Development of neurosurgery in Austria

Historical vignette

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KEY WORDS • neurosurgical history • Austria

People have been fascinated with trephination for centuries. It has also been of interest in Austria, where artifacts have been found. In medieval time through the 18th century trephination was primarily an art in military medicine.

Paracelsus (Philippus Theophrastus Paracelsus von Hohenheim, 1493–1541), an eminent European physician born in Switzerland, made Salzburg in the 16th century a center of medicine and his interests in surgery included trephination.

Neurosurgery was a serious profession, although still not academic as surgery in general, in Austria in the 18th century. It was established in 1785, during a time of war, as a school of surgery, the “Josephinum,” for military medical “barbers” and “wound physicians,” as they were called in German. This institute was established by the Roman–German emperor Joseph II. In 1865, when it became part of the University of Vienna Medical School it finally received accreditation to qualify its students to receive medical degrees. A similar process established scientific surgery at the universities in Graz and Innsbruck.

The “Allgemeine Krankenhaus”—general hospital—in Vienna, founded in the 17th century, became the nucleus of Austrian science of medicine in the 19th century and influenced thereafter many other medical developments in Europe.

As a science neurosurgery was started by a professor of internal medicine, Hermann Nothnagel (1841–1905), born in Brandenburg. Not atypically at that time, he was also an excellent neurologist. He dissected cadavers of patients who had died after neurological diseases and he compiled an excellent topography of the nature of neurological signs and symptoms. His textbook Topographische Diagnostik der Gehirnerkrankungen became famous worldwide. At those times this was of great importance for the origin of brain surgery and the basis for such eminent surgeons as Theodor Billroth (1829–1894), but especially for his follower Anton Freiherr von Eiselsberg (1860–1939), father of Austrian neurosurgery (Fig. 1). At his side was the neurologist Otto Marburg (1874–1948), who told Eiselsberg, “where to open the skull.” He was the follower of Heinrich Obersteiner (1847–1922), founder of the neurological institute later called “Obersteiner Institut,” an eminent scientific institution of neuropathology.

Eiselsberg’s follower and successor was Egon Ranzi (1875–1938). In 1913 both published a report of 168 cases...
of surgery for brain and medullary tumors. In 1924 Harvey Cushing was visiting Europe, meeting all the eminent surgeons and neurosurgeons as well as Eiselsberg. Cushing curiously remarked about the "mad artist" and the aula of the University of Vienna: "... The aula itself magnificent—two stories—very poor acoustic properties. Two blank squares on the ceiling where the pictures of the mad artists should have gone. Too indecent to put up..." The "mad artist" was Gustav Klimt (1864–1918).

Hermann Schloffer (1868–1937) in Innsbruck and Oskar Hirsch (1877–1965) in Vienna made major contributions to neurosurgery. Their surgical approach to the sellar region via the transethmoidal route made the procedure less dangerous than trephination, which was accepted worldwide by surgeons, including Cushing. In 1938 Hirsch left Vienna, went to the US and became famous for his elegant surgical skill and minimization of intraoperative blood loss. He was called "the bloodless surgeon from Vienna."

Julius Tandler (1869–1936), professor of anatomy, and Egon Ranzi (1875–1938), professor of surgery, had been an excellent team combining both fields for a better understanding of surgical approaches to brain lesions. They published their textbook *Surgical Anatomy* in 1920. Some approaches were published much later by other neurosurgeons who gave them credit for their authorship, such as the infratentorial–supracerebellar approach to the pineal region, which did not become famous until Benett Stein's publication in 1971.

The translation of Cushing’s textbook *Intracranial Tumors* in the 1930s had a great impact on the development of neurosurgery in Austria. The successor of Ranzi, Leopold Schönbauer (1888–1963), had trained briefly in Boston with Cushing in 1924; he is considered the most prominent promoter of neurosurgery in Austria.

The very first hospital dedicated to neurosurgery was established in response to needs during World War II, as Wilhelm Tönnis (1898–1978), head of the air force medical team for brain injury, moved the army hospital in 1943 from Berlin to Bad Ischl, Austria, a resort in the Salzkammergut, where the late Austrian emperor had his summer seat; the famous composer Franz Lehár also lived and died there. The former hotel "Kaiserkrone" became another nucleus of Austrian neurosurgery, lasting until 1968, when the institute was moved to Linz. In May 1945, when the war was over, the associate of Tönnis, Dietrich W. Krüger (1910–1965), had to be forced out of the train by the US occupation troops, as he wanted to go back to his native Berlin. He was reinstalled again in the Kaiserkrone to take care of the patients. Tönnis visited his former work place several times for the meetings of the German and Austrian neurosurgical society after World War II.
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In Bad Ischl the air force neurologist Karl Theodor Dus-sik (1908–1968) made a major contribution to neurosurgery, and even more to medicine in general. He applied a method for testing metal parts in airplane manufacturing (ultrasonography) to patients’ skulls for the detection of hematomas and other space-occupying lesions. He called this method Hyperphonogramm. He emigrated in 1953 to Boston, Massachusetts.

Albrecht Gund (1915–1997), a follower of Dietrich W. Krüger (1910–1965) at Bad Ischl, where he was the latter’s successor after the chain-smoker’s sudden death, moved the neurosurgical hospital to Linz, which is now run by Johannes Fischer and is the most modern equipped neurosurgical department in Austria.

Back to Vienna

The follower and close associate of Schönauer, Herbert Kraus (1910–1975) (Fig. 2), became the leading neurosurgeon in Austria, which was then still in a subdivision of general surgery at the Allgemeine Krankenhaus, University of Vienna Medical School. The site of the neurosurgical operating theater was after the war a special “bunker” for surgery built during the war against air raids, in use until 1964. In this year an independent neurosurgical department of the Vienna University Medical School under the chair of Kraus was founded, with Heinz Brenner, who was the close associate of Kraus. During his training there he was the best “drill sergeant” the author has ever met in surgery. With Wolfgang Koos, pediatric neurosurgeon, and Josef Ganglberger, stereotactic neurosurgeon, Kraus had a very successful team.

After the tragic death of Kraus, Wolfgang Koos (1930–2000) became successor, and was an early pioneer in microsurgery by the end of the 1960s. Figure 3 shows him at his favourite case: surgery of an acoustic neuroma (vestibular schwannoma) in the sitting position. We all remember his Atlas of Microsurgery. Koos was trained in Washington, D.C., under James Watts. Koos was also a man with vision. One of his goals came true when he succeeded in establishing a special building along side of the new Allgemeine

![Flow chart showing line of ancestors in Austrian neurosurgery](image)

![TABLE 1: The 10 sites of neurosurgical departments at the present in Austria](table)

<table>
<thead>
<tr>
<th>Neurosurgical Center (yr established)</th>
<th>Year*</th>
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<tbody>
<tr>
<td>University of Vienna (1938 as subdivision of general surgery)</td>
<td>1964</td>
</tr>
<tr>
<td>University of Graz (1950 as subdivision of general surgery)</td>
<td>1970</td>
</tr>
<tr>
<td>University of Innsbruck (1951 as subdivision of general surgery)</td>
<td>1971</td>
</tr>
<tr>
<td>Salzburg State Hospital</td>
<td>1966</td>
</tr>
<tr>
<td>Linz State Hospital (1943 army hospital in Bad Ischl)</td>
<td>1968</td>
</tr>
<tr>
<td>Vienna State Hospital Rudolfstiftung</td>
<td>1976</td>
</tr>
<tr>
<td>Krems Community Hospital</td>
<td>1982</td>
</tr>
<tr>
<td>Vienna State Hospital Donauispital</td>
<td>1988</td>
</tr>
<tr>
<td>Feldkirch State Hospital</td>
<td>1992</td>
</tr>
<tr>
<td>St. Pölten Community Hospital</td>
<td>2002</td>
</tr>
</tbody>
</table>

* Indicates the date of establishment or the year of independence from subdivision status.

![Opening ceremony with the first patient treated in the GK system in Graz, April 1992](image)
Krankenhaus with all the modern equipment included, as well as neuroradiology and neuropathology.

The successor of Koos was his follower Engelbert Knosp, the host of the 12th International Meeting of the Leksell Gamma Knife Society 2004, who spent some time in Mainz with Axel Pernecky, also a follower of Koos.

**Turning to Graz University Medical School**

Fritz Heppner (1917–2002) (also trained as a general surgeon by Franz Spath and, later, by Herbert Olivecrona), and Sir Wylie McKissock in neurosurgery, managed to inaugurate a subdivision of neurosurgery in general surgery in 1950. Heppner further created the department of neurosurgery in 1971. He was proficient not only in neurosurgery but also in painting, and was author of several books concerning various cultural aspects, as well as the escape from a Soviet prison camp. He can be considered a Renaissance man.

Although not until 1962, stereotactic neurosurgery was established by his follower and associate Hans Erich Diemath in Graz, who became the founding chairman of the department of neurosurgery at the state hospital in Salzburg in 1966, now headed by Bernd Richling. Although the pioneer of stereotactic neurosurgery, Ernst Spiegel (1895–1985), born in Vienna, was not taken as a young physician as a resident in Vienna by Schönbauer, so he joined the Obersteiner Institut and in 1930 traveled to the US where he became the pioneer of stereotactic neurosurgery with Henry T. Wycis.5 In Graz the first GK system in the German-speaking countries was established in 1992, the 31st in the world just after that in Marseille (Fig. 4). In the same year a GK system was also installed in Vienna.

The third site of academic neurosurgery is Innsbruck, where after a long struggle under Karl Kloss (1917–1976) the department was emancipated from general surgery in 1972, later headed by Vincent Grunert, who was a refugee from the Iron Curtain, when the communists ruled Czechoslovakia. Presently Klaus Twerdy has been the chairman in Innsbruck since 1990, and he is an energetic and charming fellow who finished the reconstruction for the most modern site just 2 years ago.

The founder of the Viennese department of neurosurgery at the state hospital Rudolfstiftung in 1976 was Heinz Brenner. He was for many years an associate of Schönauer and Kraus at the Allgemeine Krankenhaus, University of Vienna Medical School. His successor and present chairman is Fritz Böck, his long-time associate.

Another state-run site of neurosurgery is Klagenfurt in Carinthia, where neurosurgery was established in the department of surgery after the war. Walter Bischof (1920–1987), a follower of Tönnis, was the first chairman of the department of neurosurgery, succeeded by Günther Lanner in 1986, a follower of Heppner.

Additional departments of neurosurgery in Austria include Krems, founded 1982; Donauispital in Vienna 1988, at present headed by Manfred Mühlbauer, Feldkirch, headed by Alfred Witzmann since 1992, and St. Pölten headed by Karl Ungersböck since 2002 (Table 1).

In all there are 10 centers for neurosurgery in Austria, with three alone in Vienna.8

This line of ancestors in Austrian neurosurgery (Fig. 5) shows the various influence of neurosurgery in Austria, the schools and heritage of all the chairmen through the present.

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