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 Henderson, C. H., Lopez, J. C., Marchesi,
 M. C., & Trom, A. S. (2026). Lesions on
 the jaws of an adult male orca (*Orcinus
 orca*) from Punta Norte, Argentina. *Latin
 American Journal of Aquatic Mammals*,
 21(2), 55-69.
<https://doi.org/10.5597/lajam00376>

Supplementary Material 2.

Comparisons of Milestone & Paired Images.

The types of comparisons made across the different aspects of the images of the adult male orca, known as ‘Mel’ are given in Table 1.

The milestone (historic Figs 2.1-2.3), same-day pairs (2007-2009, Figs 2.4-2.9) and milestone (contemporary Figs 2.10 & 2.11) images of Mel (PTN-001) are presented (see Main text for additional images).

The calculated Lesion Size Ratio (LER) for all images (i.e., those in the Main text and Supplementary Material 2) are given in Tables 2.1 & 2.2.

An example of an excluded pair of images is given in Figure 2.12a and 2.12b.

Milestone Historic Images



Figure 2.1. Mel in 1993 with lesions on his left maxilla (classified as *Open (raw)*) and

mandible (classified as *Discoloured, Open (raw)*) – see Table 1 for definitions. Photo © Alberto M. Patrian.



Figure 2.2. Mel in 2000, with lesions on his left maxilla (classified as *Open (raw)*) and mandible (classified as *Discoloured, Open (granulated)*) – see Table 1 for definitions. The total LER for this image was 2.47. It was also the highest single-category LER at 1.93, for the *Discoloured* lesion area. Note there was no depigmentation on the maxilla and his maxilla jawline was ‘straight’ (compare to Fig. 8a). However, he did have a slightly protruding rostrum creating an ‘over bite’ (see Main text for details and compare to Fig. 11a). The Table 1 for details on lesion classification. Photo © Alberto M. Patrian.



Figure 2.3. Mel in 2001 with a lesion on his right mandible (classified as *Discoloured, Open (raw)*) – see Table 1 for definitions. His protruding rostrum is visible but does not look as significant in

this image as it does in Fig. 5a (Main text).

Photo © Alberto M. Patrian.

Paired Images



Figure 2.4a. The first pair of photographs within our dataset were taken on 19 March 2007. On the left maxilla the lesions were *Discoloured*, *Open (granulated)* and had some areas of *Depigmentation scars*. On his mandible the lesions were *Discoloured*, *Open (granulated)*. Note the curve in his jawline which is not present in 2000 (Fig. 2.2). Photo 20070319-PTN-JMC-D1-008 © Juan M. Copello.



Figure 2.4b. On Mel's right maxilla the lesions were *Depigmented* and two areas of *Discoloured*. On his mandible the lesions were *Discoloured* or *Open (granulated)*. Photo 20070319-PTN-CKH-D1-010 © Chantal K. Henderson.



Figure 2.5a. On 4 April 2008 there were no lesions on Mel's left side, only *Depigmentation scars*, in contrast to the lesions in the previous same-day pair (Fig. 2.4a), from ~1 year prior. Three teeth, with the crowns of two having negligible (<10%), if any, wear. Photo 20080404-PTN-JMC-D1-012 © Juan M. Copello.



Figure 2.5b. The lesions on Mel's right side were now much larger than those documented ~1 year prior (Fig. 2.4b). Additionally, the lesions on both the maxilla and the mandible would be classified as *Open (granulated)*, with an area of *Discoloured* on the mandible. Photo



Figure 2.6a. On 10 April 2008 there were subdermal *Discoloured* areas on both Mel's left maxilla and mandible, but these appeared as more subdermal than on the epidermis. He also had a *Depigmentation scar* on his maxilla. Photo 20080410-PTN-JMC-D1-019 © Juan M. Copello.



Figure 2.6b. Although not perpendicular, and not in focus, it is still possible to ascertain that the lesions on both the maxilla and mandible remain. These lesions would be classified as *Open (granulated)*. On the maxilla there was also *Discoloured* and a *Depigmentation scar* and the mandible had *Discoloured* areas. Photo 20080410-PTN-JMC-D1-033 © Juan M. Copello.



Figure 2.7a. Approximately a year after the previous same-day pair of images, the lesions on Mel's left side had extended into the white and previously *Depigmented* area, which was now almost entirely encompassed by an *Open (granulated)* lesion on his maxilla. Additional areas of *Open (granulated)* lesions and *Discoloured* were apparent on his mandible. Photo 20090308-PTN-INV-D1-048 © Ingrid N. Visser.



Figure 2.7b. The lesions on Mel's right side had increased in size on his mandible with the *Discoloured* encompassing nearly half of the jaw. They were *Open (granulated)* and there was *Discoloured* lesions on the maxilla and mandible. Photo 20090308-PTN-INV-D1-048 © Ingrid N. Visser.

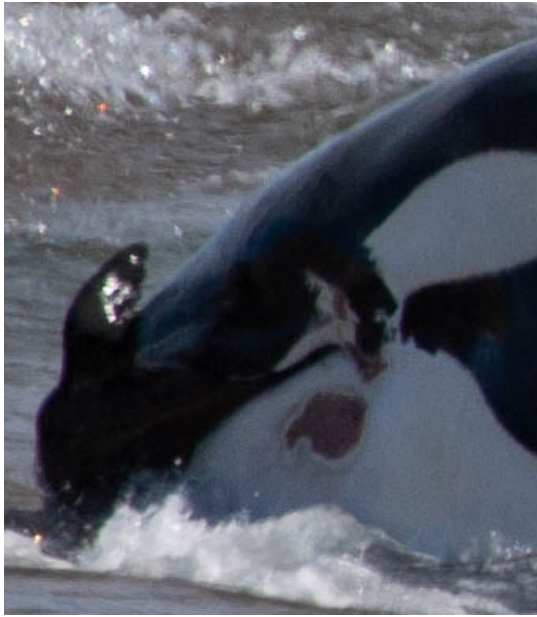


Figure 2.8a. The *Open (granulated)* lesions on Mel's left maxilla covered less of the *Depigmented* area than nine days previously. The lesion on his mandible was smaller and was classified as *Open (granulated)*, however there was a ring of *Discoloured* tissue surrounding it. Photo 20090317-PTN-JMC-D1-018 © Juan M. Copello.



Figure 2.8b. The lesions on Mel's right side remain similar in size to those from nine days previously. The lesions on the maxilla and mandible were *Discoloured* and *Open (granulated)*. The *Open (granulated)* lesion appears to be transitioning to *Open (raw)* as the lesions were redder (see Main text regarding debridging). Photo 20090317-PTN-INV-D1-100 © Ingrid N. Visser.



Figure 2.9a. The last pair of same-day photographs were taken on 30 March 2009 (i.e., 13 days after the previous pair). The lesions on Mel's left side were *Open (raw)* on the maxilla and appear to have fully encompassed his eye. There was also some *Depigmentation scarring* present on the maxilla. The lesion on his mandible was *Open (raw)*. Photo 20090330-PTN-JMC-D1-024 © Juan M. Copello.



Figure 2.9b. Although covered in water it is still possible to ascertain that the lesions on Mel's right maxilla were similar in size to earlier in the month and appeared *Open (granulated)*. Photo 20090330-PTN-CKH-D1-176 © Chantal K. Henderson.



Figure 2.10a. The only instance we documented *Open (bleeding)* lesions on Mel occurred on 17 March 2008 at 1448 hrs at Medina Bay. The lesions on the maxilla and mandible were bleeding. No *Discoloured* area was visible. No corresponding left image was available for this date, however, see Fig. 2.10b. Photo 20080317-PTN-JXC-D1-001 © Jorge Cazenave.



Figure 2.10b. On the same day as Fig. 19a, but 2 hours later at 1644 hrs and at the Attack Channel, the lesions were no longer bleeding and although obscured by water, it is still possible to classify them as *Open* and likely that they would still be considered (*raw*) (see Main text for details about debridging). Photo 20080317-PTN-INV-D1-012 © Ingrid N. Visser.



Figure 2.11. The last day that Mel was photographed was 15 April 2010. His jaws were only partially visible, with no lesions visible on his maxilla, although a very small area of *Discoloration* was visible on the mandible just below the arched jawline. There was no image for the right side for this day. 20100415-PTN-JMC-D1-010 © Juan M. Copello.

Excluded Images

A pair of images from 2009 was deemed unsuitable for inclusion as one of the images did not show the mandible. They are presented here as an example of pairs that were excluded.



Figure 2.12a. Although the left side image clearly shows both the maxilla and mandible and the lesions are visible, the corresponding right side image (Fig. 2.12b) was not suitable.

20090305-PTN-JMC-D1-208 © Juan M. Copello.



Figure 2.12b. Only part of the maxilla on Mel's right side was photographed on 05 March 2009, meaning that the lesions could not be fully assessed or measured.

20090305-PTN-JMC-D1-085 © Juan M. Copello.

Table 2.1. Comparisons made across different aspects such as left and right side and maxillae and mandibles of Mel lesions. An open checkbox indicates that the comparison was not made. n/a = not applicable (i.e., comparison was not possible).

	Left side (maxilla + mandible)	Right side (maxilla + mandible)	L+R (maxillae + mandibles)	Over Time	Maxillae	Mandibles	Maxillae + Mandibles
Lesion Classifications Separate	☒	☒	☒	☒	☒	☒	☒
Lesion Classifications Combined	☒	☒	☒	☒	☒	☒	☒
Left	n/a	☒	n/a	☐	☒	☒	☒
Right	☒	n/a	n/a	☐	☒	☒	☒
All Maxillae	☒	☒	☒	☒	n/a	☒	n/a
All Mandibles	☒	☒	☒	☒	☒	n/a	n/a
All Maxilla + All Mandible	☒	☒	☒	☒	n/a	n/a	n/a
Pairs images Left & Right	n/a	n/a	n/a	☒	☒	☒	n/a
Historic images (singles)	☒	☒	n/a	☒	☒	☒	☒
Milestones images (singles)	☒	☒	n/a	☒	☒	☒	☒
Contemporary images (pairs)	☒	☒	☒	☒	☒	☒	☒
Over Time	☒	☒	☒	n/a	☒	☒	☒
Angle (sequence)	☒	☒	☒	☐	☐	☐	☐

Table 2.2. Lesion-Eye-patch Ratio (LER) values for each lesion classification of the paired images ($n=8$). The LER was calculated by dividing the area of the lesion by the area of the eyepatch (in pixels).

Date and Pair	Side	Jaw	Lesion Classification	Area (pixels)	LER
20070319 Pair 1	L	n/a	Eyepatch	164011	n/a
		Maxilla	Discoloured	23671	0.14
			Open (granulated)	3806	0.02
			Depigmentation scar	8469	0.05
		Mandible	Discoloured	52978	0.32
			Open (granulated)	3772	0.02
		Max + Mand	All lesions	69025	0.42
	R	n/a	Eyepatch	14861	n/a
		Maxilla	Discoloured	156	0.01
			Depigmentation scar	1145	0.08
		Mandible	Discoloured	358	0.02
			Open (granulated)	707	0.05
		Max + Mand	All lesions	2366	0.16
20080404 Pair 2	L	n/a	Eyepatch	21094	n/a
		Maxilla	Depigmentation scar	3816	0.18
		Mandible	n/a	n/a	n/a
		Max + Mand	All lesions	3816	0.18
	R	n/a	Eyepatch	51109	n/a
		Maxilla	Open (granulated)	10611	0.21
		Mandible	Discoloured	37678	0.74
			Open (granulated)	11791	0.23
		Max + Mand	All lesions	60080	1.18
20080410 Pair 3	L	n/a	Eyepatch	37817	n/a
		Maxilla	Discoloured	5143	0.14
			Depigmentation scar	2688	0.07
		Mandible	Discoloured	20795	0.55
		Max + Mand	All lesions	28626	0.76
	R	n/a	Eyepatch	30477	n/a
		Maxilla	Discoloured	1053	0.04
			Open (granulated)	6588	0.22
			Depigmentation scar	250	0.01
		Mandible	Discoloured	9784	0.32
			Open (granulated)	5808	0.19
		Max + Mand	All lesions	22430	0.74

Table 2.2. continued.

Date and Pair	Side	Jaw	Lesion Classification	Area (pixels)	LER
20090301 Pair 4	L	n/a	Eyepatch	36874	n/a
		Maxilla	Discoloured	4515	0.12
			Open (granulated)	703	0.02
			Depigmentation scar	1739	0.05
		Mandible	Discoloured	17900	0.49
			Open (granulated)	4581	0.12
		Max + Mand	All lesions	24857	0.67
	R	n/a	Eyepatch	27350	n/a
		Maxilla	Open (raw)	5046	0.18
			Depigmentation scar	1552	0.06
		Mandible	Open (raw)	7559	0.28
		Max + Mand	All lesions	14157	0.52
20090308 Pair 5	L	n/a	Eyepatch	6373	n/a
		Maxilla	Open (granulated)	1298	0.20
			Depigmentation scar	345	0.05
		Mandible	Discoloured	7147	1.12
			Open (granulated)	4109	0.65
		Max + Mand	All lesions	12899	2.02
	R	n/a	Eyepatch	40316	n/a
		Maxilla	Discoloured	2280	0.06
			Open (granulated)	6174	0.15
		Mandible	Discoloured	20243	0.50
			Open (granulated)	8994	0.22
		Max + Mand	All lesions	37691	0.94
20090315 Pair 6	L	n/a	Eyepatch	15931	n/a
		Maxilla	Discoloured	2024	0.13
			Open (granulated)	820	0.05
			Depigmentation scar	842	0.05
		Mandible	Discoloured	9589	0.60
			Open (granulated)	3547	0.22
		Max + Mand	All lesions	14798	0.93
	R	n/a	Eyepatch	54473	n/a
		Maxilla	Discoloured	1840	0.03
			Open (granulated)	12175	0.22
		Mandible	Discoloured	19664	0.36
			Open (granulated)	16772	0.31
		Max + Mand	All lesions	50451	0.93

Table 2.2. continued.

Date and Pair	Side	Jaw	Lesion Classification	Area (pixels)	LER
20090317 Pair 7	L	n/a	Eyepatch	8738	n/a
		Maxilla	Discoloured	1162	0.13
			Open (granulated)	339	0.04
			Depigmentation scar	505	0.06
		Mandible	Discoloured	2495	0.29
			Open (granulated)	1577	0.18
		Max + Mand	All lesions	4916	0.56
	R	n/a	Eyepatch	184297	n/a
		Maxilla	Discoloured	7959	0.04
			Open (granulated)	38065	0.21
		Mandible	Discoloured	73085	0.40
			Open (granulated)	45855	0.25
		Max + Mand	All lesions	164964	0.90
20090330 Pair 8	L	n/a	Eyepatch	68392	n/a
		Maxilla	Open (raw)	4274	0.06
			Depigmentation scar	10511	0.15
		Mandible	Open (raw)	15757	0.23
		Max + Mand	All lesions	30542	0.45
	R	n/a	Eyepatch	54118	n/a
		Maxilla	Open (granulated)	14295	0.26
		Mandible	Open (granulated)	11326	0.21
		Max + Mand	All lesions	25621	0.47

Table 2.3. Lesion-Eye-patch Ratio (LER) values for each lesion classification of the milestone (historic and contemporary) images (n=6). The LER was calculated by dividing the area of the lesion by the area of the eyepatch (in pixels).

Milestone Images	Date	Side	Jaw	Classification	Area (pixels)	LER
milestone, historic	1993	L	n/a	Eyepatch	23925	n/a
			Maxilla	Open (raw)	548	0.02
			Mandible	Discoloured	16082	0.67
				Open (raw)	1774	0.07
			Max + Mand	All Lesions	18404	0.77
milestone, historic	2000	L	n/a	Eyepatch	40888	n/a
			Maxilla	Open (raw)	1348	0.03
			Mandible	Discoloured	78986	1.93
				Open (granulated)	20560	0.50
			Max + Mand	All Lesions	100894	2.47
milestone, historic	2001	R	n/a	Eyepatch	34285	n/a
			Maxilla	Depigmentation Scar	201	0.01
			Mandible	Discoloured	20811	0.51
				Open (raw)	23745	0.58
			Max + Mand	All Lesions	44757	1.31
milestone, contemporary (bleeding) 1	20080317	R	n/a	Eyepatch	7468	n/a
			Maxilla	Open (bleeding)	743	0.10
			Mandible	Open (bleeding)	1152	0.15
			Max + Mand	All Lesions	1895	0.25
milestone, contemporary (bleeding) 2	20080317	R	n/a	Eyepatch	12943	n/a
			Maxilla	Open (raw)	1332	0.10
			Mandible	Open (raw)	1581	0.12
			Max + Mand	All Lesions	2913	0.23
milestone, contemporary (last lesion)	20090407	L	n/a	Eyepatch	27261	n/a
			Maxilla	Open (raw)	1562	0.06
				Depigmentation Scar	4275	0.16
			Mandible	Discoloured	16889	0.62
				Open (raw)	5327	0.20
			Max + Mand	All Lesions	28053	1.03