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## Technical note

# Modification of the microscope drape to provide a closed surgical field in transoral robotic surgery

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In transoral robotic surgery (TORS), the robot surgical assistant (RSA) is particularly at risk to airborne aerosols due to their role-determined position at the patient's mouth. Other than wearing adequate personal protective equipment (PPE), a physical barrier could further reduce the risk of aerosol-related transmission. Modifying the microscope drape to form a surgeon-patient barrier in TORS was explored. The aim was to place the patient within a completely sealed chamber, which can capture and contain aerosols generated during surgery, limiting aerosol dispersion in the operating room (OR) environment to a bare minimum.

All patients undergoing elective surgery are mandated to undergo a 14-day self-isolation and SARS-CoV-2 testing within 24–72 hours before surgery. All OR staff are mandated to wear appropriate PPE. The anaesthetised patient is prepared in the usual manner for TORS.<sup>1</sup> The operating microscope drape used is a transparent, rectangle poly film sheet with a 66 mm Leica microscope lens cover and

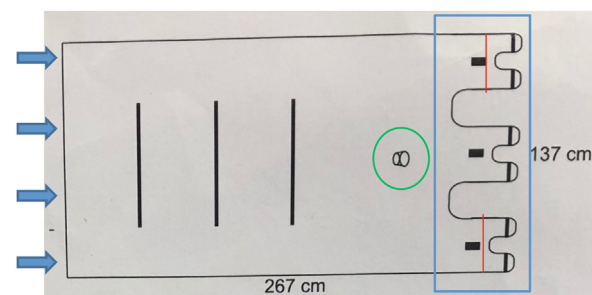


Fig. 1. Diagram showing the operating microscope drape (InvisiShield™ ICE5300, Medline International). The Blue box shows the three arms that normally fit over the oculars. The ends of the outer two arms are cut at the red lines to create an opening of a sleeve for the arms of the RSA. The position of the lens cover is marked with the green circle. The block blue arrows show the opening of the drape end, which slides over the patient and operating table.

three extending arms that fit over three pairs of oculars (InvisiShield™ ICE5300, Medline International) (Fig. 1).

The scrub nurse slides the opening at the end of the drape from the patient's head towards the feet, enclosing the patient and the operating table within the drape. The three ocular drape arms and the lens cover are conveniently located at the patient's head. The ends of the outer two ocular arms are cut off to create a sleeve opening which allows the RSA to slot through their right and left arms, respectively, towards the working field. The ends of these two sleeves are taped securely around the RSA's arms. The drape is cut circumferentially at the level of the patient's mid-abdomen, and

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Fig. 2. The patient and the operating table are completely enclosed by the microscope drape. The ocular arms and the lens cover are located at the patient's head, while the end of the drape is secured at the patient's mid-abdomen. Small punctures are made in the drape corresponding to the working position of the cannulas. The drape is sealed and secured to the cannula using tape.

taped around the patient to the bed, creating a closed 'bubble' around the patient (Fig. 2). The robot is docked into position, and the robotic arms with the cannulas are positioned over the patient's mouth.

The positions of the robotic cannulas are marked on the drape with adequate amount of plastic around each cannula to enable free intraoperative cannula movement. The cannula is inserted through the drape after a small puncture is made at the marked positions. The drape is secured and sealed with tape around each cannula. The da Vinci 8 mm Xi cannula seal is placed in each cannula. Removal of intraoperative aerosols is aided by suction attached through the Luer lock attachment of the cannula seal with laparoscopic HEFA filters (Fig. 3). Additional aerosol clearance is provided by an extra transnasal cannula into the oropharynx.

Surgical instruments could be passed to the RSA by the scrub nurse through the lens cover (Fig. 4). The lens cover is circular plastic rim with circumferential slot for a transparent rigid plastic sheet, which can be slotted in and out, acting like a sliding door to the closed bubble. At the end of surgery, the robot instruments are removed, leaving behind the cannula

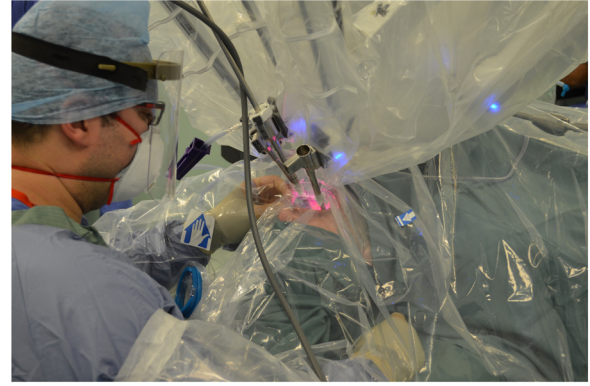


Fig. 3. The "drape bubble". The drape encloses the RSA's arms and hands, and the patient with the aerosols generated during surgery within a self-contained chamber. The cannula seal allows suction of aerosols generated in the closed chamber via the Luer lock of the cannula seal, which is attached to laparoscopic HEFA filters.



Fig. 4. The lens cover of the microscope drape conveniently forms a sliding door to the self-contained chamber to enable instruments to be passed to the RSA during surgery.

attached to the drape. The RSA arms are released from the drapes. The drape is released from the mid-abdomen and rolled inwards towards the head carefully to reduce dispersion of any residual aerosols.

### Conflict of interest

We have no conflicts of interest.

### Ethics statement/confirmation of patients' permission

Not required

### Reference

1. Da Vinci Transoral Surgery. Procedure Guide. Available at: <https://oto.med.upenn.edu/wp-content/uploads/sites/25/2016/06/daVinci-TORSPProcedureGuide.pdf>. Accessed on 11 June 2020.