Buoyancy Compensation Device for a Large Mouth Bass, Micropterus salmoides, to Help Alleviate Negative Buoyancy Disorder

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Introduction

Negative Buoyancy Disorder is a common affliction for fish in the aquarium industry. In most cases it occurs spontaneously with no predisposing causes and has a poor prognosis for long term survival (Wildgoose 2000). Most commonly Negative Buoyancy Disorder is caused by one of multiple factors such as fluid accumulation in the gas bladder, gas bladder rupture, displacement, infection, poor nutrition, egg bound, or bacterial infection (Wildgoose 2007). Although Negative Buoyancy Disorder and a possible treatment has not been significantly researched or recorded in scientific literature, it has been reported in hobbyist press and briefly in the Fish Veterinary Journal. Using that collective information, the Wonders of Wildlife team was able to create a Buoyancy Compensation Device to help alleviate the Negative Buoyancy Disorder effecting a Large Mouth Bass, Micropterus salmoides.

Situation

On the evening of 6/22/19 a female Large Mouth Bass (LMB) was found on the bottom of her exhibit ventral side up and wedged under a log. She was recovered and transferred to the quarantine facility at that time. Observations were made on 6/23/19, and after no change in physical condition, the decision was made to perform surgery on the LMB to assess and possibly fix the swollen coelom. On 6/24/19 surgery was performed. The ovaries were egg bound and obstructing the other organs, so a bilateral salpingo-oophorectomy was performed. The gas bladder was also examined and excess air was removed, no fluid was found within it. The veterinarian did note that all the organs were covered in fat indicating fat necrosis, and that the liver was pale yellow. After surgery and post-op recovery the LMB was placed back in the quarantine holding facility. On 6/25/19 the LMB was still lying upside down on the bottom of the exhibit. This was causing lesions to form on the face from constant rubbing on the bottom of the exhibit. To aid the LMB a buoyancy compensation device (BCD) was created.

Design #1

This design was created with a dive weight belt tethered by 10lbs fishing line to a central point on a pool noodle with a 1lbs dive ankle weight attached to the bottom. Design #1 only worked for a very finite amount of time, and then was replaced by Design #2 on the same day.

Design #2

This design was created with a rigid nylon micron filter bag tethered by 10lbs fishing line to a central point on a pool noodle with a 1lbs dive ankle weight (later modified to 8-.5 oz fishing weights) attached to the bottom. Design #2 worked from 6/25/19 until 7/1/19. At that point the LMB's swelling had gone down with treatment and the BCD did not fit anymore. This caused the LMB to slip from the BCD repeatedly.

Design #3

At that point design #3 was created, but it only worked for approximately 3 hours. This design was created with a 1/8” mesh netting bag with a large zip tie support “belt” tethered by 10lbs fishing line to a central point on a pool noodle with no weights. The LMB was placed into a floating isolation basket on the night of 7/1/19, then on 7/2/19 design #4 was created.

Design #4

This design was created with a spanx material supported by a ridged airline tethered by 10lbs fishing line to a pool noodle on a loop with no weights. Design #4 was used from 7/2/19 to 7/10/19, then was removed due to complications.

Design #5

Two more designs were created with a 1/8” mesh netting bag supported by a ridged airline tethered by 10lbs fishing line to a pool noodle on a loop with no weights. Design #5 would have been sewn around the LMB to create a custom fit to fix the slipping problem. Design #6 would have used zip ties and mimicked design #4 just with a different material to possibly fix the pressure necrosis problem. Unfortunately, the LMB passed away before these two designs could be tested.

Design #6

The LMB was also having issues with maintaining her slime coat due the material of design #2. Design #2 was also unable to adjust to the changing body condition of the LMB when the swelling of the abdomen went down. Design #3 seemingly resolved the rubbing and slime coat inhibiting problem. However, because a central point was used to tie the float, there were bunching problems with the material and the LMB kept slipping out. Design #4 was a very effective design. The spanx material was able to adjust with the LMB body condition and also didn’t interfere with the sutures. Unfortunately, this type of material when wet over a long period of time caused pressure necrosis. It stuck itself to the LMB sides and the slime coat ended up adhering to the material. Once this was discovered the BCD was removed and the LMB was placed into a floating isolation basket.

Discussion

Design #1 was not a practical design and its use is not recommended. Design #2 worked very well. It kept the LMB upright and allowed the LMB to move freely about the exhibit with the use of her pectoral and caudal fins. This design also did not interfere with the sutures from surgery. Unfortunately, due to the material of the bag some rubbing occurred on the LMB sides.