Worcestershire Acute Hospitals NHS Trust

Policy for the positioning of patients for all Theatre, Maternity and Ophthalmology Procedures

Department / Service:	SCSD Theatres
Originator:	Sally Ann Pickard, Andy Fryer
Accountable Director:	Clinical Directors Dr Joanna Marriott
Approval Date:	17th January 2024
Review Date **This is the most current document and should be used until a revised version is in place**	17th January 2027
Target Organisation(s)	Worcestershire Acute Hospitals NHS Trust
Target Departments	Theatres, Maternity, and Ophthalmology
Target staff categories	All clinical staff involved in any procedures throughout the Worcestershire Acute Hospitals Trust

Policy Overview:

This document sets out the standard for the positioning of any patient having an invasive procedure. Different patient positions are required to provide access for surgical/invasive procedures. Each position has implications for ventilation and haemodynamics, as well as exposing patients to possible complications such as nerve injury and pressure sores. Further possible serious risks include patients moving and potentially slipping off the table or shifting into a position where they are no longer appropriately supported. The anaesthetist plays an important role in minimising the risks associated with these positions. Common positions include supine, lithotomy, lateral, prone and sitting.
A key aim of the document is to identify actions that significantly reduce the risk of injury resulting from a patient falling of an operating table, trolley or other surfaces they have been positioned on..

Key amendments to this Document:

Date	Amendment	By:
13th Oct 2020	Policy reviewed by SCSD Governance team, no changes	SCSD Gov
28th Nov 2023	Document extended for 3 months whilst under review	Dr Hutchinson
17.1.24	Ppolicy reviewed by TACCSS governance team	TACCSS gov

Contents page:

1. Summary

This procedure sets out the standard operating procedures and expected practice with minimum standards for the safe positioning of patients undergoing any invasive procedure. It will set the minimum requirements that must be in place for patients undergoing a range of surgical positions. It must be noted that the following are the WAHT chosen minimum safe standards for positioning any patients undergoing procedures.

No patient will be left unobserved or without appropriate supports whilst they are undergoing any invasive procedure

Where appropriate, trolley and cot sides must be used.

Patient straps should be considered for all cases unless they inhibit access and in this case alternatives should be explored

Fixed lateral supports must be used for any patients undergoing any surgery that involves left or right lateral tilt. It is important that these are used to stop patients slipping from the table not to support a patient's weight. If the patient does slip into one of the supports surgery should stop and the patient should be repositioned.

Any patient in lateral position must have appropriate front and back supports unless they impact on surgical access, in this case other options must be explored

The level of tilt applied to any patient must be individually assessed, dependent on the patients weight and the manufacturers recommend level of tilt (see manufacturers guidelines appendix 3) If excessive tilt is required for surgical access then it should be with a recognized assessment of risk by the surgeon, anaesthetist / theatre team and then documented appropriately. It must also be noted that due to the potential risk that the patient may fall, continual monitoring of patient position must occur from that point forward.

2. Introduction

The purpose of this document is to provide knowledge and awareness of the possible complications of patient positioning and ensure a standardized Trust wide approach to all matters relating to patient positioning. It will discuss the importance of a team approach to the subject matter in all areas including planning and implementation.

3. Scope

This document is intended for all staff involved in caring for any patients who are undergoing a procedure in the Worcestershire Acute Hospitals Trust (WAHT). Any failure to follow the requirements of the procedure may result in investigation and management action being taken as considered appropriate. This may include formal action in line with the Trust's disciplinary or capability procedures for Trust employees; and other action in relation to other workers, which may result in the termination of an assignment, placement, secondment or honorary arrangement.

4. Roles and Responsibilities

Countywide Theatre Matrons should ensure that relevant Trust procedures and policies are implemented and that any deviation or errors arising from non-compliance with the policy are investigated and remedied. They should also ensure all relevant manual handling risk assessments are complete and up to date

The operating surgeon has ultimate responsibility for the individual positioning of patients on their operative list. However it must be noted that all members of the theatre team act as the patients advocate throughout their time in theatres and each member must be constantly observing and assessing a patients' position.

Each team member must feel that they can raise a concern that they have regarding the patients position. Should staffing change during a theatre case then all staff must handover following the trusts recognised hand over method of SBAR, this will ensure continuity of care and all staff are aware of potential problems if they arise

Senior Theatre Team Leaders must ensure there are sufficient staff members in each list to allow the safe positioning and transfer of patients, inadequate staff numbers can put patients and staff members at risk of injury. The theatre co-ordinator on each shift must ascertain each list has enough staff to perform all required tasks safely and must ensure action is taken if this is not the case.

Theatre team lead and the theatre team must ensure all staff are aware of the importance of patient positioning throughout each theatre list. In conjunction with the anaesthetist and the operating surgeon they must also ensure:-

- The patient position and support devices must be discussed at the Theatre Team Brief immediately prior to the commencement of the operating session taking into account any possible intraoperative changes that may occur. ***It is important to remember that whilst the surgeon and anaesthetist will often lead on positioning it is the entire teams responsibility to ensure a patient is positioned correctly and safely***
- It must also be identified at the team brief any patients who have increased BMI and the necessary equipment is sought to facilitate safe positioning and transfer, i.e. Hovermatt,
- The Hovermatt must be considered for use on any patients over 100kg or when a team member feels it appropriate. Out of hours when there is a skeleton workforce the Hovermatt must be considered for every patient due to the lack of staff numbers.
- Use of slide sheets is an acceptable alternative to the Hovermatt.
- Where possible Operating Trolleys should be used to reduce the risks associated with transfer between beds and tables
- During some procedures in the anaesthetic room there must always be a minimum of three people in the anaesthetic room to facilitate any changes in patient positioning. Once procedures are completed and the patient is safely secured then the extra person may be released to return to other tasks.

- If the patient position is to be changed during an operative procedure the theatre team must ensure that the existing support devices remain sufficient otherwise additional support must be placed before the position is changed. If a change in patient position occurs then appendix one should be used as a checklist to follow to ensure safety and continuity of care.
- All staff will ensure their manual handling passport is kept up to date by attending relevant training
- Staff will ensure all equipment is functional and clean prior to use

Areas that all staff must pay particular attention to during any patient positioning are listed below as well as further information that will offer more guidance on a range of surgical positions commonly used in theatres can be found in appendix two.

5. Escalation of concerns

Any member of the theatre team must feel empowered to raise any concern at any point during a patient's journey through theatre, they must be able to raise this concern in an environment that supports these concerns and listens and acts accordingly. If any member of the team feels that they are not being listened too, then they should escalate their concerns to the theatre co-ordinator or senior practitioner on shift

6. Documentation

All documentation relating to a patient position must be documented on the Bluespier Peri-operative Pathway, and must be completed for all patients unless staff have a justifiable reason for non-compliance and not following standard trust procedure, for example a life threatening emergency. A retrospective entry must attempted, a Datix must be submitted for all cases of non compliance.
The Education Facilitators/Manager for each area will keep documentation regarding the training status of all staff within theatres and ensure in conjunction with the manual handling trainers and departmental instructors this training is relevant and kept up to date.
Incidents associated with the positioning of patients, including 'near miss' or well managed situations, must be reported through the Datix incident reporting system and used for further learning.

7. Training and Awareness

All staff to be made aware of the Training Needs analysis held with the Training and Development Manager and a record maintained of competencies achieved in accordance with the trust training needs analysis.
Following completion of Trust Induction all staff involved in the process of manual handling and patient positioning must be trained at the earliest opportunity during their time working in theatres. The manual handling teams within each theatre must also ensure documentation is complete and the education and training leads keep an up to date database.
The Trust recognises that the provision of education and training to support the delivery of this Procedure will be key to its success.

8. Review

This document should be reviewed bi-annually or if any significant change occurs in patient positioning/manual handling procedures.

APPENDIX ONE
Change in patient positioning checklist

A	**Airway**	**Endotracheal tube/LMA**	**Patent and in correct position**
B	Breathing	Ventilation	Pulmonary compliance satisfactory
		Auscultation	Both axillae
		Monitoring	Sa_{o2}
			Capnograph trace and shape
C	Circulation	Monitoring	HR/BP/ECG still functioning and readings stable
		Intravascular lines	All still *in situ*, patent and accessible
D	Disability/neurology	Eyes	Closed and protected
		Neurovascular	Padded vulnerable areas and avoidance of excessive passive stretch
E	Exposure	All cables, catheters and electrodes	Checked and removed from the patient/operating table interface
		Access	Maintain access for review of at risk areas if possible http://www.treatmentpathways.worcsacute.nhs.uk/theatre-key-documents/

APPENDIX TWO
Transferring Unconscious Patients:-

Many patients are transferred and positioned on operating tables whilst they are unconscious. The manoeuvring and the final position itself can potentially cause injuries. The anaesthetist must ensure that all members of staff understand their individual roles and responsibilities in facilitating patient movement. Intravascular lines, endotracheal tubes and urinary catheters should be free to move and adequately secured before any movement. The function and position of all equipment must be reassessed after repositioning.

Peripheral nerve injuries:-

According to Contractor and Hardmann (2006) peripheral nerve injuries occur in around 0.4% (1:250) of general anaesthetic cases. These injuries can be severely debilitating and, to complicate matters, are often asymptomatic for several days after surgery. The traditionally held view that these injuries can be prevented/reduced by avoiding general anaesthesia are not supported by a recent prospective review that showed no significant difference in the incidence of ulnar neuropathy (the most common preoperative nerve injury) in patients undergoing general anaesthesia, regional anaesthesia or sedation.
The four underlying pathological mechanisms behind nerve injuries are:

i. Stretch,
ii. Compression,
iii. Generalised ischaemia, and
iv. Metabolic derangement.

However, an identifiable mechanism of injury is found in <10% of cases. It is logical to identify patients at risk of developing a neuropathy (elderly, underlying neuropathy, diabetes, etc.) and then to reduce stretch/pressure on nerves during anaesthesia by careful positioning and padding.

Suggested ways to reduce risks of ulnar nerve injury during positioning:

- Avoid full elbow extension with forearm pronation
- Avoid > 90° elbow flexion and > 90° shoulder abduction
- Placement of the blood pressure cuff so that it does not overly the cubital tunnel above the elbow
- Keep the arms at the sides unless otherwise indicated
- Soft external padding at the cubital tunnel protects the nerve from compression at this vulnerable site

Suggested ways to reduce risks of brachial plexus injury during positioning:

- prevention of shoulder abduction to more than 90°
- avoidance of contralateral neck rotation/flexion
- In the supine position, arm boards should be secured level with the patient in the horizontal plane, to avoid shoulder extension and plexus stretch
- In the Trendelenburg position, shoulder padding should distribute pressure evenly across the widest possible area to avoid plexus impingement and compression into the supraclavicular fossa should be avoided

Suggested ways to reduce risks of common peroneal injury during prolonged lithotomy positioning:

- provide position respites for the patient's legs (e.g. 15 min every 3 h)

- check that leg supports are not excessively compressing the calves
- ensure that the site at which the common peroneal nerve is most vulnerable (around the head of the fibula) is free from external pressure

Ocular injuries:-

The frequency of eye injury during anaesthesia and surgery is very low, less than 0.1% of anaesthetics (Contractor and Hardmann 2006), but the spectrum of injury ranges from mild discomfort to permanent loss of vision. Corneal abrasions are reported most commonly. They are caused by direct trauma to the cornea by foreign objects (face masks, surgical drapes, etc) combined with decreased basal tear production secondary to general anaesthesia. These injuries are largely preventable by application of eye tape but are not influenced by the use of eye ointment.
Special consideration should be given to the prone position where a head ring or horseshoe headrest is often utilized. In this position, the head may move significantly during a surgical procedure and result in direct pressure on the eye. If this pressure exceeds arterial pressure then arterial inflow may be reduced dramatically, resulting in potentially devastating retinal ischaemia.

Pressure sores:-

All patient positions are associated with abnormal amounts of pressure on relatively small parts of the body surface. A reduction in perfusion can result in tissue ischaemia, tissue breakdown and development of a pressure sore. Whilst macroscopic evidence of intraoperative development of pressure sore is unusual, the events precipitating postoperative development of this problem often commence in the intraoperative period. Dissipation of pressure is the main aim when preventing pressure sores. Careful positioning, padding, regular assessment and early postoperative mobilization help to achieve this.

SUPINE:-

Minimum table attachment devices required: Arm supports, patient straps

Upon assuming the supine position, lung volumes are impaired by upward movement of the abdominal contents. The resulting reduction in functional residual capacity (FRC) is detrimental to gas exchange with an increase in ventilation–perfusion mismatching and decrease in pulmonary compliance. These effects are most significant if the closing capacity of the lung exceeds FRC.
Redistribution of pooled venous blood from the lower limbs increases venous return to the heart and subsequent increase in cardiac output. This may partially offset the cardiovascular depressant effects of many anaesthetic techniques.

The main complications are airway obstruction and decreased tidal volumes. Severe hypotension may occur because of compression of the inferior vena cava against the vertebral bodies; this typically affects obese or pregnant patients. Central redistribution of blood may lead to volume overload in the failing heart. In supine patients, there is an increased risk of regurgitation of gastric contents. The eye is at particular risk of direct or indirect trauma and it should be remembered that corneal drying can occur in as little as 10 min if the eye is left exposed. Both supraorbital and facial nerves are at risk of crush injuries from facemasks and endotracheal tube ties, respectively.

The brachial plexus (primarily C8 and T1 nerve roots) lies in close proximity to the relatively fixed first rib, clavicle and humerus and is predisposed to compression against these structures. Damage here is often confused with distal ulnar injury as the ulnar nerve also originates primarily from C8/T1. To reduce the risk of brachial plexus injury, the arm should not be abducted by >90°, the hand pronated and head turned towards the abducted arm. More than a quarter of all perioperative nerve injuries involve the ulnar nerve. The classic site of injury is the exposed ulnar groove behind the medial epicondyle of the humerus. At this point, the nerve is exposed to both direct trauma from the sides of the operating table and indirect trauma from stretch. However, the cause of neuropathy is unknown in the vast majority of patients. The incidence is 3 times greater in males compared with females.

TRENDELENBURG (HEAD-DOWN):-

Minimum table attachment devices required: Arm supports, patient straps, shoulder supports

The Trendelenburg position was initially described with the torso supine and the legs upon the shoulders of an assistant. Later modifications lead to the classic 45° head-down tilt. However, the term is now often used to describe any head-down position.

Pulmonary and cardiovascular changes in this position are generally similar to, but more extreme than, those associated with the supine position. Diaphragmatic movement can be limited severely by the weight of the abdominal viscera; this further reduces FRC and increases atelectasis.

Ventilation-perfusion mismatch, raised intracranial pressure, raised intraocular pressure and passive regurgitation are potential complications; the severity and likelihood of these increases with amount of tilt.

REVERSE TRENDELENBURG:-

Minimum table attachment devices required: Arm supports, patient straps, foot plates

The physiological effects of this position are similar to those associated with the seated position (see below). Beneficial physiological effects include an increase in head and neck venous drainage, reduction in intracranial pressure and reduced likelihood of passive regurgitation. The main complications of this position are hypotension and increased risk of venous air embolism (VAE).

LITHOTOMY/LLOYD DAVIES:-

Minimum table attachment devices required: Arm supports, patient straps, stirrups

The key difference between the lithotomy and Lloyd Davies position is the degree of hip and knee flexion. The resulting physiological changes and complications of these two positions are very similar and will therefore be considered together.
Physiological changes are similar to those seen in the Trendelenburg position (see above). It is important to remember that the leg elevation redistributes pooled lower limb blood and this may lead to volume overload in susceptible individuals. There is almost always some cephalad movement of the endotracheal tube upon assuming the lithotomy from the supine position. Unanticipated stimulation of the carina with bronchospasm or endobronchial intubation may result.

Resting the arms by the side of the patient can lead to crushed or even amputated digits when the leg section of the table is replaced or elevated at the end of the procedure. It is important to assess any limitation of joint movement before induction of anaesthesia as this may indicate important constraints on possible positioning. It is good practice to flex both legs at the hips and knees simultaneously. Extreme flexion of the hip joints can cause neural damage by stretch (sciatic and obturator nerves) or by direct pressure (compression of the femoral nerve as it is passes under the inguinal ligament). Distally, the common peroneal nerve and saphenous nerve are particularly at risk of compression injury as they wind round the neck of the fibula and medial tibial condyle, respectively.
In the lithotomy position, calf compression is almost inevitable and this predisposes to venous thromboembolism and compartment syndrome. The aetiology of compartment syndrome is probably a decrease in perfusion pressure caused by a combination of the weight of extremities against the supportive devices, reduction in compartment capacity and elevation of the lower limb above the heart. The risk was thought to be reduced by the use of foot stirrups alone as apposed to combined calf and foot supports; however there is little evidence to support this. The most consistent factor in development of compartment syndromes is the duration of the procedure. Patients requiring the lithotomy position for a period of >5 h may be considered for continuous invasive compartment pressure measurement.

LATERAL:-

Minimum table attachment devices required: Lateral supports, patient straps

In the anaesthetized patient, the dependent lung is relatively under-ventilated and over-perfused, while the non-dependent lung is over-ventilated and under-perfused. This leads to a generally well tolerated increase in ventilation-perfusion inequality but can cause hypoxaemia in compromised patients.

This position is associated with the greatest number of ocular complications. These are primarily corneal abrasions, but occur in equal frequency in both the dependent and non-dependent eyes. The brachial plexus is at risk if the head and neck do not have sufficient lateral support. An axillary roll traditionally supports the thorax. If placement is inadequate, the neurovascular bundle can be compressed in the axilla. Even with adequate support, venous hypertension in the dependent arm is almost inevitable due to outflow obstruction. Padding should be placed between the legs to prevent damage to both common peroneal and saphenous nerve.

SEATED:- (Beach chair)

Minimum table attachment devices required: Arm supports, patient straps,

The classic seated position is only used in a few surgical procedures. The cardiovascular system is primarily affected by venous pooling, which can lead to resistant hypotension. Excessive neck flexion/extension may also be associated with obstruction of the neck veins.
The best-described and most feared complication of this position is venous air embolism, in particular during craniotomy. The pathophysiology is a combination of position related sub atmospheric venous pressure and the non-collapsible nature of the dural sinuses.

PRONE:-

Minimum table attachment devices required: dropped arm supports, patient straps, prone cushions, head support

Many of the physiological changes that occur in this position can be minimized by careful positioning and, in particular, avoiding pressure on the abdomen The consequences of a high intra-abdominal pressure are inferior vena caval compression, reduced venous return and subsequent poor cardiac output. Associated pulmonary problems are caused by an increase in transdiaphragmatic pressure leading to reduced thoracic compliance.

An increase in FRC, changes in diaphragmatic excursions and improved ventilation–perfusion matching can significantly improve oxygenation in the prone position. This technique has been utilized for treatment of refractory hypoxaemia and in early acute respiratory distress syndrome ~70–80% of patients turned prone initially benefit from improved oxygenation.

However, this position is most frequently associated with position-related injuries. Many of these can be avoided if adequate staff members are present to facilitate the manoeuvre at both beginning and end of the procedure. The head and neck need to be carefully positioned to prevent excess pressure on the nose and eyes. These structures are at particular risk; even if the initial position appears adequate, small movements are potentially hazardous. The final position of the upper limb should maintain a small degree of anterior flexion and then be abducted and externally rotated to <90°. This movement should be done in both upper limbs simultaneously. The brachial plexus is still at risk in this position and care should be taken to ensure that the chest support is not impinging upon the axilla. Forearm supports/pads should be in place to prevent direct compression of the ulnar nerve in the cubital tunnel and indirect compression of the axillary neurovascular bundle by axial pressure from the humerus.

The dorsum of the foot as well as knees, pelvic area, breasts, axilla, elbows and face are all at risk of pressure necrosis in this position. Care should be taken to ensure that all these areas are properly supported and padded throughout the procedure.

APPENDIX THREE

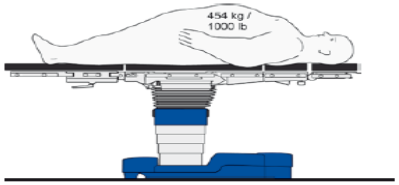
SAFE WORKING GUIDE TO
ALPHAMAXX (1133.12/22)

MAQUET
GETINGE GROUP

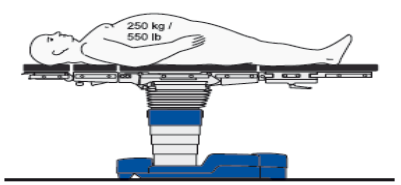
	Load up to 135 kg	Load 135 kg – 250 kg	Load 250 kg – 454 kg
Reverse orientation permitted	Yes	Yes	No
Longitudinal shift towards the head	Yes	Yes	No
Max. extension at head end (locked)	1155 mm	800 mm	540 mm
Max. extension at foot end (locked)	1180 mm	930 mm	675 mm
Beach chair position permitted	Yes	Yes	Yes
Max. column height for patient transport (unlocked)	940 mm	594 mm	not permitted
Max. Trendelenburg / Rev. Trendelenburg	± 30°	± 30°	± 20°
Maximum lateral tilt (L / R)	± 20°	± 20°	± 5°
Max. back plate movement	+ 80°/- 40°	+ 80°/- 40°	+ 80°/- 10°

ORIENTATION

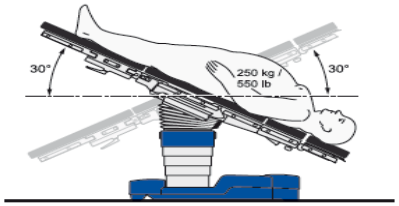
Normal



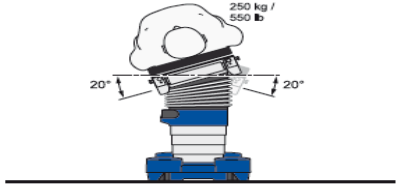
Reverse



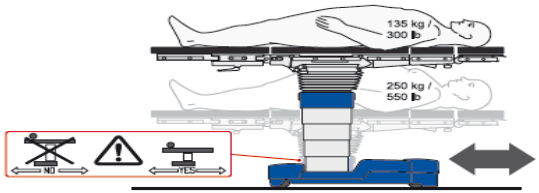
Trendelenburg & Rev Trendelenburg



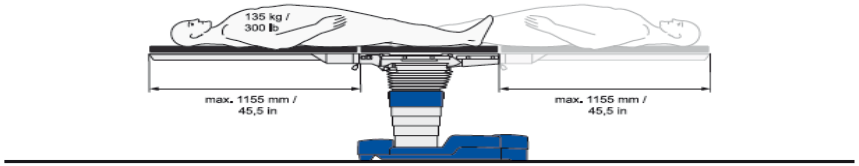
Lateral Tilt



Moving the Table with Patient



X-Ray or Surgical access
with Back Plate (1132.45A0)



Basic dynamics of centre of mass on the operating table – any movement of weight distribution away from the central point, will result in a reduction in the weight limit of the table.

Anetic aid Q4 Limits

2. Product Specifications

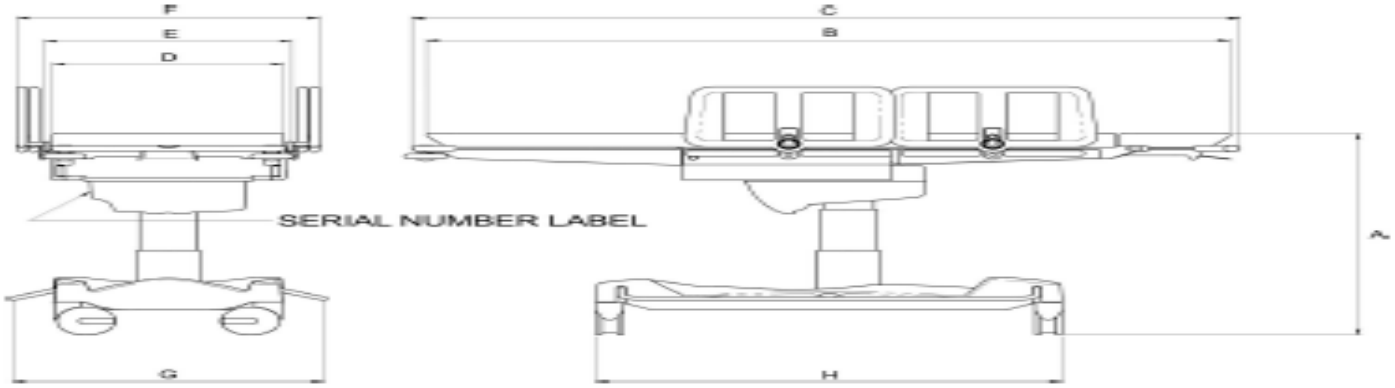


Fig. 1

Key to Fig. 1

A.	**Height, MIN**	680 mm
	Height, MAX	1080 mm
B.	**Mattress Length**	2040 mm
C.	**Trolley Length, MAX**	2100 mm
D.	**Mattress Width**	600 mm
	Trolley Width:	
E.	Side Rail Width	655 mm
F.	Cotside Width	770 mm
G.	Brake Width (Brakes Off)	835 mm
H.	**Base Length**	1190 mm
	Mattress Depth	75 mm
	Trendelenberg Tilt:	
	Trendelenberg	20°
	Reverse Trendelenberg	12°
	Lateral Tilt	±12°
	Backrest Articulation	0 - 65°
	Head Section Articulation	+25/-30°
	C Arm Traverse:	
	Head End Traverse	230mm
	Foot End Traverse	230mm
	Castor Diameter	150mm
	Trolley Weight	160 kg

Weight Limits:

Trolley	250 kg
Head Section	25 kg
Leg Section	50 kg

Fixed Leg Section (Standard)

Weight	6 kg
Articulation	N/A

Articulating Leg Section (Optional)

Weight	8 kg

Electrical Specification:
Electrical: 230VAC, 50Hz, 1.3A
Electromagnetic Compatibility: product conforms to EN 60601-1-2:1997
Battery voltage: 24V, 4.5Ah