

## Beware the Double Halo

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 Baylor College of Medicine

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### 22 m.o. female

- Increase in drooling over the past two days
- Occasional cough with eating
- Difficulty swallowing when eating
- Youngest of three



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### Symptoms Can Include

- Airway obstruction or wheezing
- Drooling
- Vomiting
- Chest discomfort
- Difficulty Swallowing, decreased appetite, refusal to eat
- Coughing, choking, or gagging with eating or drinking

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**NOTE:**

- Patient may OR may not have an ingestion history



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**Must rule out button battery ingestion**



If swallowed, button batteries can cause serious injury or death in as little as two hours.

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**Button Batteries**

- A true emergency
- Serious sequelae include:
  - Esophagus - esophageal burn, perforation, fistula
  - Nose - damage to nose, nasal septum
  - Ear - TM perforation, EAC burn



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## Esophageal battery protocol

- > 3000 BB ingestions/year
  - 2006-2017: 6 fold increase in severe injuries; 12 fold increase in mortality
- Damage occurs in as little as 2 hours



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## Imaging

- X-Ray immediately



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## Imaging

- Always get two view Xrays – AP and Lateral
- Flat surface of best seen on AP view when in esophagus
- Flat surface of best seen on Lateral when in trachea
- **Double Halo sign / Step Off sign = Button Battery**



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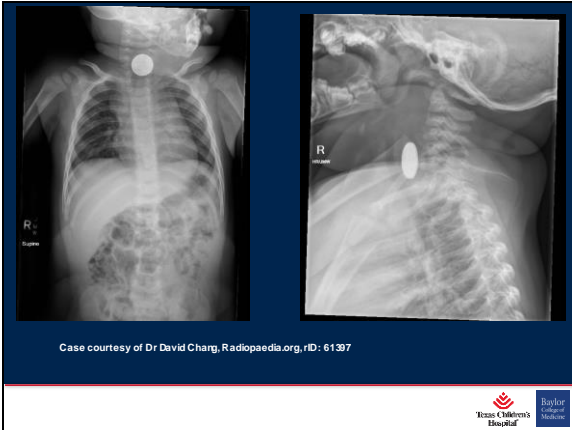
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### Details about prior case

- Patient presented with irritability, coughing, rhinorrhea
- Case courtesy of Dr David Chang, Radiopaedia.org, rID: 61397

Texas Children's Hospital | Baylor College of Medicine

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### What is a button battery?

- 5mm – 25mm in diameter, 1mm – 6mm tall
- Stainless steel forms bottom body / positive terminal
- Metallic top – negative terminal
- Contents can include: zinc, lithium, manganese dioxide, silver oxide, carbon monofluoride, cupric oxide



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### Methods of Injury

- Creation of electrical current that hydrolyzes tissue fluids and produces hydroxide at the battery's negative pole
- Leakage of battery contents (Esp. Alkaline electrolyte)
- Physical pressure on adjacent tissue



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### Remember the 3 Ns

- Negative – Narrow – Necrotic
- The negative pole of the battery, which is the narrow side on the Xray, causes the most damage



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**National Poison Control Button Battery Hotline**

**Swallowed a battery?  
Get help from the battery  
ingestion hotline  
immediately**

**CALL 800-498-8666**

**Kaiser Children's  
Hospital** **Baylor  
College  
Medicine**

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**Poison Control Website**

• [www.poison.org/battery](http://www.poison.org/battery)

**POISON CONTROL**  
National Poison Control Center

Get Help Online **www.POISONCONTROL.org** Poison Info Statistics Act Fast The Poison Center

**Swallowed a Button Battery?  
Battery in the Nose or Ear?**

Every year in the United States, more than 3,500 people of all ages swallow button batteries. These are used to power hearing aids, watches, toys, games, flashing jewelry, singing greeting cards, remote control devices, and many other items. Call **800-498-8666** for guidance if someone swallows a battery.

Most button batteries pass through the body and are eliminated in the stool. However, sometimes batteries get "hung up," and these are the ones that cause problems. A battery that is stuck in the esophagus is especially likely to cause tissue damage. An electrical current can form around the outside of the battery, generating hydroxide (an alkaline chemical) and causing a tissue burn. When a battery is swallowed, it is impossible to know whether it will pass through or get "hung up."

If anyone ingests a battery, this is what you should do:

**Kaiser Children's  
Hospital** **Baylor  
College  
Medicine**

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**Suspect a battery ingestion in these situations:**

- Swallowing or inhaling a battery, or ingestion history is confirmed (e.g., caregiver reports, witness, battery found in stool)
- Battery ingestion suspected based on symptoms (e.g., pain, vomiting, drooling, coughing, or bleeding)
- Battery ingestion suspected based on imaging (e.g., X-ray, CT scan)

**Battery ingestion known or suspected:**

**1. Suspect a battery ingestion in these situations:**

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  - Battery ingestion suspected based on symptoms (e.g., pain, vomiting, drooling, coughing, or bleeding)
  - Battery ingestion suspected based on imaging (e.g., X-ray, CT scan)
- **2. Call 800-498-8666 for help.**
- **3. Do not induce vomiting or give anything to eat or drink.**
- **4. Do not try to remove the battery.**
- **5. Do not use laxatives or enemas.**
- **6. Do not use activated charcoal.**
- **7. Do not use a stomach pump.**
- **8. Do not use a nasogastric tube.**
- **9. Do not use a rectal tube.**
- **10. Do not use any other medical or surgical procedure.**

**2. Suspect a battery ingestion in these situations:**

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## Immediate Treatment of Suspected Button Battery Ingestion

- 10mL of honey (if child > 12 months) or sucralfate every 10min
- Do not induce vomiting or give cathartics

### Laryngoscope

Bronchoesophagology

#### pH-neutralizing esophageal irrigations as a novel mitigation strategy for button battery injury

Rachel R. Anfang MA, Kris R. Jatana MD, Rebecca L. Linn MD, Keith Rhoades BS, Jared Fry BS, Ian N. Jacobs MD

First published: 11 June 2018 | <https://doi.org/10.1002/lary.27312> | Cited by: 4




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## Determining size of battery

- 20 mm lithium coin cell is most frequently involved in esophageal injuries
- Smaller batteries can lodge and cause problems too, but less frequently
- However, 40% of the time buttons cannot be identified




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## Esophageal Button Battery



Case courtesy of Dr Yair Glick, Radiopaedia.org, rID: 52187




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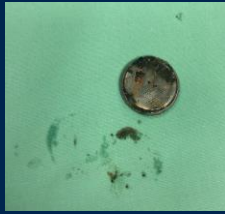
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## Esophageal Button Battery

Removed from esophagus 2 hours after ingestion



Case courtesy of Dr. Yair Glick, Radiopaedia.org, rID: 52187



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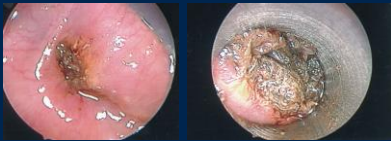
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## Esophagoscopy



Images courtesy of Dr. Anna Mesner



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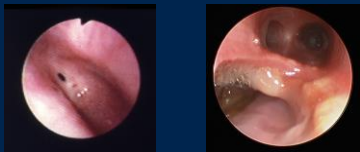
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## Complications following battery removal

- Esophageal stricture
- Vocal fold paralysis
- Tracheo-esophageal fistula
- Catastrophic hemorrhage



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### But wait! There's more!

- 4 year old boy
- Playing with bike light
- Comes to parent "something stuck in nose"

Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



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Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



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### Nasal Button Battery

- EC attempted removal – unsuccessful
- ENT consulted
- To OR within 4-5 hours of insertion

Case courtesy of Dr Alasdair Grenness, Radiopaedia.org, rID: 75978



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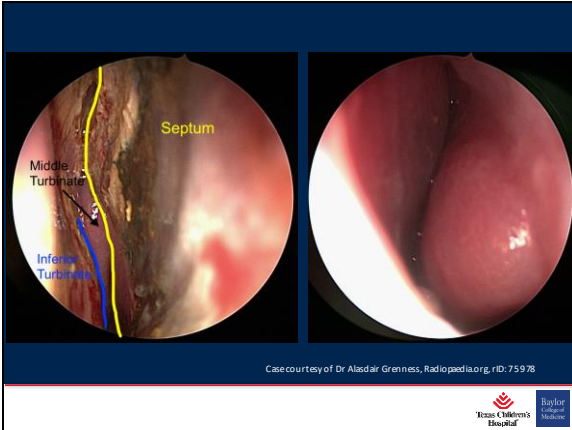
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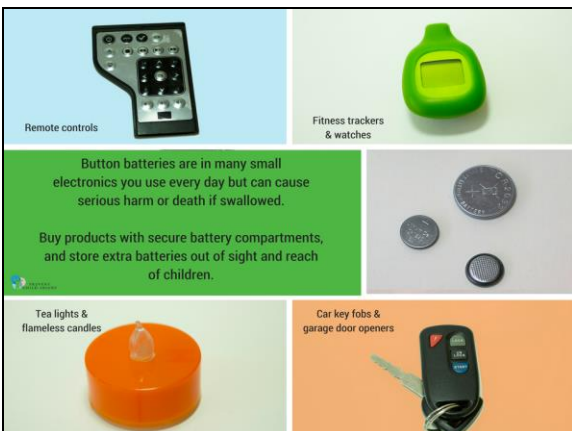
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## Where can you find button batteries?

- Remote Controls
- Tea lights / Flameless candles
- Garage door openers
- Keyless entry fobs
- Bathroom scales
- Parking transponders
- Toys
- Cameras
- Watches
- PDAs
- Calculators
- Digital Thermometers
- Hearing Aids
- Singing Greeting Cards
- Talking books
- Portable stereos
- Handheld Video Games
- Cell phones
- Home medical equipment / meters
- Flash and pen lights
- Flashing shoes
- Toothbrushes
- Bedwetting monitors
- Keychains
- Flashing / lighted jewelry or attire
- Any powered house hold item




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## Button Battery Safety

- Store all batteries out of sight and reach of children, preferably in a locked cabinet or container.
- Do not allow children to play with new or used batteries.
- Buy products with a secure battery compartment that requires a tool (often a screwdriver) to open. Check these compartments often to make sure they stay secure over time.
- When replacing batteries, immediately throw away old batteries in a trash can that children cannot access or put batteries for recycling out of sight and reach.
- Check other homes your children visit for possible access to button batteries: grandparents, family members, caregivers, and friends.




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## Questions?

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