Egg binding and hind limb paralysis in an African Penguin – a case report

Monique Anamarie Crouch

This case report assesses the role acupuncture played in the rehabilitation therapy of an African penguin with bilateral hind limb paresis and paralysis following egg binding and a caesarean section. Egg binding is the failure of the oviduct to pass the egg down into the cloaca. In avian species the sciatic nerve runs through the middle of the kidney. Swelling of the kidney tissue due to the pressure exerted by the retained egg will cause pressure on the sciatic nerve which may lead to hind limb paresis/paralysis.

Acupuncture was used to relieve any muscle, joint or nerve pain and to attempt to stimulate recovery of the sciatic nerve. Acupuncture was incorporated into a fairly intensive physical rehabilitation programme to help the penguin to walk again so that it could be re-introduced back into the sanctuary’s captive colony.

CASE HISTORY

The patient was an approximately 1-year-old, female African penguin (Spheniscus demersus), which had been hand-reared in a sanctuary after being abandoned as a chick. The penguin was presented to the local veterinarian after leaving her burrow, unable to walk or stand in an upright position. A diagnosis of egg binding had been confirmed by means of radiography. The penguin had received calcium and oxytocin treatment with no response and hence a caesarean section had been performed to remove the egg. The penguin received 5 days of oral antibiotic therapy post-surgery. She was still receiving pain control injections every 3 days, at 4 weeks’ post-surgery, with a non-narcotic analgesic, antipyretic and corticosteroid combination Dexamonol (ramifenzone, phenylbutazone, dexamethazone and cinchocaine) of which use is off-license in the avian species. The penguin was also receiving a vitamin B supplement daily.

Since surgery, the penguin had lain in sternal recumbency in a crate for 4 weeks. She had been lifted out and supported in an upright position for approximately 5–10 minutes daily at feeding time. There had been no change in her condition and the carer had noticed the muscle atrophy was progressing. The carer approached us 4 weeks’ post-surgery in the hope that acupuncture would help the penguin to walk again.

Clinical examination

The penguin appeared depressed and was recumbent in a sternal position. She had abrasion wounds on the anterior aspect of her flippers. Her back muscles were markedly atrophied. The hind limb joints, most noticeably the hips, were very stiff on manipulation. The range of motion of the hip and stifle joints of both hind limbs, more so in the right leg, was greatly reduced.

Neurologically, deep and superficial pain was present on both sides. The flexor reflex was more suppressed on the right compared to the left. No other neurological reflexes were examined. The left leg was paretic and the right leg was paralytic.

Pain was assessed according to the reports of her behaviour from the carer. The patient was eating and responsive but moody. The carer reported a marked difference in the penguin’s demeanour after receiving pain control.

There were three main problems that we needed to address: first, the paresis and paralysis of the legs; second, the back and core muscle atrophy; and third, the control of the pain or irritation of the sciatic nerve.

Treatment and response

Acupuncture as in fig 1 was included in therapy to manage the pain, to decrease any remaining inflammation in the kidney and to stimulate the nerve recovery. The penguin was dry needled at weekly intervals for 6 weeks using Seirin #5 (0.25) × 30 mm needles. Needles were retained for 5–10 minutes and stimulated at intervals. Points used were GV14 and GB29 and points bilaterally in the long muscles from the scapulae caudally. Initially we attempted to use GB30 and BL60 but the penguin would not tolerate either palpation to find GB30 or needling in her legs. The penguin did not always allow all points to be needled. Her carer, who was the only person who could handle her, held her beak while the needles were placed. Once the needles were inserted she calmed down and sat quietly. After two acupuncture treatments the penguin’s carer reported that the penguin’s mood and appetite had improved. After the third treatment no drugs for pain control were being used.

Acupuncture was used together with a very intensive physical rehabilitation programme involving the exercises shown in table 1.

Initially I was very concerned that the treatment was too stressful for the penguin. As she became stronger she was less willing to cooperate. She would move...
and try to attack me while I placed the needles. From the third session the acupuncture was performed prior to any exercise, when the penguin was less stimulated and more likely to cooperate, which solved the problem. The penguin was not unduly stressed by any of the physical exercise and obviously enjoyed the water.

Wings were bandaged daily to allow the abrasion wounds to heal and thereafter to protect them.

By the end of 6 weeks of acupuncture and rehabilitation treatment, the penguin was able to lift herself to a 45° angle while standing and exercising. She was still unstable while walking. The carer continued with the physical rehabilitation therapy and exercises until the penguin was permanently introduced back into the captive colony. The penguin never walked completely upright again but was able to return to all daily activities, albeit more slowly than the others, except in the water. The penguin died 18 months later in an enteritis outbreak which killed two-thirds of the colony.

**DISCUSSION**

Egg binding is the failure of the oviduct to pass the egg down into the cloaca.1 This condition can be quite effectively treated with acupuncture.2 The penguin was however, not presented for the egg binding. It was presented only later after the caesarean section and failure to recover from the paresis and paralysis. In avian species the sciatic nerve runs through the middle of the kidney. Swelling of the kidney tissue causes pressure on the sciatic nerve which may lead to hind limb paresis or paralysis.

The degree of injury to the nerves in the penguin was considered to be contusion, that is, neuropraxia, as distinct from axonotmesis or neurotmesis. In the latter, where the nerve and sheath is completely severed, acupuncture cannot help to stimulate recovery of the nerve. It is difficult to predict whether acupuncture will facilitate nerve recovery or regeneration as each

---

**Table 1** Physical rehabilitation exercises used for the penguin

<table>
<thead>
<tr>
<th>Exercise</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passive range of motion</td>
<td>All hind limb joints were moved through flexion and extension several times in and out of the water at intervals during the course of the day.</td>
</tr>
<tr>
<td>Assisted standing</td>
<td>The penguin was supported in an upright position manually or in the walking ring three to four times daily. Initially she sat on her back end but after 1 week started to push up on her feet.</td>
</tr>
<tr>
<td>Swimming in washing bath</td>
<td>The penguin spent a few hours daily in the water bath splashing around. Gradually she started to use the left leg and later also the right leg.</td>
</tr>
<tr>
<td>Walking in the walking ring (fig 2)</td>
<td>Twice daily until she became tired.</td>
</tr>
<tr>
<td>Walking up a sponge ramp in water bath (fig 3)</td>
<td>This gave the penguin good grip and worked the core and back muscles as well as exercising the legs.</td>
</tr>
<tr>
<td>Marching on a bean bag</td>
<td>The penguin progressed to marching on a bean bag. She was left on the bean bag for 1–2 h daily. Initially used while on the balance board.</td>
</tr>
<tr>
<td>Assisted standing in a harness</td>
<td></td>
</tr>
<tr>
<td>Balance board</td>
<td>Small movements backward and forward were used to strengthen her core and back muscles while standing.</td>
</tr>
<tr>
<td>Swimming in pool</td>
<td>Later, the penguin progressed to swimming supervised in the pool. We were not sure how she would be accepted back into the captive colony. All went well and the other penguins gave her space in the water.</td>
</tr>
</tbody>
</table>

---

Figure 2 A walking ring was specially made for rehabilitation exercise.
Case report

Figure 3  The penguin was exercised by climbing on a sorbo rubber mat.

patient responds individually, depending on the extent of the injury. It has been suggested that acupuncture stimulation of the lumbar muscles at the level of L6 has an effect on sciatic blood flow, in most cases increasing the blood flow. If this is true, acupuncture in the avian equivalent of the lumbar muscle at L6 could facilitate healing of the sciatic nerve by increasing blood supply and nourishing the healing tissue, so as to restore normal function.

Acupuncture is useful in avian medicine but does have its limitations. The most significant concern is the stress the bird undergoes during the procedure or as in the penguin’s case during the placement of the needles. Birds are highly emotional and intelligent creatures. This is a major factor that should be taken into account prior to treatment. The penguin had grown up in captivity and was handled regularly but it would not have been worth treating her if the stress caused more harm than the benefits achieved from the treatment. No specific points were used to calm the penguin as is commonly practised in pets. The needles were placed while the carer restrained the penguin and then she was left to lie quietly, which was more likely due to the fact she was not being handled than any effect from the needles.

Most acupuncture points are transposed from other species to locations on the bird using anatomical points, blood vessels and nerves. They are assumed to have the same functions. A Western approach was used for the treatment of this penguin. Points were selected on the dorsal aspects that were easy to reach while the carer restrained the penguin. GV14 was used initially to see how the penguin tolerated needling. It is considered to be an immune-enhancing point in mammals and appears to have similar effect in parrots. It is unknown if this effect is also true in the penguin. GB29 was used as a local point for the hip and surrounding soft tissue and is also indicated for hindquarter pain and paralysis in birds. GB50 would have been a more obvious choice with the Western approach due to its proximity to the sciatic nerve but the penguin resisted palpation and so GB29 on the same channel was chosen. We were able to needle this point at most sessions.

Paraspinal needling was intended. Paraspinal needling is segmental acupuncture. It is efficient and straightforward in the veterinary species. In paraspinal needling the multifidus muscle is needled where it lies adjacent to the spinous processes. In birds the equivalent muscle as described, the spinales complex, consists of a nearly continuous series of muscular slips from the synsacrum and ileum as far cranially as the axis. It is the most medial of the three sets of epaxial muscles. The aim was to stimulate the segment that innervated the kidney as well as stimulating the nervous supply to the hind limb. With the lack of muscle mass dorsally on the penguin, the needles were placed in the long muscles of the back, presumably still allowing us to stimulate the required segments. The needling was ideally performed bilaterally from two-thirds down the scapulae to halfway down the synsacrum, the unit of ankylosed vertebrae that articulates with the pelvic girdles to form the bony pelvis. The 15 vertebrae making up the synsacrum represent thoracic, lumbar, sacral and caudal regions.

Compared with mammals, birds are very sensitive. Their neurons have more rapid action and their muscles respond faster than mammals. This leads us to assume that birds are more responsive to acupuncture. The penguin’s demeanour improved markedly after two treatments. The release of endogenous opioids and the resultant pain relief was most likely the reason for this improved demeanour. The use of the pain medication could be terminated after three treatments without any sign of discomfort on the part of the penguin.

Physical therapy played the major role in the recovery of the penguin. The role of the physical therapy was to return the paretic and paralysed limbs to full and normal use. Physical therapy involved the manipulation of joints, bone and surrounding soft tissue of the back and hind limbs to regain a more normal range of motion and then exercises to regain strength and movement in the affected regions.

CONCLUSION

Acupuncture appears to have been beneficial in the treatment of the penguin providing analgesia, improving blood supply to the disused muscle and joints and promoting the recovery of the injured sciatic nerves. The above results could also be achieved with physical therapy treatment alone. We are not able to establish from the case study exactly how much the acupuncture contributed to the response. Although it may appear that the acupuncture played a small part in the therapy, its role was vital in improving the demeanour of the penguin to stimulate her natural instinct to survive.

Acknowledgements: I would like to thank Tina McDonald from Monty’s Penguin Sanctuary for her positive approach and her dedication with the therapy, Anthon for making the walking ring and balance board, Vanessa from SANCORB for providing the penguins for dissection and Dr Pam Miller for her assistance in the preparation of this case report.


REFERENCES


Egg binding and hind limb paralysis in an African Penguin – a case report

Monique Anamarie Crouch

*Acupunct Med* 2009 27: 36-38
doi: 10.1136/aim.2008.000158

Updated information and services can be found at:
http://aim.bmj.com/content/27/1/36

**References**

This article cites 1 articles, 1 of which you can access for free at:
http://aim.bmj.com/content/27/1/36#ref-list-1

**Email alerting service**

Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

**Notes**

To request permissions go to:
http://www.bmj.com/company/products-services/rights-and-licensing/

To order reprints go to:
http://journals.bmj.com/content/subscribers

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/