



Xanthelasma and Lipoma in Leonardo da Vinci's *Mona Lisa*

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Abstract

The painting *Mona Lisa* in the Louvre, Paris, by Leonardo da Vinci (1503–1506), shows skin alterations at the inner end of the left upper eyelid similar to xanthelasma, and a swelling of the dorsum of the right hand suggestive of a subcutaneous lipoma. These findings in a 25–30 year old woman, who died at the age of 37, may be indicative of essential hyperlipidemia, a strong risk factor for ischemic heart disease in middle age. As far as is known, this portrait of *Mona Lisa* painted in 1506 is the first evidence that xanthelasma and lipoma were prevalent in the sixteenth century, long before the first description by Addison and Gall in 1851.

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A careful clinical examination of the famous painting *Mona Lisa* by Leonardo da Vinci (born 1452 in Vinci, Tuscany, Italy; died 1519 in Cloux, Amboise, France), in the Louvre in Paris, reveals a yellow irregular leather-like spot at the inner end of the left upper eyelid

and a soft bumpy well-defined swelling at the dorsum of the right hand beneath the index finger about 3 cm long [Figure 1].

An infra-red detailed photograph [Figure 2], published in Wasserman's book *Leonardo* [1], undoubtedly reveals that the yellow skin alteration was part of the painting at the start. The yellow spot looks similar to what is known as a xanthelasma, and the swelling of the skin suggests the possibility of a subcutaneous lipoma. These skin lesions are common in the middle-aged and elderly, and in people suffering from essential hyperlipidemia or from secondary hyperlipidemia due to longstanding diabetes mellitus, hypercholesterolemia, jaundice, nephrotic syndrome, or myxoedema. The lack of eyebrows is striking and most probably the result of epilation which was fashionable at that time [2].

The sitter of this painting according to Vasari [3], is Madonna Lisa Maria di Gherardini, born in Florence in 1479. In 1495, at the age of 16, she married the Marchese Francesco di Bartolomeo di Zanobi del Giocondo, who was twice a widower and 19 years her senior. His name provided the title usually given to the painting in Italy and France: *La Gioconda*. It is supposed that Francesco, one of the noblest citizens of Florence, ordered a portrait of his third wife from Leonardo. The artist started to work at this painting in 1503. At this time *Mona Lisa* was 24 years old. He worked at the portrait for the next four years. When Leonardo left Florence in 1507 he did not sell the painting to the person who commissioned it but kept it for himself. *Mona Lisa* died in 1516 at the age of 37. To this day, no final proof of the model's identity has been provided. Alternative hypotheses include Isabella d'Este, or a mistress of Giuliano di Medici or of Leonardo himself. It has also been suggested that the woman portrayed by Leonardo represents the ideal woman, or even an adolescent boy dressed as a woman, or that the painting is possibly a self-portrait [4].

One may wonder why an Italian Renaissance perfectionist as Leonardo da Vinci, who was not only a painter but also a sculptor, architect and engineer, did not correct skin alterations in his sitter. In the sixteenth century there was an intensive exchange between the Flemish realis-



Figure 1. *Mona Lisa* (La Gioconda). Oil on panel 30 x 20 7/8" by Leonardo da Vinci, 1503–1506. Louvre, Paris.



Figure 2. *Mona Lisa* (detail, infra-red photograph). In: *Leonardo* by Jack Wasserman. Australia: Doubleday International.

tic painters and the Lombardian Italian Renaissance painters. In particular, according to Leana Castelfranchi Vegas [5], the portrait painting was considerably influenced by northern portrait painting. Gombrich [6] suggests that Leonardo was familiar with the compositional mastership of the landscape of the Flemish School initiated by Van Eyck, and used the light and atmospheric effects as artifices for a fantastic transformation of real landscape. Under the influence of the Flemish School, Leonardo invariably included the hands of his sitters and they are prominent in the *Mona Lisa*.

Visual arts, particularly of the Flemish School, in combination with historical documentation of sitters have been an important tool for paleopathologic research and a tool for learning observational acuity in rheumatology. Historic cases of polymyalgia rheumatica [7], rheumatoid arthritis [8,9], pustulotic arthro-osteitis (also called SAPHO syndrome: Synovitis, Acne, Pustulosis, Hyperostosis, Osteitis), pustulotic arthro-osteitis [10], systemic sclerosis [11] and Paget's disease [12] have been observed in Medieval paintings, suggesting that these diseases are not modern. The portrait of Mona Lisa by Leonardo da Vinci is another example, suggesting a metabolic lipid disease in a young woman in 1506, long before it was first described in the literature by Addison and Gull [13].

The observation of a xanthelasma in the eye region in association with subcutaneous lipoma at the dorsum of the hand in a woman between the ages of 25 and 30 may refer to an early diagnosis of metabolic disease – hyperlipidemia – that is often familial. A stronger evidence for this would be the observation of a corneal arcus. This is not the case in this portrait. The clinical findings of xanthelasma or corneal arcus, especially in young people, seem to identify persons with plasma lipoprotein abnormalities [14–16].

The relationship between xanthelasma and lipoma is not clear, except that both are related to fat in general. The occurrence of xanthelasma and a lipoma in a woman aged 25–30 is probably not coincidental. Mona Lisa died in 1516 at the age of 37. The cause of death, however, is not known but could be related to a lipid disorder.

Essential hyperlipidemia is often familial. A history of early sudden death around the age of 40–50 in the close family is a clinical indication of a familial lipid disorder. A thorough search in the family of Mona Lisa Gioconda did not reveal a tendency of early sudden death that could be related to ischemic heart disease typical for essential hyperlipidemia. Familial hypercholesterolemia is compatible with a normal life span under environmental conditions that prevailed before the twentieth century [17].

Secondary hypercholesterolemia may occur in hypothyroidism, biliary cirrhosis, nephrotic syndrome and diabetes mellitus. Symptoms of these diseases are not evident from the painting, except for the lack of eyebrows which is more likely due to epilation.

The enigma of the Mona Lisa smile has been studied medically in detail. Adour [18] proposed in 1989 that the Mona Lisa smile is a possible example of facial muscle contracture that develops after Bell's palsy when the facial nerve has undergone partial Wallerian

degeneration and has regenerated. Borkowski [19] suggests that the smile resembles an expression common to people who have lost their front teeth.

In conclusion, this portrait of Mona Lisa, painted in 1506 by Leonardo da Vinci, is probably the first evidence that xanthelasma and lipoma were prevalent in the sixteenth century, long before the first description by Addison and Gull in 1851.

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