

EVALUATION OF A CLEANING METHOD FOR THE CONSERVATION TREATMENT OF THE CANVAS PAINTING VAMPIRE (E. MUNCH, 1893) USING HIROX 3D IMAGING



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INTRODUCTION

In 2023, 70 years after the first conservation campaign, Munch's painting Vampire (1893, Figure 1) underwent a new conservation treatment performed at MUNCH¹. Due to the painting's fragile structure and long history of conservation interventions, the cleaning methods chosen to remove the non-original varnish layers have been carefully evaluated. The recent availability of Hirox microscope at MUNCH provided the possibility of implementing a new method to make informed decisions on the cleaning procedures.

OBJECTIVE

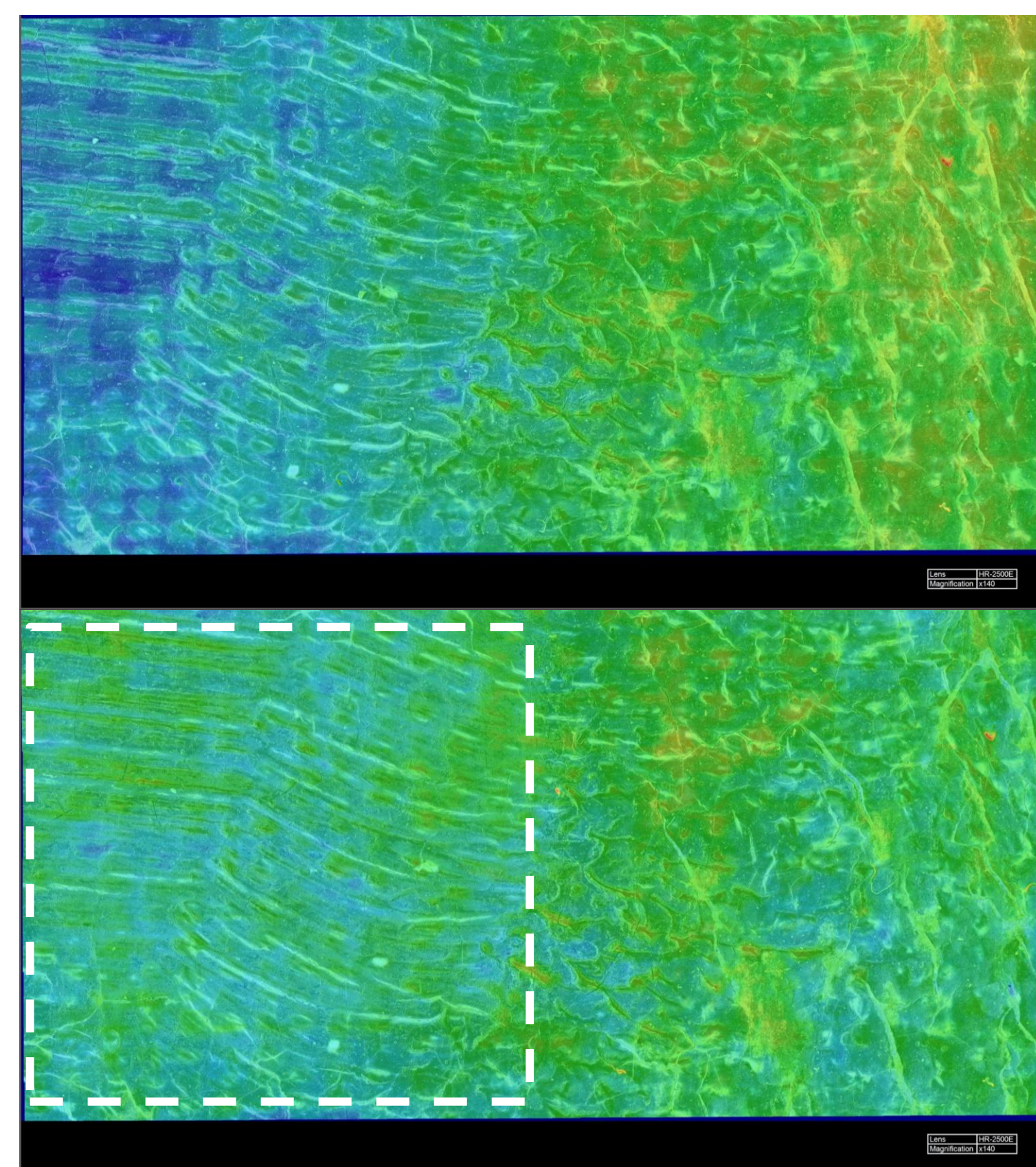
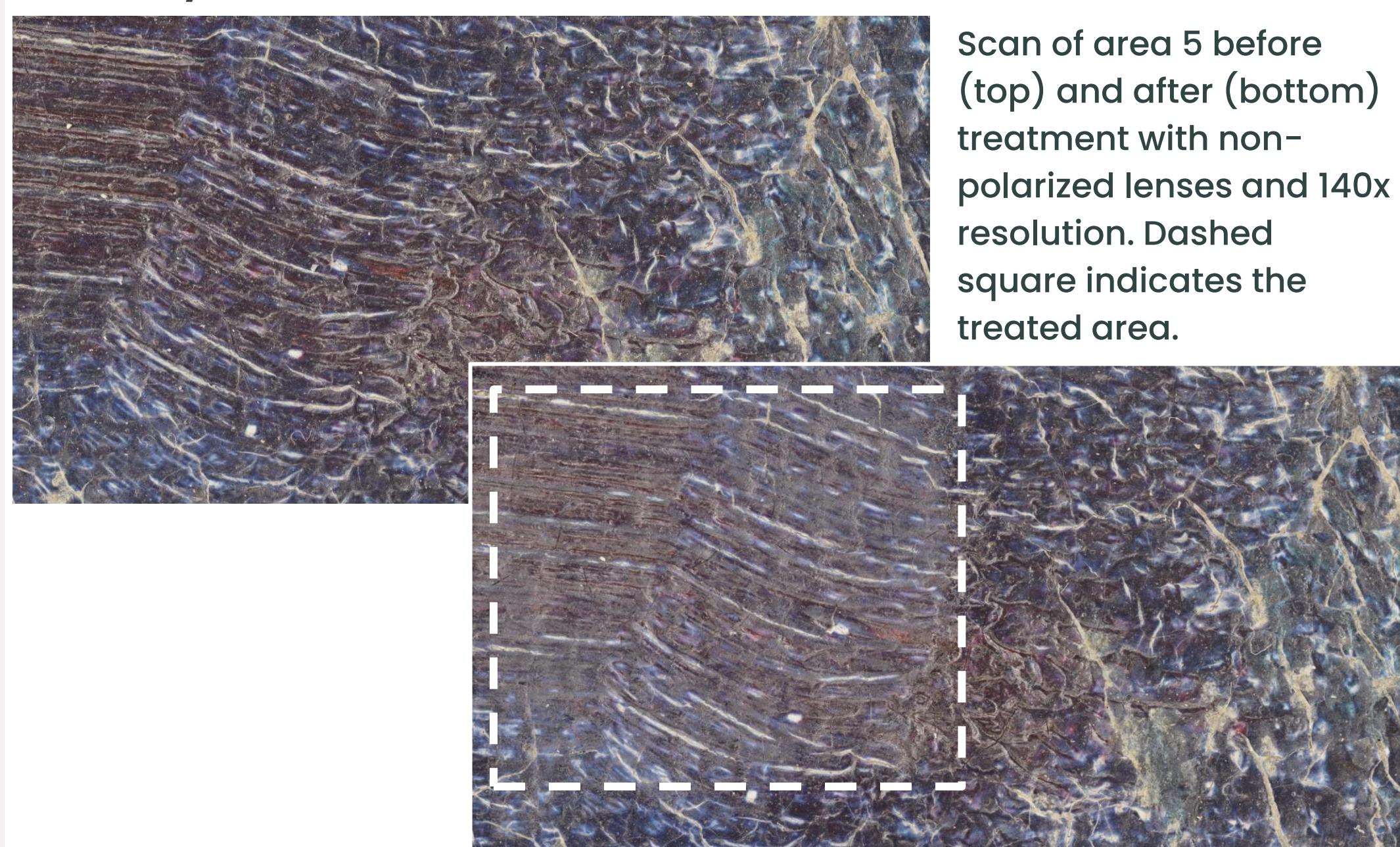
This poster highlights the advantages of using a Hirox 3D microscope to assess the efficacy and compatibility of one of the tested cleaning methods as a complementary tool for conservators that provides scientific reliability.

CONCLUSIONS

The combined evaluation method—incorporating visual observation, conservator expertise, and Hirox 3D imaging—proved to be an effective assessment tool. The 3D imaging uncovered the minute details of the surface and topography, provided detailed, high-resolution images of intricate surface features, enabling a clear visual comparison of the cleaning procedure's efficiency and impact on varnish removal and surface roughness.

RESULTS

Before and after treatment scans are shown for one of the investigated areas, both in real colors and with false-color altimetry.



Overall, the varnished surface appears more homogeneous after the treatment. Nevertheless, if the before and after pictures are compared, it can be noticed that the varnish layer has been lifted up more than removed completely. This results in a more hazed appearance in the treated areas and is symptomatic of a non-complete removal of the targeted varnish.

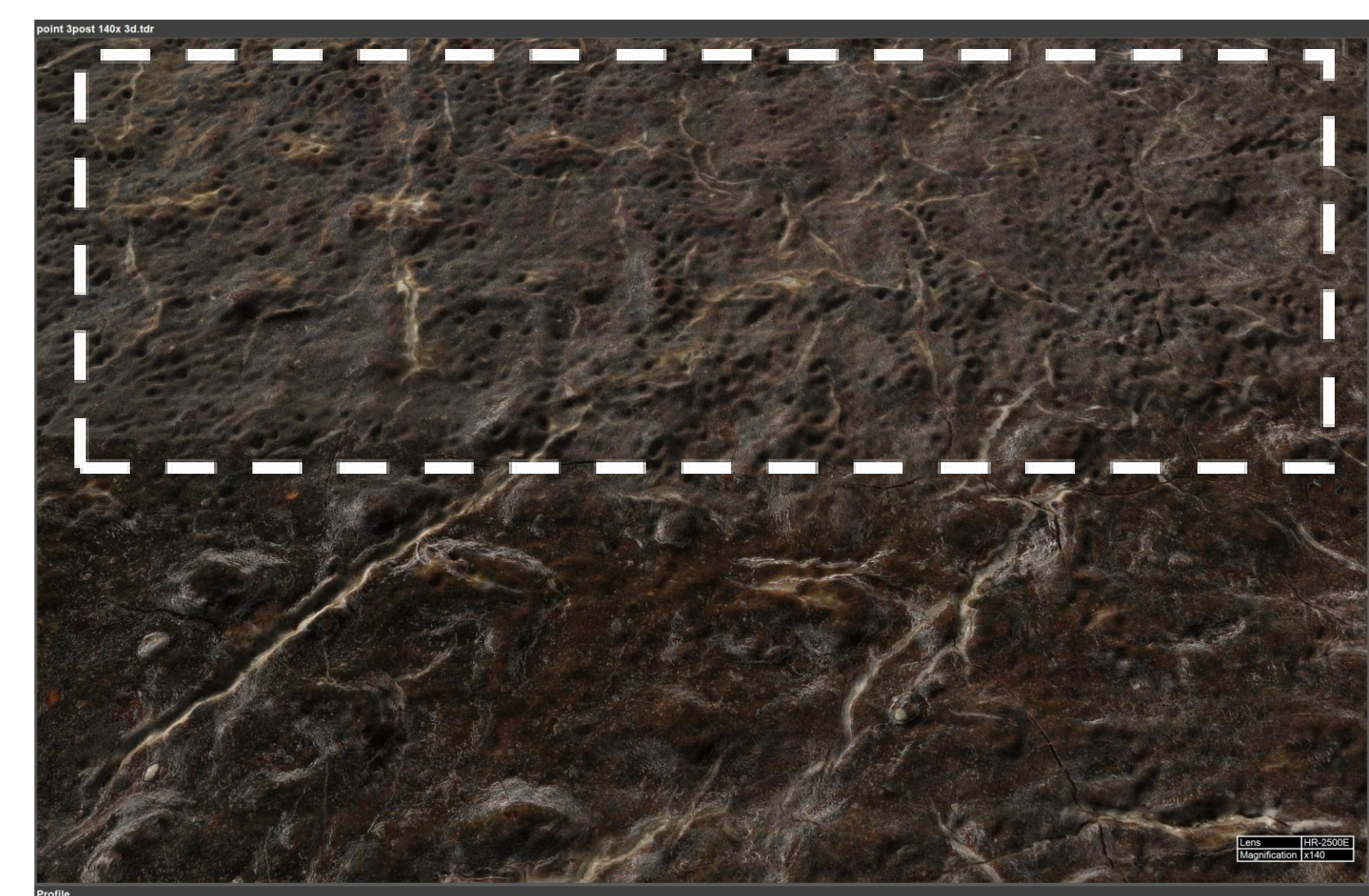
False color altimetry of area 5 before (top) and after (bottom) treatment with non-polarized lenses and 140x resolution. Dashed square indicates the treated area.



Figure 1. Vampire, E. Munch, 1893. Oil on canvas. MUNCH, Oslo. The numbers mark the cleaning test areas

ANALYSIS

Cleaning tests were performed using the Nanorestore Cleaning[®] systems and evaluated on five areas of 2cm x 1cm. The test was carried only on 1cmx1cm area to provide direct confront with the untreated areas. The topography of the tested areas was examined before and after treatment with Hirox 3D microscope. The full areas were scanned with both polarized (90x) and non-polarized (140x) lenses. Images were postprocessed using HRX-01 software.



A close-up of one of the treated surface revealed an increased roughness and swollen appearance of the treated surface compared to the untreated one, thanks to the use of non-polarized lenses that allowed to focus on the varnish layer.

MATERIALS AND METHODS

Five areas were chosen to test the cleaning efficacy and effect of two rigid gels, Nanorestore Gel[®] Peggy 5 and Peggy 6, ^{2,3} on the varnish and painting. Images of investigated areas were acquired with Hirox 3D Digital Microscope HRX-01, mounted on a ST-T500 Horizontal T-Stand 500mm x 500mm, allowing inspection and automated XYZ scan of objects placed vertically. Two different sets of lenses were used: HR-1020E Telecentric polarized

lenses for acquiring the scans ranging from 10x to 90x magnification, and HR-2500E ranging from 20x to 2500x magnification for acquiring smaller details. The HRX-01 software controls the motorized XY and Z axis to achieve automated stitching (gigapixel panorama) as well as 3D depth maps using focus variation (also called focus stacking). HR-1020E Telecentric polarized lenses were used to investigate the pictorial layers with 90x magnification, while HR-2500E were used at 140x to focus on the varnish layer.

ACKNOWLEDGEMENT

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RELATED LITERATURE

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2. Piero Baglioni e David Chelazzi, Nanoscience for the Conservation of Works of Art, Royal Society of Chemistry, 2013
3. Piero Baglioni, David Chelazzi e Rodorico Giorgi, Nanotechnologies in the Conservation of Cultural Heritage: A Compendium of Materials and Techniques, Springer, 2014