**Problem**

What: Boy swallowed button battery, required numerous surgeries

When: October 16, 2010

Where: Back came off DVD remote

Cause Map:

- **Basic Level Cause Map**: Start with simple why questions.
  - Batteries (even "dead" ones) contain chemicals that create current. The moistness of the esophagus can cause a chemical reaction that can burn holes in the tissue, causing serious damage and potentially death to those that have swallowed the objects.

- **More Detailed Cause Map**: Add detail as information becomes available.
  - Time chemical reaction occurred
  - Delay in removal of battery
  - Delay in diagnosis
  - Medical staff did not think of battery issue
  - Small batteries used to be less common
  - Did not realize child had swallowed object
  - Child could still breathe
  - Button battery is very small

- **Patient Safety Goal Impacted**: High risk of death
  - Access to button battery
  - Button battery used in DVD remote
  - Button battery not secured
  - Design of consumer product

- **Patient Services Goal Impacted**: 65 surgeries required
  - Chemical reaction in esophagus
  - Battery causes chemical reaction in body
  - Current in battery
  - Moisture in esophagus

- **Impact to Goals**: Patient Safety, Patient Services
  - Patient Safety: Risk of death
  - Patient Services: 65 surgeries required

**Analysis**

**Step 1. Problem**

- What's the Problem? Why did it happen? What will be done?

**Step 2. Analysis**

- Basic Cause-and-Effect:
  - Batteries (even "dead" ones) contain chemicals that create current. The moistness of the esophagus can cause a chemical reaction that can burn holes in the tissue, causing serious damage and potentially death to those that have swallowed the objects.

**Step 3. Solutions**

- **Prevention** - limit access to small batteries:
  - Keep loose batteries out of reach of children
  - Ensure battery compartments on products are secured
  - Buy products with battery compartments that require a tool to open if possible
  - Use duct tape to secure products with batteries that don't require a tool

- **Treatment** - act quickly to limit damage from batteries:
  - Seek immediate medical attention if you believe a battery has been swallowed
  - Do not let the child eat or drink
  - Do not induce vomiting
  - Tell the medical staff it may be a small battery

- For a free copy of our Root Cause Analysis Template in Microsoft Excel, used to create this page, visit our web site.

65 surgeries required for child who swallowed button battery

When Emmett was one, he swallowed a button battery. His parents could tell that something wasn't right, and Emmett was diagnosed with a cold, then croup. Luckily at a pediatrician visit 3 days after he swallowed the battery, the pediatrician had second thoughts and sent Emmett to the ER for an x-ray. Once the button battery was discovered lodged in his esophagus, the rush to treat him began. Emmett would receive 65 surgeries over the next four-and-a-half years to rebuild his esophagus and vocal chords.

"In homes, button batteries are now listed on the top 10 items that parents should monitor to keep their kids safe. The injuries caused by swallowing them are preventable. Almost everyone has things like remotes and key fobs in their homes, and the batteries inside can be lethal."

- Karla Rauch, Activist, Mother of child who swallowed a button battery

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