

EMMANUIL KONDOLEON: PIONEER IN SURGICAL TREATMENT FOR LYMPHEDEMA

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ABSTRACT

Our era is characterized by the rapid improvements in treatment in all areas of medicine. But we should not forget those pioneers who, with their medical actions and inspiration, changed the course of their era and left their mark on medical history. One of those is the Greek surgeon Emmanuil Kondoleon (1879-1940). His brilliant scientific personality, numerous teaching activities, and his notable publications made him a distinguished Professor of Surgical Pathology. At the beginning of the 20th century, when very little was known about lymphedema and especially its treatment, Emmanuil Kondoleon arrived on the scene with his own original technique that led the surgical treatment of lymphedema for more than 50 years. Made famous as Kondoleon's procedure, his technique included wide excision of the fascia and concomitant partial excision of the hypertrophic tissue. Such important personalities as Kondoleon set great examples in medical history and inspire future young generations of physicians.

Keywords: Emmanuil Kondoleon, lymphedema, surgical treatment, medical history

Lymphedema is an abnormal accumulation of protein-rich fluid in the interstitium

which causes chronic inflammation and reactive fibrosis of the affected tissues.

Lymphedema manifests as swelling of a body part, most often the extremities, and can be distinguished as primary or secondary lymphedema. Treatment can be conservative or surgical (1). In this article we describe an important personality, the first to introduce the modern surgical management of lymphedema – Emmanuil Kondoleon (*Fig. 1*). Information on the life and surgical activities of Emmanuil Kondoleon was obtained from the archives of Aretaieion University Hospital and Hippokration University Hospital the two major Greek hospitals in which he worked. Moreover, we studied archives from the Department of History of Medicine at the University of Athens and the Hellenic Surgical Society.

Emmanuil Kondoleon (1879-1940) was born in Kythera, a beautiful island in the south of Greece (*Fig. 2*). He graduated from the University of Athens Medical School and then completed four years of postgraduate studies in Surgery in Germany, France, and England (2,3). He became a surgical registrar in 1908, an Assistant Professor in 1910, and an Associate Professor at the Aretaieion Hospital in 1921. Finally, he was appointed Professor of Surgery and Chairman of the Propaedeutic Surgical Clinic and Surgical Pathology in 1924. He trained many medical



Fig. 1: Emmanuil Kondoleon (1879-1940)



Fig. 2: Kondoleon's birthplace in Kythera, Greece

students and surgical residents, published numerous papers, and edited a textbook called *Surgical Diagnosis* in 1926. He was also elected president of the Greek Surgical Society. He presented the famous Kondoleon procedure in 1912. In 1940, he suffered perforation of a duodenal ulcer and died a few days after operation (1-11).

But what was the famous Kondoleon procedure? It was a revolutionary technique for the surgical treatment of the lymphedema

in an era when almost nothing was known about lymphedema and its treatment. At the time, lymphedema was commonly referred to as “elephantiasis” – a descriptive term meaning the presence of a monstrous disfiguring disease (12). Rudbeck from Sweden followed and Bartolinus from Denmark used the term “lymphatic vessel” in 1653 (13,14). A description of the clinical manifestations and possible etiology of lymphedema was given by Von Mikulicz, who also performed the first wedge resections of hypertrophic tissue in 1900 (15-17). Handley in London performed the first “lymphangioplasty” by placing silk sutures along the limb in order to assist the drainage of lymph in 1908 (18). In Amsterdam, Lanz tried to divert lymph flow from the subcutaneous compartment to either the intramuscular or the subperiosteal lymphatics by performing fenestration of the fascia and the bone respectively in 1911 (19). Finally, there was the first separation of lymphedema from elephantiasis during the third decade of the 20th century (20,21).

Kondoleon started his approach to the treatment of lymphedema by making some experimental and clinical observations. He observed in dogs that lymph flow can pass through the muscular system, and he also noted its drainage through the subcutaneous tissue. Moreover, he observed in humans with lymphedema that the fascia is usually hard, thickened and fixed to the surrounding adipose tissue. These observations led to the development of the Kondoleon procedure (1912), which included a wide excision of the fascia with concomitant partial excision of the hypertrophic adipose tissue (4,5). During a two-month period, Kondoleon applied his procedure in seven patients with very good results. After a two-year follow-up period, he confirmed that moderate to good results persisted in all patients (6,7). By 1940, he had operated on 35 patients and achieved clinical improvement. Soon, the reputation of Kondoleon's procedure spread around the world. Matas (US) operated on 7 patients and

Gessner (US) 3 patients in 1913 (22,23). Royster (US) operated on 1 patient in 1914 and Sistrunk (US) operated on 7 patients in 1918 (24,25). At the 69th Annual Session of the American Medical Association in Chicago in 1918, it was hailed as the unique surgical treatment for patients with elephantiasis (25). Additionally, in 1954 Kinmoth said that Kondoleon's procedure offered significant relief to many patients (26). Between 1965-1970, Thomson in London developed a technique called Thomson dermal implant which was a modification of Kondoleon's operation (27).

In conclusion, the famous Kondoleon procedure remained the basic surgical treatment of lymphedema for more than 50 years (28,29). Such important personalities as Kondoleon set great examples in medical history and inspire the younger generations of physicians to follow them. Kondoleon's procedure was the basis and the stimulus for the evolution of modern surgical techniques which have been developed in the more recent years by Campisi, Boccardo, Baumeister, Brorson and many others who strive to find the optimal surgical treatment to better the lives of patients with lymphedema (30-32).

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