I am a Consultant Neurosurgeon specializing in Minimally Invasive and endoscopic Neurosurgery. I completed a MSc in Surgical Technology at Imperial College and a two year advanced fellowship in endoscopic skull base surgery in Pittsburgh, US.

My main areas of research are:

1- Minimally Invasive and robotic assisted Neurosurgery

2- Augmented Reality in Neurosurgery

3- Repetitive Trans-cranial Magnetic Stimulation (rTMS)

1- Minimally invasive and robotic assisted neurosurgery:

I specialise in endoscopic endonasal skull base surgery where extensive tumours of the base of the skull can be completely removed through the nose using endoscopic instruments. The technique has been developed and embraced by a number of neurosurgeons and ENT surgeons in the last 5-10 years. Please see a list of my publications below.

The procedures require at least two surgeons working side by side.

I have developed a technique whereby my assistant has now been replaced by a robotic pneumatic arm (Storz Point Setter) holding the endoscope allowing for a complex operation to be performed by a single surgeon. The benefits are:

- reduction of number of surgeons in theatre
- absence of tremor and drifting when the scope is held by the robotic arm
- reduction in operating time

2- Augmented Reality in Neurosurgery:

I am working on a project using the Microsoft Hololens augmented reality (AR) headset to aid in Stereotactic Neurosurgical procedures including:

- percutaneous trigeminal ganglion glycerol injection
- sterotactic brain tumour biopsy
- insertion of external ventricular drain for hydrocephalus

The ultimate goal of using AR in stereotactic neurosurgical procedures is to optimize the theatre space by reducing and ultimately eliminating the presence of bulky machines and monitors. All the information required by the surgeon (scans, image guidance, patients' vital signs, etc.) is now directly superimposed into his/her AR headset.

3- Repetitive Trans-cranial Magnetic Stimulation (rTMS)..

Repetitive Transcranial Magnetic Stimulation or rTMS is a novel treatment for neurological and psychiatric problems that is non invasive and offers an alternative to taking medications, electro-convulsive therapy (ECT) and surgical intervention.

rTMS employs short pulses of electromagnetic waves that travel through the skull to stimulate or suppress specific areas of the brain that are thought to play a role in conditions like depression, chronic neuropathic pain and migraine. There is also increasing evidence that rTMS might be beneficial in rehabilitation following a stroke.

In the majority of these neurological conditions the treatment with rTMS is still experimental but the evidence-base is growing fast.

1. Intraoperative computed tomography guidance to confirm decompression following endoscopic endonasal approach for cervicomedullary compression.

   Gande A, Tormenti MJ, Koutourousiou M, Paluzzi A, Fernendez-Miranda JC, Snydermnan CH, Gardner PA.

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3. Endoscopic endonasal approach for pituitary adenomas: a series of 555 patients.

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