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ISMP

Long-Term Care Advise ERR™

Educating the Healthcare Community About Safe Medication Practices

Crushing or splitting the wrong tablet can be a deadly error

It's common practice to crush or split tablets in long-term care (LTC) and assisted living (AL) facilities. Tablets may need to be crushed if the resident has difficulty swallowing oral tablets or if medications must be administered through an enteral feeding tube (e.g., percutaneous endoscopic gastrostomy [PEG] tube). Some tablets may need to be split if the oral dosage form of the drug does not come in the prescribed strength, or if the exact strength is not available from the pharmacy. Tablets have also been split to save money or to avoid delays in drug administration while awaiting pharmacy delivery of a newly prescribed half-strength tablet.

Crushing and splitting tablets have become so commonplace that some nurses may not think twice about crushing or splitting any tablet. However, it is estimated that 10% of all medication tablets are not suitable for splitting or crushing.[1] Over the years, ISMP's National Medication Errors Reporting Program (MERP) has received numerous reports of serious medication errors involving inappropriately crushed or split tablets. **Table 1** lists some of the common risks that can lead to potentially harmful errors when tablets are split or crushed.[2]

To cite one example, **K-TAB** (extended-release potassium chloride) tablets were prescribed for a LTC resident with a history of a stroke. The tablets were large, so nurses crushed them and put them in applesauce so the resident could swallow them. After 10 days, the resident began vomiting a dark brown coffee ground-like substance and had blood in her stools. The resident was transferred to a nearby hos-

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Table 1. Potential risks that can lead to errors when crushing or splitting tablets

An order or medication administration record (MAR) entry for "½ tablet" could be misread as "1-2 tablets."
Directions on the MAR to split a tablet may be overlooked and a whole tablet may be administered (a surprisingly common occurrence with both healthcare practitioners and residents who self-administer medications).
If a tablet is split, the remaining half tablet that is not administered may be saved in a makeshift, unlabeled package (often a medication cup or opened blister package) until the next dose is needed, risking misidentification of the half tablet.
If a pill splitter is not cleaned between use, pill residue can contaminate the next resident's medication, risking anaphylaxis if that resident has an allergy to the drug residue.
Tablets that have already been split may be erroneously split again, or practitioners may assume that tablets have already been split when they have not.
The wrong tablets may be split.
Directions on the medication label may suggest administration of "1 tablet" per dose, leading to confusion if the directions on the MAR indicate that the tablet must be split.
Tablets may split unevenly or crumble easily so the resident may not get the correct dose. Even if the tablet is scored down the middle, one half may actually contain more medicine than the other half.
Residents who take their own medications (e.g., in AL facilities) and who have visual or manual dexterity limitations may not be able to split tablets or use a pill splitter properly.

check it out

Consider the following recommendations to prevent errors when splitting and crushing tablets.

Develop guidelines on crushing and splitting tablets. Work with your consultant pharmacist and facility leadership to establish guidelines for crushing and splitting medications when your pharmacy cannot dispense the medication, or it is not available, in a ready-to-administer form. Do not accept blanket orders from prescribers to crush or split all medications.

Use "DO NOT CRUSH OR SPLIT" labeling. Work with your electronic health record (EHR) vendor and dispensing pharmacy to ensure that all medication administration record (MAR) entries and medication labels include prominent "**DO NOT CRUSH OR SPLIT**" warnings in bold, highlighted letters (when possible) for all tablets that should not be crushed or split. Also, ask your pharmacy to include "Sustained-Release" or "Enteric-Coated" on the medication label when this designation is appropriate and not part of the drug name (e.g., Oxy**CONTIN**).

Work with your pharmacy to dispense split tablets. When tablets must be split, it is safer for the pharmacy to split them before dispensing the medication. Ask your pharmacy to dispense exact doses by either splitting tablets and repackaging them, or preparing an oral solution in single-dose oral syringes.

Verify suitability. Ask your pharmacy to provide a list of common medications that should not be split or crushed and have it readily available to those who administer medications. Also, consider using the ISMP list of *Oral Dosage Forms That Should Not Be Crushed* (www.ismp.org/tools/donot

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pital's emergency department, where she was diagnosed with gastrointestinal (GI) bleeding caused by the crushed K-TAB tablets. K-TAB is extremely caustic and has been shown to cause GI bleeding when crushed before administration. The resident had also been taking warfarin to help prevent another stroke, but the drug had to be discontinued due to the GI bleeding. As a result, within one week, the resident suffered a second stroke which left her with permanent aphasia.

General Principles

As a general principle, any tablet that is labeled extended-release or sustained-release should not be crushed or split.[3,4] This is because crushing or splitting will damage the tablets' properties, causing immediate release of a large dose of medication that would otherwise have been released over a longer period of time. Some of the more common prefixes or suffixes that help identify extended-release or sustained-release products (also called delayed-release, controlled-release, or controlled-delivery products) include: 12-hour, 24-hour, CC, CD, CR, DUR, ER, LA, Retard, SA, Slo-, SR, TD, TR, XL, XR, or XT.[3] Unfortunately, some medications (e.g., **OXYCONTIN** [oxy**CODONE**]) do not have a prefix or suffix to indicate extended-release or sustained-release.

Enteric-coated (EC) tablets also should not be crushed or split.[3,4] The enteric coating prevents the drug inside from being destroyed by stomach acid, delaying the drug's release until it reaches the small intestine. Crushing or splitting these tablets will release the drug into the stomach, where it may be broken down and not absorbed, or may cause GI irritation. Common prefixes and suffixes may include EN and EC (e.g., **ECOTRIN** [enteric coated aspirin]),[3] but again, there may be no prefix or suffix to indicate an enteric coating.

Some other drug forms such as capsules with sustained-release beads should not be crushed because crushing the beads causes the immediate release of a large dose of medication once administered. Sublingual or effervescent tablets should not be crushed because this will decrease the medication's effectiveness.[3] There are also a few tablets that should not be split or crushed, such as alendronate (**FOSAMAX**), because they can irritate the mucous membranes.

Hazardous medications, as identified in the National Institute for Occupational Safety and Health (NIOSH) *List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings, 2016* (www.ismp.org/sc?id=2852), should not be split or crushed without utilizing special precautions. When split, or crushed, these drugs could irritate the patient's or resident's mucous membranes, or the aerosolized powder could be inhaled by the nurse or caregiver resulting in harm (e.g., cause cancer, organ toxicity, reproductive toxicity). Hazardous medications include most oral chemotherapy agents which are cytotoxic and other drugs known to cause reproductive disorders (e.g., **PAXIL** [**PAR**oxetine]) or other toxicities. Special precautions should be followed when handling oral hazardous medications including the use of personal protective equipment (e.g., special gloves, gowns, and masks). Therefore, if these medications need to be split or crushed, it should be done in the pharmacy in a biologic safety cabinet.[5] (See the ***Worth* reading...** feature on page 4 for information about a journal article on the safe handling of oral chemotherapy in the LTC setting.)

Myths

One common myth about splitting tablets is that if the tablet is scored, it can be split. This is not always true. Although discouraged by the US Food and Drug Administration (FDA), there are a few sustained-release products which are scored for cosmetic purposes, however, the manufacturer indicates that the drug should NOT be split or broken. The 30 mg tablets of extended-release isosorbide mononitrate are an example. The company recommends not splitting the 30 mg tablets despite

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> check *it* out

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crush.pdf), the NIOSH *List of Antineoplastic and Other Hazardous Drugs in Healthcare Settings* (www.ismp.org/sc?id=2852), and general drug references that include the manufacturer's instructions for crushing or splitting.

- **When in doubt, ask your pharmacist.** If you are not sure whether a medication can be crushed or split, contact the dispensing pharmacy before manipulating the drug for administration.
- **Inform the pharmacy if a resident has difficulty swallowing or if an enteral feeding tube is in place.** If the pharmacy is unaware of a resident's inability to swallow or the presence of a feeding tube, pharmacists may dispense a tablet that should not be crushed. However, if aware, they can work to make sure the appropriate dosage form is dispensed. Prescribers who order drugs, or nurses who transcribe orders for residents with an enteral feeding tube, should indicate in the order that the drug will be administered "via a feeding tube" or "via a PEG tube."
- **Work with your pharmacy to provide clear instructions for complex regimens.** When medications with complex dosing regimens must be dispensed using a combination of both full and half-tablets, ensure your pharmacy provides clear and complete instructions on the MAR and medication label. If there is any doubt about the instructions, contact the pharmacy or prescriber.
- **Do not split or crush tablets just to save money or time.** Due to the potential for errors and dose inaccuracies, do not split a tablet when a full tablet is available in the half strength just to save money or save time waiting for the pharmacy to dispense the medication in the correct dose.
- **Use proper equipment and keep it clean.** When crushing or splitting tablets, use proper equipment designed for that purpose. Ensure that all equipment is cleaned between uses. It is recommended that each resident have his or her own disposable pill splitter, as the sharp blade makes cleaning difficult and dangerous to

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its scoring, which may also be due to the small size of the tablet and its tendency to crumble when split. To cite another example, several years ago, we received a report of an error in which a delayed-release tablet of **ASACOL** (mesalamine) was split after a nurse believed the dashed line on the tablet (**Figure 1**) was "scoring." The package insert for this product indicates that it should not be split or crushed. The dashed line is merely a design on the tablet. Fortunately, the patient received only one split tablet before the error was discovered, and no harm occurred.

Figure 1. Asacol tablet with a dashed line, which is a design on the tablet not meant as scoring. The tablet should not be split or crushed.

Another myth is the mistaken belief that prescribers know which medications can be split or crushed. However, because of the complexities and sheer number of medication dosage forms currently available, prescribers may not know which medications can be split or crushed. ISMP has received reports where the prescriber ordered the medication to be split or crushed, or gave instructions to do so, when splitting or crushing was inappropriate.

Other Sources of Error

Split and crushed tablets can also cause the resident to receive an underdose or an overdose. One study that evaluated the practice of tablet splitting found a deviation of up to 58% from the intended medication dose even when a commercially available tablet splitter was used.[6] The FDA issued a warning last year that tablet splitting can result in significant dose variability.[7]

Crushing tablets can be just as problematic for dosing accuracy. ISMP has received reports of tablets that were crushed in a paper cup. Unfortunately, the paper cup split and some of the drug was lost. Only approved crushing devices should be used. However, even then, some drug residue may remain on the crushing device or in the container, which decreases the dose of the drug being administered. This suggests that splitting and crushing tablets should only be done when an exact strength full tablet or oral liquid dosage form of the drug is not available.

Another source of errors reported to ISMP involves complex orders in which different doses need to be administered at different times. This can result in confusion if splitting multiple tablets is required to make up each dose. An example follows. **CORTEF** (hydrocortisone) 12.5 mg orally every morning and 7.5 mg orally every evening was prescribed for a resident. The pharmacy sent two medication cards, one with 10 mg tablets and the other with 5 mg tablets. The directions on the label and the medication administration record (MAR) to use one 10 mg tablet and half of a 5 mg tablet for the 12.5 mg dose, and both a full and half 5 mg tablet for the 7.5 mg dose, were so confusing that the resident did not receive the correct doses until the nurse discussed the directions with a pharmacist by phone. Part of the confusion was caused by the limited space to include very clear and specific directions on the label and MAR.

Finally, ISMP received several reports of patient/resident harm when a nurse intending to administer a medication via an enteral feeding tube crushed a tablet, dissolved it in water, then put it into an injectable syringe. But due to a mental lapse, the nurse administered the drug by an injectable route (e.g., intramuscular or intravenous). Many fatalities have resulted from errors involving accidental intravenous (IV) administration of oral drugs, including a recent report in which **PAR**oxetine oral suspension drawn into a parenteral syringe was accidentally administered by the IV route. Accidental IM injection of oral suspensions can also cause harm. Only oral or ENFit syringes should be used for drugs intended to be administered orally or enterally.

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staff. Pill crushers that contain the crushed pill in a container or packet to prevent residue contamination (e.g., Silent Knight) are preferred to general pill crushing devices (e.g., mortar and pestle). For drugs administered via an enteral feeding tube, never use injectable syringes; use only oral (or ENFit) syringes.

- **Discard half tablets of controlled substances.** If tablets of controlled substances are split, discard the unused half (cannot be saved) and record it as wasted. Procedures for wasting controlled substances must be followed.
- **Educate staff.** Ask your consultant pharmacist to provide education about the hazards of crushing or splitting tablets to staff who administer medications.
- **Educate residents.** Encourage discharged residents who were taking split tablets to specifically ask their pharmacist whether these tablets will need to be split at home. Their community pharmacy may be able to dispense the correct strength tablet if available. Ensure the resident knows the actual medication dose. For residents who will need to split tablets, make sure they understand what to do, have the right equipment, and can demonstrate how they will split a tablet. Enlist the help of a family member if necessary.

SAFETY wire

- **"Ellipta"—it's not a drug.** A pharmacist misread an order for **INCRUSE ELLIPTA** (umeclidinium), used to treat chronic obstructive pulmonary disease (COPD), as "Increase Ellipta." This was a new order for a patient upon discharge from a hospital. The pharmacist was only familiar with **BREO ELLIPTA** (fluticasone and vilanterol), used to treat COPD or asthma, and dispensed this drug instead. When the individual was readmitted to the hospital several weeks later for an unrelated diagnosis, another pharmacist discovered the error while collecting a medication history from the patient and investigating why he was taking both **ADVAIR** (fluticasone propionate and salmeterol), also used to treat asthma and COPD, and Breo Ellipta.

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Conclusion

Although splitting and crushing tablets is commonplace, it is not without risk and should be reserved for doses not available commercially or in an oral liquid form. LTC staff who administer medications to residents need to be aware of the general principle that any sustained-release, enteric-coated, sublingual, effervescent, or hazardous drugs should not be split or crushed. Staff should not assume that tablets can be crushed or split simply because they are scored or the prescriber has ordered it to be administered in that form. When a resident has an enteral feeding tube, or when crushing or splitting tablets is being considered, the pharmacy should be contacted first to determine if an alternative drug form is available (e.g., liquid form) or if the medication can be crushed or split safely.

ISMP maintains a list of many drugs that cannot be crushed (www.ismp.org/tools/donotcrush.pdf). The list is not exhaustive, so it is best to review a resident's medications with a pharmacist prior to splitting or crushing. See **Table 2** for a list of common drugs that should not be split or crushed. In addition, consider the specific recommendations in the **check *it* out!** column (starting on page 1, right column) to reduce the risk of harm when crushing or splitting tablets.

Table 2. Medications that, as a general rule, should not be split or crushed

■ Extended-release or sustained-release tablets or capsules
■ Enteric-coated tablets
■ Drugs considered to be hazardous (cytotoxic or risking reproductive harm)
■ Sublingual or effervescent medications
■ Drugs that are mucous membrane irritants
■ Drugs with very precise dosing requirements
■ Very small or asymmetrical tablets

References

1) Quinzler R, Gasse C, Schneider A, Kaufmann-Kelle P, Szecsenyi J, Haefeli WE. The frequency of inappropriate pill splitting in primary care. *Eur J Clin Pharmacol.* 2006;62(12):1065–73.
2) Clark TR. Tablet splitting for cost containment. American Society of Consultant Pharmacists. August 2002. www.ismp.org/sc?id=2885
3) Kaufman MB. To crush or not to crush. *Hospitalist.* 2009;(4). www.ismp.org/sc?id=2886
4) United States Pharmacopeial Convention. USP General Chapter <800> *Hazardous Drugs – Handling in Healthcare Facilities.* USP 39–NF 34, 2017.
5) Williams NT. Medication administration through enteral feeding tubes. *Am J Health Syst Pharm.* 2008;65(24):2347-57.
6) Verrue C, Mehuys E, Boussery K, Remon JP, Petrovic M. Tablet-splitting: a common yet not so innocent practice. *J Adv Nurs.* 2011;67(1):26–32.
7) Duffy S. Tablet splitting can significantly vary doses, FDA study finds. *Monthly Prescribing Reference.* 2016 (Jun 23). www.ismp.org/sc?id=2887

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GlaxoSmithKline has marketed several different medication inhalers using the "Ellipta" trademark to identify their common inhalation delivery device. Breo Ellipta was the first of these products, becoming available in 2013. Since then, several other "Ellipta" products have been marketed. These include **ANORO ELLIPTA** (umeclidinium and vilanterol) and Incruse Ellipta (umeclidinium), both for COPD, and **ARNUITY ELLIPTA** (fluticasone furoate), for asthma.

We have received reports about "Ellipta" contributing to confusion and errors when patients, residents, or health professionals refer to these products only by that name and not the drug brand name. It may seem that the easiest way to reduce confusion may be to avoid using the Ellipta modifier at all and just refer to the products by their brand name. However, confusion could arise if the manufacturer decides to use the same brand (drug) name in conjunction with a different inhaler delivery system in the future.

We have communicated our thoughts and concerns to the US Food and Drug Administration (FDA) for their consideration. In the meantime, long-term care facilities and pharmacy staff should be aware that "Ellipta" is not a drug name.

Worth reading...

Safe handling of oral chemotherapy

Johnson TM. Long-term care: safe drug handling of oral chemotherapy. *Consult Pharm.* 2017;32(2):74-83.

Increased use of oral chemotherapy in long-term care (LTC) and assisted living (AL) facilities creates new hazards for staff who handle and administer these drugs. Recent guidelines by the US Pharmacopeial Convention (USP) <800> set requirements for the safe handling of these agents. This article discusses relevant aspects of the new requirements and the need for consultant pharmacists to be involved in LTC and AL facilities.