

Brain Stimulation the 21st Century Speciality

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The field of brain stimulation is a growing branch of psychiatry. Some have attempted to delineate the characteristics of the ECT psychiatrists [1]. Stelka proposed the term interventional psychiatry to encompass all somatic therapies in psychiatry, following the model of interventional cardiology and other medical specialities; in a response to this article the term 'procedural psychiatry' was proposed [2]. Kellner in his book used the term brain stimulation [3]. The term was used by Higgins and George in their book Brain Stimulation Therapies for clinicians [4]. Swartz used the term 'Electroconvulsive and Neuromodulation therapies' [5] in his book to encompass brain stimulation treatments. Menachem and Kraus used the term 'Neurostimulation' for invasive procedures [6]. Older terms that were used to encompass the practice included somatic therapies and electrotherapy.

Still, there is no consensus on the title of this speciality; the components of this speciality are as diverse as the names. Electroconvulsive therapy seems to be the oldest surviving member that outlived its predecessors; chemical convulsion therapies (camphor convulsive therapy and metrazol convulsive therapy), and Insulin Coma Therapy (ICT). The concept of inducing convulsions to treat mental illness in the 20th century is attributed to Meduna. The first one to evolve was the chemical convulsion. The Insulin Coma Therapy was developed by Sakel in 1935. As the name implies, the target was deep coma, however, convulsions were one of the by-products of the procedure and was named 'wet seizure'. Use of anaesthesia alone has been tried as well as photic stimulation, or gas inhalation (flurothyl). [3,7]. The most probable prototypes of non-convulsive treatments included the use of eel fish, and electrotherapy [8] and the addition of cerebral stimulation to one of the sine wave ECT devices [9].

Newer variant of seizure therapy that is still being researched is Focal Electrically Administered Seizure Therapy (FEAST), and Magnetic Seizure Therapy (MST). In MST a high-strength magnetic field is used to induce a magnetically-induced seizure, via repetitive stimulation. Both procedures involve seizure induction and require anaesthesia and muscle relaxation.

Other forms of brain stimulation includes the following: repetitive Transcranial Magnetic Stimulation (rTMS) which delivers a magnetic pulse to the cortex. Transcranial Direct Current Stimulation (tDCS), and Cranial Electrical Stimulation (CES) are non-convulsive therapies where a low current is used over the scalp to produce therapeutic effect, these procedures do not require anaesthesia. Deep Brain Stimulation (DBS) functions by inserting electrodes to stimulate the brain directly. Also, Epidural Cortical stimulation (EpCS), Responsive Neurostimulation (RNS) (primarily used for intractable epilepsy), and Vagus Nerve Stimulation (VNS) require a neurosurgeon to implant the electrodes and are more invasive. Psychosurgery (also known as Neurosurgery for Mental Disorder or NMD) which is considered the most invasive irreversible form of psychiatric interventions is usually not included

in the list. As is Gamma Knife Surgery (GKS), which is a stereotactic radio surgery that is devised primarily to ablate brain tumours, and was also studied in functional diseases as trigeminal neuralgia [10]. Lastly, non-cephalic stimulations as the Transcutaneous Electric Nerve Stimulation (TENS) where about four electrodes are attached to the body to stimulate the nerves, Transcutaneous Vagal Nerve Stimulation (tVNS) which works by stimulating the vagus nerve, electro-acupuncture which is based on the tradition of acupunctures by stimulating acu-points using needles attached to an electric device to produce stimulation, Functional Electrical Stimulation (FES), or Neuromuscular Electric Stimulation (NMES) where body parts affected by paralysis are stimulated by a small electric charge.

The speciality itself is subdivided into convulsive or non-convulsive therapies, invasive or non-invasive [11,12]. The indications for each modality seem to correlate with severity of illness. As with the rest of psychiatric interventions, the most invasive interventions are usually reserved for the most severe and the treatment resistant patients. Of all interventions, ECT seems to be the most widely practised, most evidence-based, and the most stigmatised (though it is not the most invasive). One wonders whether other related treatments would be affected by the same stigma. Ghazzuiddin and Walter discuss how the specialization in Child and adolescent psychiatry, with its relatively low contact with ECT on one hand, and the practice of ECT by general adult psychiatrists and old age psychiatrists on the other hand; may have led to the fall of frequency of referrals of children with mental health issues to ECT [13].

The expanding knowledge, technical skills, nature of practice seems to call for sub-specialization to encompass the current diversity. The dilemma of nomenclature may be a reflection of the heterogeneity of subspecialties in psychiatry, were some subspecialties are classified by target age group e.g. child psychiatry, Geriatric Psychiatry, or diagnoses e.g. addiction psychiatry. Whether the term that will prevail will be 'interventional psychiatry', 'procedural psychiatry', 'brain stimulation', 'neuromodulation,' or 'neurostimulation' is not totally clear.

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