The introduction of stereotactic techniques for operating on the human brain is generally attributed to Ernst A. Spiegel, Henry T. Wycis, Vernon Marks and A. Lee in 1947, although stereotaxis had been used for experimental studies in animals since the late 19th century. The term “stereotaxy” in neurosurgery refers to a technique for the delivery of instruments, probes, external radiation or other forms of energy to a target in the central nervous system at a distance from an entry point in the neural coverings. In general, the process entails either the use of a virtual three-dimensional coordinate system to which the target is mapped or real-time radiological guidance or both. It is minimally invasive. Early systems depended on an external frame affixed to the skull. Current systems are often frameless.

The history of stereotaxis reflects the history of technology migration into neurosurgery. Noteworthy milestones and accomplishments included advances in the design of stereotactic frames; the introduction of computerized tomographic and later magnetic resonance (sectional imaging) guidance in real time; image fusion; stereotactic radiation delivery systems; and frameless systems of varying degrees of sophistication.

While stereotaxy was initially hailed for its promise in functional surgery, particularly in Parkinson’s disease, enthusiasm waned with the advent of L-Dopa. Interest rekindled as the limitations of medical therapy became apparent, as new targets were unveiled and as the broad availability of sectional imaging simplified stereotactic procedures.

Stereotaxy flourished as disseminated computing became widespread and some calculations became automated. In parallel, innovations in instrumentation eased technical demands. As a result, indications for functional neurosurgery were extended. And stereotactic surgical training became a standardized part of neurosurgical training.

While rudimentary stereotactic radiotherapy had been introduced in the late 1940s, that technology also became more accessible and gained adherents over the past 30 years. More stereotactic centers emerged worldwide. The learning curve flattened. In time, stereotactic technique became broadly recognized for its potential to improve patient safety, surgical outcomes and the costs of care. More recently, the growth of stereotaxy has paralleled progress in neuromodulation and neuroendoscopy.

At one point, stereotaxy was perceived as a narrow and special field. It has grown to be an essential, mainstream an accessible part of neurosurgery.