

Project Title

One Flush Clean All

Project Lead and Members

Project lead: Sherly Mariano

Project members: Yvonne Lew, Jerry Vinluan, Yah Seah Chui, Isagani Gunsay, Ng Aeng Peng, Sulaiman Othman

Organisation(s) Involved

Changi General Hospital

Healthcare Family Group(s) Involved in this Project

Medical, Allied Health

Applicable Specialty or Discipline

Medical & Laboratory Technology, General Practice

Project Period

Start date: Not indicated

Completed date: Not indicated

Aims

This project aims to improve the efficiency and efficacy in cleaning reusable fine suction tubes by designing a device with manifold.

Background

- Daily, instrument sets including various sizes of reusable suction tubes are sent from the ENT Clinic to Central Sterile Supply Department (CSSD), for decontamination. It is time consuming to clean each suction tube and using a

syringe to flush the debris manually. The repetitive movements pose great strain on staff hands as it is done repeatedly for 170-180 pieces.

- Suction tubes, are used to remove blood/fluid/debris during the procedure. The challenges increase as the lumen becomes smaller in diameter. Reprocessing reusable suction tubes has been a challenge, especially when suction tubes are very fine. Manual flushing is labour intensive and requires a lot of water to clean the lumen.

Methods

The serendipity technique was used to design the suction manifold device suitable for concurrent flushing of multiple suction tubes of different sizes. This device was adopted from the fish aquarium concepts, which uses a 10-way air splitter valve to direct the airflow in the right direction and at the right pressure. A prototype was developed based on the various sizes of the suction tubes. Before finalizing the design, changes were made based on the user s' feedback during the trial.

Results

See poster appended/below

Conclusion

- In collaboration with the supplier, the team has developed a mechanical, semi-automatic flush manifold that can hold up to ten suction tubes with ability to flush simultaneously. In addition, staff can easily attach and remove the suction tubes.
- It was conclusive that the flushing device cleaned the lumen effectively and improved the efficiency of the process.
- This project has been shared with other institutions such as KKH, SNEC, SGH and NDCS during hospital visits.

Project Category

Care & Process Redesign

Productivity, Quality Improvement, Design Thinking, Job Effectiveness, Time Saving,
Manhour Saving

Keywords

Digital workflow, Scan, Automatic Design, 3D printing, Denture Design, Intral-oral
digital scan, Production

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One Flush Clean All

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Background

- ❖ Daily, instrument sets including various sizes of reusable suction tubes are sent from the ENT Clinic to Central Sterile Supply Department (CSSD), for decontamination. It is time consuming to clean each suction tube and using a syringe to flush the debris manually. The repetitive movements pose great strain on staff hands as it is done repeatedly for 170-180 pieces.
- ❖ Suction tubes, are used to remove blood/fluid/debris during the procedure. The challenges increase as the lumen becomes smaller in diameter. Reprocessing reusable suction tubes has been a challenge, especially when suction tubes are very fine. Manual flushing is labour intensive and requires a lot of water to clean the lumen.

Aim

- ❖ This project aims to improve the efficiency and efficacy in cleaning reusable fine suction tubes by designing a device with manifold

Methodology

- ❖ The serendipity technique was used to design the suction manifold device suitable for concurrent flushing of multiple suction tubes of different sizes. This device was adopted from the fish aquarium concepts, which uses a 10-way air splitter valve to direct the airflow in the right direction and at the right pressure. A prototype was developed based on the various sizes of the suction tubes. Before finalizing the design, changes were made based on the user s' feedback during the trial.



Measures (Results, Outcomes and Figures)

- ❖ The time spent washing the suction tubes has been reduced, increasing the efficiency on the process as the device facilitates flushing 10 suction tubes at 5 sec. instead of 15 to 50 sec individually. Thus, it also helps to reduce work-related musculoskeletal disorders due to repetitive movements.

Estimated time saving in washing the suction tubes / day						
Sizes	Time spent /suction tube	Number of suction tubes washed per cycle using the manifold (10 suction tubes/cycle)	Number of suction tubes washed	Before implementation time spent (MANUAL)	After implementation time spent (Using MANIFOLD)	Time save
BARON # 3	50 sec	6	55	2750 secs (46 mins)	30sec	2720 secs (45mins)
BARON # 5	30 sec	7	63	1890 secs (31mins 5secs)	35sec	1855 secs (31 mins)
BARON # 7	15 sec	6	59	885 secs (15mins)	30 sec	825 secs (14 mins)
Total time spend		19	177	5525 secs (1hr 32mins)	95 secs (1min 58secs)	5400 secs (1hr 50mins)

- ❖ The team conducted an Adenosine Triphosphate (ATP) test to check the cleanliness of the suction tubes after flushing for one month (72 times). The result ranged from 1 to 38 RLU. Refer to fig.1 & 2.

Fig.1

ATP Test for Suction Tubes							
Date	Set	Item	Result Reading (RLU)	Staff Name	Washed by	Remark	
6/1/23	Sucker speculum Ear Set	Baron # 3	6	Ze	Helen		
6/1/23	Sucker speculum Ear Set	Baron # 3	3	Ze	Helen		
9/1/23	Std ENT set (No)	Baron # 7	5	Ze	Aisha		
9/1/23	Std ENT set (No)	Baron # 3	4	Ze	Aisha		
9/1/23	Std ENT set (No)	Baron # 5	3	Ze	Aisha		
9/1/23	Std ENT set (Reg)	Baron 5	2	Ze	Shaly		
9/1/23	Std ENT set (Reg)	Baron 3	1	Ze	Shaly		
9/1/23	Std ENT set (Reg)	Baron 3	1	Ze	Shaly		
10/1/23	Std ENT set # 2	BARON # 8	7	SM	DEBEX		
10/1/23	Std ENT set # 2	BARON # 3	2	SM	DEBEX		

Note:
 • 150 RLU - Recommend
 • 30 - Passing Rate
 Effective date: 01/11/2022

Fig.2 The ATP value recommended not more than 150 RLU



Conclusion & Future works

- ❖ In collaboration with the supplier, the team has developed a mechanical, semi-automatic flush manifold that can hold up to ten suction tubes with ability to flush simultaneously. In addition, staff can easily attach and remove the suction tubes.
- ❖ It was conclusive that the flushing device cleaned the lumen effectively and improved the efficiency of the process.
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