Theodor Emil Kocher (1841-1917) was born in Bern and educated in several universities in Europe. Like many surgeons of that time, Kocher performed orthopaedic surgery, general surgery, neurosurgery and endocrine surgery and became famous in many fields. He is remembered for his description of a new approach to the hip joint and elbow joint, as well as a maneuver for reduction of dislocated shoulder joints. He introduced many instruments and some of them, such as the Kocher clamp are still in use. His most important contribution was thyroid gland surgery, and he received the Nobel Prize for Medicine in 1909, for this advancement. He was a scientific, hard working meticulous surgeon, dedicated to his patients and students, which found him a place in the history of medicine.

Key words: Theodor Emil Kocher, orthopaedic surgery, Nobel Prize for medicine

INTRODUCTION

Emil Theodor Kocher was born on 25th August 1841 in Bern, Switzerland and he became one of the most famous citizens of that city (Figure 1).

He was the second son of five children of Jakob Alexander Kocher, a mechanical engineer, and Maria Kocher (born Wermuth), who was very religious and an active member of the Moravian Church. His mother had a great influence on his Christian attitude during his whole, private and professional life.

After he finished primary school in Burgdorf, Theodor Kocher moved with his family to Bern, where he attended middle and high school. He then studied medicine during the period 1860-1866. He graduated in 1865 at the University of Bern with the dissertation "Behandlung der croupösen Pneumonie mit Veratrum-Pr paraten", when he was promoted to a medical doctor.

After that Kocher travelled extensively across Europe. He studied in Berlin and Leipzig, where he met von Langenbeck and Virchow; in London, where he met Jonathan Hutchinson, Henry Thompson, John Erichsen;
trip from an unknown female philanthropist, who was a member of the above mentioned Moravian Church. Köcher wished to complete his postgraduate training in surgery with Langebeck in Berlin, but that was not possible due to his Swiss citizenship, quite strange from the current point of view. Thus, he returned to Bern in 1866, becoming an assistant of George Lücke. After Lücke moved to Strasbourg in 1872, a still young Köcher applied for the position of Professor and Director. At that time, the board of faculties recommended the German practitioner, Franz König, a famous foreign surgeon, but under pressure from the students, the government and board of regents chose Köcher for that very important post. Anyway, Franz König found a placement at Charité, Berlin.

The Medical Faculty at Bern was a young one, founded in 1835. It was a challenge for surgeons like Köcher. As Professor of Surgery and Director of the University Surgical Clinic at the Inselspital for the next 45 years, Köcher achieved great success in the field of surgery. Actually, he was one of Billroth’s most successful students. During his life he maintained an interest in surgical anatomy and approaches, most days practising surgical approaches on cadavers. Some of these were named Köcher approaches, e.g. for the hip and elbow. Like many other surgeons of that time he dealt with fractures, dislocations and abdominal surgery. Besides orthopaedics, he became most famous in surgery of the thyroid gland. In 1909 he was the first surgeon to be awarded the Nobel Prize.

As a result of those efforts, the surgical clinic in Bern was recognized by many well-known physicians, such as William Halsted, Harvey Cushing and Charles Mayo, who came and spent time together with Köcher to improve their surgical skills, regarding careful dissection of the thyroid gland, haemostasis and antiseptic techniques. Köcher wrote a textbook about Operative Surgery, emphasizing the importance of an adequate approach, using the interspace between muscles innervated differently, avoiding muscle disturbance together with meticulous haemostasis. This principle is still of value nowadays, as a basic surgical postulate.

In 1869, he married Marie Witschi-Courant and was blessed with three sons. He retired in 1911, but continued to perform surgical operations, especially during the First World War, when most of the younger surgeons were recruited to the armed forces. He died on 27 July 1917 in his home in Bern.

CONTRIBUTIONS IN ORTHOPAEDICS

Köcher’s interests in surgery were broad and included important work on fractures and dislocations, ballistics, abdominal surgery and neurosurgery. He wrote a Textbook of Operative surgery and had a significant role as a teacher of medical students, house officers and practitioners. As mentioned above, Köcher was the first to emphasize the importance of designing an operative approach that utilized the interspace between groups of muscles innervated by different major nerves.

His description of a posterolateral approach to the hip joint was designed primarily for resection of the hip for tuberculous disease. A modification of previous incisions described by others, Köcher’s incision has also been improved by succeeding surgeons and is now used primarily for the repair of fractures of the hip and acetabulum and for total hip replacement.

In 1874 Langenbeck described a new longitudinal incision for infections and other war wounds involving the hip with the patient positioned laterally on the operating table. Köcher modified this incision in 1911 by extending it in the caudal direction. Finally in 1954 Judet et al. combined the two procedures and created the so-called Köcher-Langenbeck approach as named in 1919. The Köcher Langenbeck approach provides direct exposure of the posterior acetabulum column and wall. Proponents of this position cite facilitated access to the sciatic notch and greater ability to work through the notch for the “felt but not seen” portion of the pelvis. This is a suitable approach for both hip and pelvic-acetabular surgery (Figure 2,3). Besides the approach to the hip joint, Köcher described a posterolateral approach that allows exposure of the entire distal humerus as well as the radial head, radial neck and biceps tuberosity (Figure 4,5,6). Indications for this approach include fractures of the distal humerus, old posterior elbow dislocations, radial head fractures and excisions, arthroplasties, fixation of distal biceps tendon rupture, resection of proximal radial-ulnar synostosis and elbow flexion contractures. It has been traditionally recommended for open reduction and internal fixation (ORIF) of fractures of the lateral condyle of the humerus. The incision is centered over the site of maximal swelling and the approach passes through the damaged tissues to ex-
pose the condyle, while the fracture lies in a plane away from the view of the surgeon.

In the whole of orthopaedics, every resident know Kocher’s maneuvers for the reduction of shoulder dislocations (Figure 7). Thus, one of the most valuable contributions to orthopaedic surgery is Kocher’s method for reduction of a dislocated shoulder. He developed a rational technique for relaxing the muscles around the shoulder and made the reposition easy. This technique was introduced by Kocher during an unsuccessful attempt at reduction by Billroth. Kocher asked him to try a new method. This procedure was published in 1870 in the Berliner Klinische Wochenschrift (Berlin Weekly Clinics) under the title “Eine neue Reductionsmethode für Schulterverrenkung”, (Eng: A new method of reducing dislocated shoulders).

Kocher wrote: “Bend the arm at the elbow, press it against the body, rotate outwards till a resistance is felt, lift the externally rotated upper arm in the sagittal plane as far as possible forwards and finally turn inwards slowly”. He aimed to bring the great tuberosity into contact with the glenoid rim and this was achieved by flexing the externally rotated shoulder, which also relaxed the upper anterior part of the capsule. When the arm is internally rotated, painless reduction of the head can be achieved. He flexed the elbow and, by this leverage, he decreased the demanding force needed in the method of Hippocrates.

His article began as follows: "It might be held against me if I attribute the title of a new treatment to a method of setting dislocated shoulders whose first action totally coincides with a method already known”. This sentence shows a lot about his greatness as a scientist. He claimed that it was not suitable for old cases and should be reserved only for subcoracoid dislocations.

There are plenty of other innovations introduced in medicine by Kocher. They include the Kocher dissector, Kocher periosteal dissector and the Kocher clamp - a heavy, straight hemostat, like Pean’s, but with interlocking teeth on the tip (Figure 8). Kocher also introduced numerous instruments. His name is associated with a toothed surgical clamp, an atraumatic bowel clamp and a curved director. Most of them are in use even nowadays.

OTHER CONTRIBUTIONS IN MEDICINE

Kocher is also known for Kocher’s maneuver, a technique that allowed surgeons to clamp down on bleeding from the inferior vena cava, located behind the heart, and to access tumors of the pancreas. He published on a number of topics, including hemostasis, and his surgical approach to partial and total thyroidectomy is now known as capsular dissection, a technique still in use today.

Kocher also utilized a technique for the fixation of inguinal hernia. The sub-costal incision for an open cholecystectomy is called the Kocher’s incision. There is a Kocher sign in Graves disease, "on upward gaze the globe lags behind the movement of the upper eyelid”. The Kocher-Debré-Semelaigne syndrome is an autosomal recessive inherited athyrotic cretinism associated with muscular pseudohypertrophy. There is Kocher ureterosigmoidostomy. In 1882, he introduced the use of sterilized silk sutures into his surgical practice.

NOBEL PRIZE

Among others, Kocher’s passion was the thyroid gland and its dysfunction. He adapted the practice of full excision of ovarian cysts to the treatment of goiters, which is said to have resulted in cretinism in some patients (presumably juveniles) and lesser consequences of hypothyroidism in many others. Kocher would adopt the practice of partial thyroidectomy to avoid acute complications (fatal bleeding, laryngeal nerve injuries) and chronic complications as well. He noticed the relation between thyroid gland size and myxedema (cachexia strumagrava) and mental status. He reported cretinism after total thyroidectomies. He realized, also, that the thyroid gland is essential for normal growth and development.

Systematic, calm, with a meticulous surgical technique and employing all the principles of Lister’s antiseptic surgery, Kocher was one of the best surgeons ever. He was involved in 7052 thyroid operations and more than 5000 thyroidectomies for goiter were performed by him with mortality of 0.5-1%, while in the series of that time, the mortality rate was up to 60%. Famous Billroth, considered the most capable surgeon of that time, had 20 lethal outcomes in 1869. Billroth’s rule was strange: “less regard for the tissue and less concern for hemorrhage”. This was just the opposite to Kocher’s operative technique.
Furthermore, he pointed out that myxoedema could be prevented by the prophylactic use of iodine. Regarding all the above mentioned, Kocher received the Nobel Prize for Medicine on 11th December 1909, which was marked by a 53 page lecture: "Concerning pathological manifestations in low-grade thyroid disease". He was the first surgeon to receive the Nobel Prize.

Three years later he donated 200,000 Swiss francs to the University in Bern for a Research Institute named: The Theodor Kocher Institute. He was also involved in planning and innovations in the construction of Bern University Hospital ("Inselspital")

**SCIENTIFIC CONTRIBUTION**

During his life, Kocher published 249 articles and books and supervised more than 130 doctoral candidates. In addition to his numerous papers, "Köcher’s Text-Book of Operative Surgery" was one of the best surgical books ever and has had numerous editions and translations.

Moreover, Kocher collected and recorded his case presentations in a book entitled: "Klinische Vortrage", with 765 cases on 1100 pages. Besides these documented clinical cases, Kocher also statistically analysed the outcome-results, complications and mortality, as well as studying goiter epidemiologically in Bern province.

In 1902, Kocher was appointed the first president of the German Surgical Society, and in 1908, he became the first president of the International Surgical Congress. Kocher was also an honorary member of numerous academies and medical societies, e.g. the German Surgical Society. He was an Honorary Fellow of the Royal College of Surgeons; Ll.D. Edinburgh University; an Honorary Member of the Royal Society of Sciences, Uppsala; the American Surgical Society; the New York Academy of Medicine; the College of Physicians, Philadelphia; the Imperial Military Medical Academy, St Petersburg; as well as various other societies in Turin, Vienna, London, Paris, Brussels, Milwaukee, Dresden, Leipzig and Erlangen.

He died in 1917, but his name remains as a memory of a great surgeon and scientific worker. In 1931 among others, Cushing stated that "Kocher was a man to trust". Moynihan wrote on the epitaph a sentence which shows a lot: "He had freedom from prejudice for his own intellectual progeny". That was the real Kocher.

**SUMMARY**


Ključne reči: Teodor Emil Kocher, ortopedsk hirurgija, Nobelova nagrada za medicinu

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