



**Mr G Wijayasingam**  
Head and Neck Fellow,  
Royal Derby Hospital.



**Mr S Mortimore**  
Consultant ENT & Head and  
Neck Surgeon,  
Royal Derby Hospital.



**Mr M De,**  
Consultant ENT & Head and  
Neck Surgeon,  
Royal Derby Hospital.

**Correspondence address:**  
E: wijayasingam@me.com

# Derby Head & Neck Transoral Robotic Surgery (TORS) Program

**D**erby Robotic Head and Neck programme started following a generous donation by a local entrepreneur. He wanted to contribute to Derbyshire community and hospital. We will be grateful for his help. Currently Urology, Head and Neck surgery and Colorectal surgery are the specialities using robotic assisted surgery. Gynaecology are planning to start within next month. This is a multi disciplinary robotic surgery programme. The robotic surgery is a novel surgical technique. It is a significant step to help with the patient care pathway in Derby and its surrounding areas.

Derby Head and neck trans oral robotic assisted surgery programme is lead by two Head and Neck surgeons. There are few centres in the UK where robotic assisted head and neck surgery is performed. We are proud of our achievement and the advantage it will bring to our patients. Transoral robotic surgery was approved by FDA (USA) in 2009. The trust management with the help of a core robotic multi disciplinary surgical group after thorough examination of the business case and safety precautions agreed to start the programme.

The advantages of robotic surgery (TORS) compared to the conventional open surgery are precise removal of cancerous tissue, low complication rate, minimal blood loss, minimal need of tracheostomy tube, ability to swallow early and minimal hospital stay [1]. 1.5 million robotic surgery has been performed worldwide.

Transoral Robotic surgery is performed, via transoral route similar to other minimal invasive surgery with some similarity to Transoral Laser Surgery. However, the *da Vinci* system features a magnified 3Dimensional high definition vision system which is better than a conventional view through an endoscope.

The special wrested forceps which also functions as a bipolar diathermy has the ability to move on many planes and is steady without any tremors or minor movement. Hence, has the ability to flex and rotate far greater than a human hand through a small space. We can therefore operate with an enhanced vision, precision, dexterity and control. Since the robotic arm/forceps can move on many planes a selected group of oropharyngeal and supra

glottic tumours which otherwise would need a mandibular split or mandibular dislocation for access and would need tracheostomy can be performed. Open resections with reconstructions using free flaps can be avoided [2,3].

With conventional open surgery recovery is longer. There is high risk of infection, pain and swallowing difficulties [2]. There are certain disadvantages of laser where the access is difficult and not in a straight line. Neck dissection can be performed with the primary tumour resection or separately. Human Papilloma viral infection (HPV 16) has been recognised as an aetiology of oropharyngeal carcinoma in younger patients. In these group of patients, radiotherapy can give unwanted long term side effects, including a small chance of radiation induced sarcoma. Benign and malignant lesions affecting the oropharynx, supra glottis, glottis, and hypo pharynx can be treated by TORS [2]. Other indication of TORS are tongue base varicosities, lingual tonsillar hypertrophy, tongue base reduction for obstructive sleep apnoea and thyroid/parathyroid surgery. Limited mouth opening and advanced tumours are contra indications for TORS surgery.

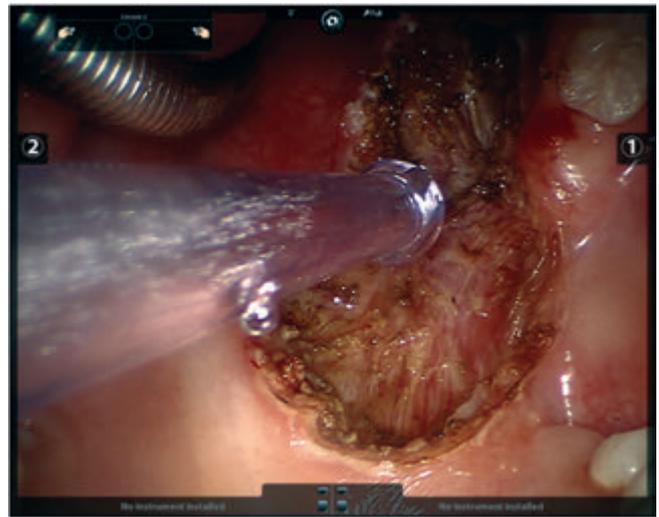
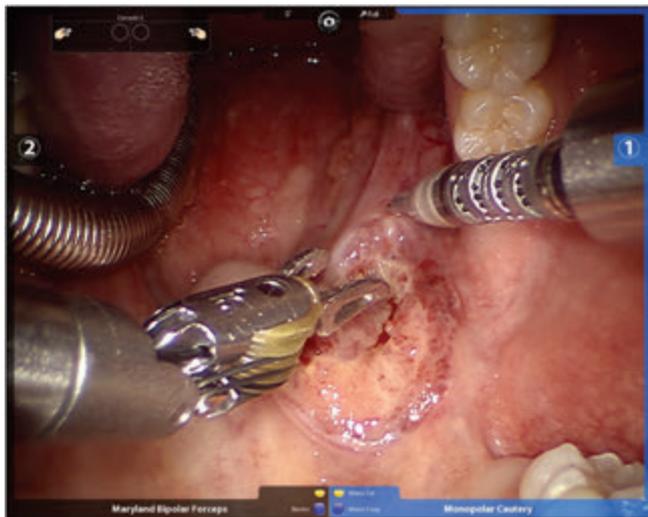
## Components of the system are:

### *Surgeon console*

- Using the *da Vinci* Surgical System, the surgeon operates using the console while viewing a high definition, 3D image inside the patient's body.
- The surgeon's fingers grasp the master controls below the display with hands and wrists naturally positioned relative to his or her eyes.
- The system seamlessly translates the surgeon's hand, wrist and finger movements into precise, real-time movements of surgical instruments.

### *Patient side cart*

- The patient side cart is where the patient is positioned during surgery. It includes either three or four robotic arms that carry out the surgeon's commands.
- The robotic arms move around fixed pivot points.
- The system requires that every surgical manoeuvre be under the direct control of



Images show intraoperative photos of TORS oropharyngeal surgery.

the surgeon. Repeated safety checks prevent any independent movement of the instruments or robotic arms.

**Endowrist instrument**

- A full range of Endowrist instruments is available to the surgeon while operating.
- The instruments are designed with seven degrees of motion – a range of motion even greater than the human wrist
- Each instrument has a specific surgical mission such as clamping, suturing and tis-sue manipulation.
- Quick-release levers speed instrument changes during surgery.

**Vision system**

- The vision system is equipped with a high-definition, 3D endoscope (flexible tube with a camera and light at the tip) and image processing equipment that provides true-to-life images of the patient’s anatomy.
- A view of the operating field is available to the entire OR team on a large viewing monitor (vision cart). This widescreen view provides the surgical assistant at the pa-tient’s side with a broad perspective and visualisation of the procedure [4].

There is a training programme for the surgeons to under go before starting to operate on patients.

Firstly the surgeons will practice on simulation for at least 20-30 hours. This is to train the hand eye co ordination and familiarise with console. The surgeons will

visit an international recognised centre to observe TORS procedure. Next step in the training programme is cadaveric dissection course recognise by *da Vinci* surgical system to enable surgeons to obtain console certificate.

The theatre scrub nurses undergoes a rigours training with the help of Intuitive surgical. This includes case observation and on line certification and a dry run prior to to live surgery.

Once the training was completed and certified by the Intuitive surgical the initial 4 to 5 surgical resection needs be done under the guidance of a mentor. Our mentor was a TORS surgeon from Hamburg, Germany. The mentor was helpful with first couple of resections. The plan is to reassess both the surgeons at Derby in three months time.

We at Derby were fortunate to have dual consoles. The operating surgeon will sit on one console while the mentor or a junior doctor would watch in the second console.

The second surgeon will sit on the head side of the patient and will guide the console surgeon. He would keep the operative field clear of secretions. The patient will be draped in as per protocol for a standard robotic surgery. The scrub nurse will assist the second surgeon. The anaesthetist is also well informed about the surgery. He/she will insert and place the endotracheal tube without obstructing the operative area. At Derby both the head and neck surgeons are experienced Trans oral Laser surgeons. The experience makes it easier for adapting and learning the new technique.



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