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Positioning Patients Safety and Effectively for Orthopaedic Surgery: The Knee

The goal of orthopaedic surgery is to "restore the mobility, stability, support, protection, and structure of the musculoskeletal system". The musculoskeletal system is complex and includes bone, muscles, tendons, ligaments, cartilage, nerves and blood vessels. All these parts of the system must be taken into consideration when positioning patients for surgery.

There are several different orthopaedic procedures and a variety of different positioning devices for each of these procedures. Positioning a patient for orthopaedics can, therefore, be quiet a task.

Theatre staff will need to be familiar with all the positions, the risks associated with them, and the required table attachments or positioning aids. In order to position a patient safely for surgery, staff will need to understand the patient's physical limitations and as well each surgeons' preferences.

Important factors to consider include:

- What part of the body is being operated on
- How to give the surgeon optimal exposure or access to the surgical site
- How to ensure patient safety with the given position

Positioning Aids

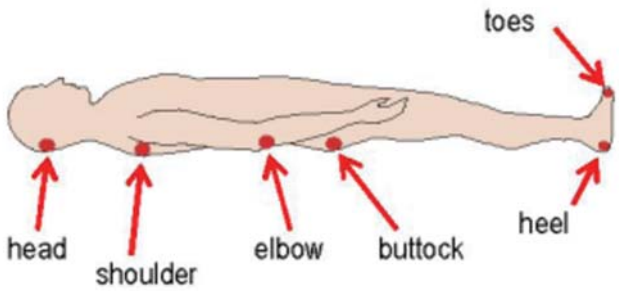
There are number of different types of patient positioning aids. These aids have been designed to secure the body and body parts in manner that makes the surgical site accessible while protecting body parts from harm. Positioning aids are available for shoulder, elbow, wrist, hips, ankle, foot and knee surgeries. This article focuses on positioning and positioning aids for knee surgery.

Knee Surgery

Knee surgery can either be performed open or using minimally invasive techniques including via arthroscopy. Surgeons may use a positioner that looks like a vice grip for knee arthroscopies and anterior cruciate ligament reconstructions. This type of positioner will straighten the leg and prevent it from rotating externally while the leg is in a dangling position. A tourniquet may be used for some knee procedures. If using a tourniquet when using the vice grip knee positioner, the tourniquet should be placed high on the patient's thigh else it could be caught in the positioning aid. Some surgeons, however, may perform arthroscopies with the patient in the supine position with the foot of the bed in a neutral position, and in this case a lateral post is attached to the bed for support.

Supine Position

In the supine position, there can be extra pressure on the bony prominences and care should be taken to avoid pressure sores on the occiput, scapula, olecranon, sacrum, coccyx and calcaneus.



Pressure points in the supine position

Knee Replacement (Arthroplasty)

It is projected that more than 3.5-million primary total joint replacements will be performed every year by 2030. A total knee replacement, or knee arthroplasty is defined as a "surgical reconstruction or replacement of the worn surfaces of the knee joint to reduce pain and improve stability". The surgeon will decide on the surgical approach which could include a total knee arthroplasty, a partial knee, or minimally invasive total knee arthroplasty.

The most important positioner for a **total knee arthroplasty** is the one that maintains knee flexion while the orthopaedic surgeon cuts the bone. Some surgeons may use one of the many types of boots available that can keep the knee in flexion. It is important to prevent the foot from sliding out of flexion during the resection of the femur and tibia.

An example of such a device is depicted below.

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Surgical Table Accessories

The STERIS Arthroscopy Knee Holder attaches to the seat section of a surgical table with a Clark Socket and is used at the end of the table. Removing the leg section of the table allows the knee to be placed at a 90° angle. The diameter of the knee holder can be adjusted as surgical needs dictate. It is compatible with most US tables.

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Tel: 021 763 3280
Fax: 021 762 2760

E-mail: info@safmed.co.za
Website: www.safmed.co.za
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Operating Room Traffic in Total Joint Arthroplasty: Keep The Door Shut!

Total joint arthroplasties are surgical procedures that should not to be taken lightly. Possible complications or risks associated with arthroplasty include:

- Fat embolism
- Soft tissue disruption
- Venous thromboembolism
- Poor joint alignment
- Excessive stress of the joint causing it to dislodge
- Infection

The incidence of infections resulting from arthroplasty is between 1-7%. Infections following orthopaedic surgery can have devastating consequences. Surgical site infections can include small suture abscess, deep tissue infections, periprosthetic joint infections and fulminant sepsis.

The risk of infection can be influenced by perioperative antibiotics, implant sterilization, timing and opening of trays and traffic in the operating room.

Minimising risk of surgical site infection: Frequent opening of the Operating Room door

The frequent opening of the operating room door disrupts and changes the dynamics of the airflow pattern in the operating room. This disruption results in the quicker spread of airborne microorganisms.

A study was conducted to determine if an educational intervention could decrease the number of times a door is opened during total joint procedures. This research was conducted in two hip and knee replacement operating rooms. The researcher first determined the incidence of door opening. It was noted that on average there were **33.5** door openings per case.

The researcher then installed a door counter to raise awareness of the number of times the theatre (operating room) doors where opened. This had little impact as the average door openings was then **34.2** per case. An interventional educational session was held and after that, the door openings reduced to **27.7** times per case.

Opening operating room doors creates turbulent air patterns which allows airborne pathogens to come into contact with the surgical field. Studies have demonstrated that there is an increased risk of surgical site infection with increased traffic in the operating room. Theatre staff should therefore employ methods to reduce the traffic in the operating room and the number of door openings.

References:

Bulatovic, A. 2018. *Positioning Patients Undergoing Orthopaedic Procedures.* AORN.108, No1

Hamilton, WG. 2018. *Operating room traffic in total joint arthroplasty: Identifying patterns and training the team to keep the door shut.* AJIC. 633-6

Periop Briefing. 2016. *Procedure at a glance: Total knee arthroplasty.* AORN. 104, No 5

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Fax: 021 762 2760

Free State:
Tel: 082 686 8075

E-mail: info@safmed.co.za
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