

Supplementary material from:
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Supplementary Material 1.

Equipment & Images.

A range of cameras were used to document the adult male's lesions (e.g., Cannon EOS 1D Mark III, Nikon D2X; typically fitted with lenses in the 80-400 mm range). Observations were also conducted by using the naked eye, or Swarovski 10x42 EL binoculars were used and contemporaneous field notes were recorded.

Measuring Eyepatches & Lesions.

Image analysis was conducted using the open-source software ImageJ (Schneider et al., 2012; Rasband, 2023) on each image. The eye patch was outlined and measured as a reference marker because eye patch pigmentation in adult orca typically remains stable in size (Visser & Mäkeläinen, 2000), allowing relative comparison across images. All lesion areas were outlined and measured according to their classification category.

To illustrate the method used for each of the images of the adult male orca Mel (PTN-001), we provide Figures 1.1-1.4). We outlined the eye patch (Figure 1.1), which produced an area in pixels.

Then, again using ImageJ, the lesions were outlined (Fig. 1.2) according to their classification category (Table 1, main text).

When marking the *Discoloured* lesions, where the area encompassed small patches of white skin, these were included in the overall lesion area because the small patches were presumed to be impacted by

the surrounding tissue damage (Figs 1.2 & 1.4).

To ensure consistency, if a specific lesion classification was surrounded by another (e.g., a *Discoloured* lesion surrounded an *Open* lesion, Figure 1.2), the area of each lesion classification was calculated separately (in this example, the measurement of the *Discoloured* area would not include the *Open* lesion area).

We outlined all lesions on both the mandibles and the maxillae to calculate the surface area for each side.

The ratio of lesion areas on each image (relative to the respective eye patch) was calculated, creating what we termed a Lesion-Eye-patch Ratio (LER). A full list of the LER for each of the images in the dataset is given in Supplementary Material 2.

The LER could be higher than 100% as it may have been larger than the eye patch (Fig. 1.3 and 1.4).

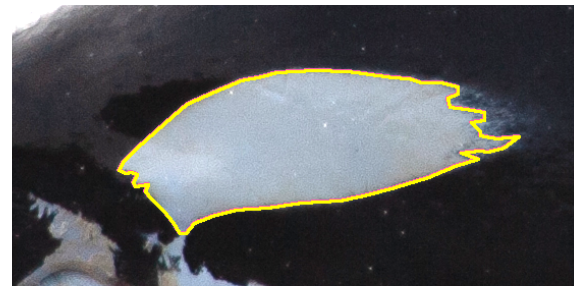


Figure 1.1. The eye patch was outlined in ImageJ. This image corresponds to Fig. 5a (20090301, L side) in the Main text (and see Figure 1.3 for context). Photo 20090301-PTN-JMC-D1-008 © Juan M. Copello.



Figure 1.2. The lesions were outlined in ImageJ, according to their lesion

classification (see Table 1 in the Main text for details). For the ease of illustrating the method, the lines are thickened to aid in distinguishing the various lesion outlines. *Discoloured* is indicated with a magenta line, *Open (granulated)* is indicated with a blue line, *Depigmentation scar* is indicated with a green line. The yellow line is part of the eye patch (see Figs 1.1 and 1.3). This image corresponds to Fig. 5a in the main text (and see Figure 1.3 for context). Photo 20090301-PTN-JMC-D1-008 © Juan M. Copello.

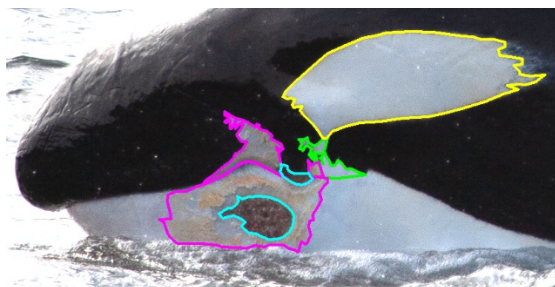


Figure 1.3. The areas of the lesions compared to the area of the eye patch (see close-ups in Figures 1.1 & 1.2) of Mel's left side gave LER values of 0.6 for *Discoloured* lesions (from both the maxilla and mandible), 0.14 for *Open(granulated)* lesions (from both the maxilla and mandible) and 0.05 for *Depigmentation scar* (which was only present on the maxilla). The total LER for this image was 0.67. See Supplementary Material 2, Table 2.2 for details. Photo 20090301-PTN-JMC-D1-008 © Juan M. Copello.

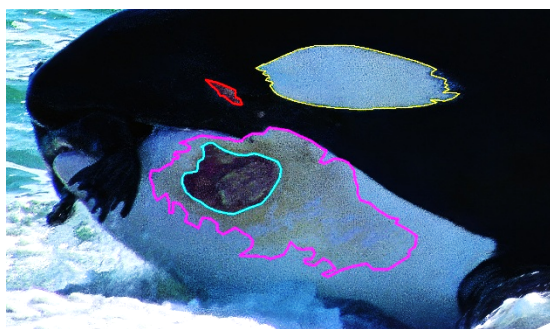


Figure 1.4. A historic milestone photograph of Mel's left side in 2000, with the eye patch and lesion areas indicated (see Fig. 1.2 for colour-classification designations already illustrated). The LER values were 0.03 *Open (raw)* (outlined here

in red), lesions on the maxilla, 0.50 for *Open(granulated)* lesions (on the mandible) and 1.93 for *Discolouration*, (which was only present on the mandible). The total LER for this image was 2.47, i.e., the lesions on his left side covered an area that was more than 2x larger than the left eye patch. See Supplementary Material 2, Table 2.3 for details of each LER value.

Exclusions

If approximately >25% of the maxilla was not visible or the mandible was not visible at all (Supplemental Material 2), the LER could not be calculated and, therefore, that image was excluded from quantitative analyses. If lesion presence was evident but classification or size could not be reliably determined (e.g., low resolution, stranding distance, or partial water obstruction), the term 'lesion' was used without further classification. If the maxillae and/or mandibles were not photographed, lesion(s) were not classified unless supported by detailed contemporaneous field notes.

Testing the angle of Mel's head in relation to the photographer.

We tested that the angle of the head of the orca, in relation to the photographer, would not provide a highly distorted LER, as both the lesion and the eye patch would logically be angled to the same degree in any given image.

We selected sequences which included near-perpendicular views (85-90°). We found only two photographic sequences that met the sequence selection criteria. The left (n=4 images) is shown as a sequence in Fig 1.5 and the right (n=5 images) is shown as a sequence in Fig. 1.6.

To standardize across the varied image angles, we measured one consistent lesion within each sequence.

The LER value is given below each image and Table 1.1 has details of eye patch and lesion size for each image.

The angle to the photographer did not affect the ratio calculations greatly.

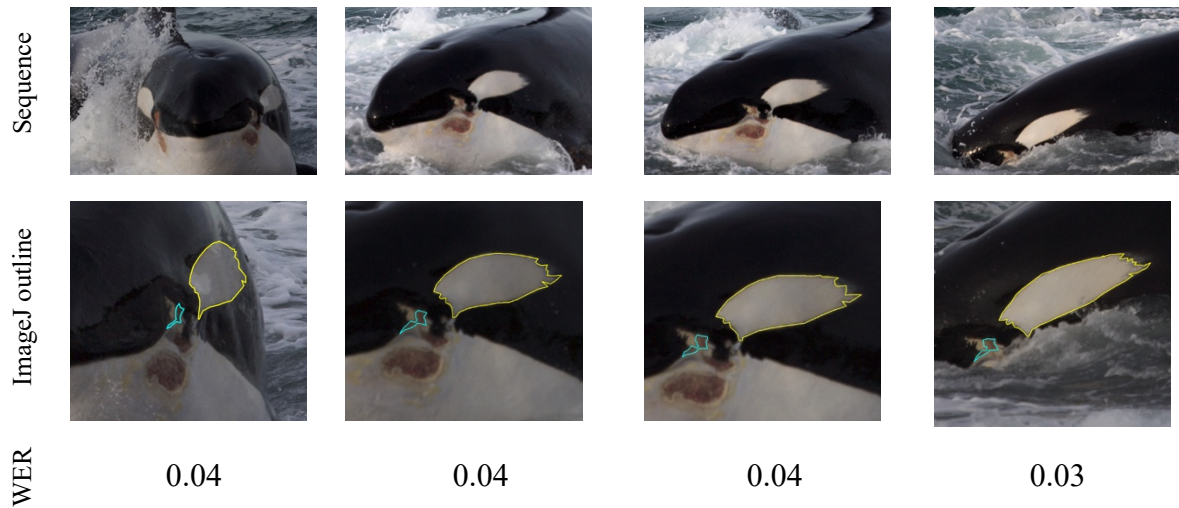


Figure 1.5. The sequence of left images (n=4) as Mel turned. **Top** row: images are moderately cropped to show overall angle. **Bottom** row: One consistent lesion was measured (an *Open (granulated)* lesion, outlined in blue) and the eye patch (outlined in yellow) for all four images. The Lesion-Eye-patch Ratio (LER) is given below each respective image. See Figure 1.6 for right side images.

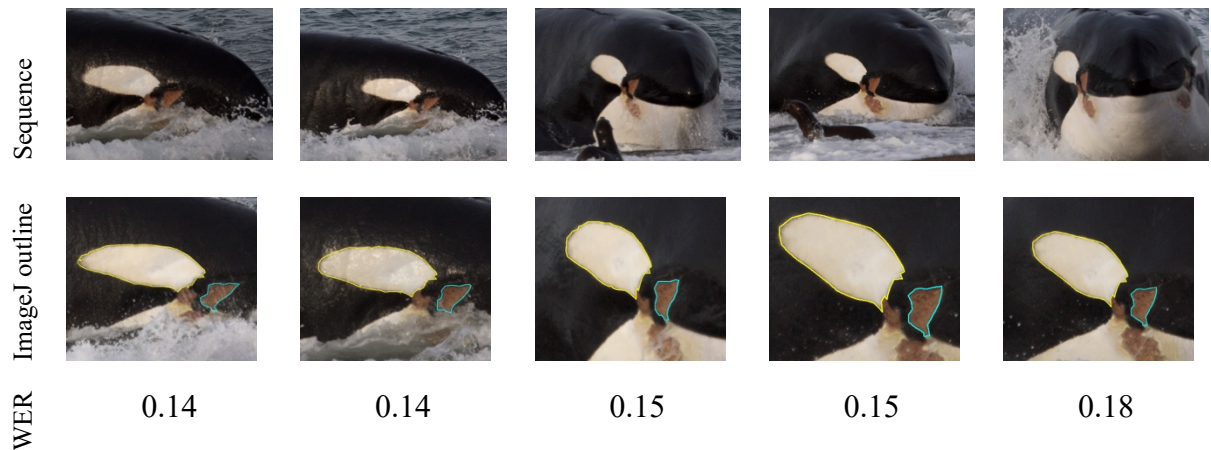


Figure 1.6. The sequence of right images (n=5) as Mel turned. See Figure 1.5 for details.

Table 1.1. Lesion-Eye-patch Ratio (LER) values for each lesion classification of left and right sequences of images. The LER was calculated by dividing the area of the lesion by the area of the eyepatch (in pixels).

Date	Sequence #.	Classification	Area (pixels)	LER
20090315 Left Side	1	Eyepatch	10801	n/a
		<i>Open (granulated)</i>	450	0.04
	2	Eyepatch	39166	n/a
		<i>Open (granulated)</i>	1537	0.04
	3	Eyepatch	44854	n/a
		<i>Open (granulated)</i>	1670	0.04
	4	Eyepatch	44270	n/a
		<i>Open (granulated)</i>	1398	0.03
	Average	<i>Open (granulated)</i>	1264	0.04
20090315 Right Side	1	Eyepatch	41775	n/a
		<i>Open (granulated)</i>	5654	0.14
	2	Eyepatch	38920	n/a
		<i>Open (granulated)</i>	5325	0.14
	3	Eyepatch	21593	n/a
		<i>Open (granulated)</i>	3246	0.15
	4	Eyepatch	25077	n/a
		<i>Open (granulated)</i>	3829	0.15
	5	Eyepatch	13301	n/a
		<i>Open (granulated)</i>	2328	0.18
	Average	<i>Open (granulated)</i>	4076	0.15

References

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Wayne Rasband and contributors, National
Institutes of Health, Bethesda, MD, USA,
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