

STEEP-T[®]

Multi-Angle Patient Positioning System

CASE STUDY SUMMARY



OVERVIEW

Surgeons use patient positioning to maximize the field of view and ensure the stabilization of the patient during the procedure; however, the patient's position must not shift during surgery. If a shift occurs, then a patient may experience an injury from increased stretch or compression of soft tissues. Possible complications include pain, neuropathy, compartment syndrome, skin pressure injuries, or rhabdomyolysis[1]–[7]. Minimally invasive surgery or robotic-assisted surgery typically requires the use of extreme surgical positioning, such as steep Trendelenburg, to maximize surgical field visualization and to properly align surgical instruments. In extreme surgical positions, iatrogenic injury risks increase because of the increased influence of gravity on the patient's body. Standard surgical restraints, such as a footboard, headboard, or limb straps, may help keep the patient in one position, but increase the risk of pressure injuries and do not eliminate the risk of iatrogenic injury. A recent review indicates that the prevalence of injury during minimally invasive surgery requiring extreme patient position is between 2 – 5% [7]. The review identified the need for positioning solutions that allow clinicians to modify the positioner to the patient and procedure to minimize the risk of injury.

To address the limitations of standard surgical positioning equipment, DeRoyal developed the STEEP-T[®] Multi-Angle Patient Positioning system. The system's design aims to address the shortcomings of standard restraints used to stabilize a patient during extreme surgical positioning. Components of the system include:

the O.R. table pad and patient foam-positioning pad, the head positioner, scapular wedges, arm protectors, and a body strap.

The O.R. table pad and patient foam-positioning pad represent the key components of the system. The interfaces between the pad and overlay contain a non-skid surface that interlocks to prevent patient movement. When the OR team places the patient on the foam pad, the foam distributes the patient's weight across the pad. This feature helps reduce the risk of pressure injury and reduces the risk of movement of the patient. Straps attached to the foam pad allow the OR team to reposition the patient and eliminate the need for a sheet that can interfere with patient fixation. The head positioner design includes a large radius neck roll that correctly positions the head and neck in a neutral position and ensures proper airway positioning during recovery. Scapular wedges help to protect the brachial plexus from pressure and neural injuries, and

it aids in fixations by redistributing positioning-related forces towards the mattress. The design of the arm protectors eliminates the need for straps, use of sheets, and platform restraints that can cause injury and helps reduce pressure on the sacrum through a wedge that extends under the patient. A hook and loop enclosure allows clinicians to position and secure the patient's arms comfortably in the arm protectors to reduce the risk of pressure injury. This system enables clinicians the necessary flexibility to safely position the patient during the use of fixed, steep angulation surgical positions.

Recently a clinic specializing in robotic surgery completed a three patient evaluation of the STEEP-T[®] system. The patients selected for the evaluation required steep Trendelenburg positioning for the surgeon to complete the prescribed procedure safely. In each case, the Clinic team customized the STEEP-T[®] system to position the patient safely.



CASE STUDY 1

The first case involved a 56-year-old male that weighed 185 lbs with an overweight BMI of 29 undergoing a robotic prostatectomy to treat prostate cancer. The surgeon required the patient in 32° steep Trendelenburg, prompting the use of the STEEP-T[®] system. In this case, the surgical team used all components of the STEEP-T[®] system to maintain the patient's position during the 2 hour and 24 minute surgery. The STEEP-T[®] system maintained the patient's position throughout the procedure, with the surgical team noting the arms remained secured. The post-operative skin assessment found a small area of red skin located on the posterior right side, which resolved without intervention. The STEEP-T[®] system allowed for successful completion of the robotic prostatectomy without physiological complication.



CASE STUDY 2

The second case described the use of the STEEP-T[®] system on a 48-year-old female undergoing a robot-laparoscopic assisted vaginal hysterectomy to treat uterine cancer. She weighed 176.4 lbs and had an overweight BMI of 28.5. Positioning the patient in 32° steep Trendelenburg required only the foam pad, arm positioners, and scapular wedges, demonstrating the flexibility of the STEEP-T[®] system to meet specific positioning needs. The patient remained on the STEEP-T[®] system for 4 hours in a static position and did not develop any positioning-related physiological changes or signs of potential pressure injuries.



CASE STUDY 3

The third case involved a 67-year-old female with a history of hypertension and type I diabetes with uterine cancer, and required a robot-laparoscopic assisted vaginal hysterectomy for treatment. She weighed 133.3 lbs with a normal BMI of 22.9, but her pre-existing conditions indicated an increased risk of positioning-related injury. The clinical team used the STEEP-T[®] system patient / foam pad, scapular wedges, arm positioners, and the head pillow to position the patient in 32° steep Trendelenburg. Her procedure lasted 2 hours and 10 minutes, and she experienced no positioning-related complications during the procedure.



SUMMARY

These three versatile cases demonstrate the ability of the STEEP-T[®] system to maintain static positioning of patients in steep Trendelenburg. Each case had unique positioning challenges or comorbidities that placed the patient at increased risk for positioning-related injuries. In this evaluation, all patients remained static during the steep Trendelenburg position, and no patient experienced a positioning-related injury. This evaluation of the STEEP-T[®] positioning system demonstrates that the system safely maintains steep angulation surgical positions, minimizing the risk of injury to the patient.



References

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