



Comparison of flexible endoscopes problems in different hospital's departments

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Abstract:

A failure of medical devices in hospitals is disturbing because of its impact on the workflow. In this paper we study the faults of flexible endoscopy devices and their causes in several departments and hospitals. Where knowing these faults and Understanding the causes of this faults will help to protect this devices, which reduces material cost resulting from maintenance of these devices and keep workflow in the department that depend on them.

Keywords: Flexible Endoscopy, Military Hospital, Pentax.

Introduction:

The Flexible Endoscopy devices is sensitive medical equipments, because it used in direct contact with patient, also the Endoscopy operation required a high accuracy during the procedure, which making them at risk to crashes.

Before identifying the most important faults of the flexible endoscopy devices and their causes, we should be identifying the main parts of the flexible endoscopy devices, where most of the flexible endoscopy devices consist of the following parts:

- Operation channel (working channel).
- Air / water channel.
- Fiber optic cable.
- Camera.
- Segment.
- Pulley assembly.
- Insertion tube.
- Bending rubber.

After the identification of the main parts of the flexible endoscopy devices must be referring to the steps that take place when using these devices, Where the endoscopy operations different from one to another, but in general all endoscopic operations participate in the following steps:

- Use forceps to sampling.
- Leak test after the operation.



- Disinfection.

After identifying the main parts of the flexible endoscopy devices and the common steps in endoscopy operations. We will discuss in this study the faults that occur for these devices and the causes of them. This may help to protect these devices from these faults, which helps to provide costs of maintenance this hardware and keep workflow in the department that depends on them.

Case of study:

In our study we referred to the maintenance calls, service reports and history cards in the institute of biomedical technology database for the Jordanian military hospitals.

Where we noticed through the study of the Jordanian military hospitals that the faults of the flexible endoscopy devices are divided into two parts:

- ✓ Failures during the implementation process of endoscopy.
- ✓ Breakdowns after the implementation of the process of endoscopy.

❖ Failures during the implementation process of endoscopy:

As we pointed out earlier that the flexible endoscopy devices are sensitive equipments and they needed accuracy when used due to direct contact with the patient.

During this study we show that the faults that occur for flexible endoscopy devices during endoscopy process include:

1. Operation channel damage:

The cause of this fault as a result of use non compatible forceps to the Diameter of Operation channel, or as a result of opens the forceps inside the channel.

2. Air / water channel damaged:

This fault occurs during the process of endoscopy, Because of the entry of some substances and fluids from the patient to the air / water channel. Which works to close the channel, also the compression in the blocked channel may cause damage to the channel.

3. Insertion tube and Bending rubber damaged:

This is fault caused during the implementation of the endoscopy process of several reasons. including as a result of carrying endoscope in the wrong way, which would be in danger of crash from the materials in working room, and may result as well as the fault as a result of a defect in one of the inner parts of endoscope (operation channel, air/water channel, fiber optic cable, camera), and therefore when you move the flexible part of the endoscope and change direction during the performance of working, could this parts pressured On the Tube, which may damaged the tube.

❖ Breakdowns after the implementation of the process of endoscopy:



After the completion of the process of endoscopy must reprocess the endoscope, where the reprocessing operation includes the following steps:

- ✓ Leak test.
- ✓ Channels (operation channel, Air/Water channel) cleaning.
- ✓ Disinfection.

During this study we show that the faults that occur for flexible endoscopy devices after endoscopy process include:

1- Channels (operation channel , air/water channel) leak:

This fault occurs during the endoscope cleaning operation As a result of the use of non compatible cleaning brush.

2- Fiber optic cable damaged:

This fault occurs during the endoscope cleaning operation As a result of the lack of cleaning lenses properly, causing the survival of some impurities on the lenses. Consequently, according to Energy law (energy does not perish not develop out of nowhere, but can be converted from an image to another), these impurities will work as a barrier to light, and thus when the passage of light through optical fiber, part of this light will be blocking by these impurities, and thus this objectionable part of the light will turn into heat, so that this heat will damaged the fiber optic cable.

3- Camera damaged:

The camera is a sensitive part of the endoscope. The cause of camera fault mainly as a result of entering liquids to the interior of the endoscope, because there is a leak in any part of endoscope.

During our study on the different Jordanian military hospitals we noticed that there is a different faults occurs for flexible endoscope. These faults can be shown in table (1) which shows the percentage of each failure from the total service calls in the last year:

Fault	During the implementation	After the implementation
Operation channel damage	43%	17%
Air / water channel damage	33%	23%
Insertion tube and Bending rubber damaged	14%	11%
Fibr optic cable damaged	6%	26%
Camera damaged	4%	23%

Table (1): Percentage of failure in Endoscopy parts

Results:



From what was mentioned before we can say that we can protect flexible endoscope from faults by the preventive maintenance steps:

* Technical refreshing seminar programs to be held for the medical staff, the goal of these programs is to teach them the ideal and proper way of using and dealing with the endoscopes, also the proper way of reprocessing the scopes after use, and this will definitely reduce the misuse failures caused by a non-trained staff.

* Use compatible tools (brush, forceps) to our system.

Conclusion:

In this paper we took the Jordanian Military hospitals in Jordan as a case of study trying to help putting a good preventive maintenance plan for different departments in those hospitals, and we found that failures of the machines differ from one place to another some of them are caused during the operation and other of them after the operation the table (2) show the percentage of this faults.

Faults	Percentage
during the implementation	63%
after the implementation	37%

Table (2): the percentage of Endoscopy faults before preventive maintenance

We found when applying a good preventive maintenance plan for each hospital depending on this study that different failures reduced by different percentages as shown in table (3):

Faults	Percentage
during the implementation	33%
after the implementation	67%

Table (3): The correction percentage of Endoscopy fault

Regarding to table (3) the actions been taken reduced the down-time periods of the endoscope and the spare parts orders so the total cost of maintenance which is a very important factor in any hospital's economical plan. And again: Knowing the cause of any problem or failure is the major part of the solution

References

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