

# 15 History of Stereotactic Neurosurgery in Italy

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The history of stereotactic neurosurgery in Italy is strictly linked to the development of the mayor European schools of Paris, Stockholm and Freiburg. In the sixties almost any neurosurgical department in Italy had a stereotactic frame dedicated to thalamotomy for Parkinson disease (the Talairach frame, Reichert frame, Guiot frame, Leksell frame and the Cooper frame were the most popular stereotactic devices). From this “pneumoencephalography era” we can remember Franco Migliavacca in Milan, Dalle Ore in Verona, Faust D’Andrea in Naples and Elio Tartarini in Genoa who performed thousands of stereotactic operations for Parkinson disease, mental illness, and pain [4]. After the LDopa discovery and its wide therapeutical application, stereotactic surgery seems to have disappeared from Italy except for a few Institutes which still continued to perform stereotactic operations for tremor, pain, dystonia, and epilepsy.

So the real first generation of surgeons mainly devoted to functional neurosurgery in Italy in the “ventriculography era” includes Franco Marossero and Paolo Emilio Maspes in Milan [12,13,14], Victor Aldo Fasano in Turin [7], Gianfranco Rossi [16] and Beniamino Guidetti [11] in Rome. An original stereotactic frame was also developed in Turin and utilized for the treatment of cerebral palsy in adults and children (● *Figure 15-1*) utilizing alcoholic lesions and later cryothalamotomy.

The main interests of the schools of Milan (F. Marossero) and Rome (G. Rossi) were the functional exploration of the brain by acute and chronic implanted electrodes recording deep EEG activity (SEEG) in epileptic patients candidate to tailored resection of the epileptic focus or to

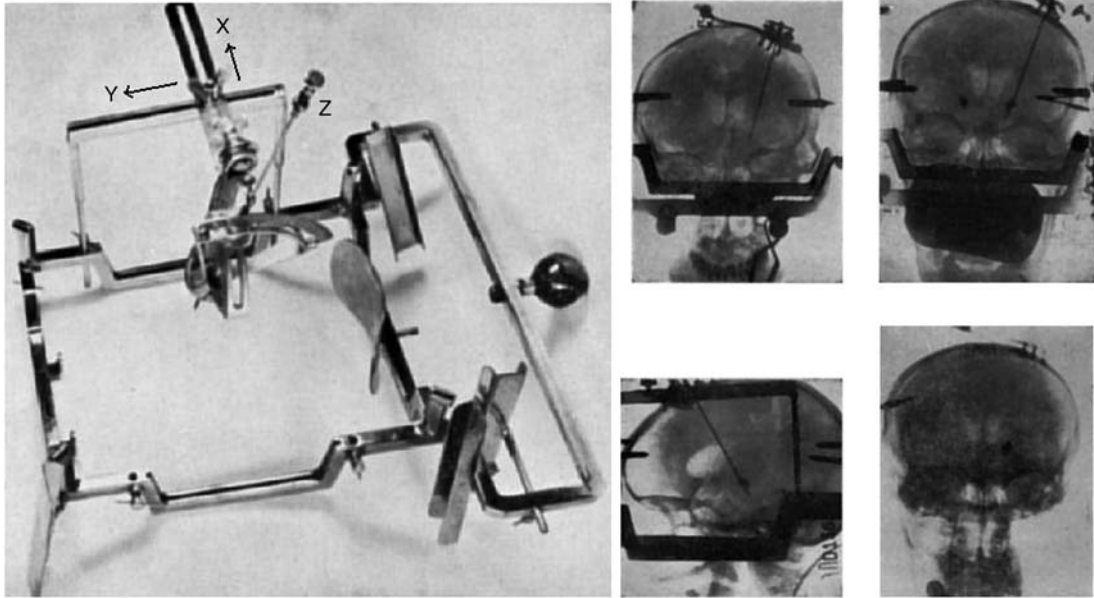
deep radiofrequency lesions of nuclei and tracts involved in the origin and diffusion of the epileptic discharge [13]. Also if this methodology was imported from the Paris School of Talairach and Bancaud, they developed many original observations and contributed to the definition of criteria still utilized worldwide for surgical treatment of epilepsy [12,14]. In those years particularly Gianfranco Rossi had an eminent role in the development of functional and stereotactic neurosurgery in Italy; he therefore deserves a more detailed history. Prof. Rossi worked for 4 years in the field of experimental neurophysiology under the leadership of Prof. Giuseppe Moruzzi and his research interest was centered on the anatomic and functional organization of brainstem reticular formation and sleep physiology. Later when he became chairman of the neurosurgical Department at the Catholic University of Rome his neurophysiological background had a strong influence on clinical practice and research projects and original criteria were proposed to improve the interpretation of electrocerebral epileptic signals.

The rationales, indications, and relative efficacy of classic surgical resection approaches including callosotomy, multiple subpial transection, and the so-called lesionectomy were studied [17].

In the same years C. A. Pagni in Milan wrote an universally appreciated book and publications about the surgical treatment of central pain [16]. In that period B. Guidetti in Rome performed operations to treat spasticity (Dentatectomy) and pain (Pulvinotomy) [11]. The main interest of the Turin school was the treatment of cerebral palsy and many thalamotomies have been

■ **Figure 15-1**

Stereotactic thalamotomy performed in the “pneumoencephalographic era” with the Italian frame named Fasano-Sguazzi. Note the contrast medium (lipiodol) in alcoholic solution injected at the target sites on both sides. (Courtesy of Sergio Zeme M.D., University of Turin, Italy)



performed in dystonic children [7]. The second generation of functional neurosurgeons at the beginning of the “CT era” includes De Divitis in Naples who heralded stereotactic surgery for Gilles de la Tourette syndrome [5]; the senior author (G.B.) who published milestone studies about impedance guided biopsy [1], cell kinetics of deep brain tumors, stereotactic treatment of brain abscesses and pioneered in Europe the treatment of cystic components of craniopharyngiomas by intracavitary Bleomycin; founded in Milan the first Italian neurosurgical Department dedicated to functional and stereotactic neurosurgery providing fuel for future development of original treatments such as Deep Brain Stimulation for the treatment of chronic refractory cluster headache and disruptive behaviour.

Another master of stereotactic neurosurgery was Franco Frank in Bologna who pioneered surgery of mesencephalic structure to treat cancer pain [8]. Prof. Frank was trained in Freiburg by Munding and founded in Bologna the school of functional and stereotactic neurosurgery. His

original approach included nearly all fields of interest of neurosurgery with particular regard to management of brain tumors by intracavitary irradiation and management of pain by stimulation of the periaqueductal gray and thalamus [9]. Massimo Scerrati in Rome and Pierligi De Riu in Sassari [6,18] introduced in Italy the stereotactic brachiterapy of brain tumors. Prof. Scerrati developed the “Scerrati’s arc” to transform the Talairach frame in an isocentric frame [19]. Prof. Mario Meglio in Rome introduced the use of spinal cord stimulation to improve blood flow in peripheral vascular diseases [15].

Belonging to this generation is also Claudio Munari who worked in Paris and Grenoble and founded in Italy the first department entirely dedicated to surgery of epilepsy and functional exploration of the brain. Also in the field of radiosurgery the Italian contribution was significant, particularly due to the contribution of Federico Colombo who applied the linear accelerator to the stereotactic frame and widened considerably the field of application of radiosurgery [3]. Dr. Colombo

built up a huge casuistic which includes more than 800 arteriovenous malformations treated by radiosurgery and is one of the larger series of the world. Also in the field of neuroimaging, the Italian contribution was highly represented by Cesare Giorgi who built one the first digitalized stereotactic atlases [10] and developed original equipments in the field of robotics and tridimensional neuro-navigation. The “neuromodulation era” heralded at the beginning of the eighties by the senior author [2] belong to the present.

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