

Appendix M: Device Technique

Medications: Inhalation Devices

Medications come in many forms. However, most often they are taken by the inhaled route:

- Metered Dose Inhaler (puffer)
- Dry Powder Inhalers (Turbuhaler®, Diskus®, Diskhaler®, HandiHaler®)
- Nebulizer

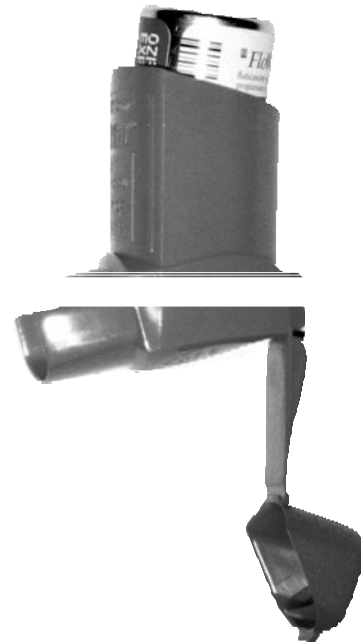
Accurate technique for using these devices is extremely important.

Delivery Device

The inhaled route is the most effective method to deliver the medication directly to the airways. As a result of using the inhaled route, the total dose of medication required is greatly reduced, thereby reducing the chance for the medication to have a systemic effect.

A. Metered Dose Inhalers (MDI)

Metered dose inhalers (MDI), or puffers, deliver a precise dose of medication to the airways when used appropriately. It is very important to have a good technique. A holding chamber or spacer is recommended for use with a MDI, particularly for those not able to use a puffer accurately. To determine whether the puffer is empty: (1) calculate the number of doses used, or (2) invert or shake it close to the ear several times and listen/feel for movement of liquid. One advantage of using the MDI is that it is quite portable. A number of different metered dose inhalers are available. Different pharmaceutical companies manufacture similar medications that are in different inhalers. Advair has dose numbers on both MDI and Diskus.



Metered Dose Inhaler: Proper Use of a MDI

1. Remove the cap from the mouthpiece and shake the inhaler.
2. Breathe out to the end of a normal breath.
3. a) Position the mouthpiece end of the inhaler about 2-3 finger widths from the mouth, open mouth widely and tilt head back slightly, *OR*
b) Close lips around the mouthpiece and tilt head back slightly.
4. Start to breathe in slowly, and then depress the container once.
5. Continue breathing in slowly until the lungs are full.
6. Once breathing in fully, HOLD breath for 10 seconds or as long as possible, up to 10 seconds.
7. If a second puff is required, wait one minute and repeat the steps.

Metered Dose Inhaler

Care of a Metered Dose Inhaler

Keep the inhaler clean. Once a week, remove the medication canister from the plastic casing and wash the plastic casing in warm, soapy water. When the casing is dry, replace the medication canister in the casing and place the cap on the mouthpiece. Ensure that the hole is clear. Check the expiry date. Check to see how much medication is in the inhaler as described previously.

Holding Chambers/Spacers

A number of different holding chambers are available on the market. Different pharmaceutical companies make different devices. All these devices are effective. The difference between them is the cost and durability.

Holding chambers are devices with one-way valves that hold the medication for a few seconds after it has been released from the inhaler. This allows the individual the advantage of taking in more than one breath for each puff when unable to hold their breath, particularly in an acute episode of dyspnea.



Holding Chamber/Spacer

Key Point

- Holding chambers are indicated for all individuals who use a Metered Dose Inhaler.
- When a holding chamber and inhaler are used, the larger particles drop down into the holding chamber. This limits the amount of particles in the mouth and throat, which in turn limits the amount absorbed systemically.
- Using a holding chamber may prevent a hoarse voice or sore throat which can occur with inhaled steroid use. Whether a holding chamber is used or not, individuals using inhaled steroids should gargle after treatment.

Proper Use of a Holding Chamber with Mouthpiece:

1. Remove the cap on the inhaler (MDI) and holding chamber mouthpiece.
2. Shake the inhaler well immediately before each use. Insert the inhaler (MDI) into the large opening of the inhaler adaptor on the chamber.
3. Exhale normally. This will help the individual to prepare to take in a deep breath. It is best to take the inhaled medication while standing or sitting.
4. Insert mouthpiece between teeth and seal with the lips around the mouthpiece. Do not block the slots on either side of the mouthpiece with lips.
5. Activate canister. Spray one dose of medication into the chamber by squeezing the canister down once between forefinger and thumb.
6. Inspiration should begin no later than 1-3 seconds after actuation of the pump. Once the medication is aerosolized, breathe in slowly and deeply through mouth. Try to take 3 to 5 seconds to inhale completely while the spray remains suspended in the holding chamber for less than 10 seconds. This will open the valve, allowing the drug to leave the spacer. Breathing in too quickly will cause the drug to hit the back of the throat and mouth. With the aerochambers, if a whistling sound is heard, this means that inhaling is occurring too fast and one must slow down.
7. a) Single-breath technique: Hold breath for 5 to 10 seconds. Holding breath will give the medication time to settle in the airways.
b) Tidal volume technique: Breathe slowly in and out of the spacing device, 3 or 4 times in a row.
8. If more than 1 dose is required, wait 30 seconds to 1 minute between puffs and repeat all steps from the beginning.

Proper Use of a Holding Chamber with Mask:

1. Remove the cap from the mouthpiece and shake the inhaler.
2. Place the MDI upright in the holding chamber's back rubber opening.
3. Exhale normally. This will help the individual to prepare to take a deep breath in. It is best to take the inhaled medication while standing or sitting.
4. Place the mask over the face, making sure that the mouth and nose are covered and that the seal is as airtight as possible without undue discomfort.
5. Activate canister. Spray one dose of medication into the chamber by squeezing the canister down once between forefinger and thumb.
6. Inspiration should begin no later than 1-3 seconds after actuation of the pump. Once the medication is aerosolized, breathe in slowly and deeply through mouth. Try to take 3 to 5 seconds to inhale completely while the spray remains suspended in the holding chamber for less than 10 seconds. This will open the valve, allowing the drug to leave the spacer. Breathing in too quickly will cause the drug to hit the back of the throat and mouth. With the aerochambers, if a whistling sound is heard, this means that inhaling is occurring too fast and one must slow down.
7. a) Single-breath technique: Hold breath for 5 to 10 seconds. Holding breath will give the medication time to settle in the airways.
b) Tidal volume technique: Breathe slowly in and out of the spacing device, 3 or 4 times in a row.
8. If another dose is required, repeat steps 2-7. If more than 1 dose is required, wait 30 seconds to 1 minute between puffs and repeat all steps from the beginning.

Care of a Holding Chamber (with/without mask)

Whichever holding chamber is used, it must be cleaned at least once a week with warm soapy water, and air dried.

B. Dry Powder Inhalers (DPIs)

There are several dry powder inhalers available. Examples include the Turbuhaler®, Diskus®, Diskhaler® and the Handihaler®.

Key Point

General points of dry powder inhalers include:

- A quick forceful breath in is required to deliver the medications to the lungs, versus a slow breath for MDIs.
- All DPIs contain a lactose carrier or filler.

Proper Use of a Turbuhaler®

1. Unscrew the cover and remove it.
2. Holding the device upright, turn the coloured wheel one way (right) and back (left) the other way until it clicks. The inhaler is now ready to use. Once you have done this, do not shake or turn the Turbuhaler® sideways or upside down as the medication will be lost.
3. Breathe out, away from the Turbuhaler® mouthpiece.
4. Place the mouthpiece between lips and tilt head back slightly.
5. Breathe in deeply and forcefully.
6. Remove the Turbuhaler® from your mouth while holding your breath. Continue holding your breath for about 10 seconds.
7. If a second dose is prescribed, repeat the steps.

When a red mark first appears in the little window, only 20 doses remain. The Turbuhaler® is empty and should be discarded when a red mark reaches the lower edge of the window. Newer Turbuhaler® devices have a counter that appears in a little window to show the number of doses left.



Turbuhaler®

Care of a Turbuhaler®

Clean the mouthpiece two or three times a week. Using a dry cloth, wipe away any particles which have collected on the mouthpiece. Never wash the mouthpiece.

Proper Use of a Diskus®

1. *Open* – Place thumb on thumb grip. Push thumb away from body as far as it will go.
2. *Slide* – Slide the lever until a click is heard. Breathe out away from the diskus.
3. *Inhale* – Seal lips around the mouthpiece. Breathe in steadily and deeply through mouth. Hold breath for about 10 seconds, then breathe out slowly.
4. *Close* – Place thumb on thumb grip, and slide the thumb grip towards body, as far as it will go.



Diskus®

Important: If more than one puff is prescribed, repeat steps 2 – 4. The diskus contains medication in a powdered form for Ventolin®, Serevent® (long acting bronchodilator), Flovent® (anti-inflammatory) or Advair® (a combination of Serevent® and Flovent® in one inhaler). Rinse mouth after using Flovent® or Advair®.

Care of a Diskus®

The dose counter displays how many doses are left or when the inhaler is empty. Keep the Diskus® closed when not in use, and only slide the lever when ready to take a dose.

Proper Use of a Diskhaler®

1. To load the Diskhaler®, remove the cover and cartridge unit.
2. Place a disk on the wheel with the numbers facing up and slide the unit back into the Diskhaler®.
3. Gently push the cartridge in and out until the number 8 appears in the window
4. The Diskhaler® is now ready for use.
5. Raise the lid up as far as it will go - this will pierce the blister.
6. Close the lid.
7. Breathe out.
8. Place the mouthpiece between the teeth and lips – make sure not to cover the air holes at the sides of the mouthpiece.
9. Tilt head back slightly.
10. Breathe in deeply and forcefully.
11. Hold breath for 10 seconds or as long as possible.
12. Sometimes 2 or 3 forceful breaths in are needed to make sure all the medication is taken.
13. If a second blister is prescribed, advance the cartridge to the next number and repeat steps 5-11.



Diskhaler®

Care of a Diskhaler®

Remove the cartridge and wheel. Clean any remaining powder away using the brush provided in the rear compartment before replacing the cartridge and wheel.

Spiriva® Handihaler®

The HandiHaler® is an inhalation device that has been specially designed for use with SPIRIVA capsules. It must not be used to take any other medications.

The HandiHaler® consists of: (1) Dust cap (2) Mouthpiece (3) Base (4) Piercing button (5) Centre chamber

Proper Use of HandiHaler®:

1. Press the green piercing button completely in and let go to release the dust cap.
2. Lift open the dust cap and mouthpiece.
3. Right before use, remove only one SPIRIVA capsule from the blister.
4. Place the capsule in the centre chamber. It does not matter which end of the capsule is placed in the chamber.
5. Close the mouthpiece firmly until a click is heard, leaving the dust cap open.
6. Hold the HandiHaler® device with the mouthpiece upwards and press the piercing button in once completely, and release. This makes holes in the capsule and allows the medication to be released when breathing in.
7. . Breathe out completely. Do not breathe into the mouthpiece at any time.
8. Raise the HandiHaler® device to mouth and close lips tightly around the mouthpiece. Keep head in an upright position and breathe in slowly and deeply but at a rate sufficient to hear the capsule vibrate. Breathe in until lungs are full; then hold breath as long as is comfortable and at the same time take the HandiHaler® device out of the mouth. Resume normal breathing. To ensure full dose of Spiriva® is received, repeat steps 5 and 6 once again.
9. After taking the daily dose of Spiriva®, open the mouthpiece again. Tip out the used capsule and dispose.
10. Close the mouthpiece and dust cap for storage of the HandiHaler® device.

Care of a HandiHaler® Device:

Normally, during a one-month period of use, the HandiHaler® device does not need to be cleaned. However, if cleaning is needed the HandiHaler device can be cleaned as described below:

1. Open the dust cap and mouthpiece. Open the base by lifting the piercing button. Rinse the inhaler



HandiHaler®

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completely with warm water to remove any powder. Do not use cleaning agents or detergents.

2. Dry the handiHaler® device thoroughly by tipping the excess water out on a paper towel and air dry afterwards, leaving the dust cap, mouthpiece and base open. It takes 24 hours to air dry, so clean it right after using it and it will be ready for the next dose. Do not use the HandiHaler device when it is wet.
3. If needed, the outside of the mouthpiece may be cleaned with a moist, but not wet tissue.
4. The HandiHaler® device should not be placed in the dishwasher for cleaning.
5. Store Spiriva capsules and the HandiHaler® device at 25° C (77° F); excursions to 15-30° C (59-86° F).

C. Nebulizers (Compressors)

A nebulizer or compressor is used for antibiotics and nebulized opioids. No hand-breath coordination is required. Each treatment requires sitting quietly for 20-30 minutes while the drug is nebulized from a liquid to a mist.

The nebulizer is generally not portable unless it is a 3-way system. The 3-way nebulizer can be plugged into an electrical outlet, has an adaptor for use in a vehicles cigarette lighter, and can be battery operated. Both the 3-way machine and the regular nebulizers are expensive and must be serviced regularly. The inhalers, when used properly, are as effective as using a nebulizer.

Care of Nebulizer and Equipment

Wash mask with hot, soapy water. Rinse well and allow to air dry before re-use.

Reference:

Adapted from: Registered Nurses' Association of Ontario (2003b). *Adult Asthma Care Guidelines for Nurses: Promoting Control of Asthma*. Toronto, Canada: Registered Nurses' Association of Ontario

The Lung Association <http://www.lung.ca/asthma/manage/devices.html>

