

# **TOTAL KNEE REPLACEMENT INFRASTRUCTURAL SUPPORT AND MANAGERIAL ISSUES**

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**1<sup>st</sup> yr PG**

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# ISSUES OF FOCUS

- OT requirements
- Physiotherapy Dept
- Documentation
- Legal Aspects (A Case scenario)

# BASIC REQUIREMENTS OF OTs

- Design should follow the function in OT
- O.Ts have to be independent of general traffic
- Away from the main corridors
- Continuous progression from the entrance to the suite through different zones that increasingly approach sterility
- Clearance of dirty material without passing through clean areas
- Air flow within the suite should be from cleaner to less clean areas
- Ventilation system to be safe, comfortable

# OT ROOM

1. Size: Optimum size is 25'x25'
2. Walls: height upto 12 feet, fully covered with tiles, joints to be seamless.
3. Doors and Windows: of two leaves, double acting and 5' wide. Windows 3' above floor – opening to be 16-20% of floor area with double glass hermetically sealed

## OT ROOM contd..

5. Fixtures & Installations: Should be Minimum.  
OT tables should be positioned on the floor with piped services from the floor
6. Fire fighting equipment to be available
7. Floor: washable, non-staining, impervious and electro-conductive
8. Ceiling: moisture-proof: False ceiling to be avoided. Wall joints to be well finished.

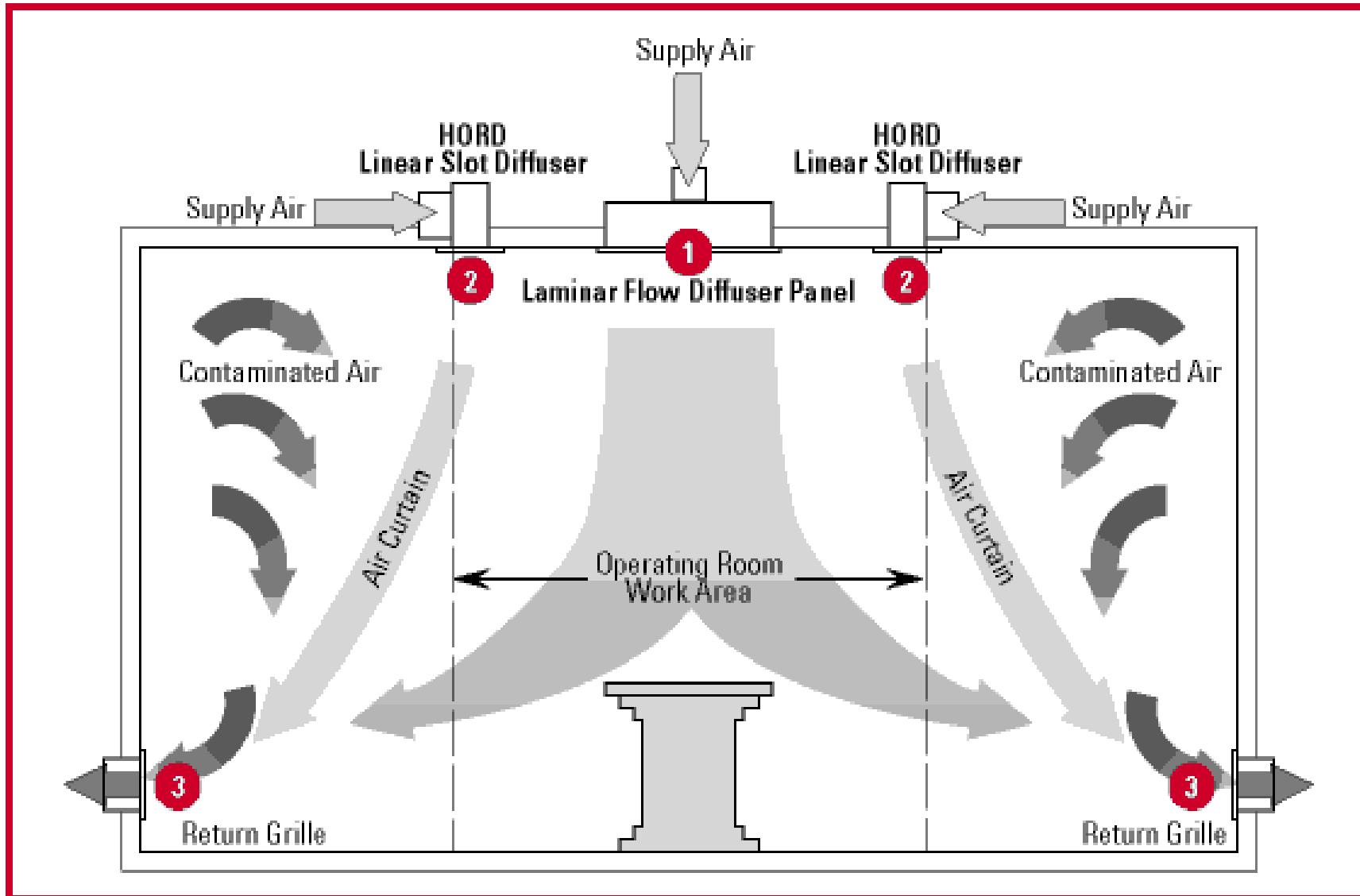
# OT ROOM contd..

10. Light: 300 lumens per sq. ft. required at floor and 1000 lumens per sq. ft. on working area. Higher intensity at the site of surgery. To be on UPS.
11. Air conditioning: Central air-conditioning preferred as it helps in maintaining asepsis. Maintained by HVAC(heating ventilation air conditioning)
12. Temperature:68-73 F ( maintained by Air-handling unit )
13. Humidity: 30-60 %. 100% fresh air with 20 air-changes per hour.
14. Air filter: 0.3 microns, high efficiency particulate arrestance (HEPA) filters are more efficient for laminar flow, allow recirculation of air.

# VENTILATION SYSTEM

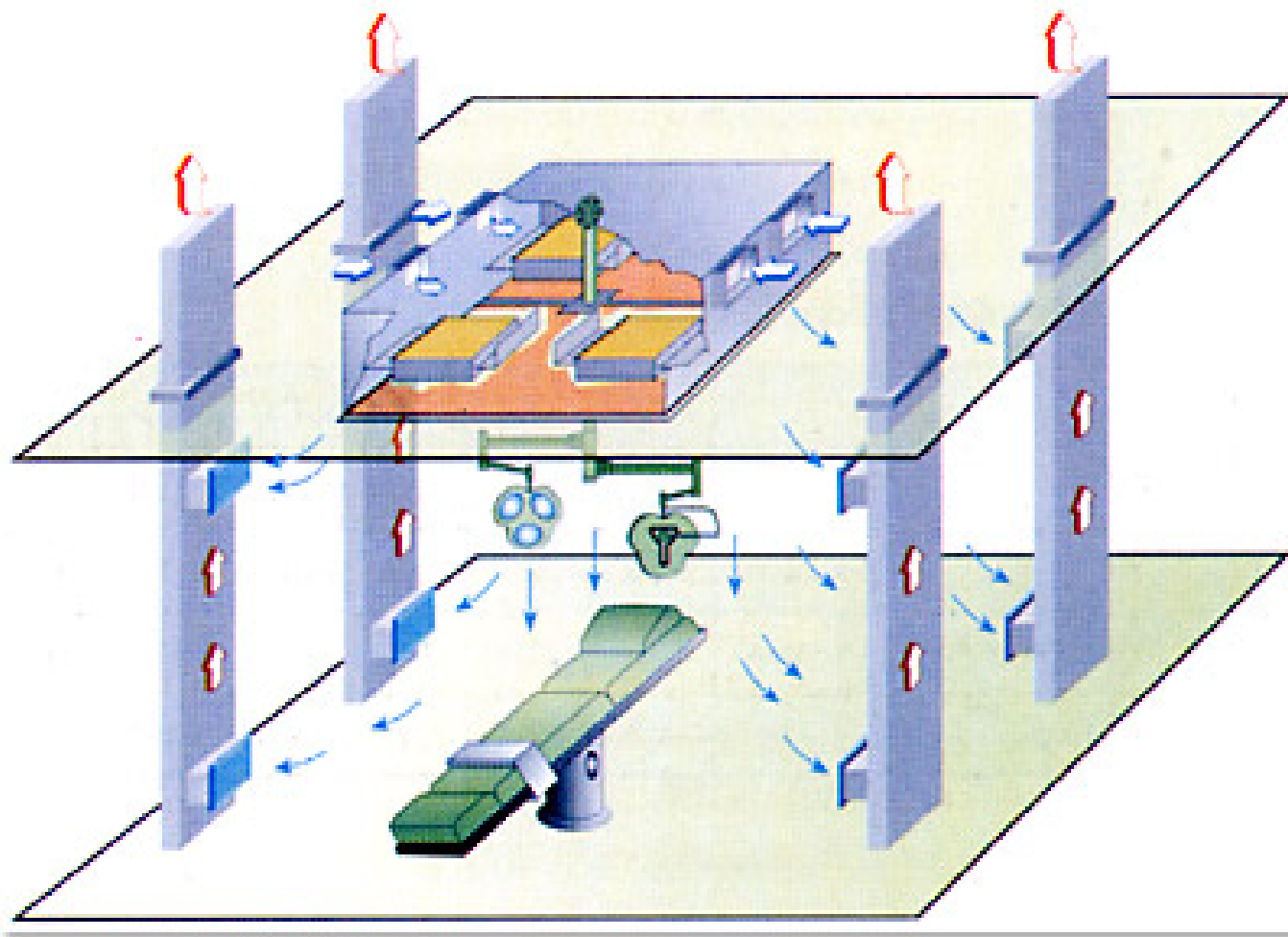
- Positive pressure ventilation
- Pressure gradient highest in sterile zone.
- Pressure gradually diminishes towards the clean , protective and disposal zones.
- No mixing of air from one OT to another.
- Air turbulence velocity should be minimum at operating table.

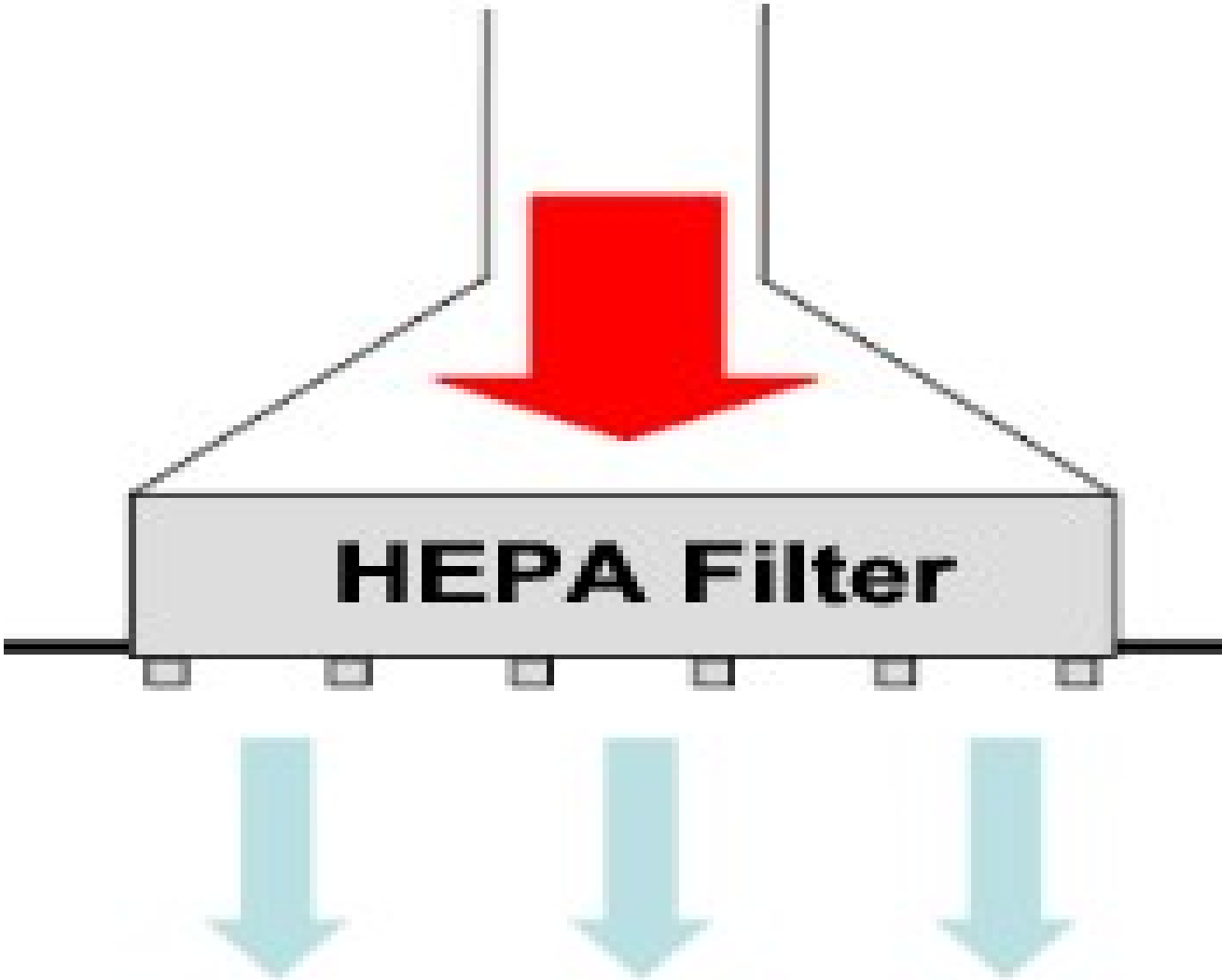
# LAMINAR AIR FLOW





# LAMINAR AIR FLOW





- Surgical-site infection is the leading complication of surgery. Normal skin flora of patients or healthcare workers causes more than half of infections following clean surgery.
- Modern operating theatres have conventional plenum ventilation with filtered air where particles  $\geq 5$  micron are removed.
- For orthopedic and other implant surgery, laminar-flow systems are used with high-efficiency particulate air (HEPA) filters where particles  $\geq 0.3$  micron are removed.
- The use of ultra-clean air has been shown to reduce infection rates significantly in orthopedic implant surgery.
- Bacterial threshold limits for conventionally ventilated operating rooms with 20 air changes per hour has been set to obtain 50-150 colony forming units/m<sup>3</sup> of air.

**Reference** : Dharan S, Pittet D. Environmental controls in operating theatres. J Hosp Infect. 2002 Jun;51(2):79-84.

# ZONING OF OT

## **Five Zones Concept:**

- 1. Sterile Zone**
- 2. Ultra clean Zone**
- 3. Clean Zone**
- 4. General Protective Zone**
- 5. Disposal Zone**

## **ADVANTAGES**

- Minimizes risk of HAI (hospital acquired infection)**
- Minimizes unproductive movement**
- Ensures optimum utilization of OT**
- Smooth work flow**
- Enhances efficiency of staff**

# POLICIES, PROCEDURES

1. Informed consent.
2. Judicious Operating list
3. Aseptic measures documented
4. Good inventory control of gases, consumables
5. OT registers to be maintained
6. OT Committee (Operating Schedule )
7. Administration of OT
8. Punctuality
9. Theatre staff
10. Transportation of Patients
11. Justification of postponements

# PHYSICAL MEDICINE AND REHABILITATION

## Objectives

- To provide suitable physical therapy service to patients in order to prevent, correct or alleviate physical disability.
- To assist patients in reaching their maximum functional level.
- To extend the patients activities of daily living.

## PHYSICAL MEDICINE AND REHABILITATION contd..

- It should be located to provide services to the out patients and in patients.
- Should be close to orthopaedics department.
- Should be located preferably in the ground floor for easy transportation of patients.

# CASE SHEET DOCUMENTATION

- Patient details
- History
- lab reports
- Informed Consent
- Operation notes
- Post op notes
- Daily patient condition notes
- Discharge procedure



# Why is documentation important ?

- As many TKRs are successful, patients expect their knee replacement will also be successful.
- Patients who experience complications, poor outcomes, and rare catastrophes often seek legal redress.
- The end result of complications is often severe disability with mental and financial agony.

# LEGAL CASE PRESENTATION

Dr. H.R. Nayyar Memorial Hospital vs Gurbachan  
Singh Bhatia on 5 October, 2010  
in Amritsar Punjab

# From patient side

- It was pleaded by the complainant that he was having pain in the right knee while moving and walking. He went to Dr. H.R. Nayar Memorial Hospital in 2002
- He was advised by Dr. J.P.S. Chhina that his right knee needs replacement.
- The complainant also pleaded to court that appellants did not bother to get preoperative medical tests done before performing surgical operation and consent of the complainant was not taken before operating him.
- It was further pleaded that as a result of the medical negligence committed by the appellants, patient is having severe pain in knee and is bed ridden.

# From patient side

- The patient went to Christian Medical College , Ludhiana for second opinion.
- He was attended by Dr. Bobby John who after examining the medical test reports, felt that medical negligence was committed while conducting the knee replacement and It was done in a careless and unskilled manner.
- In view of this patient filed case against Dr chinna for compensation of Rs.3 lacs and reimbursement of Rs.1.5 lacs spent on medical treatment

# From doctors side

- It was pleaded that patient was diagnosed to be a case of Osteo Arthritis Right Knee.
- He already had shortening and deformity of the left lower limb also and was unable to bear weight on left side.
- It was further pleaded that patient had never come with the complaint of acute pain after the operation.
- ultra-sound and x-ray reports were recorded in case sheet thus ruling out first allegation.

# From doctors side

- The age of the complainant was recorded as 70 years. It reveals that Gulshan Kumar respondent son had given the consent for the medical tests/medical treatment.
- He was clinically examined by Dr. Arvind Sharma who was the medical specialist and by Dr. Raman Chatrath who was specialist in anaesthesia. It was done before surgery and was declared fit for surgery.
- Medical record also reveals that the patient findings were recorded before starting the operation.
- It also revealed that the patient was attended from time to time on every day and number of times a day.

# Evidences from patient side

## Diagnostic reports

- Conclusion: mild/ early loosening of tibial component of prosthesis on lateral aspect.

# Defense from doctor's side

- There can be various reasons why the mild loosening was noticed. It can be because of the low healing power in old age or because he had not carried out proper knee exercises.



Patient had got himself subjected to scintigraphy test

Impression: 3 Phase bone scan findings are suggestive of mild infective pathology around the right knee.

# In the court

- Moreover the complainant in his cross-examination has also admitted that **he started feeling pain in his right leg in the month of April 2003** and prior to that he was alright . He was not having pain in his right leg immediately after the knee replacement on 10.6.2002.
- **Complaint was filed against the appellants in January 2003** even before he had pain in the right leg.

# Doctors defense

- Dr. J.P.S. Chhina was a duly qualified doctor. He had vast experience and he was competent for surgery of knee replacement
- Thus, it is not proved that there was any medical negligence on the part of the appellants when the replacement of his right knee was done by them on 10.6.2002.
- And the case was dismissed

# IMPORTANCE OF DOCUMENTATION

- Good documentation can serve as evidence in a court of the law that the process indeed took place.
- A timely and thorough documentation in the patient's chart by the surgeon performing the procedure can be a strong piece of evidence that the surgeon engaged patient in an appropriate discussion.

# INFORMED CONSENT RECOMMENDATIONS

The process requires the disclosure and discussion of the following points:

- Diagnosis
- Nature and purpose of a proposed treatment or procedure, with risks and benefits
- Alternatives, regardless of cost or coverage by insurance, along with risks and benefits of these alternatives
- Risks and benefits of not being treated
- The patient, in turn, should have the opportunity to ask questions to elicit a better understanding of the treatment or procedure, so that he or she can make an informed decision to proceed or to refuse a particular course of medical intervention.

# PRE OP COUNSELLING

- Should be video recorded
- Should be in patient's language
- Will serve as an important evidence in court

# CONCLUSION

- Competent OT support
- Adequate physical rehabilitation
- Proper documentation

YOU

THANK



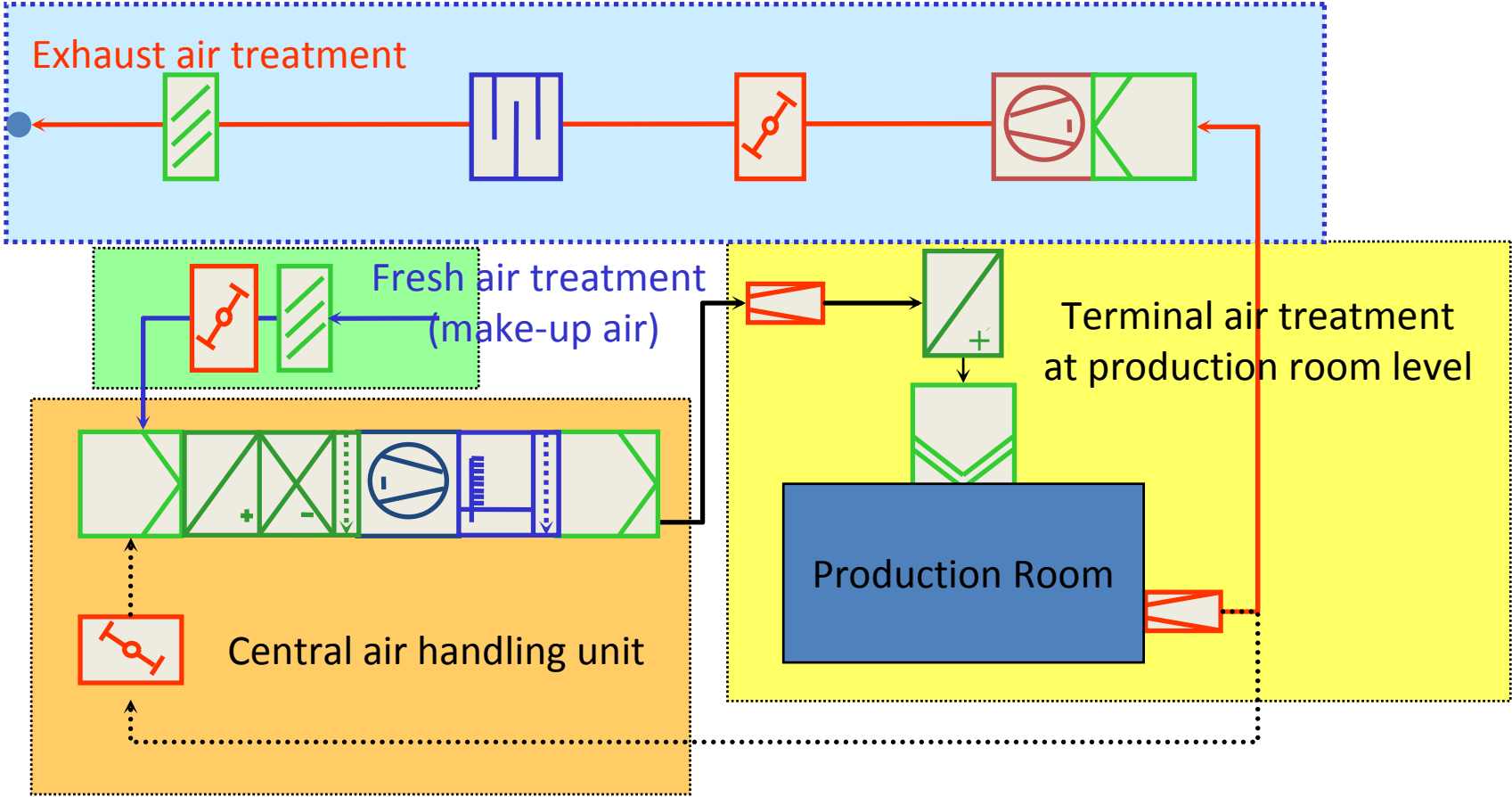
# INSTRUMENTS REQUIRED

- The instruments used in the operation include:
- Scalpel---used to make the incision
- Bovie pencil---a device used to electrically cauterize, or burn and seal, the ends of blood vessels that are bleeding into the surgical area
- Rake retractors---to pull the skin away from the incision
- Rongeur---used to remove bone spurs
- Drill---for drilling holes in the bones
- Femoral, tibial cutting and patellar jigs---used to cut the bones
- Mallet and pins---the pins help keep the prosthesis in place, and the mallet is used to hammer the pins into the bone
- Bone saw---used to shape the bone for the prosthesis
- Cement---used to adhere the replacement to the bone
- Sutures---used to sew the skin back together after the procedure is complete

# Equipment

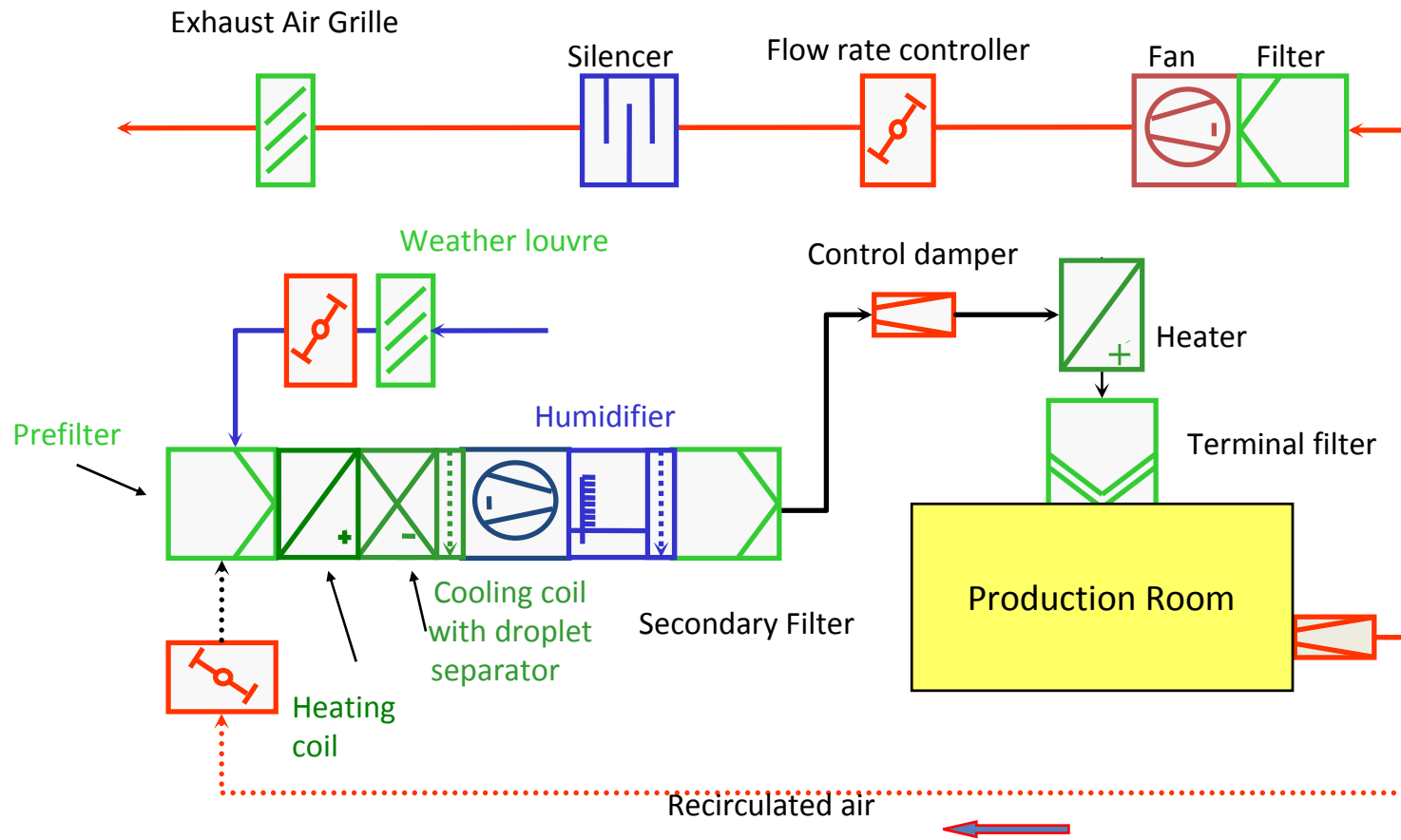
- Exercise table
- Weights and pulleys
- Rocker board
- Balance board
- Exercise cycle with resistance
- Parallel bars
- Shoulder wheel
- Rowing machine
- Suspension frames
- Traction equipment
- TENS
- Wall bars
- Ultrasonic therapy
- Infra red
- Quadriceps table
- SW diathermyAdults and paediatrics sand bag
- Flat face board
- Floor mat
- Hot packs/ hydro collector packs
- Wax bath, goniometer
- Nerve muscle stimulator
- Hand exercise kit
- Water/air mattress
- Magnet therapy
- Multi exerciserLASER
- Cold/hot/contrast bath
- Pulsed diathermy
- Thread mill exerciser
- IFC

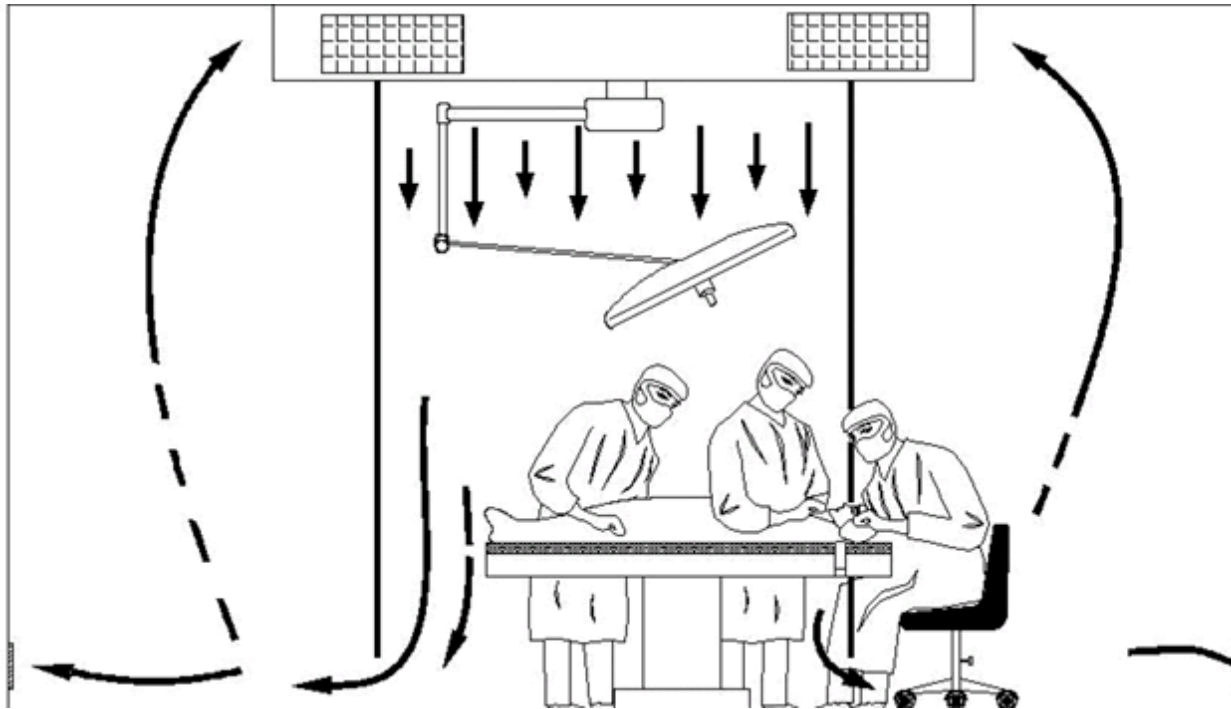
# HVAC Main subsystems



# HVAC

## Overview components





## Exponential flow of air

# PATIENT CARE

- Hospital stay
- Nursing care
- Dietary
- Prevention of nosocomial infection
- Rehabilitation