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Hi-tech medicine and surgery! Super Glue as a means to fix open wounds in reptiles.

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ABSTRACT

Stitching large lesions in emaciated small reptiles poses logistical problems in that the skin is too weak to hold the sutures required to keep the wound shut.

As a means to get over the problem, commercially available "Super Glue", a common type of quick drying super strength glue, as sold in shops has been found to be a quick and effective means to seal gaping wounds by joining skin tight with healing success the usual outcome.

Keywords: Snake; python; Olive Python; Centralian Carpet Python *Liasis olivaceous; Morelia bredli*; Australia; super glue; open wounds; sealing.

DETAIL

Over more than two decades, I have used so-called "Super Glue" as means to seal wounds in snakes and lizards that would otherwise be difficult to suture up in the usual way.

While there are numerous examples I can give, all of which have been successful (none unsuccessful), only a limited number of examples are given here.

They are however sufficient to show how the process works and why it has been successful.

"Super Glue" is a generic term to describe a number of similar commercially available glues. They come in a tiny tube (5-6 cm long) and the glue itself is clear like white wine. In tiny amounts it bonds almost instantly (or a few seconds) and the bond is very tight and hard to break.

While it does degrade with time, it is excellent for fixing broken china, ring settings, rubber, some plastics, tiles and toys. The principal ingredient is Cyanoacrylate, which is toxic. When sold it comes with a safety warning to avoid contact with the skin and eyes and to avoid breathing the vapour.

Notwithstanding the preceding, dried glue itself is relatively inert and the dangers from this glue arise from the wet form as it emerges from the tiny tube it is packaged in.

The biggest risk when handling the glue is that because it bonds in such tiny amounts one must be careful not to leave drops around or accidentally touch and bond materials together, including for example two fingers.

Because of the bonding issue, one must be very careful when using the glue to fix products such as broken china. Obviously if the glue is to be used on a living and potentially moving animal, these warnings and safety issues become even more important.

On 27 February 2018, I received a severely emaciated young *Liasis olivaceus* Gray, 1842 with a minor infestation of parasitic snake mites.

While the snake had been hatched a year prior, it had not eaten for most of the previous year and so had only grown slightly since hatching and was extremely thin.

In effect the snake presented as a newborn sized snake in emaciated condition.

The mites were removed by way of spraying in a near sealed box and the snake placed in a small mite-free cage of the usual rack-style set up.

In this case it was in a 30 cm (12 inch) long tub, being about 20 cm high and wide.

There was a heat mat under one end and cool at the other.

The tub had newspaper as a substrate and a cut plastic container to form a hide at the warm end, which as a matter of course the snake would rest in.

A day after arrival, the snake was offered a so-called pinkie, being a pink coloured young mouse (no hair), the mouse having been thawed from a freezer. It was refused and so the snake was force fed.

The feeding process was repeated with five pinkies four days later after it was clear that the first had been digested in the usual way.

The force-feeding involved holding the head and front end of the snake in a tight grip and forcing the food item with tongs past the mouth and into the neck of the snake, where as a rule it would then proceed to continue to swallow until it ended up in the stomach region of the body.

After some days following the second force-feeding, I did on 10 March 2019 the same feeding process with a so-called fuzzy mouse, weighing about 8 grams. While the head and neck were easily able to expand to take the girth of the food item, what was not expected was that instead of expanding in the usual way, the skin on the neck split along long lines and yielded grey flesh and

bone underneath. While the snake only measured about 60 cm in length at the time, each gash (there were two) measured about 4 cm in length each (see images on page 64).

It was clear that due to the emaciated condition of the starved snake that the skin had become almost like paper and broke in the same way as weak paper would. The wounds, while completely clean, needed to be shut immediately as there would otherwise be an intolerably high risk of infection and death.

Clearly no sutures of any form would have been able to be used to close the relevant wounds as the skin would not have had enough strength to be able to hold the sutures and stay shut as the snake moved about.

Instead Super Glue was used to seal the wound.

With one person (daughter Adelyn Hoser) holding the snake in a rigid way, she also used her hands to close the gap and hold it the same way.

Using Super Glue I then put a tiny amount across the joined areas of skin and this bonded immediately. Excess was removed as fast as possible and the skin area of the snake where the glue had been applied was checked to be totally dry before the snake was allowed to move about. The snake was also gently wiped and monitored for some minutes to ensure no inadvertent bonding occurred (see image on page 64).

Significant in this case is that while the snake's skin had broken apart, there was no open wounds as such with bleeding and so none of the toxins of the glue had any ready access to the body fluid system.

As mentioned already, dried glue is inert and so as expected there were no signs of glue toxicity to the snake.

Noting the nature of the operation detailed herein and the weakness along the line of joining, the snake was not fed again until after it shed its skin which was only 13 days later (23 March 2019) and anticipated.

The cage was saturated in the days preceding the shedding to ensure maximum ease and reduce risk of breaking open of the wound area. When the snake did in fact shed its skin, the wound had effectively completely healed and all that remained was a discoloured grey line where the break had been (see image on page 64).

The snake was force-fed four more pinkies immediately after shedding (the cage now being dry again) and this was repeated five days later.

Five days after that the snake was deemed to be in far better condition as compared to when received and was force-fed a so-called fuzzy mouse, weighing about 8 grams.

As it was pushed down the neck region with use of tongs, I was surprised that as before there was yet two more splits of the skin as previously, but these two were 5 cm in length, being longer than before.

These were sealed in the same manner as previously and again the snake was not fed until shedding its skin.

That was in fact 20 days later.

The process this time was as for previous, in that the snake was kept in a saturated wet cage in the days prior to shedding and the wounds had basically healed when the new skin was visible.

Due to the risk of relapse, feeding of the snake in following weeks was particularly conservative, being only pinkie mice for the first four feeds and then on feed five a so-called fuzzy mouse, weighing about 8 grams was force-fed to the snake.

In this case the mouse was forced past the jaw and into the neck, but no further, at which point it managed to get the mouse down all the way by itself and without causing any re-split of the skin.

At the time this paper was written in May 2019, the snake has continued to be force-fed fuzzy mice of about 8 grams, which it takes as explained above and has continued to grow larger and more robust accordingly.

Quantities of mice have been upped to be 3-4 at a time, equating to feeds of adult mice and due to frequency of feeding the snake has become well-fed and now on a good growth trajectory.

However due to the extremely restricted food intake of the first year of its life, the snake is likely to mature as a small adult.

At end June 2019, the snake was assist fed an adult sized mouse for the first time and there was no issues with skin split on the sides.

In 2016 I was presented with a pet Green Tree Frog *Litoria caerulea* (White, 1790) that had been slit with a knife or something similar. Using a method similar to that described above the inch long cut was sealed shut and the frog held for a short time in a dry plastic tub, with care to ensure that it did not itself adhere to the surface.

The cut healed and was shed a month after being sealed.

In 2015, an adult female Centralian Carpet Python *Morelia bredli* (Gow, 1981) of 10 years of age was bitten by another of its species while being shipped to a Hands-on Reptile Show and discovered with a 5 cm long gash on its back on arrival at the event.

As soon as practicable the snake had the wound sealed in the manner as described above and it also visibly healed to all intents and purposes. During the healing time for all relevant animals, including this snake, they were never handed in any way (except perhaps to move gently when cleaning a cage) and none were used in reptile shows or similar.

In the case of the adult female Centralian Carpet Python, I did however make an error and inadvertently took the snake out of its cage and loaded it into a box of snakes for a reptile show just 4 weeks after its wound had been closed.

While being handled at the show, the wound was broken open.

The snake's wound was again sealed, this time using the normal sutures method and the stitches remained in for several months and the wound did not ever re-open. The snake now has minor scarring on the cut line and that is all.

In this case, it was a large strong 2 metre python and the skin was certainly strong enough to hold sutures. The only advantage of the use of Super Glue in the first instance was ease of application and had I not by way of oversight, handled or caused to be handled, the snake too soon after the wound had been sealed with Super Glue, I have no doubt at all that it would have sealed in the same way as occurred for the Olive Python detailed above.

Even as of end June 2019, that snake has never been handled, except for feeding and cleaning purposes and it is unlikely to be handled at public reptile shows for several months beyond this date and only by the stage that any likelihood of re-opening of neck wounds is gone.

Note that they appeared 100 per cent healed at end June 2019.

However in the case of that snake, the risk seems to be from feeding, rather than external means and so size of food being force-fed (or taken) is more the issue.

In summary, Super Glue, administered with extreme care is an effective part of the armoury of a herpetologist and reptile veterinarian in terms of sealing wounds in snakes, lizards and frogs and potentially other small animals in cases where the skin may not be easily sutured or other relevant factors are at play, including for example immediate access to sutures, when Super Glue is available and on hand.

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CONFLICTS OF INTEREST - NONE.

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Images (Raymond Hoser): Top, skin split on emaciated 1 year old python.
Middle: Skin sealed and dried with "Super Glue"
Bottom: Sealed and healed wound 13 days later after sloughing skin.