Dilemmas in Removing Old Varnish from Baroque Painting
Objokovanje (Lamentation)

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1. Introduction

The painting *Lamentation* is an oil painting, painted on canvas by an unknown artist in the 18th century and is currently kept in the National Gallery of Slovenia, Ljubljana. The painting is 88 cm high and 143 cm wide (Figure 1).

*Figure 1* Unknown author, Objokovanje (Lamentation), oil on canvas, 88 × 143 cm, National Gallery of Slovenia, Ljubljana (Photo: Nives Slemenešek and Barbara Kogoj, UL ALUO, October 2015)
The central Christian theme of this painting portrays the deceased Jesus. He is portrayed in a semi-sitting position, lying on a white fabric. Two angels, one on each side of the painting, lament his pale body. The view from the grave is set on the hill with three crosses, where Jesus was crucified. Although lamentation is a frequent theme in the art of the High Middle Ages and Baroque, this painting stands out, the main reason being the absence of the usually present people on a baroque painting (Mary, Joseph and others).

The painting itself is badly damaged and covered with yellowed varnishes. Before the procedure of varnish removal, research and solubility tests had to be done and previous conservation interventions had to be taken into account.

2. The painting’s condition and previous restoration interventions

The picture is painted on a cross-stitched canvas, made of three pieces, with two shorter parts on the upper edge of the painting. There are multiple holes on the edges of the fragile support, caused by nails that were used to pin the canvas on the stretcher. On those points, the cellulose degradation is evident. Due to inappropriate handling and conserving in the past, there are multiple irregularities on the support, such as tears, burned areas and local deformations. Verso of the painting is coated with a water-soluble coating (Figure 2). The paint layer is applied on colored oil ground. Visible aging cracks are concentrated on the darker areas. Because of a weak bond between the paint layer and the ground, losses of the picture layer are present. Missing areas are located especially on the edges and on the seam zone. Varnish, applied on the painting’s surface, had been distributed unevenly and due to the elapsing time it became yellow and it cracked. Paint cracking affected also the varnish, which had been unevenly applied on the surface. Wax drops and scorched areas prove that the painting has been stored in an unsuitable place.

The painting underwent certain conservation-restoration procedures in 2013/2014. The procedures were performed by the Department for Restoration, Academy of Fine Arts and Design, University of Ljubljana as part of a second cycle study programme. Interventions included reinforcing the edges, tears and holes from the verso of painting. These also included consolidation with Aquazol 200, and since the first consolidation was not sufficient, it had to be repeated.\(^1\) Solubility tests of varnish and dirt were also carried out. The last procedure was the removal of the water-soluble coating from the verso, which was continued in the following year.

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\(^1\) First consolidation was done through the entire surface of the painting, the second was done locally. Partial consolidation was also done later on by applying adhesive to protect the paint layer.
After a careful review of the conservation-restoration reports, we found out that several consolidations with Aquazol 200, dissolved in ethanol, affected the process of varnish removal that was partially carried out in the current year.

3. Picture layer

A scientific research was made to identify materials that had been used in the painting and its stratigraphy. In 2013/2014, ten samples were taken from the picture’s layer and one sample from its support, in order to identify the origin of the canvas.\(^2\) Samples were taken from the painting before any of the restoration procedures began; therefore we could see the original structure of the picture layer. The samples were analyzed by optical microscopy, ultraviolet fluorescence microscopy, Fourier transform infrared spectroscopy (FTIR) and Raman spectroscopy (RS).

Cross-section photomicrographs showed that the paint had been applied on the ground unevenly in one or more layers (Figure 3 left) and that the surface has been varnished in two layers. An interlayer of dirt indicated that the varnish had been applied in time lapses. Dirt also appeared on the surface (Figure 3 right).

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\(^2\) The fiber taken from the canvas was analyzed with polymerized light. The results confirmed its linen origin.
FTIR results showed that the first layer of varnish contained proteins, which can be found in albumen. Because varnishes made of egg whites were commonly used in the 18th century as a protective layer that was usually applied before the final layer of the varnish, we can assume that the egg white varnish had been used on the painting. We found residues of natural resin (most probably dammar or mastic) in the final layer of the varnish, while the examination of the ground showed that it contained burnt sienna, calcium oxalate\(^3\) and calcium carbonate. Further research with RS identified the oil component in the ground. In the blue sky Prussian blue pigment was found. This particular pigment appeared in the early 18th century. The combined results from the research have therefore confirmed the paintings age.

4. Varnish removal

The results from the previously described research helped us determine further conservation-restoration procedures. Because they were covering the true nature of the colors, the removal of surface dirt and old yellowed varnish was a must. According to the conservation-restoration report from 2013/2014, the yellowed varnish and surface dirt can be removed simultaneously by using the same solvent.\(^4\) Due to this reason we focused more on the removal of the varnish. Consequently, we primarily focused on the use of neutral organic solvents. To determine the solubility of the film-forming material, Wolbers solubility test was used based on following solvent

\(^3\) The presence of calcium oxalate indicates the degradation of the binder.

\(^4\) This is unusual since surface dirt interferes with the solubility of varnish, which is usually soluble in neutral organic solvents. We presume that the reason for the unusual reaction is the previous consolidation with Aquazol 200.
mixtures: Shellsol D40 mixed with isopropanol (SI), Shellsol D40 mixed with acetone (SA) and Shellsol D40 mixed with ethanol (SE).

The mixtures of Shellsol D40 with isopropanol and acetone did not bring satisfying results, especially when its polarity was low. The best results were achieved with the mixture of Shellsol D40: ethanol in the volume ratio 3:7 (Figure 4). A larger amount of ethanol would instantly dissolve the varnish and would present a risk for the paint layer, so, therefore, it was not used. The aforementioned results were valid only for areas, painted in lighter colors, since a very thin and white vail appeared on the darker areas after the use of solvent mixture. This was the reason why we conducted further tests. We used distillated water thickened with different types of Klucel, applied over the japan paper and left it from 7 to 15 minutes (Figure 5). An addition of 3 % Klucel H (w/v) was too viscous and using 3 % Klucel GF and Klucel G (w/v) proved to be too liquid. In the end, we used a 1,5 % solution of Klucel H in distillated water, which gave us the optimal result.

*Figure 4* The procedure of cleaning the surface dirt and the varnish in visible light (left) and UV light (right) (Photo: Nives Slemenšek and Barbara Kogoj, UL ALUO, October 2015)

*Figure 5*: The process of removing the surface dirt and the varnish from darker areas of the painting (Photo by: Nives Slemenšek and Barbara Kogoj, UL ALUO, October 2015)
One of the strangest things about the test results was the fact that both, the albumen and the natural resin varnish on the painting, were water soluble. We assume the reason for that was the consolidation of the picture layer as a preventive procedure before removing the water-soluble coating from the verso of the painting. The solution of Aquazol 200 in ethanol was applied on the surface. The adhesive penetrated into the depth through cracks what, most probably, made the varnish soluble. Since the darker unstable areas of the paint have absorbed more adhesive, it was a lot easier to remove the varnish. However, areas with lighter colors were not as damaged and a more polar solvent was needed to clean the surface. In addition, the thickness of the final varnish also effected the solubility. The thicker the varnish the more time consuming was its removal. A different approach had to be taken to remove the wax drops from the surface. The area on these parts could not be cleaned with water due to the insolubility of wax in water. We partially removed the wax by using heat spatula and interface of paper, which absorbed the melted wax.

On the basis of the tests carried out, three different cleaning systems were used for surface cleaning. On the lighter areas, such as the drapery and the body of the Jesus, we used a mixture of SE7 (Figure 6). In some of these areas a mechanical approach with a scalpel was needed, since the albumen varnish is not soluble in neutral organic solvents. The darker areas were, at the end, cleaned with thickened distilled water placed over japan paper. We let the mixture work for about 10 minutes. However, because of unevenly applied varnish, the time of cleaning varied. The most problematic areas for cleaning turned out to be the brown areas, in our case, the hair of the angels and Jesus. On those areas, the cleaning agent based on water and solvent mixtures started to dilute the color to the point where we could remove the pigment particles with a cotton swab. Therefore, instead of a circular sliding with the cotton swab, rolling and tapping was used. Even though this process was time consuming, we partially removed the varnish and at the same time preserved the brown paint layer.

Figure 6 Before and after the removal of the varnish (Photo: Nives Slemenšek and Barbara Kogoj, UL ALUO, November 2015)
We were constantly verifying the surface with a UV light to make sure if it was properly cleaned. However, it turned out that the painting still had the so called “varnish islands”, concentrated mostly on darker areas, that were only seen with a UV light. The surface also looked unevenly cleaned under closer observation. Nevertheless, since we would need much more mechanical force to remove the varnish in those parts, we decided that we would first clean the whole surface and then decide what to do next (Figure 7).

Figure 7 The painting before and after the removal of the varnish and surface dirt (Photo: Nives Slemenšek and Barbara Kogoj, UL ALUO, December 2015)

5. Conclusion

The results from removing old varnishes⁵ and surface dirt are straightforward. The details on the painting are much more visible after the conservation-restoration procedures and the painting recovered to its original purpose. However, because of the complexity and various layers of the varnish, the process of removing them is not finished.

To understand the painting, we first analyzed the painting’s condition, its stratigraphy and the materials that were used by the author. Furthermore, it was also important to gather information about the previous conservation-restoration procedures. These steps helped us to understand the solubility of the varnish, which

⁵ Mostly natural resin varnish and presumably partially albumen varnish.
resulted in the use of Aquazol 200 as an adhesive for consolidation. The variety of
different tests on colored areas helped us to decide about the final methodology of
work that was adapted for each color area.

We had less problems with removing the final resin varnish than with the egg
white varnish. Albumen varnishes are not soluble in neutral organic solvents, thus
removability represents a greater risk for the paint layer. Removability also varies
according to the state of the lower layer of varnish. Upon a closer observation of the
darker areas we can still see the residues of varnish as a thin gray vail, which can be
removed by cleaning the surface multiple times. However, since the usage of
albumen varnish is also a historical data, we could consider leaving it intact.

It may be necessary to do a further stratigraphy samples from the painting to
determine the effect of varnish removal. The question here is how much albumen
varnish did we successfully remove and how much varnish is still on the painting.

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