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Filiation: A Historical Term the COVID-19 Outbreak Recalled in Turkey

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ABSTRACT

Originally derived from the Medieval Latin word, *fīliātiō* (from *fīlius*, son), filiation literally means paternity, descent-from-father, or line of descent. Concerning medicine, however, it refers to the connection of things resulting from one another, or contact tracing. The core idea behind filiation as a measure of precaution against outbreaks is to prevent the disease by interrupting the chain of transmission with a systematical tracing and isolation of susceptible individuals having contact with any confirmed cases. Filiation became a widely used medical term in the first quarter of the 19th century, primarily in French medical literature, soon adapted to English and some other languages. In the Ottoman Empire, it appeared in medical journals in the 1850s, used primarily by some European physicians practicing in the country. As part of various measures that have been taken to tackle the current pandemic of COVID-19, the method of filiation was also recalled by the medical community. Soon after the observance of the first confirmed case of COVID-19 in Turkey on March 11, 2020, the index case and its contacts were identified and the Turkish Ministry of Health launched the procedures of filiation at a national level with ad-hoc medical teams established around the country. Aiming to shed light on the etymological and historical aspects of filiation, the current review discusses the concept based on original resources.

Keywords: Contact tracing, epidemiology, history of medicine, medical terms, outbreak, pandemic

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) was first reported on December 8, 2019, in Wuhan, the capital city of Hubei province of China, and rapidly spread to its neighboring countries, then many others around the world, before the World Health Organization (WHO) officially announced on March 11, 2020, that the outbreak turned into a global pandemic (1). As of April 24, 2020, there are 2,686,785 confirmed cases in 213 countries, with a global death toll of 184,681 (6.9%). In Turkey, the number of infected cases surpassed 104,912, leading to over 2,600 deaths (2.5%) (2).

As part of various measures that have been taken to tackle the pandemic, COVID-19 recalled the historical medical term, "filiation", which had fallen into oblivion for many years. However, there appear to be misunderstandings due to a lack of knowledge about the term which has been occasionally confused with different non-medical practices (e.g., filing, archiving) or words with similar pronunciations (e.g., philiation, affiliation), even by some health professionals, presumably due to its novelty in use, albeit old.

To address this gap, the current historical review seeks to discuss the concept of filiation from both etymological and historical perspectives in light of several primary resources.

Filiation as a Measure of Precaution against the COVID-19 Outbreak

Filiation derives from the Medieval Latin word, *fīliātiō* (from *fīlius*, son), which literally means paternity, descent-from-father, or line of descent (3, 4). Aside from its slightly different uses, mostly in legal, biological, or theological contexts, filiation is a more common word in French than in English, defined concerning medicine as "liaison" or "concatenation". The latter refers to the connection of things resulting from one another or generating one another (5). While it has an evident link with the medico-historical understanding of communicable diseases, it found either limited or unsystematic backing for action as a medical measure of control up until the last two centuries.

The core idea behind filiation as a measure of precaution against the ongoing COVID-19 outbreak was to prevent the disease by interrupting the chain of transmission with a systematical tracing and isolation of susceptible individuals having contact with any confirmed COVID-19 cases, especially cases who were suspected to be infected or potentially at a higher risk. Soon after the observance of the first confirmed case of COVID-19 in Turkey on March 11, 2020, the index case and its contacts were successfully identified. The index case was a 44-year-old

tradesman working in the Grand Bazaar in Istanbul, whose symptoms had started six days before he was admitted to the hospital on March 9, 2020. The first death linked to COVID-19 was on March 17, 2020, when the total number of cases reported reached 98 in the country (6).

With the case tracking module that has been launched through the Turkish Public Health Management System (*Halk Sağlığı Yönetim Sistemi*, HSYS), all people who may be exposed COVID-19 cases and are subject to isolation at home together with their contacts began to be strictly monitored. Since March 17, 2020, almost a week after the first confirmed case in Turkey, related retrospective data have become available via the HSYS for the use in medical settings around the country (6). In addition to these measures, ad-hoc filiation teams were established immediately. These field teams are responsible for epidemiological investigations; they carry out contact tracing of cases that had different levels of interactions with confirmed cases. They also monitor the health status of susceptible individuals regularly, and cases that developed symptoms are conveyed in dedicated ambulances to hospitals to undergo the screening tests or for isolation and supporting care (6).

In a press conference made on April 14, 2020, Turkish Minister of Health, Dr. Fahrettin Koca, mentioned the practice of filiation, making special emphasis on its success with the following words (7): "There are 1,200 filiation teams on duty in Istanbul, which has the highest number of cases. There are 4,600 teams across Turkey. The highest success rate was in the Black Sea province of Zonguldak with 99%, while the lowest was in the southeastern province of Urfa with 92%."

Consisting of three members (physician, health professional, and assistant personnel), the filiation team is responsible for following up each case and visiting households to take history and collect samples for tests when necessary. According to the facts revealed by the Turkish Minister of Health, as of April 17, 2020, a total number of 322,754 individuals have been identified in the contact chain of 68,146 confirmed cases, and the rate of filiation reached up to 97.5% (8).

History of the Idea and Practice of Filiation

Although the contagious nature of epidemics was known before, one of the earliest accounts regarding the subject was provided in detail by the historian Thucydides (460 BC–395 BC) with reference to the Plague of Athens in 430 BC, when an epidemic initially occurred among a group of soldiers during the Peloponnesian War, later accompanied Athenian military forces, and then moved into the central upper city of Athens (9). Regarded as the Father of Medicine, Hippocrates (c. 460 BC–c. 370 BC) established a medical meaning for the term epidemic—in contrast with the earlier non-medical use of the term by Homer, Sophocles, and Xenophon—and also recorded the clinical symptoms of numerous patients he observed in his treatise in seven volumes, entitled "Of the Epidemics" (400 BC) (10).

Neither in these texts nor in subsequent ones, however, are we able to find a particular reference to filiation as a public health measure indicating the systematical tracing of individuals who had close contact with infected patients. Only the old traditional way of isolation of the sick in segregated areas, and later practices of quarantine after the 14th century, were general measures implemented against the spread of communicable diseases (11).

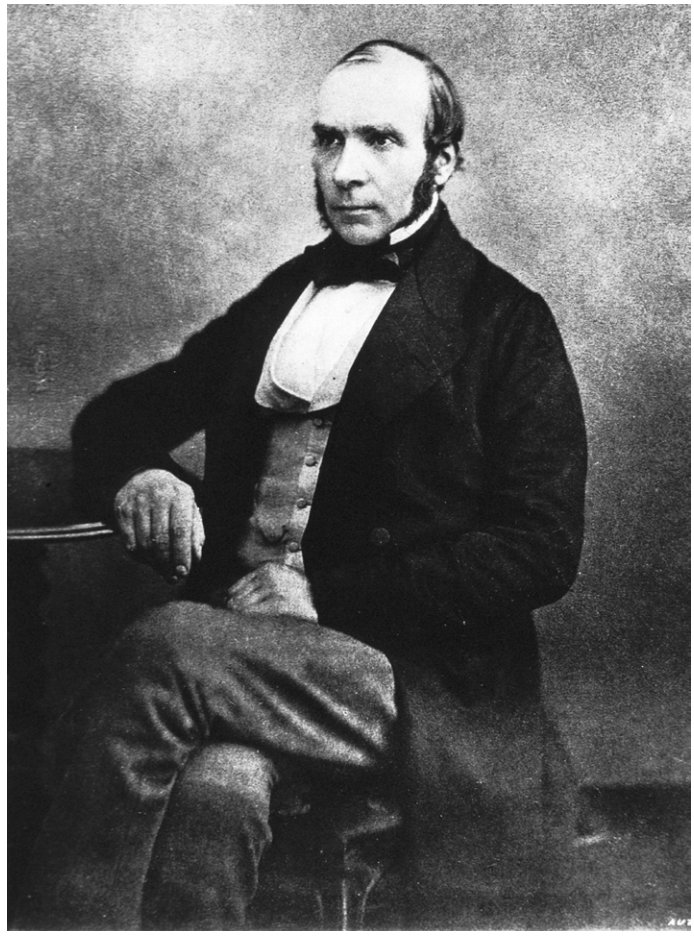
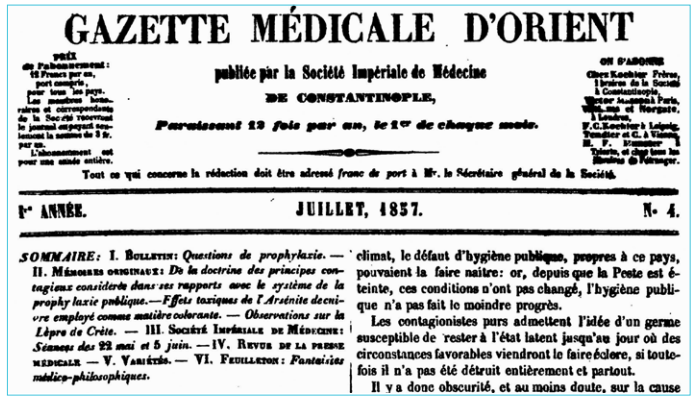


Figure 1. Dr. John Snow (1813–1858), one of the founders of modern epidemiology

Courtesy of the History of Medicine Division of the US National Library of Medicine, Maryland

In fact, since the second half of the 19th century, many significant developments in the field of medicine evolved concerning sanitation, public health, and epidemiology of diseases. English physician, John Snow (1813–1858), also known as one of the founders of modern epidemiology, investigated the Soho epidemic of 1854 and gave one of the first examples of descriptive studies in the field by successfully identifying the "origins" of the outbreak by talking to local residents (Fig. 1, 2) (12). Furthermore, the growing pursuit of international measures to prevent and control epidemics (i.e., cholera, malaria, plague, typhus, yellow fever) led to a series of International Sanitary Conferences and Conventions in many countries, including Turkey (1866) (13). It was also in this period that statistical analyses were applied to health problems for the furtherance of epidemiological understanding and public health practice (14). Therefore, this highly flourishing medical climate should significantly contribute to the successful efforts in developing a more rational approach and scientific models of epidemics, especially in tracing the contagious lineage of communicable diseases, with a special focus on the "index case".

Figure 2. Original map by John Snow displaying the clusters of cholera cases in the London epidemic of 1854
Courtesy of the Wellcome Trust Library, London



GAZETTE MÉDICALE D'ORIENT

publiée par la Société Impériale de Médecine DE CONSTANTINOPLE,

Paraissant 12 fois par an, le 1er de chaque mois.

Tout ce qui concerne la réduction doit être adressé franc de port à Mr. le Secrétaire général de la Société.

1re ANNÉE. JUILLET, 1857. N° 4.

SOMMAIRE: I. Bulletin: *Questions de prophylaxie.* — II. Mémoires originaux: *De la doctrine des principes contagieux considérés dans ses rapports avec le système de la prophylaxie publique.—Effets toxiques de l'Arsénite de cuivre employé comme matière colorante. — Observations sur la Lèpre de Crète.* — III. Société Impériale de Médecine: *Séances des 22 mai et 5 juin.* — IV. Revue de la presse médicale — V. Variétés. — VI. Feuilleton: *Fantaisies médico-philosophiques.*

climat, le défaut d'hygiène publique, propres à ce pays, pouvaient la faire naître: or, depuis que la Peste est éteinte, ces conditions n'ont pas changé, l'hygiène publique n'a pas fait le moindre progrès.

Les contagionistes purs admettent l'idée d'un germe susceptible de rester à l'état latent jusqu'au jour où des circonstances favorables viendront le faire éclore, si toutefois il n'a pas été détruit entièrement et partout.

Il y a donc obscurité, et au moins doute, sur la cause

Figure 3. Title page of the Ottoman medical journal *Gazette Médicale d'Orient* citing "filiation" as a scientific term, 1857
Courtesy of the Harvard University Francis A. Countway Library of Medicine, Boston

To our knowledge, filiation became a widely used medical term in the first quarter of the 19th century, primarily in French medical literature, soon adapted to English and some other languages (15). However, most of the early examples simply referred to this term either as the "origin of cause", "descent" or mostly "[logic of] consistent sequence of events" at a general level instead of an individual one, without having specific connotation for a method of identification (16, 17).

One of the early examples that is similar to the current concept of filiation is the paper referring to an epidemic of 1865, written by the famous French epidemiologist, Dr. Achille Adrien Proust (1834–1903). In this work, he makes the following statement (18):

> I have endeavored, in the study of the epidemic of 1865, as in the preceding relations, to show above all the road of the epidemic at its beginning and to *establish clearly the filiation of the first cases. Only then can the course of the disease be usefully taught*. But when the epidemic reaches central Europe, the chain of events becomes more difficult to disentangle (emphasis added, p. 664).

In the same decade, we encounter the term "index case" in an 1869 report written by Dr. James L. Bryden (1833–1880), a British statistical officer attached to the Sanitary Commissioner with the government of India. In the seventh chapter of his report, dealing with cholera of the central provinces of 1868, we read Bryden's statement that "it was not until the 20th of December that the *first case of cholera*, an *index case*, appeared in the Bhopal territory" (emphasis added, p. 153) (19).

Similarly, in the Ottoman Empire, filiation was likely to have been cited as a scientific term in medical journals in the 1850s, primarily by some European physicians practicing in the country. One of the early examples includes a paper published in July 1857 in *Gazette Médicale d'Orient* (*Şark Tıp Gazetesi*), a periodical of the Imperial Society of Medicine (*Cemiyet-i Tıbbiye-i Şahane*) in Istanbul. In his article, literally entitled "The doctrine of contagious principles and contagious diseases, considered in its relations with the system of public prophylaxis" Dr. Marcus Marchand, a long-term member of the Ottoman Superior Council of Health in Istanbul, mentioned about "following the *filiation* and the progression [of contagious diseases] step by step" (Fig. 3) (20).

Further examples continued to appear in the following decades, such like in a treatise in French, and then a series of papers published in *Gazette Médicale d'Orient*. These papers, literally entitled "Studies on the cholera epidemic that reigned in Constantinople in 1865" by Dr. Louis [Luigi] Mongeri (1815–1882), an Ottoman physician of Italian origin, referred several times to filiation of the epidemic (21). Likewise, in 1872, another French paper also published in the same periodical, written by Dr. Andreas David Mordtmann (1837–1912), German delegate to the Quarantine Council and previously the Consul of the Hanseatic League to the Sublime Porte (*Bâb-ı Âli*), the cholera outbreak that occurred in the city of Bursa in the summer of 1871 was discussed, and referred several times to "filiation" of the outbreak (22). The terminology was repeatedly invoked in many other publications written in French, *lingua franca* of Ottoman medicine for decades; it became an entry in medical dictionaries, hence an established term (23).

Soon after the actual microbial causes of diseases became known in the late 19th century, we observe that the practical significance of filiation was starting to be acknowledged. For instance, it was in the *Encyclopaedia Medica* (1900) that we read the following statement, highlighting implication of filiation in epidemics (24): "This property of attacking larger of smaller numbers of a population simultaneously or in succession implies a common origin of the units constituting an epidemy. The individual cases must be connected either by *filiation*, *the one from the other* or by derivation from a common source of infection (emphasis added, p. 290)."

CONCLUSION

Filiation has become a frequently used term in modern medical literature, particularly in the last few decades when epidemiological studies contributed significantly to a better understanding of the etiology of several diseases. It was also in this period that the application of combined clinical, epidemiologic, and laboratory studies led to the rapid detection, characterization, and control of several epidemics (i.e., SARS-CoV in 2003 and MERS-CoV in 2012) observed before the ongoing COVID-19 pandemic. While outbreak investigations integrate multiple epidemiological methods, a special feature of them is the urgent need to implement control measures, or intense public and media interest in the outbreak (25). This strategy is likely to be maintained solely with the corporate endeavors in the healthcare system, highlighting the role and importance of filiation teams in the field, along with other health care professionals serving in a variety of medical settings.

Following the early one published in the *American Journal of Medicine* in 1984 (26), we observe a growing number of papers on epidemics that began publishing filiation graphs of primary cases in detail (27, 28). Likewise, some recent studies on the current COVID-19 pandemic have revealed results from patient clusters by displaying local transmission when the index case cannot be conclusively identified (29). In addition to the traditional ways of evaluation, however, the filiation process of the primary cases has also been elucidated at the molecular level by establishing phylogenetic trees of genetic sequences (30).

Recently, the Turkish Ministry of Health has made wide publicity of filiation as a medical term and recalled medical professionals for the surveillance of suspected or contacted persons during the COVID-19 outbreak. Despite it still being a bit early to make a bold claim, the recent filiation method of screening the chain of contact in COVID-19 cases in Turkey is likely to have promising results. With the implementation of a new mobile phone application called "*Hayat Eve Sığar*" (Life Fits Home), traditional methods of filiation gain a novel form so that the control measures of the Ministry of Health are expected to be more successfully coordinated with instant navigation of the areas at potential risk. Although filiation is a historical method in epidemiology for tracing the spread of infections, it has been used in recent outbreaks (such as SARS, MERS, Ebola) with success, as well as the ongoing COVID-19. The implications of classical epidemiologic tracing methods, together with new molecular methods, are useful to prevent and control the outbreaks to identify the source of infection and transmission way.

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