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Summary

This article summarizes the history of epileptology in Lausanne, which started as early as in the 18th century with the work of Samuel Tissot. The evolution since the middle of the last century is then reviewed, including the discussion on the most important contributors, their scientific publications, the evolution of investigation technics and clinical practice. The various collaborations developed over this period, particularly with the Institution of Lavigny, are also reviewed. Perspectives of future developments conclude this review.

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Key words: Samuel Tissot, Theodor Ott, Paul-André Despland, pediatric EEG, EEG monitoring, prognosis of coma, status epilepticus

L'histoire de l'épileptologie à Lausanne

Cet article résume l'histoire de l'épileptologie à Lausanne, qui débute très précocement au 18ème siècle avec les travaux de Samuel Tissot. L'évolution depuis les années 50 du 20ème siècle à nos jours est ensuite parcourue, avec les figures marquantes, les travaux scientifiques, l'évolution des techniques d'investigation et de la pratique clinique. Les différentes collaborations développées au fil du temps, notamment avec l'Institution de Lavigny, sont également passées en revue. Finalement les perspectives de développement dans le futur concluent cette contribution.

Mots clés : Samuel Tissot, Theodor Ott, Paul-André Despland, EEG pédiatrique, monitoring de l'EEG, pronostic du coma, état de mal épileptique

Geschichte der Epileptologie in Lausanne

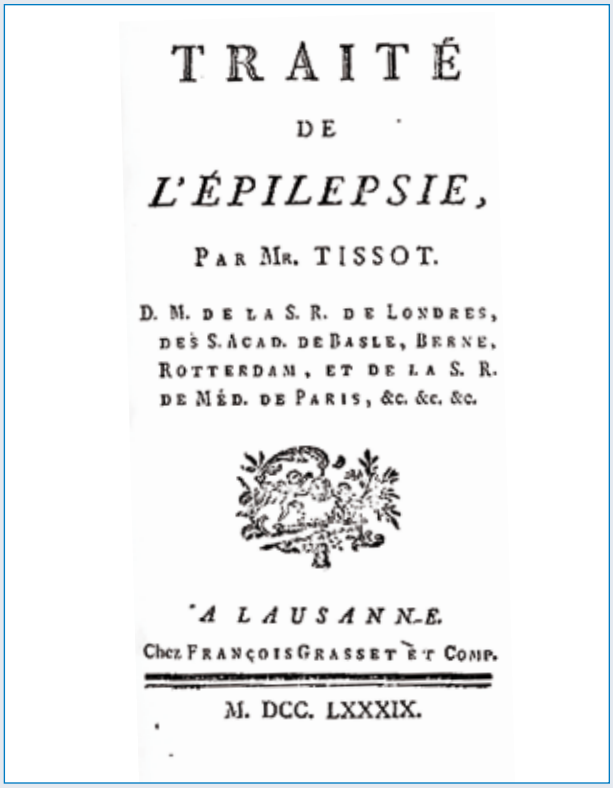
Dieser Artikel fasst die Entwicklung der Epileptologie in Lausanne zusammen, eine Geschichte die bereits im 18. Jahrhundert mit dem Werk von Samuel Tissot begonnen hat. Die moderneren Fakten seit der Mitte des 20. Jahrhunderts werden dann diskutiert, zusammen mit den prägenden Persönlichkeiten, den wissenschaftlichen Arbeiten und den technischen und klinischen Entwicklungen. Es wird auch an die wichtige Zusammenarbeit mit der Institution von Lavigny erinnert. Mit einem Wort über die zukünftigen Perspektiven schliesst dieser Beitrag.

Schlüsselwörter: Samuel Tissot, Theodor Ott, Paul-André Despland, Kinder-EEG, EEG-Monitoring, Komaprognose, Status epilepticus

The (very) early beginnings

The history of epileptology in the Lausanne area starts as soon as in the 18th century, with Dr Samuel Auguste Tissot (1728-1797; **Figure 1**) [1]. Born in Grancy, a village in the Vaud Canton close to Lausanne, he attended medical school in Montpellier, a very renowned medical university at that time, before returning to practice in Lausanne. His medical skills were widely appreciated and he became quickly renowned across

Figure 1: Dr Samuel Auguste Tissot [1]



TRAITÉ

DE

L'ÉPILEPSIE,

PAR MR. TISSOT.

D. M. DE LA S. R. DE LONDRES, DES S. ACAD. DE BASLE, BERNE, ROTTERDAM, ET DE LA S. R. DE MÉD. DE PARIS, &c. &c. &c.

A LAUSANNE.

Chez FRANÇOIS GRASSET & Comp.

M. DCC. LXXXIX.

Figure 2: Cover page of Tissot's Treatise about epilepsy („Traité sur l'épilepsie") [2]

Europe, receiving several offers for honorific positions. He taught several years at the University of Pavia, another important place for medical studies in Europe, and when returning to Lausanne he became vice-president of Medical College (Collège de Médecine), a function mainly devoted to the training of local physicians. He is well known for several publications, and notably for his Treatise about epilepsy ("Traité sur l'épilepsie") published in 1770 (**Figure 2**) [2]. In this comprehensive monograph he described a wide array of seizure types and discussed their possible pathophysiology, treatment, and prognosis. Tissot already distinguished convulsive (« grand accès » ; major fit) from non-convulsive seizures (« petits accès » ; minor fit), and gave as an example a detailed account on a young girl experiencing what was likely to be one of the first detailed descriptions of absence seizures. The discussion of etiologies was also well ahead of his time, as he introduced the concept of predisposing and determining causes (« causes prédisposantes » and « causes déterminantes »), in order to describe inherited and acquired etiologic factors.

This treatise was part of a greater work on neurological conditions ("Traité des nerfs et de leurs maladies"), in which he listed for example different forms of migrainous aura. Doctor Tissot is further remembered for his publication on public health ("Avis au peuple sur sa santé"), which also makes him a pioneer in social and preventive medicine.

The modern era

The beginning of modern epileptology in Lausanne is intimately linked to Professor Theodor Ott (1909-1991) (**Figure 3**). After completing his training in Zürich (where Professor Rudolph Hess introduced the first EEG in Switzerland in 1948) and London, he returned to Switzerland and settled in Lausanne. In a countryhouse called Villa Sandoz, not far from the Hôpital Cantonal (this institution became the Centre Hospitalier Universitaire Vaudois -CHUV- in 1981) he set up the first EEG recording in October 1954 (**Figure 4**). This tool had also

Figure 3: Professor Theodor Ott (courtesy of the neurology Service, CHUV, Lausanne)

started to be used in the Neurosurgery clinic, allowing a non invasive brain exploration complementary to the structural information of gaseous encephalograph; Ott had also scientific interests in peroperative EEG recordings [3]. He started to obtain pediatric EEGs with Paul-André Despland in 1971, and performed the first EEGs in premature newborns with Professors Gauthier and Prodon in the neonatal clinic [4]. He also published the first Swiss observation on the electroencephalographic evolution in Creutzfeld-Jakob disease in 1975 [5]. The EEG and EMG centre, which until that time were run independently by Ott, was incorporated by a footbridge to the Neurology service located a the Hôpital Beaumont (a facility lying next to the present CHUV main building), led at the time by Professor Michel Jequier. They were both strong characters, which led to some rivalry between the service of neurology and the EEG-EMG centre; it is, in fact, still rumored that the footbridge physically connecting the two entities was considered

Figure 4: One of the first EEG recordings in Lausanne (Courtesy of Professor P.-A. Despland)

Figure 5: Professor Paul-André Despland

the hallmark of this antagonism. At the end of his career, Professor Ott spent most of his time in his private practice in town, and came into the clinic in the late afternoon to supervise the reading of the EEGs of the day and teach the residents. He donated at his death a fund bearing his name (Fondation Théodore Ott), which generates a prestigious prize awarding research work of special interest in fundamental neurosciences.

When Professor Ott retired in 1976, Dr Paul-André Despland (born 1942) (**Figure 5**) took over the direction of the EEG-EMG centre, as well as the outpatient clinic a couple of years later, and became associate professor. Despland, an authentic "vaudois" personality, attended medical school and completed his neurological training in Lausanne. Having a strong interest in electroencephalography and more generally in pediatric neurophysiology, in the early Seventies he spent a fellowship period in Paris and later two years in San Diego, California, in order to refine his knowledge in pediatric neurophysiology, including EEG and evoked potentials. When he returned to Lausanne, he pursued the development and implementation of pediatric and neonatal neurophysiology [6], taking part in several studies with Professor Thierry Deonna and Professor Eliane Roulet (who succeeded the former as head of the Neuropediatric Unit in 2003) on neuropsychological and behavioral consequences of electrical status epilepticus in sleep and other severe forms of epilepsy in children [7]. He also had a strong interest in pharmacological treatment of the epilepsies, taking part in multicentric trials on several anticonvulsant agents, such as valproate monotherapy in idiopathic (genetic) generalized epilepsy [8]. At the end of the last Century, Despland developed together with Professor Philippe Leuenberger (head of pneumonology) the overnight video-polysomnographic recordings, which progressively led to the funding of the CHUV sleep center (CIRS) in 2006, one year before his retirement. In parallel, he contributed to the creation and development of the presurgical programme "Vaud-Genève", led in Geneva by professor Margitta Seeck since 1995, which aims at rationalizing and optimizing the resources of the two university hospitals of French-Speaking Switzerland in this specific field. Across the millennium the program took great advantage of the presence of Professor Jean-Guy Villemure, a very skilled and innovative neurosurgeon from Montreal with an outstanding knowledge of epilepsy surgery [9, 10], who was the head of the Neurosurgery service at the CHUV.

During the years of his leadership in Lausanne, Despland progressively introduced the digital video-EEG technology, and the number of yearly recordings increased markedly: beyond 2000 studies in 1995 and more than 3000 a few years later. Since 2001, all EEG studies of the CHUV are recorded digitally. At the end of his university career in 2007, Professor Despland led a large outpatient clinic and was deeply appreciated by his patients; he currently runs a lively private practice in Clarens near Montreux.

Epilepsy center in the countryside

Over the years, the service of neurology in Lausanne tightened its collaboration with the Institution of Lavigny, which offers homing, care and employment for people with epilepsy and learning disabilities since 1906 in a bucolic environment of the Côte, off the western outskirts of Lausanne. Dr François Martin, one of the first Swiss electrencephalographers who were trained in Geneva, was the neurologist in charge and introduced the EEG in the mid Fifties; after 1956 he was followed by Dr Michel Tchicaloff trained in Bulgaria, who ran the Institution until 1978. In line with the patient population he managed in Lavigny, Tchicaloff developed a strong interest in epilepsy associated with learning disabilities [11]. Dr Edouard Bärtschi succeeded him for a brief period, before Dr Giovanni Battista Foletti (born 1947) took over in 1982 (**Figure 6 left**). Originally from Ticino, Foletti was trained in Zurich and Lausanne, and pursued in Lavigny his interest on the relationships between epilepsy and co-morbid learning

Figure 6: Dr Giovanni Foletti (left), Dr Malin Maeder-Ingvar (right)

Figure 7: The epileptology team in CHUV Lausanne in spring 2014, from left to right: PD Dr Andrea Rossetti, Dr Anita Barbey (resident), Dr Jan Novy, Dr Myriam Guidon (resident)

disabilities [12]. He also developed a large outpatient clinic, introducing vagus nerve stimulation as soon as in the mid Nineties, and carried out regular consultations in many other institutions where people with learning disabilities and epilepsy are hosted (an activity which he still pursues presently). Furthermore, he developed an EEG monitoring unit in Lavigny, including sleep study facilities, while a therapeutic drug monitoring laboratory was set up. Upon his retirement in 2012, Dr Malin Maeder-Ingvar (**Figure 6 right**) took over his duties. Originally from Sweden, and after several neuroscience fellowships in the USA, she completed her neurology and EEG trainings in Geneva and Lausanne, where she worked as an attending for almost two decades, taking part in several research activities, with a strong interest in pediatric neurophysiology [13].

Recent years and outlook to the future

At Prof. Despland's retirement in 2007, PD Dr Andrea Rossetti (born 1971) inherited the lead of the epilepsy/EEG unit of the CHUV. After his basic education in Lugano, he attended the medical school in Bern and was trained in Lausanne and Lugano in neurology and sleep medicine, before a fellowship in Boston that allowed him to refine his skills in clinical research. In these last few years, under his direction, the unit further developed complementary skills to the neighboring Geneva epilepsy platform. While on the one side the tight clinical collaboration within the presurgical program "Vaud-Genève" was pursued [14 - 16], with PD Dr Claudio Pollo and subsequently Professor Roy Daniel as important neurosurgical actors on the CHUV side, on the other hand, with the help of Dr Maeder-Ingvar (see above), attending epileptologist until 2011 and with Dr Jan Novy (see below) since 2013, Rossetti undertook a progressive expansion, mainly in the field of electrophysiology at the interface with emergency and intensive medicine. Thanks to intense and fruitful collaborations with the service of Adult intensive care medicine (particularly PD Dr Oddo), the Institute of social and preventive medicine (professor Bernard Burnand), the Center of biomedical imaging (notably PD Dr Marzia De Lucia), as well as international neurological clinics (such as the Brigham and Women's Hospital in Boston, or the Johns Hopkins and Bayview Medical Center in Baltimore), the CHUV has reached a relatively wide visibility and recognition regarding outcome prognostication of comatose patients after cardiac arrest [17 - 19], as well as prognostication and treatment of status epilepticus [20 - 25]. Another field of interest is represented by the pharmacological treatment of the epilepsies, particularly in patients with severe comorbidities [26]. This latter aspect, together with pharmacogenetic explorations in collaboration with the Queen Square National Hospital (Professor Sisodiya), is now actively developed by Dr Jan Novy (born 1978). He grew up in Vevey and completed his medical school and neurology training in Lausanne, reintegrating recently the CHUV team as attending epileptologist after a three-year fellowship and PhD in London, where he could acquire his skills in pharmacology and genetics [27, 28].

As regards the clinical counterpart, in 2014 the epilepsy/EEG unit of the CHUV in Lausanne (**Figure 7**) is expanding the capabilities to perform long term video-EEG monitoring at the bedside, particularly in acutely ill patients, from premature newborns up to elderly subjects. Local, regional, and international multidisciplinary collaborations, together with a stimulating and relaxed working environment, allow undertaking the challenges of the upcoming years with optimism and confidence.

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