



**Methodology Article**

# Optimize the Management and Effectiveness of Orthopedic Spare Loaner Instrumentation and Implants in Central Sterile Supply Department

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**Abstract:** Objective: Loaner Instrumentation due to various comprehensive factors, the equipment often can not be delivered to the disinfection supply center according to the prescribed time, which not only affects the handling quality of the equipment, but also affects the timely supply and usage of the equipment. The study aims to explore the managing method of orthopedic spare loaner instrumentation and implants in Central Sterile Supply Department of the hospital (hereinafter referred to as CSSD). Methods: 418 orthopedic operations use orthopedic spare loaner instrumentation and implants in 2018 were selected as per-implementation. The routine methods were used to manage the orthopedic spare loaner instrumentation and implants. 437 orthopedic operations use orthopedic spare loaner instrumentation and implants in 2019 were selected as the implementation. Using the optimized method to manage the orthopedic spare loaner instrumentation and implants is to compare the changes of timely supply rate, double closed loop management execution rate and doctor satisfaction before and after the implementation of orthopedic spare loaner instrumentation and implants in our hospital. Results: After the implementation of optimized management measures, the timely supply rate of orthopedic spare loaner instrumentation and implants reached 100%; the implementation rate of double closed-loop management increased from 69.86% to 100%; and the doctor satisfaction increased from 77.78% to 97.22%. Conclusion: By optimizing the management measures of orthopedic spare loaner instrumentation and implants, we can improve the timely supply rate, achieve the whole process trace ability and improve the doctor's satisfaction, further improve the safety of the instruments, reduce the surgical infection, and ensure the safety of patients.

**Keywords:** Central Sterile Supply Department, Optimize the Management, Loaner Instrumentation and Implants

## 1. Introduction

Loaner Instrumentation refers to the medical device manufacturer, company leasing or free of charge to the hospital reusable medical device, divided into tools and implants. Implants are implantable objects that are placed in the body cavity caused by surgical operation or exist physiologically and have a retention time of  $\geq 30$  days [1]. When the hospital needs to use loaner instrumentation and implants, the surgeon shall inform the instrument

manufacturer to send the corresponding devices to the CSSD for sterilization and use for operation. Due to various comprehensive factors, the equipment often can not be delivered to the disinfection supply center according to the prescribed time, which not only affects the handling quality of the equipment, but also affects the timely supply and usage of the equipment. The disinfection supply center of our hospital, with the assistance of multi-department [2], established the long-term storage of orthopedic spare loaner instrumentation and implants in the operating room [3], and optimized the

management of the spare loaner instrumentation and implants in orthopedics during the course of use, further improved the processing quality of the devices, and all realized the double closed-loop management to ensure the safety of normal supply and use, with remarkable effect. The report is as follows.

## 2. Materials and Methods

### 2.1. General Information

418 sets of orthopedic spare loaner instrumentation and implants in 2018 are used as per-implementation, while 437 sets of orthopedic spare loaner instrumentation and implants in 2019 were selected as the implementation. And the changes of the timely supply rate of orthopedic spare loaner instrumentation and implants, the implementation rate of double closed-loop management and doctor satisfaction before and after the implementation were compared.

### 2.2. Method

Before the implementation, the management of orthopedic spare loaner instrumentation and implants should be carried out according to the conventional methods. And after the implementation, the management of orthopedic spare loaner instrumentation and implants should be optimized as follows.

#### 2.2.1. Integrating the Suppliers of Spare Loaner Instrumentation and Implants for Orthopedics

In 2019, the hospital reorganized the quantity of external loaner instrumentation and implants for orthopedics, selected 6 registered companies with large usage and the approval of orthopedics doctors, used 12 kinds of common surgical instruments with high frequency, stored in our hospital as conventional instruments for a long time, and checked the validity period regularly to ensure the work of emergency orthopedic surgery in hospital [5].

#### 2.2.2. Improve Handover Management of Operating Room and CSSD

Operating Room Nurses need to confirm that the instrument is stored in the sterile room of the operating room after receiving the notification of the specific use of the orthopedic spare loaner instrumentation and implants. The instrument is in a standby condition during the period of validity. When the instrument is in the disinfection supply center, both parties should check the appointment notice and the information of the orthopedic spare loaner instrumentation and implants in time. The staff of the disinfection supply center should confirm that the instrument is in the state of pending packing, sterilize the instrument and send it back to the operating room as soon as possible.

#### 2.2.3. Improving Double-loop Management

The equipment supplier shall prepare the delivery slip and the implant list, orthopedic spare loaner instrumentation and implants list and other related information according to the use of the spare loaner instrumentation and implants in orthopedic department; after the inspection data are complete, the

personnel of the CSSD shall receive the inventory and clean the disinfection equipment, and the equipment shall be in accordance with the list, and the contents of the receipt, cleaning form and check list of the spare loaner instrumentation and implants shall be accurate and complete; the information shall be handed over to the operation packing group, and the label of the spare loaner instrumentation and implants shall be printed after the equipment has been cleaned and disinfected, and the contents shall be accurate and complete; the inspection of the spare loaner instrumentation and implants in orthopedic department shall confirm the brand number, the number, the clean and clean inspection, and no stains, and place the indicator card; Choose non-woven double-layer packaging, per-vacuum high-temperature and high-pressure sterilization, orthopedic spare loaner instrumentation and implants after physical, chemical, biological monitoring qualified, transport to the operating room sterile storage; according to the patient's situation, the surgeon and the equipment business confirmed the use of orthopedic spare loaner instrumentation and implants, the surgeon in the operation notice to indicate the company and orthopedic spare loaner instrumentation and implants specific name; operating room nurses prepare the equipment according to this information. After the operation patients use the orthopedic spare loaner instrumentation and implants, arrange the orthopedic spare loaner instrumentation and implants with the equipment merchant, fill in the information of the patients and the equipment use in detail, and paste the external label of the orthopedic spare loaner instrumentation and implants package on the back. After the personnel of the disinfection supply center check the handover data is complete, do well the postoperative receiving inventory and cleaning disinfection equipment, register the relevant receiving cleaning and disinfection information; the equipment merchant prepares the relevant information, check and supplement the spare loaner instrumentation and implants of orthopedic department in time; register and supplement the relevant receiving cleaning and disinfection information, thus complete the double closed loop management of the spare loaner instrumentation and implants of orthopedic department.

#### 2.2.4. Standardizing the Management of Spare Loaner Instrumentation and Implants in Orthopedic Department and Improving the Satisfaction of Doctors

(1) The disinfection and supply center has established the management system of orthopedic spare loaner instrumentation and implants, formulated the processing flow of orthopedic spare loaner instrumentation and implants, and trained and assessed all staff in the Department; (2) The disinfection and supply center shall make a list of orthopedic spare loaner instrumentation and implants, in which the names of orthopedic spare loaner instrumentation and implants of each company in our hospital shall be listed and distributed to the surgeons, so that the doctors can see clearly and select according to the operation requirements; (3) Standardize the management of the instrument manufacturers, and the disinfection supply center requires the instrument manufacturers to unify the name of the

orthopedic spare loaner instrumentation and implants, check and supplement the orthopedic spare loaner instrumentation and implants within 24 hours after the use of the equipment, so that the orthopedic spare loaner instrumentation and implants can be packaged and sterilized in a timely manner, and in a standby state in the shortest time. After the implementation of the above measures, under the special circumstances that orthopedic surgery urgently needs the use of instruments, surgeons can have orthopedic spare loaner instrumentation and implants to use in time, which further improves the satisfaction of surgeons.

### 2.3. Statistical Analysis

SPSS 19.0 software was used for statistical analysis. Chi square test was used to compare the counting data.  $P < 0.05$ , the difference was statistically significant.

**Table 1.** Comparison of timely supply rate, double closed loop management implementation rate and doctor satisfaction before and after implementation.

Group	Timely supply	Double Closed loop management	Doctor satisfaction
Prior to implementation	415 (99.28)	292 (69.86)	28 (77.78)
After implementation	437 (100)	437 (100)	35 (97.22)
Chi square value	1.429	154.495	4.571
<i>P value</i>	0.232	0.000	0.033

## 4. Discussion

### 4.1. Reduces the Early Release Rate and Ensures the Medical Quality and Safety

Some studies have shown that the emergency operation in orthopaedic department can lead to the occurrence of nosocomial infection after operation due to the untimely delivery of instruments [6] and the insufficient time for post delivery processing of instruments [7-9]. Our hospital has two ways to supply orthopedic loaner instrumentation and implants: one is temporary distribution, and the other is long-term standby storage. The establishment of orthopedic loaner instrumentation and implants can provide orthopedic backup loaner instrumentation and implants for use in time when surgery is in urgent need, without waiting for temporary distribution of loaner instrumentation and implants, effectively reducing the early release rate [10], and ensuring medical quality and safety.

### 4.2. Improves Doctors' Satisfaction and Work Efficiency

The spare loaner instrumentation and implants in orthopedic department is in standby state, so the surgeons and patients can save time waiting for the loaner instrumentation and implants [11], implement the operation in time, and improve the satisfaction of orthopedic surgeons; the nurses in operating room reduce the time needed for multiparty communication links; the equipment manufacturers save the delivery time of equipment out of warehouse and in warehouse; the equipment department only accepts the supplementary implants, but also saves the time; The work efficiency is improved in many ways.

## 3. Results

There was no significant difference in the timely supply rate ( $\chi^2=1.429$ ,  $p=0.232$ ) after the implementation of the improvement measures, which indicated that the implementation of the measures did not significantly change the timely supply of orthopedic spare loaner instrumentation and implants, and the timely supply rate of orthopedic spare loaner instrumentation and implants in the disinfection supply center was higher, while the implementation rate of double closed-loop management was significantly improved compared with that of doctor satisfaction ( $p < 0.05$ ), indicating that the effective implementation of the measures improved the double closed-loop management and doctor satisfaction of orthopedic spare loaner instrumentation and implants. See table 1.

### 4.3. Strengthen the Double Closed-Loop Management of Loaner Instrumentation and Implants

The double closed-loop management of spare loaner instrumentation and implants in orthopedic department of CSSD ensures the standardization of each treatment link of loaner instrumentation and implants, achieves the whole process trace ability [12], and ensures the safety of the use of loaner instrumentation and implants. this management mode is of great significance in the hospital proof inversion while realizing the relevant information of disinfection items trace ability [13].

## 5. Summary

The contamination rate of loaner instrumentation and implants is significantly higher than that of hospital conventional instruments after use and in use [14]. The purpose of establishing orthopedic spare loaner instrumentation and implants in our hospital is to limit the fluidity of loaner instrumentation and implants and ensure the quality of cleaning, disinfection, sterilization and preservation. By optimizing the management measures of spare loaner instrumentation and implants in orthopedic department, we can improve the timely supply rate, realize the whole process trace ability and improve the doctor's satisfaction, further improve the safety of the instruments, reduce the surgical infection, and ensure the safety of the patients.

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