
MULTIDISCIPLINARY APPROACH FOR THE CONSERVATION OF THE CASOLI TRIPTYCH

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Abstract

The triptych of Santa Liberata is housed in Santa Reparata Church of Casoli, a little town in the district of Chieti (Central Italy). The Catholic community requested a restoration of the triptych to restore the original appearance of the painting. The aim of this work has been to restore a better vision of the painting, through a double intervention on the support and on the pictorial film. The multidisciplinary approach made it possible to carry out analyses aimed at studying the constituent materials, executive techniques and defining the intermediate objectives to be achieved in the various phases of the restoration. The analytical method and the multidisciplinary and interdisciplinary method guarantee a respectful approach to the artwork. The operations on the wooden support made possible to recover a partial flatness of the surface, guaranteeing a more homogeneous view of the pictorial film. The restoration was carried out with fir wood (*Abies alba* Mill.), a philological choice consistent with the botanical species of the wooden support. The application of the new elastic containment system allows the table to contain the micro-movements due to thermo-hygrometric variations without a rigid constraint. The cleaning operations made possible to recover the brilliance of the polychromies that appeared yellowed due to varnish oxidation. Pictorial reintegration and aesthetic restitution restored the legibility of the painting lost during the time.

Keywords: panel, *Abies alba*, restoration, elastic, system

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1. Introduction

A devotional work of art is a complex system in which the material and immaterial components merge, starting from the artist's design and confronting with the expectations of the client and the faithful who have inherited it over time. The restorer who intervenes on such kind of artwork has to make choices that condition the conservation of both the materials and the immaterial component. The analytical method and the multidisciplinary and interdisciplinary method, used in the present paper, guarantee a respectful approach to the work of art in its entirety [1].

The triptych of Santa Liberata (Figure 1) is housed in Santa Reparata Church of Casoli, a little town in the district of Chieti (Central Italy) [2]. Originally, the church was dedicated precisely to Santa Liberata.

A marble plaque, now preserved in the church of Santa Reparata, documents that on November 1st, 1447, the new building was erected in the name of Santa Liberata in observance with the vow made by the people of Casoli for the received grace.

In fact, the story tells that between the spring and summer of 1447, a great plague epidemic decimated the population. The people of Casoli gathered in prayer to ask for the liberation from the terrible disease, promising in return the construction of a new sanctuary. A mystical apparition “... *di una Santa, bella e adolescente, circonfunsa di nembi e recante nella mano la palma del martirio* ...” (of a Saint, beautiful and adolescent, surrounded by nembs and holding in her hand the palm of martyrdom...) is narrated [2].

The new sanctuary became very famous, attracting many pilgrims. The great economic resources derived from the pilgrimage made it possible the realization of the triptych within a broader program of iconographic and artistic enrichment of the new church.

The original cult of Santa Liberata in the sanctuary is documented by the triptych itself and the plaque placed there from the mid-sixteenth century, since in circumstances still uncertain, the church was dedicated to Santa Reparata. The triptych, as a reminder of the gratitude for the intercession of the saint, has an important relevance for the local community. The cult of Santa Liberata can be included in a demo-ethno-anthropological context similar to that of other Italian cases [3-5].

The artwork consists of three cuspidate wooden elements (Figure 1). The central panel of the triptych shows the young Saint with her hands turned to the sky towards God's blessing hand. The two side panels depict two angels in niches surmounted by domes. The inscriptions on the side panels declare that the painting was made by Antonio Francesco from Fossombrone on 18 April 1506. The paint represents, according to the inscription on the central panel, ‘*Santa Liberata Vergine e Martire*’ (Saint Liberata virgin and martyr).

The art critic Carlo Ricci identified a style of the triptych author close to the art of the painter Crivelli, very active and appreciated in the nearby Marche in that same period [2]. Enrico Santangelo noted style similarities with Andrea Delitio painter in those years in the nearby Guardiagrele, a town near Casoli [6].



Figure 1. Triptych of Santa Liberata: (A) front side after restoration, (B) back side after restoration, (C) back side before restoration: the back side is opened, the lateral, upper and lower side are closed.



Figure 2. Conservation status of triptych of Santa Liberata: A) varnish and some retouches applied in previous restoration, clearly altered; B) detachments of the painting layers; C) previous restoration dovetail crossbeams.

The wooden supports were obtained with sub-radial cut panels (Figure 1C). The thickness is about 2.5 cm and the surface of the supports is covered by ‘incamottatura’ to preserve the pictorial film from movements of shrinking and swelling.

The painting, made in tempera, is enriched with gilding that creates particular effects of lights and shadows. The gilding of the aureole made ‘a guazzo’ on red bolus, are marked by incisions. The gold in powder (‘a conchiglia’) was used for painting small and very thin decorations on the dress of the figures, on the plumage of the angels and in some details of the hair. Each panel of the triptych is provided with a moulded frame, gilded on red bole.

The Catholic community requested a restoration of the triptych to restore the original appearance of the painting. In fact, localized lifts and detachments of the paint film were visible. Numerous abrasions and falls of the gold leaf were detected in the perimeter frames. The alteration of the paint and some retouches carried out in the last restoration of the painting were evident (Figure 2A and 2B). Furthermore, the wood panel showed some conservative problems. Originally, the wooden support was stiffened by two crossbeams nailed to the back, one located near the base and the other one near the cusp, replaced in a previous restoration with two dovetail crossbeams [7] embedded in the thickness of the table (Figure 2C).

During a previous restoration, in the central panel, the rehabilitation of the wooden support was carried out with wedges in correspondence of a crack along the whole height for a depth of about 2/3 of the thickness of the board (Figure 1C).

2. Experimental

The aim of this work was to restore a better vision of the painting, through a double intervention on the support and on the pictorial film. The interdisciplinary and multidisciplinary approach made it possible to carry out analyses aimed at studying the constituent materials, executive techniques and defining the intermediate objectives to be achieved in the various phases of the restoration.

Wood support was carefully examined to identify the original defect of wood and to collect macroscopic anatomical feature. Wood thin sections were examined by Zeiss Axioskop light microscopy. The anatomical features on the transverse, radial and tangential sections, described following the IAWA list for softwood identification [8], were observed and compared with the descriptions of Nardi Berti [7], Schweingruber [9] and with the data base of Microscopic Wood Anatomy of Central European species [W. Schoch, I. Heller, F.H. Schweingruber and F. Kienast, *Wood anatomy of central European species*, 2004, <http://www.woodanatomy.ch/>]. Microphotographs were captured through a Zeiss AxioCam digital camera directly connected to the microscope.

A useful support to the study of executive techniques and the state of conservation was provided by the IR reflectography (IRR) performed by a digital basic reflectoscope, IRIS equipped with three interchangeable filters (715-850-1000 nm) [10, 11].

The obtained results allowed us to better design the various phases of the restoration intervention, namely: restoration of the wooden support and application of a new elastic restrain system, fixing of the paint layers, cleaning of the painted surface layers, anoxic treatment, pictorial reintegration and finally aesthetic restitution.

3. Results and discussion

3.1. *The botanical species identification*

Observation and control of the macroscopic and microscopic characteristics were performed in order to limit the sample number, as any intervention on wood artworks is anyway irreversible [12]. The macroscopic observations indicated that the same conifer wood, with growth ring boundaries distinct, was used for boards. The colour differentiation between sapwood and heartwood was not detected. The colour differences probably were due to the different exposition time to the light. It is well-known that light modify the wood colour over time [13-15]. The lighter colour of the back side of the central board and of the lower edges of the three parts confirms this hypothesis. The central board was diametrically cut and the pith axis is facing the painted surface. The lateral panels were radially cut and the area around the pith was removed during panel processing. The radial cut ensures the less warping of the panels. The thin frames and the old crossbeams contributed to the board flatness limiting the effects of the dimensional anisotropy of the shrinkage and the hygroscopic asymmetry imposed by the painted surface. Some knots were found, both on the central and lateral boards.

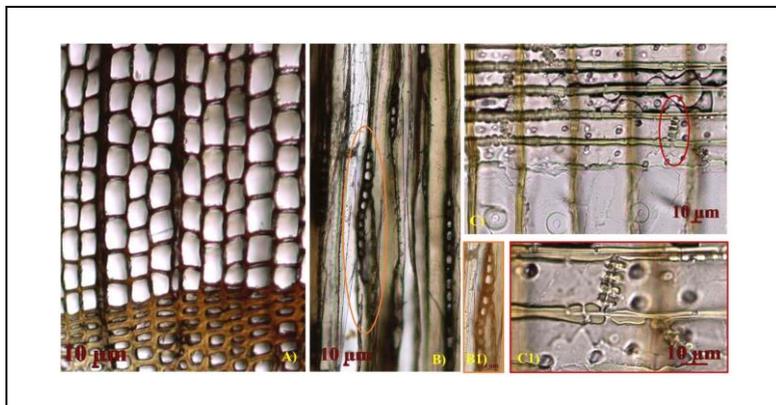


Figure 3. A) Cross section, distinct growth ring, no resin canal; B) tangential section, no spiral thickenings, rays homocellular (B1), no resin canal and tacheids in rays; C) radial section, cross field with taxodioid pits in earlywood, distinct nodular chains in tangential walls of ray cells (C1).

Under the microscope the anatomical features indicated that the botanical species was fir (*Abies alba* Mill.): no resin canals in cross section (Figure 3A), no spiral thickenings in longitudinal tracheid walls (Figure 3B); in rays, no radial tracheids, horizontal walls of ray parenchyma cells with taxodioid pits in earlywood and distinct nodular end walls (Figure 3C).

3.2. Rehabilitation of the wooden support and application of the new elastic containment system

The support, as mentioned above, had already undergone a restoration probably in the middle of the last century. This restoration is easily recognizable both in the insertion on the wooden support of right-angle wedges, and in the replacement of the original crossbeams nailed with two new dovetail crossbeams embedded in the thickness of the table. The position of the original nailed crossbeams was deduced not only for the presence of traces of the nails but also for a different colour of the support. It is well-known that wood changes its original colour following a prolonged exposure to natural light [16-18].

However, these operations failed to guarantee a good preservation of the triptych. The restoration of the wooden support was unsuccessful to restore the flatness of the board which, exposed over time in environments with thermohygrometric variations, displayed irregularities of the painted surface with a shadow effect emphasized by the real differences in level of the painted surface.

The restoration works first involved removing the dovetail crossbeams and the old, now no longer functional, wooden wedges from the support. To restore legibility to the pictorial surface, the depth of the wedge seat had been increased. Fir wood was used for this intervention, the grain oriented following the original board, with a double wedge having junction lines staggered to limit localized stress as much as possible. The seats of the dovetail crossbeams had been filled with a wooden tessellation and positioned with the grain according to that of the board.

Once the wooden restoration was completed, a new elastic containment system was applied for deformation control. To counter the cupping and to have a better control of the warping it was necessary to identify the points in which to apply the joints of the new containment system [19, 20]. 10 basic points (Figure 1B) have been identified (5 for the upper side and 5 for the lower side) for the application of the constraints, considering the ratio between the width and the thickness of the support. The load applied to the springs was the minimum necessary to hold the board adhering to the structure formed by the two crossbeams.

A load value of the springs equal to three times the initial mass (about 5 kg) was chosen, beyond this value the spring begins to deform. The micro-movements of the board are therefore contained and do not affect the preparation and the paint layer. In fact the new containment system absorbs and controls the forces generated by the dimensional variations of the board in the elastic field of the wood, preventing the movements of the board (Figure 1B).

When the strain increases, due to drastic variation in the relative humidity of the conservation environment, until the limits of the containment system are exceeded, the springs begin to compress and they accompany the deformation without reaching a stopping point and immediately ready to recall the neutral position when the humidity returns to the initial situation.

3.3. IR reflectography (IRR)

The IRR showed the gaps at the central panel: in particular they characterize different areas of the face of the saint such as the chin, the forehead and the hair, and the mantle. IRR has highlighted a decoration with a floral and geometric (rhomboid) motif characterizing the Santa's dress.

The decoration is better preserved in the upper part, while in the lower part it is not perceptible. The decorative motifs visible through IRR can be traced back to an original decorative motif which was replaced by a new decoration as a consequence of probable damages. The floral motif visible in reflectography corresponds to the description of art critic Corrado Ricci in 1913: "...il *manto chiaro a fiorami alternato alle lettere LB...*" (the light-coloured flowered mantle alternating with the letters LB) of Santa Liberata [21]. The elaboration of the acquisitions allowed a reconstructive hypothesis of the original decorative motif [10].

3.4. The restoration

A thirty days anoxic treatment was necessary to eliminate the xylophagous insects. The cleaning gave the interesting indication that the last restoration was carried out in a relatively recent period. This hypothesis is supported by the evidence that the protective layers on the surface were largely soluble at relatively low polarity, between Fd 100-70 [22]. However, another layer of neglected varnish and repainting was found, probably belonging to previous interventions, only in some areas of the painting.

In view of these results, the removal of the layers of oxidized varnish was established. The most superficial layer was removed with a solvent mixture of Ligroin 80% and Ethanol 20% applied by Solvent Surfactant Gels. The removal of the lower layer was carried out with a solvent mixture of Acetone 50% and Ethanol 50% applied in gelled form (Figure 4). After cleaning the painting, urea aldehyde resin in 20% solution (LaropalA81® 20% in a solution of 80% White spirit and 20% Butyl acetate) was applied by brush, in order to protect and saturate the paint film before the grouting operations.

The pictorial reintegration was carried out with a camouflage technique for the small lacunae. The larger lacunae were reintegrated with a recognizable technique (Figure 5). This intervention was carried out by first applying gouache colours and then resin-based colours, making possible in this way to reduce the visual interference of the lacunae.

The final varnishing was carried out with an aliphatic resin in a 20% solution (Regalrez1094® at 20% in White Spirit with the addition of Tinuvin292® and 0.5% of microcrystalline wax), spray applied with the aim of protecting and restoring the correct index of refraction of the pictorial surface.

At the time of the restoration, the lower part of the frame of the central panel was devoid of gilding as it was rebuilt from a previous restoration and left without the application of any type of finish. The lower part of the frame was gilded in order to give a more homogeneous view of the work through a chromatic and material unity of the surface. Pure gold leaf 23 carats and $\frac{3}{4}$ were used, polished with agate stone, and, finally, a protective coating was applied with a microcrystalline wax to homogenize the new parts with the old ones.



Figure 4. Cleaning phases.

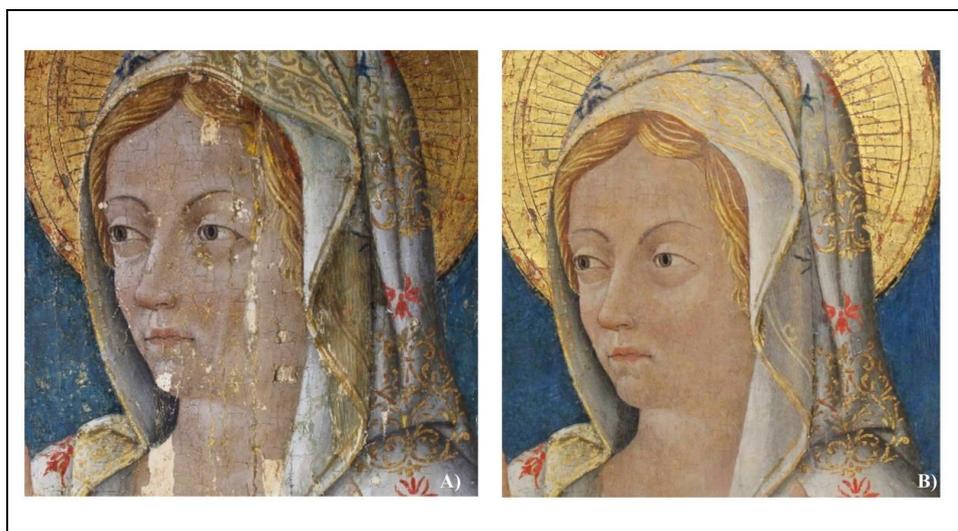


Figure 5. Face of Santa Liberata: (A) before painting reintegration, (B) after painting reintegration.

4. Conclusions

The multidisciplinary approach has allowed us to understand the work in its complex state of conservation, guaranteeing a respectful restoration of both the materials and the original functioning of the support with a contemporary methodology, combining the expectations of the faithful and of the client.

The operations on the wooden support made it possible to recover a partial flatness of the surface, guaranteeing a more homogeneous view of the pictorial film. The restoration was carried out with fir wood (*Abies alba* Mill.), a philological choice consistent with the botanical species of the wooden support. The application of the new elastic containment system allows the table to contain the micro-movements due to thermo-hygrometric variations without a rigid constraint.

The cleaning operations made it possible to recover the brilliance of the polychromies yellowed by the oxidation of the varnish. Pictorial reintegration and aesthetic restitution restored the legibility lost in time.

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