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# STAGES OF ORGANIZING METROLOGICAL SUPPORT AND TECHNICAL MAINTENANCE OF MEDICAL EQUIPMENT

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**Annotation:** Metrological support of medical equipment is a process that includes the processes of regular inspection, calibration, testing and certification of medical equipment to ensure their measurement accuracy, reliability and safety. These processes are carried out within the framework of metrology - that is, the science of measurements - and are of great importance in the healthcare system. This article considers the issues of metrological support of technical equipment used in medicine. Calibration, testing and compliance with standards of measuring instruments play an important role in ensuring the reliability and accuracy of medical equipment. Metrological support improves the quality of the healthcare system, reduces errors, and ensures patient safety.
**Keywords:** metrological support, medical equipment, initial inspection, periodic inspection, extreme inspection, calibration, maintenance, preventive maintenance, current repairs

Introduction

Today, along with the widespread introduction of modern medical technologies, their accuracy and reliability have become a priority. If the diagnostic data obtained through medical equipment is incorrect, this poses a threat to the patient's life. Therefore, the metrological support of each measuring instrument and device is an integral part of the healthcare system. So, what is metrological support? Metrological support is a set of measurements aimed at ensuring the compliance of medical equipment and devices with established technical and medical requirements. This maintenance includes:

- Calibration (i.e. comparison of measuring instruments with standards),
- Verification (inspection),
- Testing,
- Standardization and certification work.

The importance of metrological maintenance for medical equipment

The equipment used in medicine (for example, ECG machines, ultrasound systems, X-ray machines, infusion pumps, laboratory equipment) has a direct impact on the life and health of the patient. Therefore:

- Measurement errors can lead to incorrect diagnosis and treatment;
- Safety is necessary, since some equipment operates with high voltage or radiation;
- The quality and reliability of the healthcare system depend on metrological control.

Metrological maintenance processes

- Initial inspection - inspection of the equipment before its use after it is manufactured or imported;
- Periodic inspection - carried out regularly at certain intervals during use;
- Extreme condition testing – testing is carried out if the equipment is out of order or malfunctioning;
- Calibration – adjusting measuring instruments in accordance with national or international standards.

Each medical technology and equipment used in modern medicine is of great importance for human health and life. Their accuracy, reliability and stable operation directly affect the patient's life. The global health standards established by the World Health Organization emphasize the metrologically correct adjustment of medical equipment. Therefore, regular metrological control and maintenance of medical equipment, especially surgical equipment used in the vertebrology department, is an urgent issue.

Maintenance activities are very important in the vertebrology department to ensure the operation of medical equipment and equipment. Such services are an integral part of the modern healthcare system and one of the important conditions for providing quality medical services to patients. Technical maintenance not only ensures the uninterrupted operation of equipment, but also serves to increase its service life and reliability.

Stages of technical maintenance organization

The following main stages must be carried out to effectively organize technical maintenance work:

1. Planning: The main stage of technical maintenance is planning, in which the frequency, procedure, responsible persons and work to be performed for each piece of equipment are clearly defined.
2. Preparatory work: Before servicing, technical personnel are provided with the necessary tools, spare parts, and technical documentation.
3. Equipment inspection: During the service, the equipment is checked for its technical condition, and if necessary, diagnostic work is carried out.
4. Troubleshooting: If a malfunction is detected during maintenance, it is eliminated or immediate repair work is carried out without stopping maintenance.
5. Control and reporting: Upon completion of maintenance, a report on the results is drawn up and recorded in special journals. This serves as the basis for subsequent maintenance.

Persons responsible for maintenance

Maintenance work is carried out by the engineering and technical department of the medical institution or external service services. These works are supervised by the following persons:

• Medical technical engineer: Monitors the condition of equipment, draws up a maintenance plan and ensures its implementation.
• Department head: Responsible for the vertebrology department, hands over equipment during maintenance and determines its condition.
• Maintenance specialist: A specialist who directly performs maintenance work, assesses the technical condition and replaces spare parts.
• Medical staff: Doctors and nurses using the equipment give feedback on the condition, report malfunctions in a timely manner.

Practice by types of service

The Vertebrology Department uses preventive, current and capital types of service. Each type has its own technologies:

• Preventive service: This service is carried out on a periodic basis. It is carried out monthly or quarterly. It includes dust removal, electrical connection control, case condition, screens, buttons, cables and connectors.
• Current repairs: It is carried out in cases where a malfunction occurs in the operation of the equipment. To perform this service, specialists determine the cause of the malfunction and eliminate it with the necessary spare parts.
• Capital repairs: At a certain period of the year, all equipment is completely disassembled, the main components and systems are updated or undergo in-depth diagnostics.

Conclusion

Metrological support of medical equipment is an important factor in ensuring the quality of the healthcare system, the accuracy and reliability of diagnostic and treatment processes. Through metrological control of equipment operation, it is possible to ensure patient safety and improve the quality of services. Regular comparison of medical equipment in medical institutions ensures the reliability of the quality of medical services provided by healthcare institutions. According to WHO standards, metrological support of medical equipment is a vital necessity.

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