

ASPECTS OF HAND RAISING THE SHORT BEAKED ECHIDNA (*Tachyglossus aculeatus*)

Leigh Koppman
Veterinary Nurse
Echidna Coordinator – Wildcare Australia
Email – koalacare1@bigpond.com.au

It is apparent that the more we learn about the secret lives of echidnas the less we actually can be sure of. The echidnas that I have cared for over the past 15 years have taught me alot, most of all that learning never ends. This paper hopes to share a few of the mysteries of echidnas and make way for future discussion of their rehabilitation. Echidna handrearing techniques continue to improve however there are still many gaps to be filled in particular at what age the young finally disperses from the burrow and the condition of the mothers pouch from the time of birth to when she deposits the young into the burrow.

Handrearing echidnas is challenging and rewarding. Whilst the initial impression of echidnas is that perhaps they may be an easy care species due to the infrequent feeds many new carers find themselves at their wits end and have many sleepless nights. It is preferable that unfurred infants are raised by experienced echidna carers. Experienced can be gained by starting with adults and working down to younger animals. If you are interested in caring for younger animals spend time with an experienced carer in your area.

Basic biological data

Classification

Order Monotremata, family Tachylossidae

Monotremes are unique because they are egg laying. The word echidna is thought to have to come from the word echidnas - meaning spiny and the genus name Tachyglossus - swift rapid tongue and Aculeatus - with points.

Identification

Easily identified by the back, head and sides being covered by spines, underbelly and in between spines filled with dense fur. Colour varies from dark black to blonde. Some males have a non venomous spur on the ankle of the hind legs.

Habitat and distribution

Echidnas are quite adaptable and are spread throughout Australia and Tasmania within varying habitats including desert, mountains rainforest and grasslands. Anywhere where their requirements of survival are met.

Behaviour

Solitary with overlapping home ranges. Female is followed by one or more males in breeding season August -January. A soft shelled egg is laid around 2 weeks after mating and hatches around 10 days later in the pouch. Females in breeding season have a temporary pouch and lactate through pores on a bare patch of skin on their underbelly.

Diet

Ants, termites and other invertebrates such as beetle larvae.

(Augee and Gooden, 1993)

Have a good knowledge of basic anatomy and physiology; this will aid you in assessment and detecting problems that need Veterinary assistance.

1. Reasons for needing care

Infant and juvenile echidnas are rescued for various reasons. These include:

- Habitat loss
- Orphan
- Domestic animal attack/predation
- Trauma - farm machinery, motor vehicles
- Misadventure

2. Considerations

Before committing yourself to rehabilitating an infant or juvenile echidna, consider the following:

- Permit requirements for your state
- Experience -ideally with adults first
- Time - feeding, food collection
- Resources - housing requirements and natural foods
- Access to a mentor
- Veterinary assistance
- Release technique and sites

3. Rescue and rehabilitation equipment

Equipment required for rescue and rehabilitation includes:

- First aid kit
- Suitably sized plastic tub, lined with soft cloths.
- Various other sizes of tubs and access to outdoor housing when required.
- Feeding tubes, syringes, shallow dishes, sterilizing equipment
- Hand washing solution - Chlorhexidine Gluconate
- Formula - Wombaroo® milks - <30 & >30, Divetelact®, Biolac®
- 2 x indoor outdoor thermometers - preferably with humidity reading
- Heat pad (for critically ill animals only)
- Wombaroo Carnivore mix® or ingredients for other mixes.

4. Rescue

Equipment

- Soft bedding.
- Smooth sided tub - appropriate size.
- Indoor/outdoor thermometer.

In most cases pouch or burrow young have already been contained by the caller. Ensure that the caller does not heat the animal and that the animal is on soft clean bedding in a smooth sided container. Independent young may also be contained if not you will need to scoop the animal up.

5. Handling

I prefer to handle adult echidnas by placing one hand either side of the middle of the animal and scoop my hands under the animal's stomach. Pouch young have no spines so this is not an issue. Cup them in your hand. Burrow and independent young have developing spines however the underside of echidnas is covered with fur so this makes for easier handling. The echidna can also curl over your hand this may allow for a more thorough examination of older young.

Grasping the animal by the hind feet and holding them upside down is distressing for the animal and they may well have significant painful injuries. If the animal can not be examined properly it will need to be sedated or anaesthetised by a Veterinarian to ensure nothing is overlooked in the physical examination.

6. Initial assessment of an echidna

6.1 Record history

6.2 Carry out a Primary Assessment

In an emergency this may need to be carried out whilst giving first aid.
Provide first aid if necessary

Preserve life

Prevent further injury and suffering.

ABCD

- **A - Airway - Challenging in an echidna, ensure their tongue or blood is not blocking the airway. Extend the head/neck.**
- **B - Breathing - Check if the animal is breathing, the Veterinarian or Veterinary nurse can assess the quality of breath sounds**
- **C- Circulation - Check for a pulse - is it strong & regular or weak & thready.**
- **D - Dysfunction of CNS**

6.3 Provide warmth - only if the echidna is in shock or serious ill - preferred temperature is 25°C; temperatures above 30°C are fatal. Ensure there is adequate bedding.

6.4 Minimize stress - dark, quiet and comfortable environment. If the echidna needs pain relief ensure it receives this as soon as possible. Signs of stress in the echidna include: attempting to escape, weight loss, inappetence, abnormal behaviour, fur/quill loss and death. If the animal has a life threatening condition seek Veterinarian immediately.

6.5 Secondary examination.

Having a good knowledge of the normal anatomy and physiology of echidnas will help identify abnormalities to be reported to the Veterinarian. Echidnas are challenging to exam and can be very good at masking problems.

Any echidna that has bruising, broken quills or a damaged beak can have other problems beyond the surface. I have all these animals x-rayed to ensure that there are no fractures and ultrasound if concerned about internal problems. We have had echidnas presented with fractures that were still attempting to burrow. Young echidnas have often been held over by members of the public. They often present dehydrated and need rehydrating sooner rather than later. Usually this requires subcutaneous fluids to be administered.

Consider the use of pathology. Tests can include:

- Full blood count, PCV/TP - ill animals, pre/post operatively
- Faecal - good to do routinely
- Swabs - wounds etc

General assessment points:

- Be prepared. Have everything you need.
- Carry out the examination thoroughly, confidently and efficiently in a quiet environment.
- Be systematic and establish a routine, you can bring important observations to the Veterinarians attention.
- Minimize stress.
- Assess the animal in the pouch or tub before handling it. Is the animal ataxic, unbalanced, recumbent, and conscious?
- Look for both behavioural and physical abnormalities.
- How detailed and the equipment you use will be determined by your level of experience. The Veterinarian diagnoses and prescribes treatments.
- Assess the animal regularly, complete prescribed treatments and attend any rechecks the Veterinarian suggests. No improvement or if the animal is not fit and able to fend for itself = euthanasia.

Echidna Vital signs

Heart rate - 40-60 beats per minute

Respiration rate - 5-20 breaths per minute

Body temperature - 29-33°C

The following procedure may be used

Start at the head and work your way down the echidna's body.

A. Head and neck

Examine the beak - look for:

- Swelling
- Blood (Clear fluid bubbling is normal)
- Obvious fractures and wounds - i.e.: Compound fractures (bone protruding through the skin)
- The tongue if it is protruding - Can you see its colour? (pink normally).
- Echidnas that have displaced beak fractures require euthanasia

Examine the eyes - look for:

- Symmetry and pupil response
- Bleeding, wounds, discharge etc?
- Swelling
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Examine the skull and ears - look for:

- Look for bleeding, swelling, fluid, fractures and wounds
- Check also in the ears for parasites

Examine the neck - look for:

- Wounds, fractures, broken quills (if old enough) and swelling

B. Examine the thorax and chest - look for

- Chest wounds, bleeding, fur/quill loss.
- Note respiration rate, rhythm and quality
- The Veterinarian or Veterinary nurse may auscultate the chest

C. Abdomen and Spine - look for

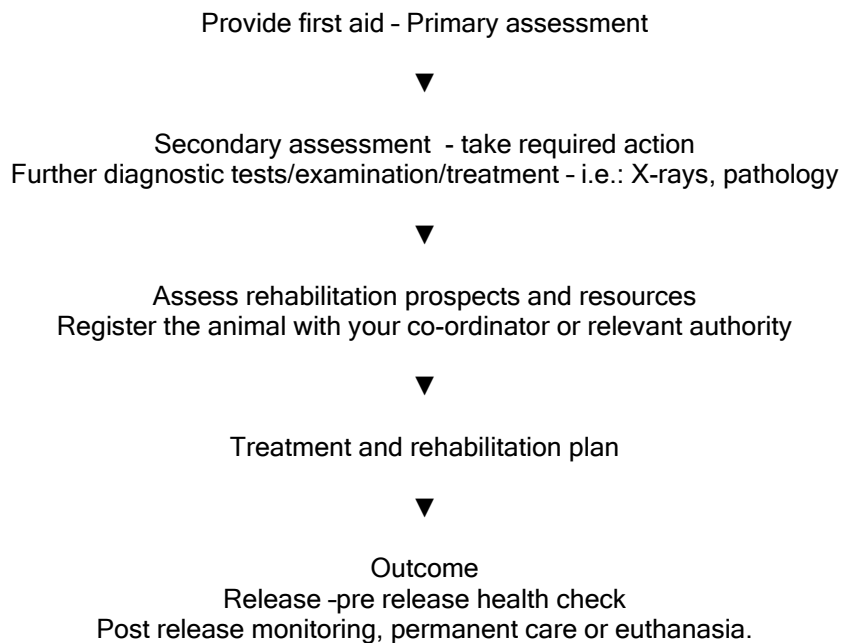
- Wounds ,bleeding and discharges
- Swelling
- Pain
- Percuss and observe for bloat, free fluid etc
- Palpate gently
- Monitor faecal and urine output (often projectile whilst examining)
- Assess spinal function

D. Extremities - look for -

- Assess the position and blood supply to extremities
- Wounds , bleeding and discharges
- Obvious fractures
- Pain

A management plan needs to be devised for the animal.

Summary



Record all your findings.

HANDREARING

Ideally the carer should gain experience with older echidnas first working their way down to infants. Observing wild echidnas is also beneficial and much can be learnt from this experience. Record all details, we need to share information to continue to improve the final outcome for the animal.

Ageing

Adults are not able to be reliably aged. Young however can be divided into two stages.

Stage 1 - Pouch young

These young are around 50 days or less, they are pink initially then develop coloured skin, "fuzzy fur" then denser dark fur. Their eyes are closed. They are carried in the mother's temporary pouch. They are very difficult to raise, come into care infrequently and an experienced echidna carer should be contacted. I keep pouch young at 25°C, monitor temperature using an indoor/outdoor thermometer probe in between the layers in the pouch.

Stage 2- Burrow young

These young are developing small needle like spines. They are deposited in the burrow and the mother returns to feed them at regular intervals. Dense fur continues to grow more quickly than their spines. Eyes open and they become more active. Most of the young I have raised appear to be "drunk" until they are close to weaning age. I keep burrow young between 18 - 23°C, they seem most settled at 20°C and go into torpor when the temperature drops below 12°C.

Pouch young and burrow can be measured by using a flexible sewing tape measure or similar. Run the tape from the tip of the snout up over the spine to the tip of the tail. Weigh the young wrapped in a soft cloth on digital scales.

Weight alone is not an accurate way to age the young, look at all the developmental features. Echidna young under 50 days tend to gain around 5-12 grams between feeds. Echidna young over 50 days tend to gain around 15-20g per day. Around the time solids are introduced weights can vary. Look at weight gain as a trend rather than the actual weight itself. With most young I try to graph their progress. On the vertical axis I put body weight in grams and on the horizontal axis age in days, remember that your initial aging may also be an estimate. As I plot the points I look to ensure that the weight is increasing steadily. Remember that growth charts available are guides.

Housing

For pouch young I use sewn soft flannel cloths inside a flannel pouch. Place the pouch in a well padded smooth plastic tub. Burrow young are placed in a larger plastic tub filled with uncontaminated dirt and leaf litter in hollow large enough to cradle the infant. Suggested size for the plastic tub is 90cmLx60cmWx70cmH.

For weaned young around 7 months old if they require hospital housing a large plastic tub 90cmLx 60cmWx 70cmH is fine. Provide shredded paper/towels to hide in if ill or has wounds or leaf litter and dirt if no wounds.

Considerations for a pre-release yard (place young in when weaning or weaned)

- Escape proof.
- Safe flooring
- Deep layer of dirt, logs, litter & grasses to hide in - I find they dig burrows ranging from 15-30cm.
- Logs, termites etc
- Temperature - need to be able to keep cool
- Smooth sided (1.4m - iron/Perspex) - echidnas can climb and also damage their feet and beaks.
- Water - large bowl -like to lie in on warmer days.
- Away from domestic noises.
- Predator proof
- Spot clean and change litter/dirt regularly.
- Dimensions for 1 animal - 4mLx3mWx1.5m+H

Hygiene

As with all orphans hygiene is vital. Echidnas are susceptible to infections. Sterilize all feeding equipment with a solution such as Milton® and then boil (10 minutes) or sterilize in a baby sterilizing unit in the microwave (follow manufacture's directions).

If I am using an infant gastric feeding tube I use a new tube for every feed.

The infant needs to be cleaned of any milk spilt or faeces when necessary. Use a soft cloth with warm pre-boiled water.

Change bedding as necessary. Pouches/liners should be soaked in an antibacterial laundry soaker, washed and then hung out to dry in the sun or placed in a dryer.

Burrow young should have their dirt changed every few days with faeces and urine spots removed as necessary.

Wash your hands before and after feeding or when you need to handle the echidna. I use a Chlorhexidine Gluconate hand wash.

Formula choice

I choose to use Wombaroo® echidna milks. Choose the appropriate milk depending on the animal's stage of development. I have had very consistent growth rates and feed every 48 hours depending on the echidna's history. Ensure you follow the manufacturer's directions for whichever formula you choose to feed with, your quantities and time between feeds may vary. Remember that echidna young in the wild have more than 48hour intervals between feeds. Monitor the young's progress closely, look for signs of dehydration. Offer cool boiled water if needed.

Young echidnas suckle milk patches on their mothers stomachs, there is no teat and the young feeds rapidly and infrequently (B.Green pers.comm). Initially I attempt to feed the young every day for around 30-40 minutes until it learns to feed. Usually healthy young will learn after a few attempts. I have had a few sick young that have needed to tube feed with an infant gastric feeding tube. Please do not attempt this unless you have done it before. The tube needs to be inserted into the stomach blindly (can see well in unfurred animals) when it pokes its tongue out, take care not to damage the beak or gut itself. Incorrect insertion can result in milk be directly placed into the lungs. Try to get lapping as soon as possible, I leave a small amount of milk on the tube so the animal can taste it on their tongue.

When weaning I add Wombaroo® Carnivore mix into the milk, reducing the milk fed and making a slurry then more crumbly mixed with water, ants and termites over 3-4 weeks. Alternatively I use the following high fat mix if the young has been difficult.

Prior to feeding the diet is mixed with an equal volume of water to form a slurry. Termites and termite dirt are also added. The ingredients need to be blended together well and can be frozen in portions. The avidrops (not available) have been replaced with soluvet drops.

Reference: Bellamy, Teri (1994) Handrearing native animals - Echidnas. "Wildlife". The T.G. Hungerford Refresher Course for Veterinarians. Proc. 233, 24

I use premium mince and calculate the amount of supplementary diet required using the suggested amount of 12g/kg body weight per day.

High fat Diet

Ingredient	quantity g/1000g Diet
Minced beef	554.2
Egg (2)	132.4
Glucose monohydrate	87.6
Wheat bran	92.6
Olive oil	71
Calcium carbonate	35.5
Soluvet drops	4 drops/100g food
Equine E	13.2
Total	1000.0g

Feeding technique

- Have everything ready including your patience.
- Wake up the young gently if in a pouch or by moving the substrate for burrow young and cup in your hand to warm.
- They usually urinate or pass faeces once they are woken up.
- Initially the young needs to be taught to dab the milk from your hand (wash well). Sit in a comfortable chair next to a table. Have the young sitting on its rump on a cloth on your lap. Allow their front feet to sit on one of your palms.
- With the other hand drip the warmed milk onto the palm of your hand. Gently encourage this action by moving the beak on your hand.
- Continue to drip milk onto your palm as the young sips it up. Once taught they consume these large amounts of milk over a half an hour or so period of time.
- As they feed their stomach expands and they are quite large when they finish.
- They tend to fall asleep at the end or near the end of feeding.
- Wash all excess milk off and dry the animal.
- Return young to pouch or hollow in tube of dirt and leaf litter.
- The amount of milk taken can vary however when feeding Wombaroo® I have found that they take close to the amount suggested.

Echidna progress chart

This progress chart has been based on echidnas that I have had in care in Northern NSW and SE Queensland. Compared to young I have cared for in NSW in general they appear to develop a little more quickly and not to go into torpor for long periods over the cooler months. Their weights as with most echidna young have varied greatly and this chart is a guide only. They are all individual. The feeding regime described is when I use Wombaroo® milk and any differentiation from manufacture's guidelines does not reflect advice or instructions given by the company.

Echidna progress

Body Length (mm)	Age (days)	Weight (grams)	Development	Housing
111-115cm	25 (October)	70-90	Pink, eyes closed, colouring on beak. No skin care unless very dry (small amount of pure lanolin/wool fat), faeces is yellow custard consistency.	Pouch (folds of sewn flannel fabric) inside flannel pouch, in small plastic tub. Air temperature 25°C (They would be in contact with their mothers skin). Be guided by the animal. When overheated their skin becomes red and they become very agitated and will not go back to sleep. They toilet when picked up before feeding. Milk dependent. Feed every 48hrs. For pouch young I give them a course of Amoxycillin injectable + Nilstat (standard dose rates - consult your Vet)
	30	90 -120 Large differences		As above
125-140	35	170- 195	Slight colouring-few fine hair coming through	As above
	40	225-265	Skin colouring - darkening - more fine hairs	As above
165- 180	45-60 (Nov/Dec)	300-390	Skin blue-grey colour, fur still growing, small dark spines coming through	Move the young into an artificial burrow.
200	60-70 (Dec)	390-450	Eyes open, spines continue to grow, hair becomes thick & shiny. Faeces are now more formed.	Enough to place the young in. Keep the air temperature between 18-25°C. The young I have had appear to be most settled at 20°C. Allow some access to natural sunlight - avoid overheating.
	90 -110 (January)	350-500	Continues to develop	Can wake self in hollow and moves around a little
Varies now	120-160 (February-March)	500-800	Body covered in spines, looks like miniature adult	Can teach to lap from sturdy dish, do not allow echidna to sit in milk.

Body Length (mm)	Age (days)	Weight (grams)	Development	Housing
	180 -210 (March - April)	800-900	Faeces are now firmer cylindrical pellet shaped.	Start weaning - decrease milk and introduce solids. More co-ordinated and starting to explore around tub. Move to pre-release yard, small amount of supplementary diet, provide. Provide a sturdy water bowl. Growth slows over cooler months, wakes sporadically, feed when awake.
	300 August	750-950	Fully developed, spines continue to lengthen	Weaned, solid food only, weight will decrease when less active & feeding less.
	330-350 September	1000 -1400	Fully developed, spines continue to lengthen.	Release- can occur earlier depending on the weather & when the young was born, they are totally independent around 10-12 months.

Release

Prior to moving the young into a pre-release enclosure and release I take a faecal sample to the Veterinarian to be looked at. If it is clear then the young can be moved into the yard or released. If housing more than one echidna together ensure that they have been quarantined.

Prior to release consider the follow:

- Provide the young with large amounts of natural food and vegetation to encourage foraging skills. Releasing an animal that has only been fed a supplementary diet would not be in the best interest of the animal.
- When choosing a release site the animal should ideally go back to where it came from. However if there is a habitat or domestic animal problem then a more suitable location needs to be chosen. Remember that these animals have large home ranges and the animals release should not impact on existing populations. Ensure there are adequate food sources, water and shelter.
- Consider hard or soft release. I try to soft release when I can, I am very interested in finding out what happens when the echidna is released.
- Choose a cooler time of the day, dusk or early morning, remember they are nocturnal.

For obvious reasons echidnas can not be ear tagged however there are several methods of identification that can be considered. A piece of coloured plastic tubing can be glued to a quill. Ensure it fits well and does not rub the skin. I have been microchipping individuals. A microchip is inserted using a sterile technique into the lateral flank area, under Veterinary supervision. We are looking at radio tracking a group of young echidnas that came in as orphans, using glue on radio transmitter, in conjunction with some University students. We hope to be able to follow the echidnas for several months, monitoring how far they travel from the release site and their daily activities.

There is much to be learnt about echidna young and how they interact with their mother. To improve and further understand the conditions that pouch young live in, we hope to be able to study the temperature and humidity of the mothers pouch.

Read widely, make your own notes about the animals that come into your care and be prepared to share data that you collect.

Best wishes with your echidna encounters.

References

1. Augee, M. & Godden, B. (1993) Echidnas of Australia and New Guinea. New South Wales University Press.
2. Bellamy, Teri (1994) Handrearing native animals - Echidnas. "Wildlife". The T G Hungerford Refresher Course for Veterinarians. Proc 233, 24.
3. Green, B., Griffiths, M. & Newgrain, K. (1985) Intake of milk by suckling echidnas (*Tachyglossus aculeatus*) (Shaw) Comp. Biochem. Physiol, 81A, 441-44.