

## JOSEPH FRANZ DOMIN (1754-1819) AND HIS CONTRIBUTION TO ELECTROTHERAPY

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### SUMMARY

Joseph Franz Domin (1754-1819) as the Croatian theologian and philosopher is primary animist (vitalist), and in practice he has worked as physicist - mechanist, although the humoral theory at that time will be a foundation of medical philosophy more than twenty centuries from Hippocrates to the half of 19th century and Virchow's cellular theory. Besides his academic and researcher's work he has been working on electrotherapy of numerous conditions and diseases about which he has published (cephalea, neuralgia, paresis, plegias, pterygium oculi, rheumatism, Gicht, epilepsy, arthralgias, febres etc). The latter is undoubtedly progressive natural scientific theory which at that time have widely spread at Habsburgs Monarchy Universities and as proof between first and second Wien's medical school by integration of other scientific branches (physics and chemistry) in medicine. According to the various researchers Domin was an author of the first electrotherapy manual published in Zagreb, practitioner of electrotherapy in pregalvanic era in contemporary Austrian empire and for sure a scientist who have left a significant remark in contemporary applied physics in medicine, which continued in professional and scientific elaborations not until the end of the 19<sup>th</sup> century.

**Key words:** Joseph Franz Domin - physic - electrotherapy - Croatia - history of medicine

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### INTRODUCTION

Joseph Franz Domin (Croat. Josip Franjo Domin) was born in Zagreb on January 28<sup>th</sup> 1754, as a fifteen-year-old boy he entered into Jesuit order, then educated in Wien, Leoben, and at the end in Graz at the Humanion. With the abolishment of Jesuit order, he continues his philosophy studies in Wien, and afterwards in Zagreb where he had graduated philosophy and physics studies at 1774. He obtained his PhD in Philosophy, Physics and Mathematics on April 11<sup>th</sup> 1777 in Trnava. He was a physicist, chemist, and pure natural scientist, professor at academies in Jauranium in Győr, Pécs and Pesta, dean of the Faculty of Philosophy in Pesta, especially admired in academic circles of the Austrian empire, and a full member and honorary fellow of two Italian academies in Neaples and Cortona. His particular interest were the gas chemistry and electrotherapy, mechanics and cosmology about which he has published several papers and books. He has been nominated Zagreb's Canon, archdeacon, protonotary apostolic and a member of the consistorial board of Zagreb diocese. In the last days of his life, he couldn't walk and died in Zagreb on January 19<sup>th</sup>, 1819, from the consequences of the severe rheumatoid arthritis (Brozović 1951, Schmid 1951, Thaller 1927). Besides his academic and researcher's work he has been working on electrotherapy of numerous conditions and diseases about which he has published.

This paper is a contribution to the Croatian and global medical historiography based on new insights about the work of J. F. Domin in the electrotherapy field from the end of 18<sup>th</sup> and beginning of the 19<sup>th</sup> century.

### J. F. DOMIN AND ELECTROTHERAPY

Domin after his laboratory work in physics cabinet of Pécs academy cures using electrotherapy at the initiative of domestic town physician Baltazar Petković. All the therapeutic procedures were conducted after the physician's examination and by his presence. He states that "several successful healings with the still lasting outcome, have suddenly made me a physician" (Domin 1789).

According to numerous healing experiences, in less than ten years he wrote four books about electrotherapy approach, from which one as original work in electrotherapy has been published in Zagreb 1789 "Comentation in electricitatem medicam regii musaei physici Quinque Ecclesiensis" (Domin 1789), afterwards "Reflexiones, quibus auctor commentationis de electricitate medica", published in Buda 1790 (Domin 1790). The other two books have been published in Pesta 1793 "Comentatio altera de electricitate medica in museo physico Quinque Ecclesiensi experimentis comprobata" (Domin 1793), and 1796 "Ars electricitatem aegris tuto adhibendi, cum propriis, tum aliorum virorum celeberrimorum experimentis innixa" (Domin 1796). Arrived in Zagreb for a vacation in 1803 and afterwards at his service to the moment of his death, has cured citizens at the initiative of Zagreb's bishop Maksimilijan Vrhovac (1752-1827) after physician's examination in their homes and in Cathedral of Zagreb (*Templo catedralis*) (Domin 1796).

The electrotherapy (*electricas medica*) has conducted using electric baths (*balneum electricum*), electric

wind (*ventulum electricus- ventulus*), electric sparks (*scintilla electrica- scintillas*) and electric shock (*ictus flumineous, electricitus- succussionibus electricus*) using a Leyden jar, new forms of electrodes and various plugs attaching or placing on the body or the diseased part of the body by obtaining the most favourable electricity doses with minimal damaging consequences and therapeutic effect. His electric machine (*machine medica majoris forma*) for the static electricity production consisted of the rotating glass cylinder rubbing the wool rags created electric charge, and transferred to the isolated ball. To the ill person have been told to sit down in an isolated chair to achieve better charge of static electricity. He has used electrotherapy until the moment the patient can bear, but it doesn't state how much (*quo electricitatis intensitas aestimatus*), because at that time he doesn't have had electrometer, but he has had *conductor*, which deploy the magnitude power and decreases it (Domin 1789, 1796) (Figure 1 and figure 2).

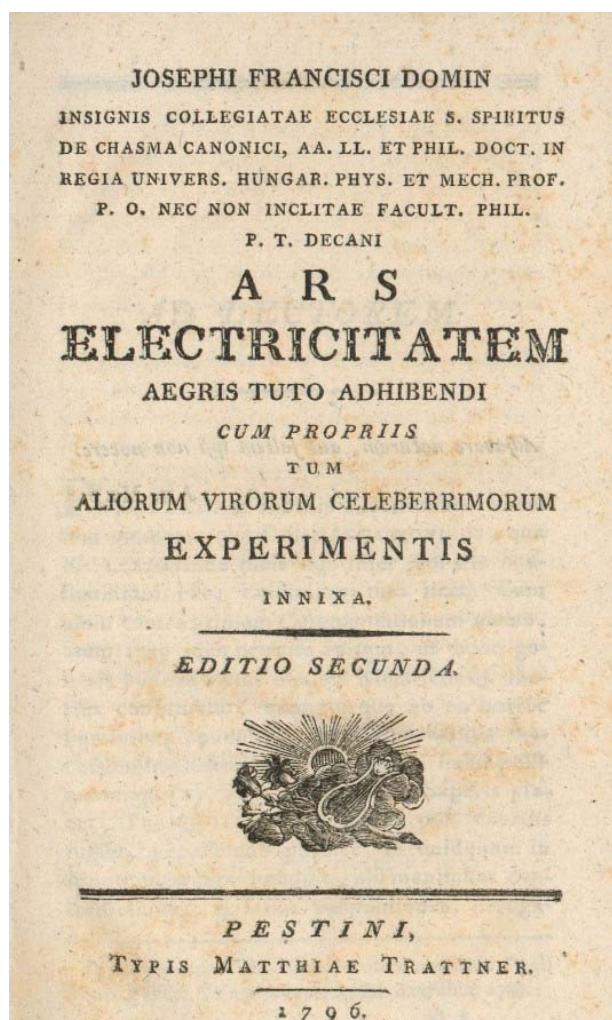


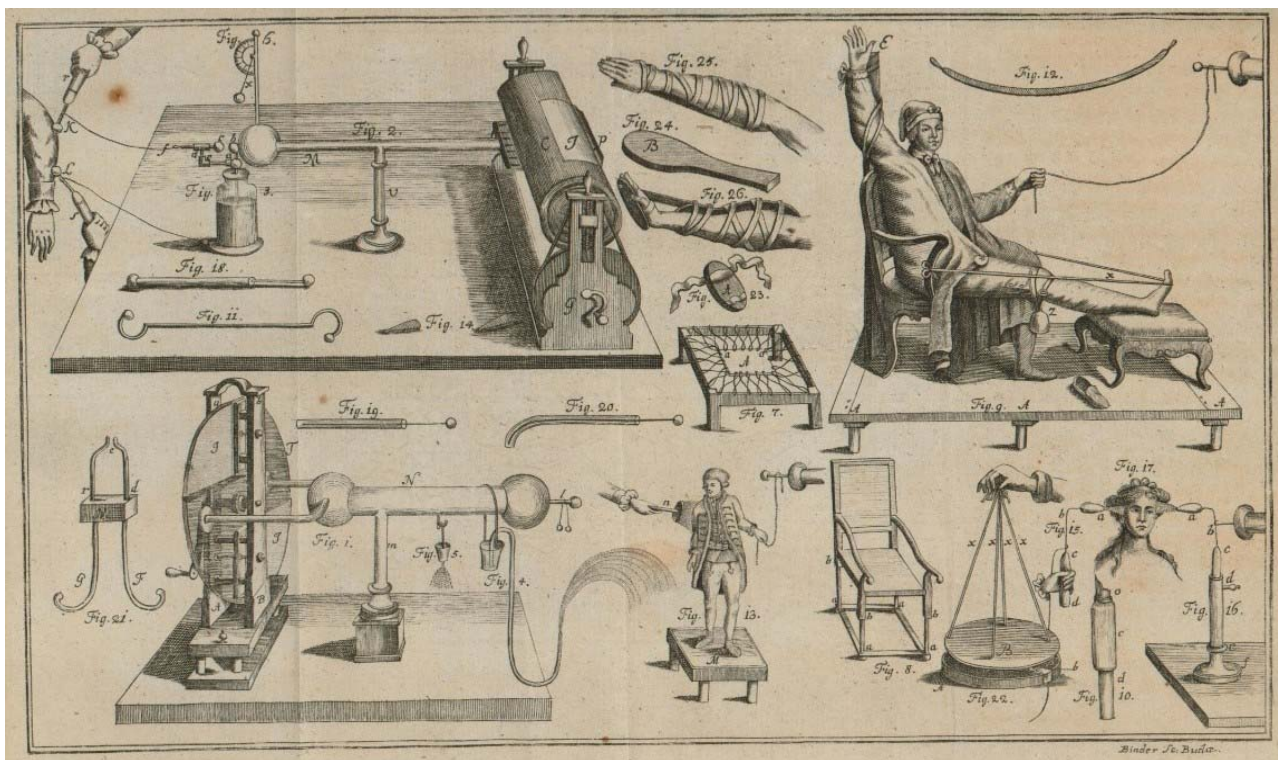
Figure 1. Front pages from electrotherapy books, Pest, 1796

He describes examples of curing the forearm pain, neuralgia, frenesis of the right paralytic fist, hand and feet paralysis in certain Joseph Kiss, and afterwards

curing the Bell's palsy, at that time naming *maxilla paralyticum* using *balneum electricum*. Particularly he mentions curing rheumatism using multiple electrifying (*scincillae electricae*). He has healed Georgius Horvath from sciatic pain using five times longitudinally by the painful nerve electric shock (*ictus electricitus*). He emphasises that the therapy has better effect if it is for more extended period applied, and holding the proper diet. In the female patient's house he cures *Febris quartana* and *febris quotidiana* in which she had six times epileptiform seizure, obviously a febrile convulsion. The electric baths (*balneum electrica*) mainly advises for the children's febrile convulsion, and *ventulus* for children with neurologic diseases (Domin 1789).

In his second book, he described the case studies and physician outcomes of electrifying in cases of neuro-pathic pain, children and adult contractures, consequences of delivery injuries, and wounding (Domin 1793). He mentioned painful head, and shoulder contracture electrification of a boy named Maximilian who from his birth could not stretch upper arm, foot contracture of girl named Ana, and right arm forefinger contracture of another girl named Ana in whom with repeated electrification (*cura magna*) gained satisfying movement outcome. He has electrified head, shoulders, hands, feet, limbs, depending from injury or contracture. He has cured in Zagreb *pterygium oculi*, electrifying head and feet fingers, and subsequently libido increase in the penile weakness (apparent impotence), curing splenic tumour and fever, severe *sciatica* (Domin 1793), and after that a particular febrile Czundekovisza condition. He mentioned he has cured after the physician's (*medicus*) exam and therapy or pharmacist if the treatment were unsuccessful. He draws curing the paralysis, eye diseases, ulcers, headaches, gout, fever, discharges. In the chapter „*Experimenta*“ of the same workpiece describes individual cases with the therapy dates, with successfully cured headaches, where he has electrified head and neck once or several times, thereafter curing macular degeneration in little girls case, curing toothache, cataractes (posterior capsule opacification), rheumatism (lumbar joints), repeated rheumatism exacerbations, in paralysis cases limb pain, tumours, fevers and epilepsies where the duplex procedure is recommended (Domin 1793).

In his last and most significant workpiece in the introductory pages, he describes electricity physics according to contemporary knowledge. Afterwards he describes diseases that have cured of the already familiar previous publications with the indication extension: hearing loss (*surditatem- surditas*) where he electrified tongue, painful ear (*Dolores aurium*), toothache (*Dolores dentium gingivae*) in coldness and warmth, in inflammation. Curing tumours with electrotherapy for which emphasised they are “deposit of the ill mater”, afterwards inflammation (*inflammations*), amaurosis, eye pterygium, paralysis (with the five minutes therapy),



**Figures 2.** Modalities of electrotherapy from Domin's books of electrotherapy, 1796

ulcers, exanthenata cutanea, chorea s. Viti (after the physician's diagnosis he electrified through thumb - *scintillae*). Electrified *Dolores spasmodicae*, *scrophulosis carcinoma* (especially pain), *abscessus*, *ischiadem*, *inflammationis pulmonum*, *nervos capitis dolores (nervi spastici)*, *hydrope* (electrifying using flannel!!), gout (germ. *Gicht*) - reduces pain, after that *febres intermittens*, *epilepsia*, *asphyxia*. He mentions trying two uterus haemorrhages (metrorrhagies) therapies, but in these cases electrifying method never was useful and should be avoided, as in male sexually transmissible diseases (*supressum mensium fluxum*) (Domin 1796).

## DISCUSSION

The tissue conductivity philosophy in humoral medical philosophy under 18<sup>th</sup> century based on so-called "electric fluid, activation of nerve fluid" according to the legacy of iatrophysics and iatrochemistry from the humanism and renaissance era. The basic physics research about electricity have laid out B. Franklin (1706) and Luigi Galvani (1737-1798). Therefore Hales 1733 interprets the blood friction in blood vessels as production of electricity, Kessler and Quelmatz 1744 explain the animal electricity, Gordon the same year speaks about the pulse change in the case of electrification, Caklani 1745 about the electricity effect on heart and muscles, and Jallabert 1740 and Kratzenstien 1745 about curing paralysis with electricity. The latter was a foundation, and also a confirmation of Domin's research and practical work. The electricity therapy has begun at the end of 18<sup>th</sup> century with modest publicity,

particularly in our domestic landscapes as *stimulantia*, respectively *cura externa* (Schmid 1951, Horvath 1790, Zemlen 1964).

As late as the end of 19<sup>th</sup> century will start more significant use of electrotherapy in medicine, therefore various therapy forms have been called faradisation, franklinotherapy, galvanisation. Thus, stated that franklinotherapy cures infertility by electrifying male's and female's perineum (spermatorrhoea, dysmenorrhoea, amenorrhoea, male infertility), and Darwin observes 1872 a facial expression induced by electrostimulation to compare the emotional expression in human and animals (Horvath 1790, Zemlen 1964).

Domin emphasises that electricity accelerated the circulation with the accelerating effects manifestation on the pulse (tachycardia), increase of the body temperature, perspiration, gland excretion and maintaining the density balance, decreasing obstruction in small blood vessels and improving the fluid movements, opening the obstructed natural fluid foramen, loosening the myofibril, irritating the nerve fibre and reviving the apparently dead ones. Stating that Franklin has cured the paralytic arm, placing two electrodes on foot and arm (Domin 1793). Domin emphasises previously necessary doctors examination and opinion. He observes the patients and monitors their treatment and healing in numerous cases, stating that the method is harmless, but that every therapy such as electrotherapy has limitations and successes respectively partial unsuccesses, providing an impression of medical electrification, or healing electrification (*electricae curationi*) (Domin 1790).

The modern scientists consider Domin the real physics and publishing scientist (Zemlen 1964) in a contemporaneous environment of known and unknown charlatan's who in different ways have poorly healed. His electrotherapy works in physics education have adopted numerous successors, such as Anysrol Jedlik (1800-1895) succeeding him at the position of physics professor at the Pesta university, and about Domin spoke as of the father of electrotherapy (Horvath 1790). Furthermore, his work "*Ars electricitatem aegris tuto adhibendi*" stands at the medical dictionary reference list from 1815 (Academy de France 1815), though Danish author of workpiece about electricity Saxtorph 1804 and Lüderitz textbook from 1993 does not mention Domino's work and his publications (Saxtorph 1804, Lüderitz 1993).

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## CONCLUSION

According to the various researchers Domin was an author of the first electrotherapy manual published in Zagreb, practitioner of electrotherapy in pregalvanic era in contemporary Austrian empire and for sure a scientist who have left a significant remark in contemporary applied physics in medicine, which continued in professional and scientific elaborations not until the end of the 19<sup>th</sup> century.

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Literature searches and analyses and manuscript writing: Dubravko Habek, Jasna Čerkez Habek & Anto Čartolovni.

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