

## **Project Title**

Improvement of Current Medication Pill-Crushing Process

## **Project Lead and Members**

- Louis Ong
- Lim Jia Hui

## **Organisation(s) Involved**

National University Hospital, Equip Medical Pte Ltd

## **Project Period**

Start date: Nov 2017

Completed date: Dec 2018

## **Background**

Previously, nurses used the traditional mortar and pestle to pound the medication (pills) into powder form before serving to patients who have difficulties in swallowing pills or are on nasogastric tube (NGT) feeding. Typically, each patient can have up to 12 pills to grind during each medication round (up to 3 medication rounds each day) and nurses were required to grind the medication, administer to patients, wash and dry the mortar and pestle; before grinding the medication for the next patient.

This project aims to reduce the non-valued added time nurses spent preparing medication using mortar and pestle for patients who required medication to be crushed. Using the automated pill crusher helps to improve the medication administration process as it replaces the conventional way of pounding medication with mortar and pestle and expedites the grinding process, which in turn improves both patient and staff experience.

With an aging patient population, we see a higher number of patients requiring their medication in “powdery” form. Thus, we saw a need to relook at how technology and innovation can automate labor-intensive tasks, such as finding a better alternative to mortar and pestle.

## Methods

The major steps taken to implement the project were as follows:

1. The automated pill crushers were procured for the wards in NUH.
2. Vendor conducted education training before users started to use.
3. Team walked the wards to observe.
4. A guide was created to highlight and rectify the issues arising from using the pill crusher wrongly.

## Results

Time spent to prepare medication (which requires grinding) for patients decreased from an average of 2.2 minutes per patient to an average of 0.7 minutes per patient – an improvement rate of 68.3%. Nurses shared that they require less energy and time in grinding the pills. They would be able to channel more time on meaningful and quality activities. Majority of nurses also agreed that the automated pill crusher has reduced the incidence rate of blocked NGTs during feeding.

## Lessons Learnt

Several observations were made:

- Nurses transferred fine powder from pill crusher cups to transparent medication serving cups. We educated the wards to administer the medication using the pill crusher cups directly. This will reduce consumables cost.
- Nurses misaligned the cup holder and used the wrong set of pill crusher cups together for grinding. These resulted in difficulty in crushing medication. They

were educated to correct placement of cups and a visual guide serving as a reminder was given out to all wards for clearer instructions.

- Best practices sighted in wards, such as “Do Not Overcharge” and “Do Not Dispose” stickers, were shared across the hospital.

### **Project Category**

Process Improvement, Technology, Robotics & Automation, Clinical Productivity

### **Keywords**

Process Improvement, Technology, Robotics & Automation, Clinical Productivity, Medication Serving, Medication Grinding, Medication Preparation, Reduce Waste, Time Saving, Automated Pill Crusher, Staff Training, Dysphagic Patient Friendly, Nursing, Industry Partner Collaboration, National University Hospital, Pill Crusher

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# First Crush Pill Crusher



**Do not leave to charge for more than 6 hours**

If your unit needs to be recharged, the red light will blink

The unit is fully charged when the red light turns off

# Step-by-Step Instructions



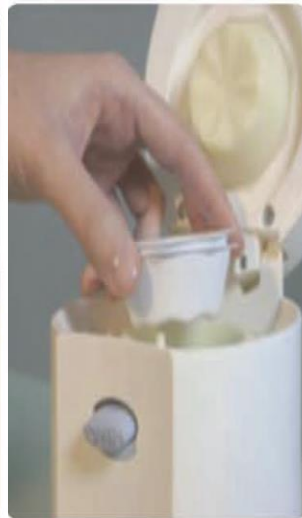
1 Press **ON** button to turn on unit (**GREEN** light should be on)



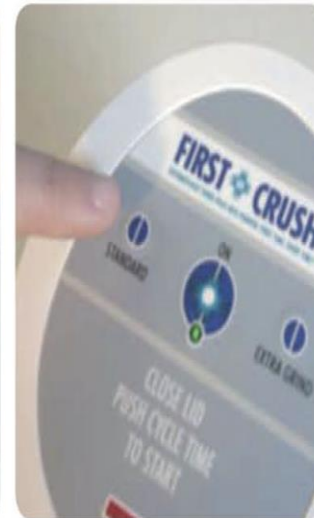
2 Place pills into bottom cup and put top cup on top (max. **10** pills)



3 Push **"OPEN"** button and lift lid



4 Place cups into cup holder and firmly close lid until it latches



5 Push **"EXTRA GRIND"** button



6 Remove both cups and tap **TOP** cup to remove residue



***Break harder/bigger pills into half before crushing***

***Determine if powder is fine enough, otherwise can press "EXTRA GRIND" again***

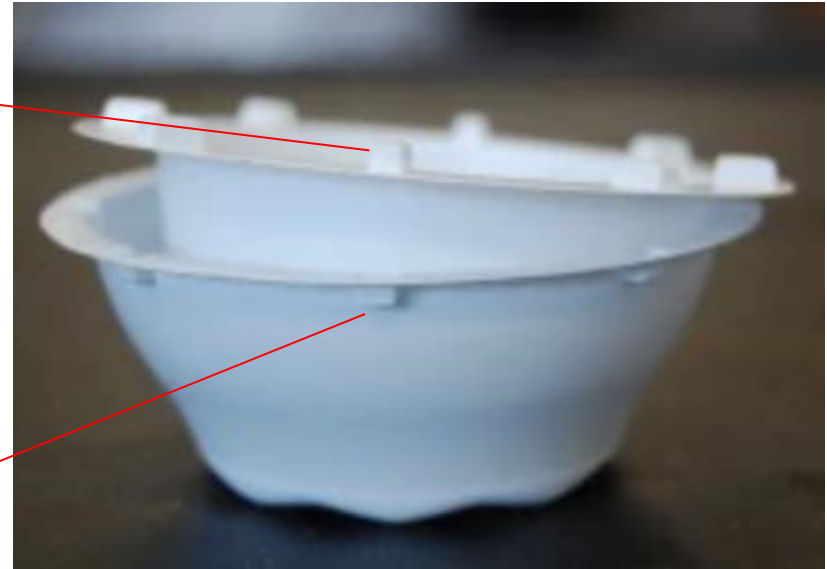
# How to Identify Top and Bottom Cups

**A TOP CUP AND A BOTTOM CUP ARE REQUIRED FOR EVERY CRUSH**



**Top cup**  
(ridges on **top** of rim)

**Bottom cup**  
(ridges on **bottom** of rim)



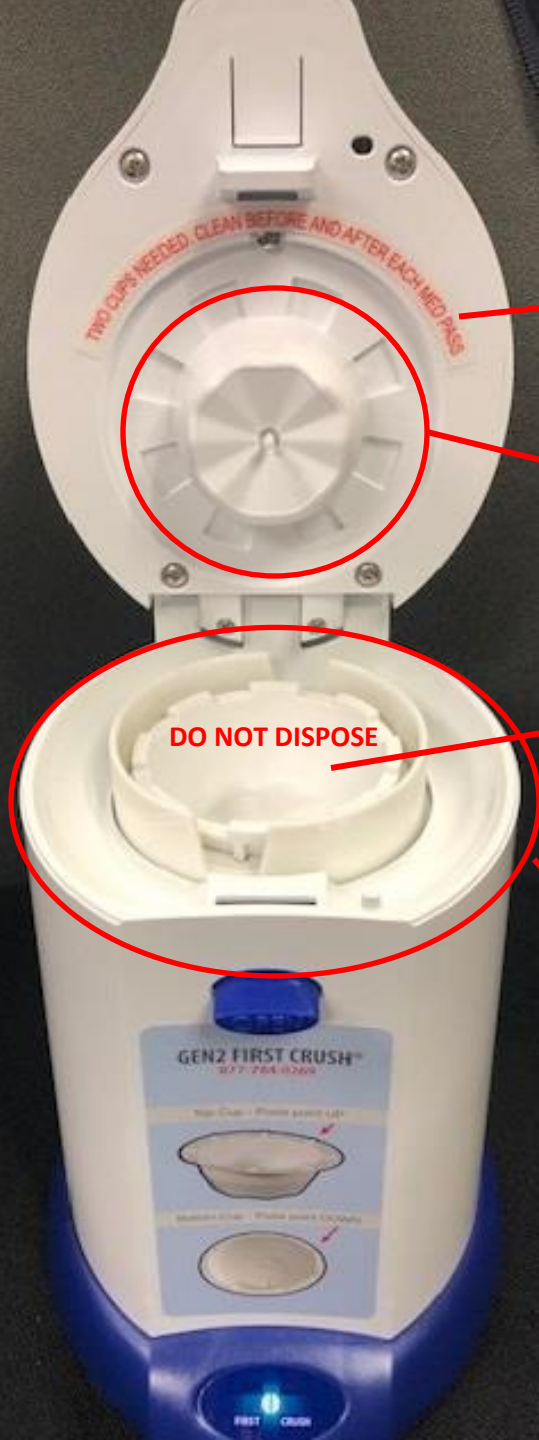
**Complete RX cups dimensions:**

Width: 6.35cm

Height: 2.16cm

Capacity: 41.25ml

# Maintenance of Pill Crusher



Do not remove label.

Do not force the lid shut, check placement of disposable cups.

Remove the medication cup holder for cleaning only. **DO NOT DISPOSE.**

Hold machine upside down with lid open, tap bottom of machine to remove excess residue.

Clean daily with 75% alcohol and **WIPE DRY WITH PAPER TOWEL TO PREVENT DISCOLORING.**