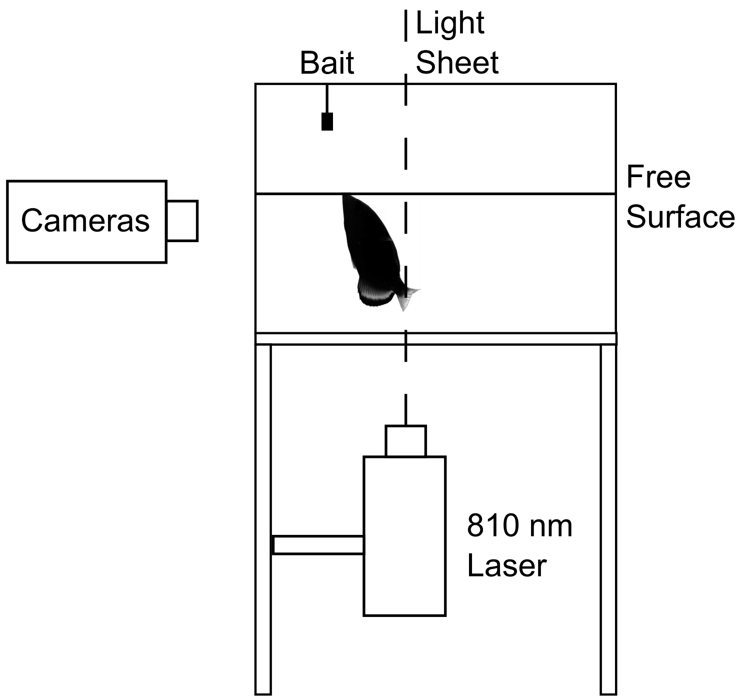

Fig. S1: **PIV experiment setup**. Two cameras running at 500 frames s^{-1} viewed the ventral side of the fish as it jumped. The laser was positioned below the tank with the light sheet parallel to the tank wall and camera image plane (into/out of the page as shown here). Bait was placed between the tank wall and the near-infrared laser sheet. The tank was partially filled to provide space for the fish to jump above the free surface.

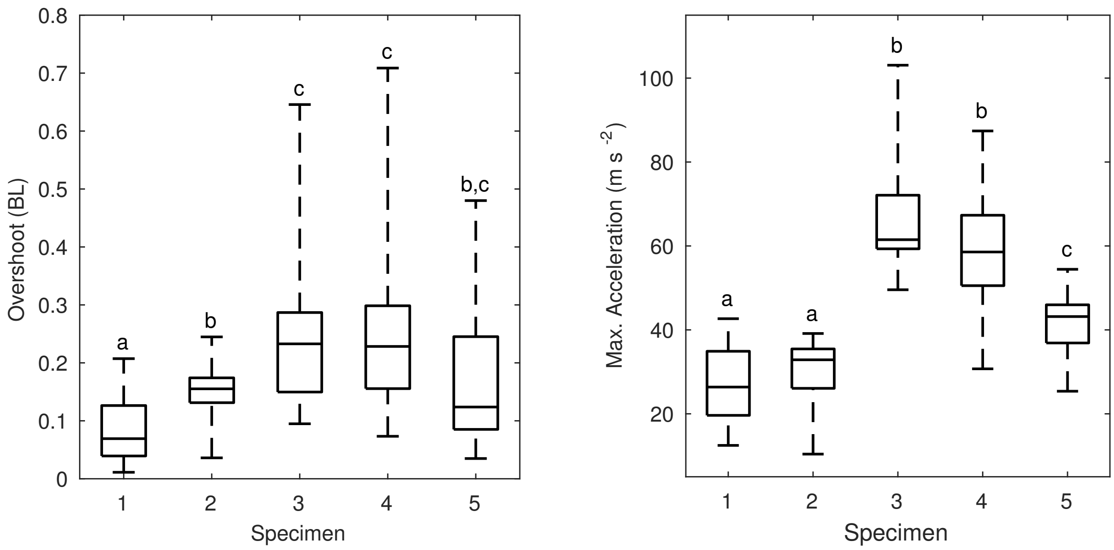

Fig. S2: **Box plots of overshoot and acceleration (for all jump heights) by specimen.** Letters (i.e., a,b,c) denote statistically significant groupings using Mann-Whitney U tests with $p < 0.05$ considered significant. (A) The two larger fish (specimens 1 and 2) exhibited lower median and maximum overshoots than the three smaller fish (specimens 3-5). (B) Acceleration varied strongly by individual specimen. Specimens 1 and 2 exhibited the lowest accelerations. Specimens 3 and 4 reached the greatest accelerations.

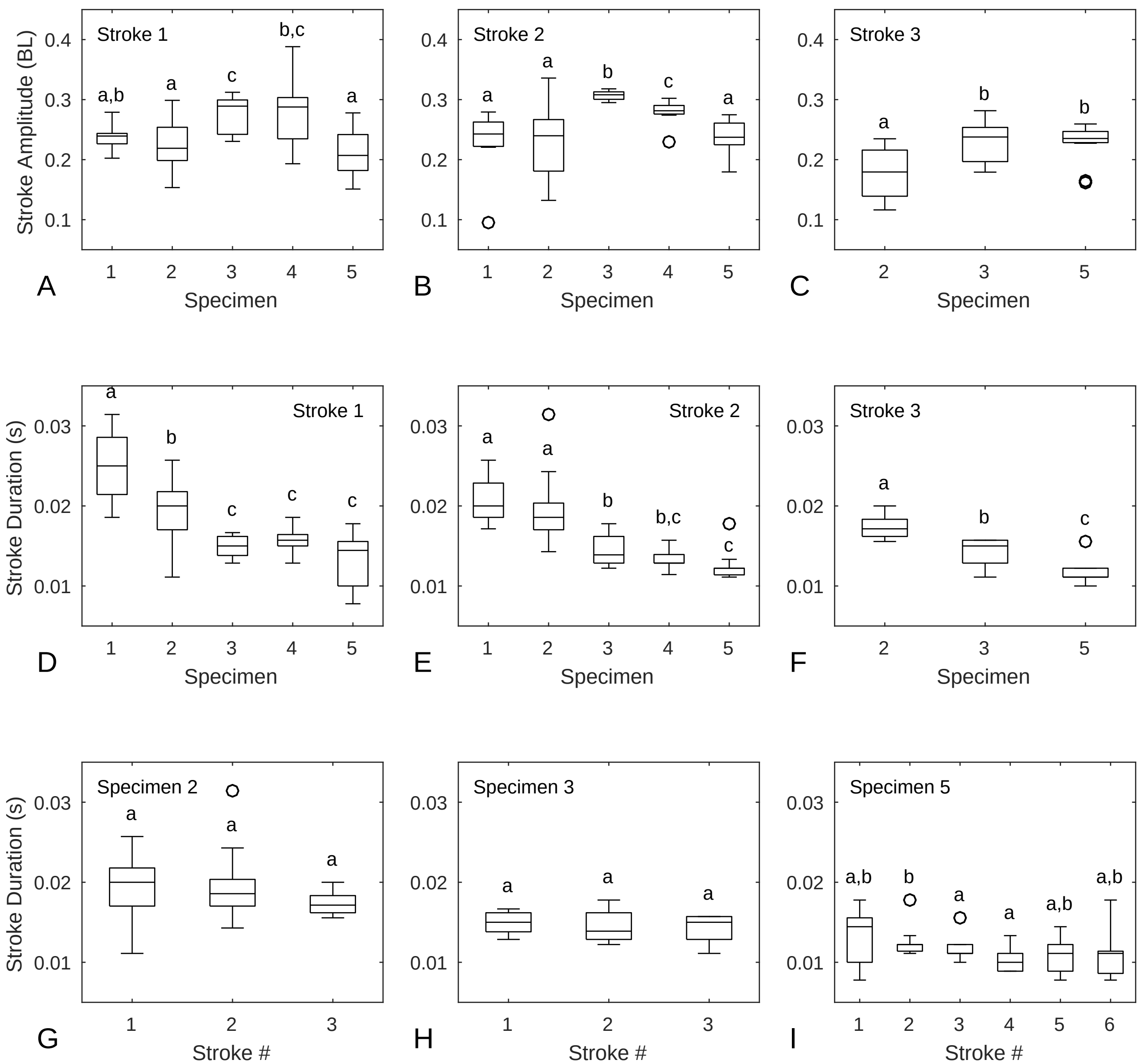

Fig. S3: **Box plots of tail amplitudes and durations.** Letters (i.e., a,b,c) denote significant differences using Mann-Whitney U tests ($p < 0.05$). Outliers (o's) are points greater than three interquartile ranges from the upper and lower quartiles. Comparisons were made for groupings with greater than five runs of available tail kinematic data. No significant differences between kinematics and the total number of tail strokes (e.g., the first stroke of a two tailbeat jump versus the first stroke of a five tailbeat jump) were observed. (A-C) Comparisons of tail stroke amplitude (normalized by BL) across specimens for the first three tail strokes. For the first two strokes, specimens 3 and 4 had the largest amplitudes, though specimen 4's first stroke was not significantly different from specimen 1's. (D-F) Stroke durations compared by specimen for the first three strokes. The two fish with the greatest lengths and tail areas (specimens 1 and 2) took the longest to complete a tail stroke. (G-I) Stroke durations compared within each specimen for all stroke numbers. Stroke durations did not vary significantly within data from specimens 2 and 3. Minimal variations were observed in stroke durations for specimen 5, though the time intervals were still very consistent between strokes.

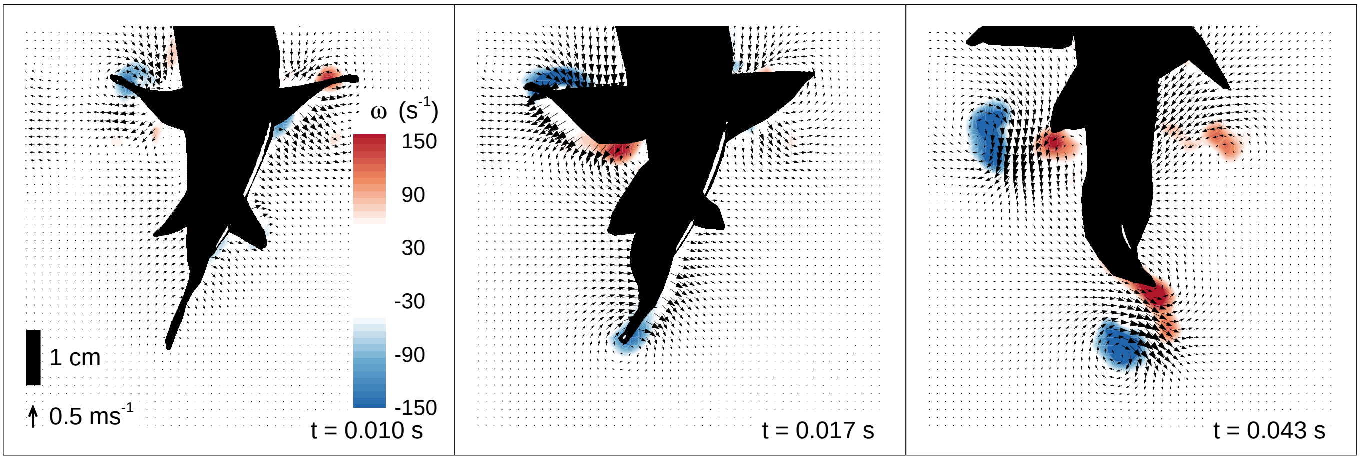

Fig. S4: **Time series of PIV images of the anal fin for a 0.5 BL jump by specimen 4.** The light sheet was positioned toward the front of the anal fin. Qualitatively, wake structures were the same as those seen in Fig. 7, with propulsive jets originating on the pectoral and anal fins.

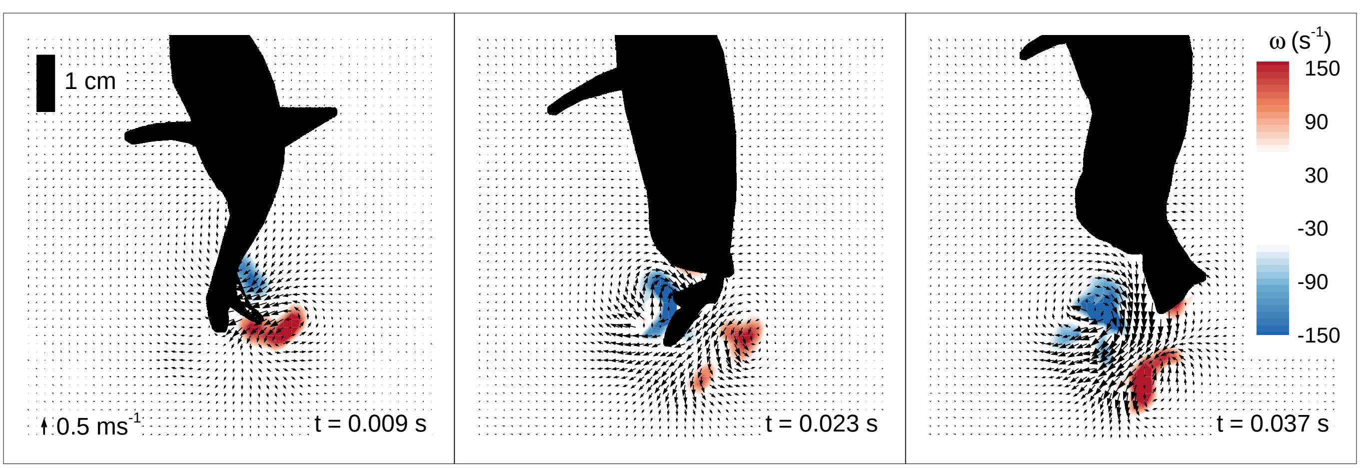

Fig. S5: **Time series of PIV images of the caudal fin for a 0.5 BL jump by specimen 5.** The caudal fin wake resembled the reverse K´arm´an street of forward locomotion. The fish executed three propulsive tail strokes before reaching the bait.

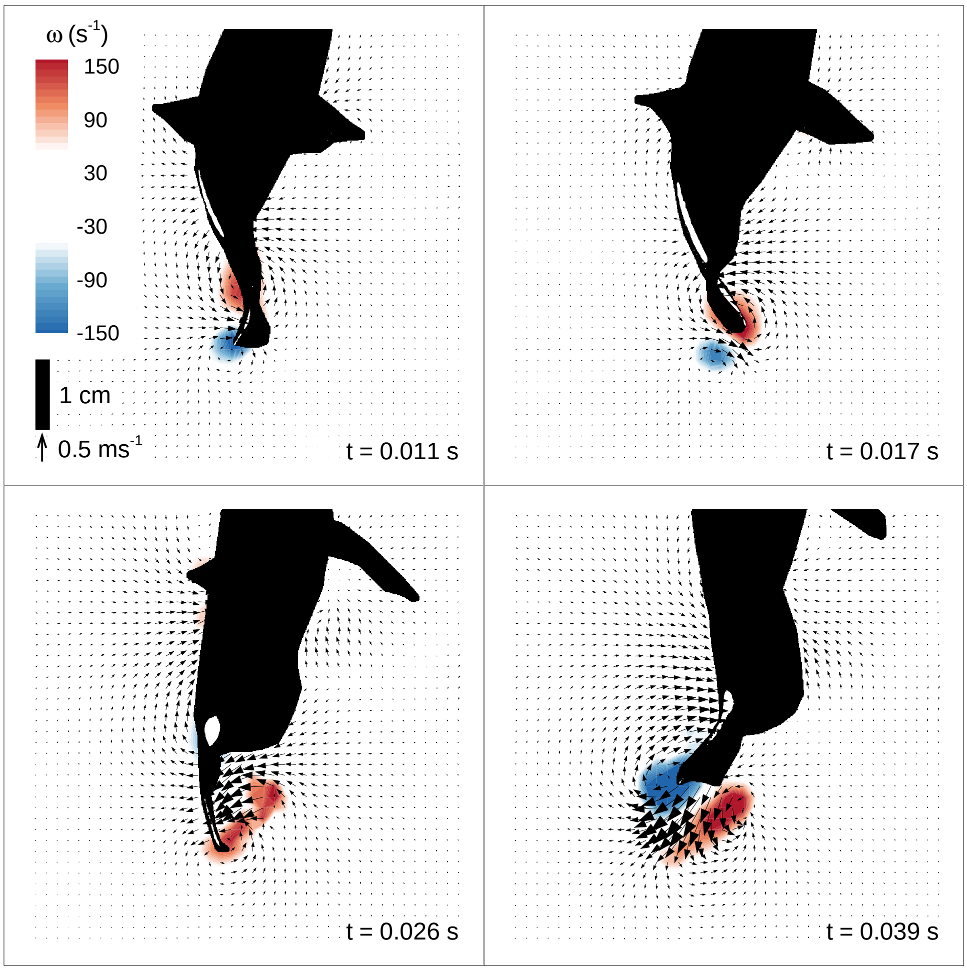

Fig. S6: **Time series of PIV images of the anal fin for a 0.5 BL jump by specimen 5.** The light sheet was initially positioned toward the back of the anal fin. At t = 0.026 s the caudal fin was observed to enter the measurement plane and interacted with the anal fin wake.

Table S1: **Kinematic and vortex parameters for PIV runs imaging the caudal fin for 0.5 BL (Fig. S5) and 1.0 BL (Fig. 6) jump heights and the anal fin for an 0.5 BL jump (Fig. 7).** Some strokes were captured in kinematics but not in PIV due to their position in the light sheet. The time to peak circulation (Γ_{max}) was measured from t = 0 s (first jumping caudal fin motion). For the 1.0 BL jump, the first tail stroke took over twice as long as the following three and was smaller in amplitude than the following three strokes. The second stroke had the shortest duration and the highest circulation. For the 0.5 BL jump imaging the caudal fin, the first two strokes had comparable amplitude and duration while the third stroke was lower amplitude and produced a weaker vortex. For the two 0.5 BL cases, the wake structures reached maximum strength over similar time intervals (0.019-0.022 s for the first vortex core and 0.031-0.032 s for the second vortex core).

Height [BL]	Fin	Stroke No.	Amplitude [BL]	Duration [s]	Γ_{max} [cm^{2}s^{-1}]	Time to Γ_{max} [s]
1.0	Caudal	1	0.15	0.026	73	0.019
1.0	Caudal	2	0.21	0.010	-131	0.019
1.0	Caudal	3	0.21	0.013	72	0.039
1.0	Caudal	4	0.20	0.011	–	–
0.5	Caudal	1	0.23	0.013	67	0.019
0.5	Caudal	2	0.24	0.013	-104	0.032
0.5	Caudal	3	0.09	0.015	48	0.048
0.5	Anal	1	0.16	0.018	-51	0.022
0.5	Anal	2	0.14	0.022	58	0.031

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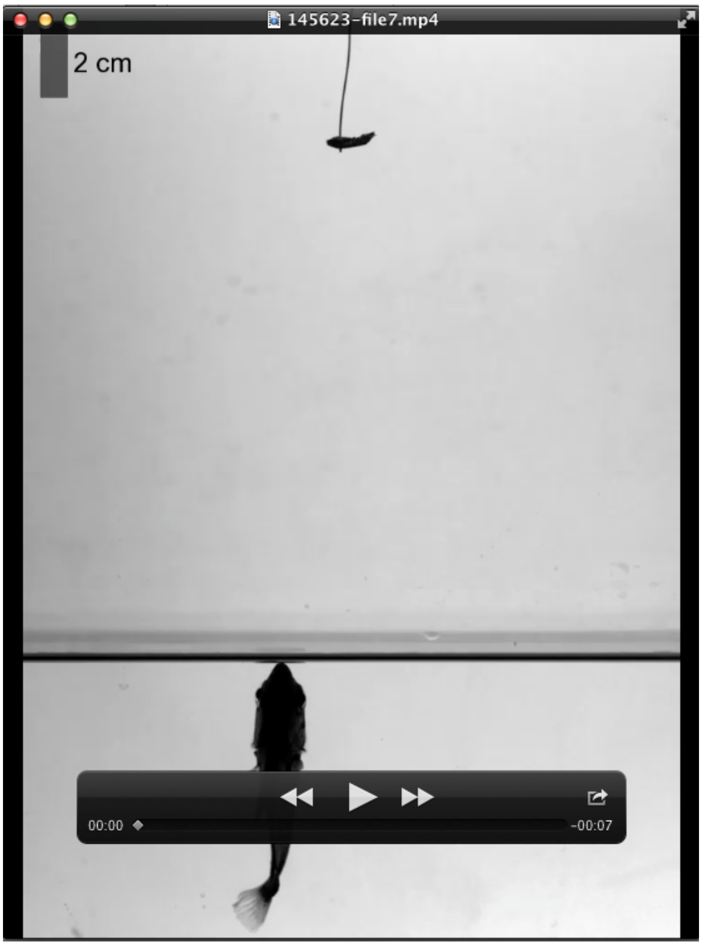
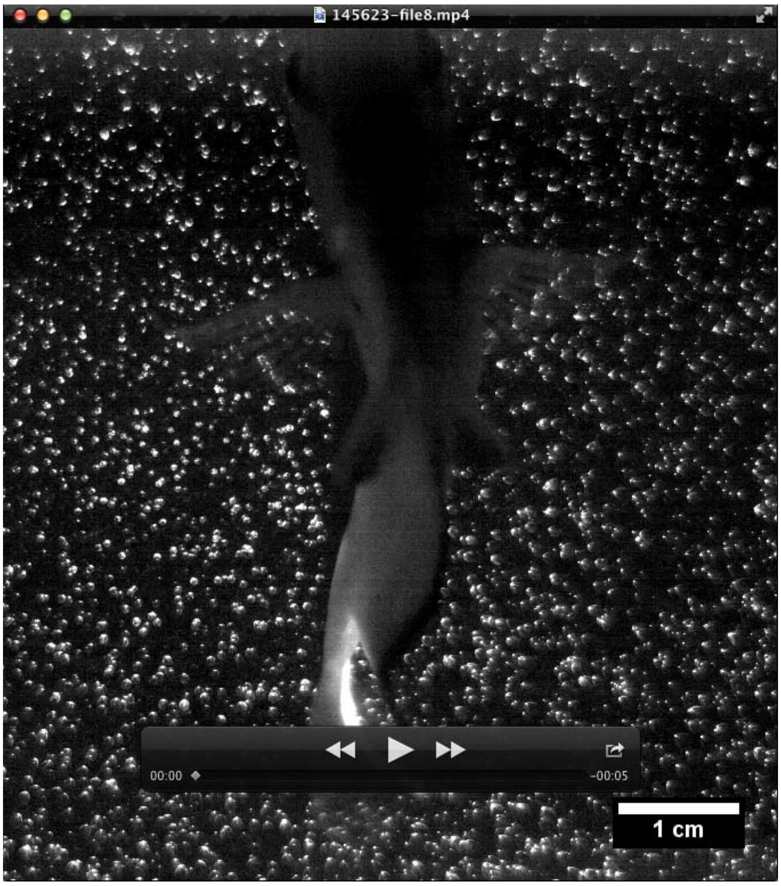


Movie 1: **2.3 BL jump by specimen 5.** This movie was recorded at 900 frames s^{-1} and played back at 30 frames s^{-1}. The fish transitions from pectoral fin hovering to jumping behaviors, executes multiple propulsive tail strokes and glides once out of the water. The movie is the same jump for which image stills and body midline traces are available in the main text (Fig. 1).



Movie 2: **Dorsal fin position during 1 BL PIV.** This movie was recorded at 500 frames s^{-1} and played back at 5 frames s^{-1}. This sequence of images shows the presence of the dorsal fin, along with the caudal fin, in the PIV light sheet (see also t = 0.030 s of Fig. 6). Contrast in the video has been linearly stretched until 2.5% of the original pixels reach saturation to increase body visibility.