

Pregnancy is a drag for bottlenose dolphins

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Credit: Wkipedia

Lumbering around during the final weeks before delivery is tough for any pregnant mum. Most females adjust their movements to compensate for the extreme physical changes that accompany the later stages of pregnancy. However, no one had been able to find a distinct gait change – such as a change in stride length or frequency – associated with the latter stages of pregnancy.

Intrigued by the ways that newborn dolphins learn to swim after birth,

Shawn Noren from the Institute of Marine Science, University of California Santa Cruz, realised that she had the perfect opportunity to find out how [pregnancy](#) affects female dolphins. Joining a pod of dolphins at Dolphin Quest, Hawaii, just before two of the females gave birth, Noren analysed the impact of pregnancy on the animals' streamlined shape and mobility. She publishes her discovery that pregnant dolphins are significantly disadvantaged by their burden and adopt a new swimming style (gait) in *The Journal of Experimental Biology*.

'The pregnant females had huge protrusions where the fetus was sitting towards the back end of the body', says Noren, who donned SCUBA gear and spent a large portion of the final fortnight of the dolphins' pregnancies filming under water as they swam parallel to her camera between their trainers. Noren also filmed the dolphin mothers immediately after their calves were born and at regular intervals until the calves were 2 years old. Comparing the footage before and after delivery, Noren realised that pregnant females were slower. Their top speed was restricted to 3.54 m/s, whereas they were able to swim at much higher speeds after giving birth. 'Two to three metres per second is a comfortable speed for most bottlenose dolphins,' says Noren, 'but these pregnant animals did not feel comfortable going beyond that.'

She also measured the animals' girth and calculated their frontal surface area, and realised that the pregnancy had a colossal impact, increasing their frontal surface area by an enormous 51%. And when Noren measured the drag experienced by the animals as they glided through the water, she discovered that it doubled when the mothers were close to delivery.

The pregnant dolphins also had another problem: their increased fat stores in preparation for lactation had also increased their buoyancy. 'The buoyancy issue is going to be problematic when you are going down

on a dive to capture prey and they are going to need extra energy to overcome that buoyant force', says Noren. So, pregnancy had a dramatic effect on the dolphin's hydrodynamics, but had it changed their swimming style? Did the pregnant dolphins move with a different gait?

Manually digitising the position of the animals' flukes (tail fins) as they beat up and down, Noren discovered that the pregnant females were unable to sweep their flukes as far as they could after birth. They had reduced the amplitude of their tail beat by 13% and they compensated for the reduced propulsion by beating their flukes faster. The pregnant dolphins had changed gait.

Having found how pregnancy affects soon-to-be dolphin mothers, Noren outlines the additional risks that the females face. Unable to outrun predators, heavily pregnant [dolphins](#) are more vulnerable to attack and they may not be able to keep up with the pod if pursued by fishing vessels. Explaining that tuna are still fished using massive nets in the eastern tropical Pacific, Noren says, 'Here is a fast speed event, so it is possible the near term pregnant females are being left behind in the chase. They are reliant on a large pod for protection and cooperative feeding and once the animal is separated it would be hard for it to find the pod again.'

More information: Noren, S. R., Redfern, J. V. and Edwards, E. F. (2011). Pregnancy is a drag: hydrodynamics, kinematics and performance in pre- and post-parturition bottlenose dolphins (*Tursiops truncatus*). *J. Exp. Biol.* 214, 4149-4157.

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