth</li> </ul>	<ul style="list-style-type: none"> <li>Breath-actuated</li> <li>Require adequate acceleration on inhalation: must inhale deeply and forcibly at the start of the inhalation</li> <li>If the patient does not inhale fast enough or long enough:               <ul style="list-style-type: none"> <li>Not all the dose is emitted</li> <li>Particles generated are too big to enter the lungs, resulting in increased oropharyngeal deposition</li> </ul> </li> <li>Do not prescribe to children &lt;5 years old</li> <li>Do not prescribe to patients with insufficient inspiratory effort</li> <li>Sensitive to moisture, store in dry place</li> <li>If the dose is supplied in a capsule then two inhalations are required to empty the dose</li> </ul>

## Inhaler resources and training aids

Information on different inhaler devices is summarised in the Global Initiative for Asthma guidelines,<sup>3</sup> and inhaler and spacer diagrams are available on the GINA website (<http://www.ginasthma.org>). General guidelines for inhaler device selection have been published by the American College of Chest Physicians/American College of Asthma, Allergy, and Immunology.<sup>2</sup>

The Ontario Thoracic Society Provider Education Program has produced an educational CD-Rom illustrating inhaler device technique; the CD-Rom can be ordered and the videos are viewable on the Ontario Lung Association website (<http://www.on.lung.ca/Health-Care-Professionals/Provider-Education-Program/CD-ROMS.php>). In addition, inhaler technique for several devices is illustrated by schematic cartoons on the Asthma UK website ([http://www.asthma.org.uk/using\\_your.html](http://www.asthma.org.uk/using_your.html)).

Several devices to check inhaler technique and maintain trained technique are now available. For use with a MDI, the Aerosol Inhalation Monitor (AIM, Vitalograph Ltd, Buckingham, England) provides feedback about a patient's technique, whilst the 2Tone Trainer (Canday Medical Ltd, Newmarket, England) is a training aid to help patients use a slow inhalation flow. The AeroChamber Plus spacer (Forest Pharmaceuticals, Inc, St. Louis, US) makes a noise when the inhalation flow used is too fast.

For use with a dry powder inhaler, the In-Check Dial (Clement Clarke International Ltd, Essex, UK) is a device to check if the patient can generate the required fast inhalation. The Turbuhaler whistle (AstraZeneca International, London, UK) is an example of a simple device that has been introduced to check for the required inhalation rate for patients prescribed this device. Finally, the Novolizer (MEDA Pharma GmbH & Co. KG, Bad Homburg, Germany) has been designed to release its dose only when the required inhalation rate is achieved.

### References

- Giraud V, Roche N. Misuse of corticosteroid metered-dose inhaler is associated with decreased asthma stability. *Eur Respir J.* 2002;19:246–51.
- Dolovich MB, Ahrens RC, Hess DR, et al. Device selection and outcomes of aerosol therapy: Evidence-based guidelines: American College of Chest Physicians/American College of Asthma, Allergy, and Immunology. *Chest.* 2005;127:335–71.
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