해부 · 생물인류학 제 39 권 제 1 호
Anat Biol Anthropol Vol. 39, No. 1 (2026) pp. 77~80
https://doi.org/10.11637/aba.2026.39.1.77

Short Communication

Could Artistic Intuition Foreshadow Anatomical Science? Lacrimal Apparatus in the Hand of St. Lucia

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Abstract : The Renaissance marked convergence between artistic naturalism and emerging anatomical science. This study explores whether artistic intuition could anticipate anatomical knowledge through an analysis of Francesco del Cossa's *Saint Lucy* (c. 1473). Unlike conventional depictions of the saint holding her eyes on a dish, Cossa presents a flower-like stem bearing two anatomically detailed eyes. Notably, the stems attach at the medial canthi, corresponding to the superior and inferior lacrimal canaliculi—an arrangement preceding Giovanni Battista Carcano Leone's description of the nasolacrimal duct in 1574. Historical sources indicate that the general anatomy of the lacrimal tract was known before 1473, beginning with Galen and continuing through medieval medical traditions. By situating Cossa's painting within this context, the study suggests that careful artistic observation converged with anatomical reality. This illustrates how artistic representation may align with scientific understanding, offering insight for anatomists and oculoplastic surgeons into the value of attentive visual observation.

Keywords : Anatomy, Artistic, Lacrimal apparatus, Nasolacrimal duct, History, Early modern 1451~1600

INTRODUCTION: ARTISTIC ANATOMY AND ANATOMICAL SCIENCE—WHICH CAME FIRST?

The Renaissance was a crucible in which art and science coalesced. Anatomical science, invigorated by the revival of human dissection after Mondino de Luzzi's *Anathomia* (1316), advanced alongside the growing demand for naturalism in art [1]. While anatomists sought functional knowledge, artists sought to render divine beauty in human form. In some cases, artists' powers of observation produced visual truths before science confirmed them. This raises a provocative question: could artistic intuition precede, even foreshadow, anatomical discovery?

The purpose of this study is to examine whether the depiction of ocular structures in Francesco del Cossa's *Saint Lucy* reflects anatomical knowledge of the lacrimal apparatus available before the late Renaissance, and to explore how artistic observation may align with or anticipate anatomical science. This may provide historical insight for anatomists and oculoplastic surgeons regarding the role of visual observation in understanding delicate anatomical structures.

This work was supported by the Korean Military Medical Research Project funded by the ROK Ministry of National Defense (ROK-MND-2024-KM-MRP-006).
The author(s) agree to abide by the good publication practice guideline for medical journals.
The author(s) declare that there are no conflicts of interest.
Received: January 22, 2026; **Revised:** March 19, 2026; **Accepted:** March 24, 2026
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ISSN 2671-566X (Online)

HISTORICAL KNOWLEDGE OF THE LACRIMAL APPARATUS BEFORE 1473

Evidence suggests that while physiology remained poorly understood, the anatomy of the lacrimal drainage system was described with surprising clarity long before the Renaissance.

Galen (2nd century) offered early descriptions of the lacrimal puncta and passages, noting small openings near the medial canthus through which moisture passed from the eye into the nose. He wrote that "these thin openings in the eyelids … communicate with the nose and exchange moisture," showing awareness of canalicular structures. Later, Celsus described cauterization for lacrimal fistula, Aetius (6th century) offered surgical details for treating oegilops, and Avicenna and Rhazes described lacrimal fistula surgery and the dangers of injuring nasal branches of the ophthalmic nerve. These longstanding traditions demonstrate that the *existence* and *general pathway* of lacrimal outflow were established long before 1473. Cumston summarizes: "It is not exact to maintain that the ancient practitioners had only false ideas … Galen possessed fairly precise notions on the anatomy of the lachrymal (an archaic spelling of 'lacrimal) tract [2]."

Thus, while no evidence links Cossa directly to these texts, the *concept* of tear drainage into the nose was known in classical and medieval medicine.

ST. LUCIA AND THE EYE

St. Lucia of Syracuse, a Christian martyr of the 4th century, became the patron saint of vision and sight. Legends describe her eyes being plucked out during her martyrdom, which gave rise to her iconography [3]. Artists across centuries depicted her holding either a dish with eyes or eyes set upon a palm. Her cult intertwined ocular symbolism with spiritual illumination, making her an ideal figure for exploring intersections between art, anatomy, and vision.

FRANCESCO DEL COSSA'S *SAINT LUCY*

In Cossa's *Saint Lucy* (c. 1473), now in the National Gallery of Art, Washington, the saint holds a flower-like stem topped with two disembodied eyes [4]. At first glance, this may seem only symbolic. Yet closer examination reveals remarkable anatomical accuracy: the eyes bear iris, pupil, sclera, and subtle periocular contour suggestive of eyelid structures. Most strikingly, the "stems" attach at the medial canthi, precisely where the lacrimal canaliculi open (Fig. 1). This visual choice places the depiction nearly a century ahead of Giovanni Battista Carcano Leone's formal description of the nasolacrimal duct (1574, Table 1) [5].

In the schematic representation (Fig. 1), the bilateral nasolacrimal ducts are shown converging into a single stem. Anatomically, the nasolacrimal ducts remain separate on each side and do not merge. This discrepancy may reflect artistic simplification or symbolic representation rather than anatomical intent. Alternatively, the convergence into a single stem may emphasize compositional symmetry or the botanical metaphor inherent in the 'eye-flower' motif. Therefore, this feature should be interpreted cautiously as artistic stylization rather than anatomical accuracy.

COULD ARTISTIC INTUITION FORESHADOW ANATOMICAL SCIENCE?

How could Cossa, without anatomical training, anticipate the lacrimal apparatus? Several explanations arise. First, he

Table 1. Comparative timeline

Year/Source	Discipline	Contribution	Anatomical relevance
2nd century – Galen	Medicine	Described puncta, passages to nose	Early recognition of canaliculi-like structures
6th~11th c. – Aetius, Avicenna, Rhazes	Medicine	Surgical treatment of lacrimal fistulae	Practical anatomical understanding
c. 1473 – Cossa, *Saint Lucy*	Art	Depicts medial canthal stems resembling canaliculi	Aligns artistically with anatomical reality
1574 – Carcano Leone	Anatomy	Precise description of nasolacrimal duct	First modern delineation of the tract

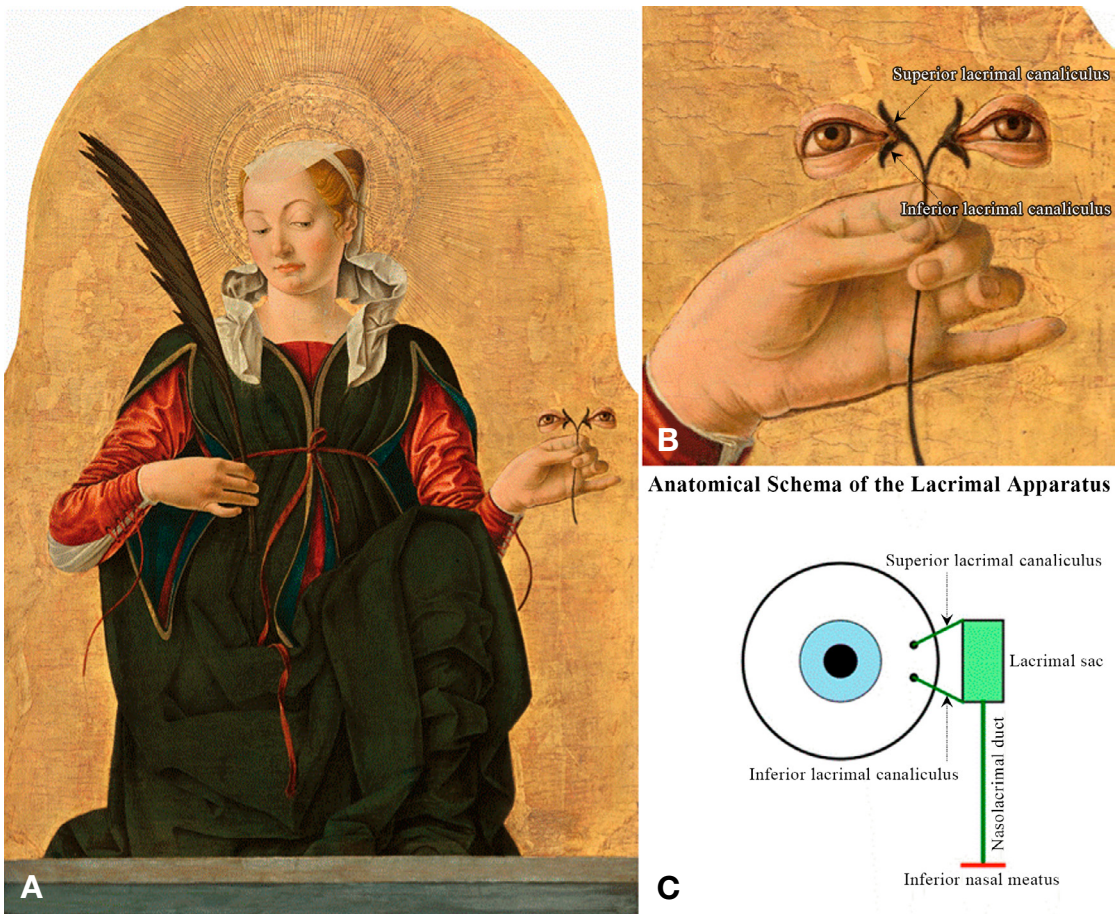

Fig. 1. (A) *Saint Lucy* by Francesco del Cossa (c. 1473). (B) Symbolic schema inspired by the painting. (C) Anatomical schema of the lacrimal apparatus showing the superior and inferior lacrimal canaliculi. Image credit: National Gallery of Art. Used under open-access policy.

may have drawn on empirical observation—eyes of animals in butcher shops or corpses in workshops. Second, his symbolic motif of "eyes-as-flowers" might have serendipitously aligned with true anatomy. Third, and most provocatively, it suggests that artistic intuition, sharpened by relentless visual study, can arrive at anatomical truths before scientific confirmation.

A key issue is whether the stems represent anatomical structures or merely a stylistic floral motif. While botanical elements are common in Renaissance art, the specific attachment of the stems at the medial canthi—rather than centrally or randomly—supports an anatomical interpretation. The bilateral positioning corresponds closely to the known location of the superior and inferior lacrimal canaliculi, which are situated at the medial eyelid margins. This precise localization is less easily explained by purely decorative intent and suggests that careful visual observation may have contributed to this depiction.

IMAGINATION OF THE ARTIST IN TODAY'S FINE ARTS

Modern artists, too, explore anatomy through imagination—whether in hyperrealist sculpture, medical illustration, or contemporary bio-art. Artistic renderings of the human body often anticipate or parallel medical imaging, reminding us that artistic imagination remains a fertile partner to anatomical science.

LESSONS TO ANATOMISTS AND OCULOPLASTIC SURGEONS

For today's surgeons, particularly in oculoplastic and reconstructive practice, Cossa's painting is more than art history—it is a lesson. The placement of the stems over the canaliculi is a reminder of the delicacy and clinical impor-

tance of these structures. Trauma surgeons who repair canalicular lacerations or reconstruct the lacrimal apparatus echo, in a sense, Cossa's intuition: they see beyond the surface, into the invisible pathways of vision and tears.

LIMITATIONS

This study does not claim that Cossa knew the full lacrimal anatomy; rather, his depiction aligns with structures recognized historically. Without documentary evidence of dissection or anatomical study by the artist, interpretations must remain cautious.

CONCLUSION

Francesco del Cossa's *Saint Lucy* embodies a rare convergence of symbolism and anatomical foresight. While no evidence suggests he dissected cadavers, his rendering of eyes with canalicular stems eerily prefigures scientific discovery by a century. This case highlights the potential of artistic intuition to foreshadow anatomical science, and challenges us—artists, anatomists, and surgeons alike—to recognize that attentive observation, fused with imagination, may reveal truths before science names them.

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