

PAIN MAKES VENOMOUS SNAKES BITE HUMANS

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ABSTRACT

While many reasons exist for snakes to bite people, for the first time ever, this paper proposes the hypothesis that the main catalyst for snakes to bite people on most occasions is in response to pain inflicted on the snake, or to a lesser extent fear of that pain based on recent prior experience of pain inflicted. This is particularly so in the case of highly venomous species from Australia, the main subject of this paper. The basis of support for the hypothesis stems from observations of live snakes interacting with humans in a range of situations as detailed here or cited, snakes interacting with one another and alone and finally a series of controlled situations or tests with results that became predictable and are corroborated with results published elsewhere.

Another commonly alleged driver of snakebite is fear on it's own (in absence of pain), which is shown here not to be as significant a factor. In that situation, "flight" or "fleeing" is the main outcome for the snake and over-riding natural response.

So-called "food bites" are common in captive situations involving people and their "pets", and not driven by pain, but in totality involve a lesser number of serious bites. Contrary to widespread perceptions, there is no evidence at all for so-called "aggression" being a driver of snakes biting people.

The same hypothesis was investigated for Australian pythons and colubrids and yielded the same results.

Put another way, animal cruelty to snakes often results in snakebites and as a rule, the blame for the bite must be placed on the human.

Keywords: snakebite, venom, bite causes, LD50, John Lucas, Steve Irwin, Crocodile Hunter, venomoid, devenomized.

INTRODUCTION

Venomous snakes are unusual in the animal kingdom in that they are for most people the only dangerous animal they are likely to encounter in their day-to-day lives.

Most other dangerous animals in the form of Lions, Tigers, Sharks, Crocodiles, Bears and so on are now generally exterminated (by humans) from inhabited areas, confined to well-defined "reserves",

or otherwise found in very remote places where people generally don't go.

As snakes remain the only animal found even in urban areas, still potentially able to kill people, there remains a reasonable fear of them. Combined with the likes of TV shows and movies like, "Snakes on a plane", "Anaconda" and even "Crocodile Hunter", it's not surprising that a sizeable proportion of the population has a general idea that snakes live for no other reason, but to bite and kill people.

The result is a widespread anti-snake phobia or fear, often to a degree way out of proportion to the actual risk, even for situations when snakes are physically encountered.

Unfortunately this view often translates to so-called herpetologists, with a sizeable number of venomous snake keepers echoing these sentiments, either in their writings, their handling methods or what they put into their video productions.

There is also a strong financial incentive for many TV presenters to exaggerate the dangers of snakes to shore up their own "credentials" and marketability.

Persons with a greater knowledge of snakes soon realize that killing people is not a thought that routinely enters a snake's head, even for the deadly species.

However because deadly snakes are just that, "deadly", handlers must take all reasonable precautions and as a rule, use force to prevent them having the slightest opportunity to bite the handler.

Observations over the last five years in particular have shown that this forced restraint, even with so-called handling sticks, "pinning" or simply "tailing", inflicts sufficient pain to drive a snake to try to bite.

Later parts of this paper give examples of situations involving snakes that show pain alone is what drives them to bite in the situations given. This is a stark contrast to most of the printed and video publications that assert that fear alone, or alternatively some form of aggression is what is driving snakes to bite.

MATERIALS AND METHODS

The basic method of most of what follows, is a summary of observations of snakes over three decades, but in particular the period since end 2003.

In 2003/5, I acquired specimens of what are often reported as the worlds five deadliest genera of snakes (by venom toxicity to mice/humans and LD50 numbers), (in order *Parademansia* Inland Taipan/Fierce Snake, *Oxyuranus* Coastal Taipan, *Pseudonaja* Brown Snakes, *Notechis* Tiger Snakes and *Acanthophis* Death Adders), all being Australian elapids. Even allowing for differences in opinion, these five genera must rate as being among the most toxic in the world based on LD50 results.

In a world first all were surgically de venomized (made "venomoid")(See Hoser 2004, Hoser 2005 and later papers for the details of the method). The subject snakes remain healthy and breeding as of the time of this paper (2008).

This paper is not about venomoids or the operation, but the following points must be made in the context of this paper. The operation is simple and effectively painless and risk-free for the snakes (in as much as

any procedure is) with no adverse results to date. Behavior immediately post operation is "normal" and gives no indication of pain or suffering and the snakes will eat immediately post operation, which is perhaps the best indicator of this general state of well-being.

In all other ways, the behavior of the snakes is unaffected. However by removing the element of bite risk from the snakes, the need to forcibly restrain the snakes is also removed as damage from bites becomes effectively nil.

Contrary to reports on the web (e.g. "www.aussiereptilekeeper.com") and elsewhere, no bites from venomoids have ever (to end 2008) become infected or cause any complications, the only effects being spots of blood from the fangs. Perhaps the fact that these Australian taxa have smaller fangs than North American and other taxa should be noted here, on the basis that particularly large-fanged taxa may be able to inflict sizeable wounds with their fangs.

My own venomoids have bitten myself and other people over 20 times (over 5 years), with no bites treated in any way and no adverse results of any form.

Further to that the snakes have been lined up and forced to bite me, one after another to show that 1/ The snakes still have fangs, 2/ The snakes have not had their mouth's superglued shut as claimed on the internet and 3/ The snakes remain non-venomous (as in de venomized). This has been videotaped many times, involving many dozens of forced bites.

In the past "free-handling" deadly taxa was regarded as either an act of bravado (like for example the late Steve Irwin regularly did on TV to claim he was "the best"), or stupidity, if and when the handler got a bite, as sometimes happened, and presumably happened with Mr. Irwin when he obviously tormented a Stingray in the same way he tormented other animals, got stung and died with the cameraman still filming.

One of the things that never escaped the attention of myself and others was how often a person could free-handle one or more deadly snakes (usually tame pets) before a bite actually occurred, if at all.

Put another way, it's never been the case that free-handled deadly specimens necessarily bite on the first time they are free-handled!

By contrast, "free handling" non-venomous taxa such as pythons was not regarded as brave, stupid, or requiring intestinal fortitude, but rather the acceptable means of handling on the basis of welfare advantages for the snake.

It is universally agreed that non-venomous taxa don't need to be forcibly restrained or stick handled

and that the need to inflict the pain of “tongs”, “pinning sticks” and the like isn’t justified.

With the venomoids (above mentioned) now being effectively harmless and non-venomous snakes (as for taxa like pythons), it made sense to handle them as such.

Within months of the first operations in 2003/4 it became clear that venomoids didn’t regenerate venom (as often alleged on the web, see again www.aussiereptilekeeper.com or thread at: <http://www.venomdoc.com/forums/viewtopic.php?t=2404>), with this fact confirmed not just by testing the snakes, but by the inevitable bites that occurred when “free handling” them, bearing mind that these particular snakes were often handled for several hours a day, days on end.

Also and contrary to the malicious posts on the web just mentioned, all our venomoids have been inspected by Dr Rob Zelesco, a registered practicing veterinary surgeon of decades experience and accurately certified as such for several government authorities in several jurisdictions!

Besides the welfare considerations against using sticks to handle non-venomous snakes, there was also the simple matter of convenience.

It is easier (and more time effective) to simply shove your hand into a cage and grab and remove the (non-aggressive) snake by hand, rather than manipulate a stick under or on top of the snake.

This is especially so when up to thirty venomoids may be removed and carted off for a “show” on a given day.

Hence by mid 2004, none of our venomoids saw a handing stick again and that’s been the case for all of them in the four years since.

It should also be noted that our venomoids are handled and used daily for educational shows at schools, universities, events and the like by myself and several other licenced assistants and that in our jurisdiction (Victoria, Australia), it’s been illegal since mid 2005 to use venomous snakes not de-venomized under section 32 of the Occupational Health and Safety Act.

Our venomoid snakes included many Eastern Brown Snakes (*Pseudonaja textilis*) and Taipans (*Oxyuranus scutellatus*), often cited as being the most aggressive and intractable snakes in the world.

Contrary to my own past experience and that of others, these allegedly aggressive snakes lost their aggression to me as a handler and urge to bite almost immediately after they were free-handled on a regular basis. This same non-aggression carried through to other people.

The most extreme example of this I can document

being seen in the Jaffa/Collett’s Snakes (*Panacedechis colletti*), a pair of males which were handled by over 600,000 people (most with no experience with snakes) over a 3 year period (end 2004-end 2007) and without ever biting anyone! Meanwhile bites from stick handled snakes of this taxon are common involving well-known reptile people!

Our venomoids did bite (as already mentioned), but one interesting statistic emerged at this facility. That is on a basis of hours a given taxon is handled, either “in house” or when elsewhere the number of bites from our pythons (mainly genus *Morelia*) actually exceeded the bites we got from any or all of our elapid taxa!

When doing our shows, the most common question we were asked was “Why don’t your deadly snakes bite?”

Underlying the question was the presumption that venomous snakes must have an inherent urge to bite people, which they don’t.

The answer wasn’t because our snakes were venomoid, because there was no evidence to suggest the operation changed the snake’s behaviour or that snakes know they are either “venomous” or “non-venomous”. The answer became, the non-biting was a direct function of the fact that the snakes were not being forcibly restrained and didn’t respond adversely to it (in pain).

The function of the forcible restraint that causes the aggression therefore had to be the high degree of pain inflicted at the time.

This pain (cause) and subsequent effect (the bite), became the basis for the assertion (hypothesis) in the abstract of the paper and subsequently a number of experiments were done to test and/or corroborate the hypothesis.

Other aspects of the study included observations of situations that led to otherwise non-aggressive snakes biting as well as other snakes elsewhere, including in other collections as captives and also wild and wild-caught snakes.

VENOMOIDS THAT BITE!

Before detailing venomoid bites, it should be mentioned that venomoids are effectively harmless immediately post operation due to the procedure of the operation. The mouth region is irrigated liberally with water at the start and end of the procedure, literally washing away venom remaining. While residues no doubt remain, tests immediately post operation showed that the snakes were unable to kill mice with bites after the operations.

On that basis venomoids were deemed harmless a

week post operation and from that point on, all were only “free handled”.

Getting the venomoids to bite was never hard (see later), although it wasn't actually something I set out to do.

The contrary was actually the case.

Venomoids were never confronted by hand-waving in front of them (except for feeding food items at end of tongs). Venomoids were never “tailed”, (by this I mean picked up from the general caudal/vent region to support all or most of a snake's weight).

Venomoids were never “necked” or pinned to be handled in that manner.

As a rule venomoids were only handled mid-body (including often being draped around a person's neck), with body supported in a non-restrictive, non-painful to the snake manner.

While in these situations bites from venomoids were rare, they did sometimes occur and the reasons ascertained.

The situations where the venomoids bit handlers were assessed.

While records were only kept when both fangs penetrated and broke the skin, the results were effectively unchanged if including so-called partial bites.

All venomoid bites fitted the following parameters

- Newly venomoided snakes that had been formerly handled via means of sticks, tailing and the like and still in fear when approached by a handler. One such example was when a newly venomoided Inland Taipan (*Parademansia microlepidota*) bit me. That snake had only been venomoid for three weeks.
- When a group of snakes was held as a bunch and the weight of some pressed onto another, inflicting pain on the snake, the result being it either bit another snake or the handler. One such example again involved another Inland Taipan, and again the snake in question was newly venomoided.
- In a similar situation, usually at times of mating, a male snake would bite another when a group (usually of several) was being held in hand, often resulting in retaliation by the bitten snake. The retaliating snake bites the nearest “live” object, being either another snake or on rarer occasions, the handler.
- When a snake was in pain through illness. Two such cases occurred with Tiger Snakes (*Notechis scutatus*), one infected with a virus (from which it recovered) and another that had been treated with worming treatments (Panacur/ Droncit). The snakes were normally totally tractable and “non-biting”. Same has been observed in pythons in identical situations.
- When a snake was rapidly grabbed by the neck. Two instances of this occurred with Death Adders (*Acanthophis* spp.), in both cases the snakes were grabbed tightly by the neck and responded by pulling back, with mouth open and effecting “a bite” at the same time. Both were full of feces from large feeds and about to defecate as well, putting the snakes in pain. Similar occurred with a Coastal Taipan (*Oxyuranus scutellatus*), that was being forcibly held by the neck, being administered worming drugs, that pulled back and with mouth open “bit” me, while pulling back (as opposed to striking at me).
- Two so-called “food bites” involving a Red-bellied Black Snake (*Pseudechis porphyriacus*) and a Tiger Snake, when the snakes struck past the rodent being held by short (25 cm long tongs) and bit the hand of the handler (myself).
- On at least two occasions I inadvertently put my finger inside the mouth of a Tiger Snake being handled as a group, because I wasn't looking at the snake's head. The snake then pulled back and by closing it's mouth to at least a limited extent “bit” at the same time.

The last examples are significant in that it shows the casualness in terms of handling the venomoids with regards to consequences of bites. With the venomoids being handled daily, so long as the snakes were being supported (their weight), the position of the head was almost irrelevant.

In other words, the bites were accepted as a trade-off for allowing the snakes to be unrestricted and on the basis it was to the snakes welfare benefits to be “free handled”, even if myself and my staff got a few pin pricks from elapid fangs.

Of relevance to this paper however is that in all cases the cause of bites was pain, the only exceptions being the cases where real fear (based on immediate past experience) of pain drove the snakes to bite, two bites involving placement of hand in mouth and two "food bites".

Notwithstanding the above actual bites there were other times that the venomoids tried to bite and without success. Usually involving newly venomoided snakes of certain taxa (e.g. Tigers and Copperheads), the snakes would strike at me, often deliberately missing and often with mouth closed. These were so-called "warning bites". In identical situations when the same snakes were presented with food, they'd strike and bite their food items, proving the "warning bites" misses to be deliberate. Once the snakes got used to being hauled out of the cages mid-body on a daily basis, the warning bites and associated hissing would stop.

(For the record we find that regularly handled snakes actually like being picked up and handled because the surface of the human body is thermally at about the preferred temperature for the snake, as in around 30 Degrees C, and more often than not the snake is emerging from a cage or box much cooler).

However the main time that venomoids would bite was if and when they had to be "necked" to give them drugs, force-feed them or similar.

All snakes at our facility are treated "shotgun" for internal parasites every 6 months on average. This involves "necking" the snakes and administering fluid via a syringe barrel.

Because most of the venomoids are extremely tractable, they are allowed to crawl through the hand, which is gently closed shut over the head and neck and then the snake is given the drugs.

Because there is no venom involved, the handling of the snakes is somewhat looser and more gentle than would be the case if life was at risk.

Amazingly, in most cases the snakes do not struggle and the dosing of them is generally quick, easy and relatively painless for all.

However in some cases snakes can struggle and pull back, which they may do.

The small number who do this are then "pinned" using an appropriate stick and at this point some invariably try to bite.

Again the driver of the bites is pain, inflicted by the stick over the head or neck, as even when free-handled after being pinned and drugged, the same venomoids do not often try to bite.

The three Red-bellied Black Snakes at our facility were acquired in early 2004 and infected with a

reovirus at time of receipt (Hoser 2003a, 2003b, 2004/5, 2007b) . One was adult, the other two were a year old.

They were administered Baytril (Enrofloxacin) orally on a daily basis for some time. When the snakes were in an established recovery mode in mid 2004, all were made venomoid, but all continued to be force-fed for some time beyond this point.

When pinned to be fed, the snakes would routinely try to bite.

The snakes all first voluntarily fed in late 2004 and have been trouble free captives since and remain alive and well as of mid 2008.

In the four years since being made venomoid, none have ever bitten when being handled. These snakes are handled several times a day, most days of the year and always "free handled".

As already mentioned, in 2007, one of the trio bit me when feeding it which isn't surprising considering the aggressive feeding response of these snakes.

Notable however is that in the absence of pain, there has also been an absence of bites.

With these snakes and most other venomoids (of all taxa), it's extremely difficult to get these snakes to open their mouths in the absence of food. At demonstrations I can slam their heads into my face and the mouths are held tightly shut. When packing them into small boxes, the snakes are bundled up and shoved in, pushing them face back into the box, if the snakes try to move forward. Again they keep their mouth's shut.

Persons accustomed to seeing allegedly "aggressive" Taipans and Brown Snakes are flabbergasted when they see us pushing these species hand in face into a box.

Red-bellied Black Snakes are generally regarded as being a more tractable elapid and is known to settle down in captivity. Free-handling keepers are common.

However the opposite extreme is the Eastern Brown Snake (*Pseudonaja textilis*), often touted as the fastest moving and most aggressive snake in Australia, if not the world.

While individuals vary in disposition, the trends for the taxon are apparent and it is established fact that most venomous snakebites recorded in Australia and also deaths come from this taxon.

In terms of the Eastern Brown Snake venomoids, all are free handled and no bites have been recorded during shows or when keeping at the home facility.

However one bite did occur in 2007 and the circumstances are again worth noting.

The bite occurred at the end of a one day "snake

handling course" conducted at our facility.

The situation involving the bite is given below.

This was the second day of such courses and combined involved 12 persons, all of whom were taught to "tail" then catch, "tail" then "pin" and "neck" the same snake.

The people didn't know the particular snake was venomoid and each handled the snake (often brutally) several times so that they could be tutored and get their methods "right".

The snake was subjected to this ordeal two days in a row and in two sessions, one with the snake cool (in the morning) and another when "hot" (in the afternoon).

At the end of the session, I grabbed the snake mid body to place it into a box and it struck at my leg and "bit" it, as in both fangs penetrated the skin.

The circumstance was obviously related to the pain it had just been subjected to as it hadn't bitten prior and has never struck since.

Hence, based on the unique experience of venomoid elapids that are free-handled on a daily basis and often for hours at a time and rarely if ever biting, the conclusion that pain is the main driver of bites is inescapable.

WILD SNAKES

In Australia it is a criminal offence to "interfere with wildlife". You can get permits to do this, which I have done on a number of occasions, but as a rule my main snake handling of wild snakes comes as a licenced snake catcher.

I am fortunate enough to be able to be paid to find and catch snakes, or alternatively catch snakes found by other people crawling around their property.

The main snakes here in Melbourne are Tiger, Copperhead and Brown, in descending order of abundance. In the spring months, it's not unusual for me to get 3-4 snakes on call outs for many days in succession.

While Tiger and Browns have a reputation for aggression, the real world of these snakes is vastly different.

On call-outs I don't have to worry about snakes bashing down doors to attack people. My main concern is where the snakes have fled to.

When confronted with humans, the overwhelming response is flight!

Newly venomoided snakes picked up mid body usually try to move away, but not bite. The same applies to wild snakes!

While the opportunities to free handle wild elapids with relative safety are limited, they do occur and the

flight response still appears to dominate.

When I move in to catch a snake (of the three aforementioned taxa), the most common response is for the snake to move away. As I approach to the point of nearly picking the snake up (or otherwise stopping it), the snake usually accelerates to escape, but still makes no attempt to bite.

Tiger Snakes in particular may flatten out their neck and if tightly cornered will strike in a warning strike. As for the venomoids, the warning strikes generally miss.

However (in the case of the three aforementioned taxa) the moment the snake is physically pinned with a stick (usually a window cleaner), or grabbed by the tail, the snake will either flee (if it can gain movement), or otherwise turn and bite. The biting is swift and usually without apparent hesitation.

The significance of course is that it's only after I physically move onto the snake and actually stop it, inflicting pain and pressure, that it attempts to bite.

Sometimes a snake will attempt to bite before it is pinned or grabbed, but such is rare in the real world involving these or any other Australian elapids I've encountered.

Once again, pain is the main driver of the bites.

In 2006, I had two calls in the same day to capture two "aggressive" Tiger Snakes that had "attacked" and bitten two men in properties in the Melbourne suburb of Langwarrin.

Both "victims" had been carted off to hospital.

I found and caught both snakes and both had shovel marks in their backs and the shovels had in both cases been dropped after the men had been bitten.

Again the bites occurred after pain had been inflicted on the snakes.

A classic example of the bites occurring after pinning (the pain inflicted) and not before was seen on a series of so-called documentaries called "The Snakebuster" (an illegal use of my trademark, that resulted in a court enforced payout to me of \$39,500), involving novice snakeman Bruce George, who on a number of shows, brutally pins elapids and then gets bitten. For those that are similarly pinned and don't actually bite him, the footage is clear in that it shows the snakes in pain and wanting to bite.

On a number of occasions, I have encountered snakes on roads that have bitten themselves. Invariably they have been hit by a car and the bite is again a response to pain.

Another such example was given by Hoser 1985.

That case is below:

"On 18 January 1980 Mr. Bill Miles found a grey adult 50 cm in snout-vent length, male

Death Adder (*Acanthophis antarcticus*) on a bush road at night in the Sydney district. When found, the snake opened its mouth wide to strike at Mr. Miles who was inspecting the snake and the snake bit itself. The snake died shortly afterwards. It was immediately preserved in formalin. It was at first concluded that the snake had died from the effects of its own bite, but on closer inspection of the specimen by the author in May 1980, it was revealed that the anterior end of the snake had been run over by a car just prior to Mr. Miles locating the snake. It therefore appeared that the likely cause of death was not from the effects of its own venom, but more probably from internal injury.”

Again it was pain that drove the snake to strike at Mr Miles and then later itself!

DOWN'S SYNDROME SNAKE HANDLER

No one would recommend letting mentally retarded people with Downs Syndrome handle deadly Tiger Snakes, but I know of at least one case where this occurred without adverse result.

At 10 PM on 20 January 2004, I received a call from Plenty Road Residential Services, the Department of Human Services Intellectually Disabled cottages at Bundoora, Victoria, where a Tiger Snake had been seen in a dormitory wing of the complex.

A mentally retarded man had seen a smallish (about 45 cm Tiger Snake) crawling across the floor and picked it up in his hands, then proceeded to put the snake in his mouth and started to swallow it.

The man was belted across the face, whereupon he spat out the snake (not chewed) and the snake fled behind a stove.

I arrived at the scene nearly an hour later, moved the stove and with a stick pinned the snake and then “tailed” it into a plastic tub.

As soon as my pinning stick landed on the snake’s front end, the snake went ballistic and tried to bite the stick. This is routine for Tiger Snakes. However of significance is that the retard was able to free handle the snake and avoid a bite.

My own view is that if I were to repeat the same act randomly on Tiger Snakes, most would not bite, but if I were averaging ten a week, (not uncommon), I’d be unlikely to last more than a week without a bite. Hence I’d rather “pin”, “tail” or “neck” the snakes and forcibly avoid a bite, even if it actually makes the snakes want to bite, because I’m inflicting a degree of pain, rather than do the alternative and get bitten as a result of unfavorable odds.

THE EXPERIMENTAL RESULTS

There’s no doubt that some people adverse to the truth, known as the “Truth Haters” within herpetological circles, will dismiss the central hypothesis of this paper on the basis of the amount of data based on venomoids. Claims along the lines of “but venomoids aren’t snakes” will emerge. Rather than argue the point, it is easier to present data on non-venomoids to settle the point, which at the same time proves that the responses of venomoids are in fact no different to snakes with venom glands intact.

On 9 April 2008, I acquired 6 neonate (26 cm long, total length) Red-bellied Black Snakes from Dean Carroll of Cranebrook, NSW. All had venom glands intact and as snakes with no contact with myself or my husbandry methods, any so-called bias in results could be easily eliminated.

Red-bellied Black Snakes differ from the other large Australian elapids in that their venom glands are relatively small and their venom is relatively weak. Fatal bites from adults are rare and from juveniles unknown.

Upon receipt of the juveniles, I was able to ascertain almost immediately that the snakes had no general aggression or propensity to bite. Hence they were free handled as they were moved from container to container, shown to people and photographed as a held group of six in my hands and even on my face. The effective bite risk was low.

In the wild the dominant food for these snakes at this size is skinks or frogs, neither of which I had access to. Hence to feed the snakes, all needed to be fed an alternative, which in my case was mouse legs. These are used on the basis of availability (you take them from the frozen mice), nutritional value and the fact that the snakes can physically swallow and digest them with relative ease (rodent legs are preferred over tails due to their higher nutritional value and ease of digestion).

Typically neonate Red-bellied Black Snakes cannot be induced to feed voluntarily on rodents or parts thereof and so must be force-fed. Furthermore the feeding and swallowing motion will in the first instance only commence if the food item in it’s totality breaches the lower jaw. Otherwise the snake will attempt to spit out the item.

In the first 9 days the snakes were all force-fed four times (one leg on first feed, two or more on later ones). In all cases the snakes were “pinned” and “necked”, with the food items forced down with large tweezer tongs. The post neck region is also held straight and at the same orientation to enable easy passage of the food item into the front part of the snake. In all cases the snakes readily bit onto

anything that approached their heads once they were pinned and being forced to remain immobilized by their head and neck.

In all cases the obvious driver for the snakes to bite was pain.

Interestingly, the only way to elicit a bite response from these snakes was to effectively induce pain!

For me the force-feeding of several small elapids such as the Red-bellied Black Snakes takes mere minutes due to the fact that I've raised countless elapids over decades in this manner and have the general method down to a routine.

Juvenile elapids including Red-bellied Black Snakes will thrash if tailed and from experience in the past, tailed neonates will readily bite as they thrash about.

Again the only conclusion to be drawn must be that the pain is making the snakes want to bite the apparent source.

Further to this is the response to young Red-bellied Black Snakes when first encountering a threat such as a human. In the case of the six above mentioned snakes, they were housed individually in small plastic tubs. Each snake had a single "hide" in which to shelter and as a rule they remained in them. When I would lift the hide to reveal the snake, the snake's response was to flee. When I grabbed the snake mid-body to pick it up, the response would be to squirm and try to move on, but was never to bite.

This was for all six snakes and remained the case until at least 26 June 2008, the date at which this paper was last proof read.

In other words, the main defense of the snakes was "flight", not "fight".

The same is seen in wild Red-bellied Black Snakes of all sizes.

Juvenile Tiger Snakes and Juvenile Brown Snakes are somewhat different to Red-bellied Black Snakes. Young can be free-handled and as a trend don't bite without provocation or pain. But they do so often enough to make their free-handling a risky proposition. But while biting in the absence of pain is a questionable outcome, again all will bite anything they can when pinned with a stick when force-feeding them. This I know because in the 2007/8 season two (venomoid) female Tiger snakes produced a total of 46 live young, one of the groups of offspring being the result of artificial insemination (see Hoser 2008).

I also got stuck with 8 brown snake hatchlings in the 2007/8 season produced by the same venomoid pair that produced 8 hatchlings in the 2005/6 season.

In the 2007/8 season, Ballan, Victoria keeper Les Williams, bred and produced 8 baby Blue-bellied

Black Snakes (*Panacedechis guttatus*) and the bite responses for them mirrored that of the Red-bellied Black Snake babies mentioned above. At other times, the young could be free-handled and never attempted to bite. However when pinned by the head and neck they would try to bite anything they could.

The same response as for the Red-bellied Black Snakes was seen with baby Southern Death Adders (*Acanthophis antarcticus*) produced from venomoid parents in the 2005/6 season.

CORROBORATION OF THE EXPERIMENTAL RESULTS

The same results in terms of pain driving bites in Australian elapids can be found in many places, including the internet (which I generally view as unreliable for a lot of information).

However, worth referring to is a series of posts from a novice snake keeper posting under the pseudonym "lovemysnakes", accepted here on "face value".

It is reproduced in some detail here so that I don't get falsely accused of misrepresenting the posts.

In summary the man acquired his first elapid in the form of a 60 cm Red-bellied Black Snake 14 February 2008 and posted the fact the same day at:

<http://www.aussiepythons.com/forum/australian-snakes/my-new-rbbs-got-one-at-last-75530>

where he wrote:

"My New RBBS - Got One At Last

I have just bought a RBBS after 8 months of searching. I'm a little confused though. I am told it is two years old but it's only 50 - 60 cms long. What ? Is that right? Surely not? I got quite a surprise when I got him out only to find him the same size as a Python Hatchling.

Does anybody have any charts showing average lengths for their age?

It's strange though, his temperament is that of a well handled loving pet. Cant work it out personally.

All comments welcome.....
GC"

He then followed up on the same forum with pictures of him proudly "free handling" the snake.

And notwithstanding his apparent lack of expertise on snakes, he obviously never got bitten.

However things got worse when it wasn't eating, leading him to post on 1 March the following thread.

<http://www.aussiepythons.com/forum/australian-snakes/my-rbbs-is-a-bad-feeder-76786>

"My RBBS is a bad feeder

He wont even touch live frogs - he will only

eat the odd live skink but not very often - helpful comments more than welcome - heeeeeeeeeeeeeeeep!"

Things really turned pear shaped when the snake still wasn't feeding and he had to force-feed it a month after the post.

His lack of experience showed up both in his published method and the result, in that he got a "bite" on the first attempt.

While both are salutary lessons to gain proper experience before getting involved with potentially dangerous reptiles, the story of relevance here is that the pain inflicted on the snake is what drove it to bite the keeper.

The post is given below:

<http://www.aussiepythons.com/forum/australian-snakes/hospitalized-bitten-by-my-rbbs-79772>

"Hospitalized - Bitten By My RBBS

06-Apr-08, 12:12 PM

Hey Guys,

RBBS are supposed to be one of the lesser venomous snakes eh? I attempted to force feed my poor little Otis as he will only eat live food - I just cant get any food for him now as winter nears. He turn his nose up at live mice etc etc etc. He is always been a reluctant biter, as they say.

Anyway, I put a welding glove on the feeding hand (for obvious reasons) but kept my snake holding hand exposed for a good grip. He started to get angry (very unlike him) and even took a few strikes at the much hated pinkie. I thought to myself "Ok, next strike, this food is going down his throat,"

All of a sudden, with a lot more strength than I realised he had in him, he managed to turn and sink one fang into my finger, he would not let go for what seemed like ages - I think it may of been a couple of seconds. Loving little Otis like I do, I didn't want to rip him off as I didnt want to snap his fang off. I shouted "oh *****!" before promptly placing him back into the vivarium. I immediately called my wife who came in, promptly unwrapping the snake bite kit.

Then the pain started, ooooh the pain. I had no idea a RBBS bite produced so much localised pain. Ever been stung by a bee? X that by 50! A trickle of blood was making it's way down my finger as the bandage was firstly placed a few times around the finger proceeding up to my shoulder. The pain intensified as my wife (surprisingly calm) drove me to the hospital (we live 3 mins

away from Flinders Medical Centre)

My wife dropped me off at Emergency then went off to park the car. I stood in the queue for about five minutes before deciding to ask a passing nurse that I had been bitten by a snake and should I continue to queue? All of a sudden I was shoved on a bed, oxygen, heart monitors, drips, blood tests, snake bite venom tested, five staff buzzing around me!!!

My hand was turning blue - it's amazing how tight you place a bandage on and not realise at the time. They removed the bandage and quickly placed it back on from my wrist upwards and marked the bite site with a marker pen.

A red rash was creeping across my right (bite side) shoulder and down my chest. I was given the maximum allowed dose of morphine which sure helped with the pain (ooooh the pain).

Anyway, cutting a long story short, I was kept in overnight. Approximately 8 hours after the bite, the headache, tum tum cramps and throwing up started. My right hand, arm, shoulder and chest and all glands in that area was killing me (not sure if this is a non intended pun or not).

I now had a rash all over my chest and back and a thick red track was visible from the bite sight right up to my shoulder. You can literally see the route the venom took!

Anyway, blood tests, blood pressure test and constant saline drip for another 12 hours was no joke - talk about being a pin cushion!

I was home the following day in time for my little boys first school sports day. Felt like ***** all day! I still felt sick and my hand was up like a balloon. I have what can only be described as slow pins and needles that went in deep and painful right up my arm. My armpit was so painful that it was making me feel sick. I was really giddy, but tried my hardest to encourage my little boy and egg him on. (He did soooo well - won the big race at the end as well - bless his little five year old cotton socks).

The next day, much the same, no improvement. That evening, I was in so much pain with my arm I started dry reaching. I was taken back to the hospital, more of the same tests and kept in for yet another night. More morphine, blood test every two hours and injected antibiotics. They put it down to a secondary reaction to the venom.

I left hospital yesterday, feel 80% better today (Sunday) The pain in my hand an arm is still bad, cant pick anything up very well, and cant touch the track area up my arm. The arm pit is better though. The bite sight is a deep scratch and a black dot where the fang went in. My finger is now only swollen very slightly, my hand is not swollen at all now. I have strong pain killer and a five day course of antibiotics.

Let me know if you have any question.
PS. I still love my little Otis (RBBS)"

The rest of the thread reads several other pages and on the same webforum "lovemysnakes" has started other threads about his misadventures with the same Red-bellied Black Snake.

Another somewhat comical thread is at:

<http://www.aussiepythons.com/forum/australian-snakes/live-in-adelaide-ven-expert-wanted-81590>

Posted on 27 April it reads:

"Live In Adelaide? Ven Expert Wanted

Hi Guys,

Any Experienced Ven keepers who wouldnt mind popping by my house in Bellevue Heights and force feeding my RBBS for me?

Please dont offer feeding ideas - I've been there and tried that! Ta.
GC"

As it happens this individual isn't known to me and as stated above the posts are merely accepted on their face value.

Also from the same website (see same threads) and taken on face value, John Lucas, a novice snake exhibitor from Queensland who started his business in 2007 has admitted to being rushed to hospital from a "bite" from a King Brown Snake (*Cannia australis*), that he was trying to get into a bag during one of his first ever reptile demonstrations in late September 2007. For that effort he spent three days in hospital. In another case, after pinning and necking a Collett's Snake, he was rushed to hospital after he got pricked with a fang.

Of interest, was that just days before he was bitten by the King Brown Snake, Lucas had written on an internet forum, the following:

<http://www.aussiepythons.com/forum/general...4487#post948214>
"26-Sep-07, 09:07 AM
Jonno from ERD

G'day,

The fact is that every single venomous snake bite that occurs in a captive situation is avoidable. With the correct handling

techniques, sound knowledge of the species and a safe handling environment, the risk of a bite is all but eliminated. Unfortunately, there is a lot of venomous keepers who lack all of the above.

Cheers
Jonno"

Lucas then made further claims along the lines of that if a person was carted off to hospital for a venomous snake bite, then they shouldn't be handling them as their actions would jeopardise the rights of others who handled venomous reptiles. After the King Brown Snake bite, Lucas was derided on the same forum, but due to his being a newfound "sponsor" for the ailing website, most posts critical of Lucas and his hypocrisy were deleted before they were widely read.

While it is not totally certain whether or not any pain inflicted on the King Brown Snake was what drove it to bite Lucas in September 2007, one thing is certain and that is that fear of pain would certainly have been a potential driver. On the same web forums, Lucas has repeatedly claimed that he wanted "aggressive" snakes for his "in pit" snake shows and that he did not want placid individuals that were disinclined to bite.

However to make snakes aggressive, witnesses have repeatedly stated that Lucas, harasses, torments and inflicts pain on the snakes.

Lucas himself has also admitted this.

In fact after an early draft of this paper was written and was being reviewed, Lucas found himself at the receiving end of yet another venomous snake bite, with him being carted off to hospital for a third time, which is perhaps the worst ever record for a newly licenced snake demonstrator. Lucas had at that stage had been in business for less than a year.

This time it was in March 2008, when a Death Adder bit him and on this occasion there was no doubt that the snake chose to bite Lucas after it had been subjected to intense pain and suffering.

Contrary to popular perception, Death Adders (Genus *Acanthophis*) are not an aggressive snake and in 40 years of handling them, I have never had a drop of anti-venom in me. As a rule they only try to bite when tormented with sticks, aggressively head pinned, or grabbed with tongs.

In the past five years of using exclusively venomoids for snake demonstrations, I have handled Death Adders on a daily basis and with all being "free handled" as in mid body support, none have bitten myself, or for that matter my children, who also handle them regularly.

Add to that list several thousand school teachers, the majority of whom have never handled any

snakes previously, let alone Death Adders!

Yes, we have the photos to prove it!

The circumstances of the Lucas bite, resulting from pain and suffering are definitely worth repeating here and for that I shall rely on the "first hand" account from Lucas himself as posted at:

<http://www.aussiepythons.com/forum/australian-snakes/erd-venomous-husbandry-course-81838>

As it happened, the only reason he posted the details of this bite at all, was because a witness to the event, posting under the name of "Bundy" posted his version of the events leading to the bite on the same website and Lucas wanted to stem the unwanted adverse comments that were thereafter inevitable by putting his own "spin" on the unfortunate events, that in the few days prior, he'd done his best not to disclose to the world at large.

On this site Lucas then wrote:

"It's best that I explain how the bite happened to stop any new rumours from starting.

It's difficult to explain unless it is demonstrated, but Sharna and I were showing the 6 people in the course how difficult Death Adders are to head restrain. I had successfully pinned and restrained the very agro Adder, and then repinned it in a reverse grip using my left hand. The problem started when I was showing the students how "spongy" an Adders head is by flexing it's jaws in and out and effectively loosening my grip on it. At the loosest point of the grip the Death Adder pulled it's head out from the restraint and I managed to pull away just fast enough - it got it's bottom teeth into the webbing between my finger and thumb.

Of course, Sharna and I were fully honest with everyone about what happened, and Sharna applied a pressure bandage straight away. My partner Melisa drove me to QE2 hospital"

Yes, squashing a snake's head to show how "spongy" it is will inflict pain and hence there is no doubt that pain was the driver of this bite.

In partial defence of Lucas, he could claim that this act of inflicting pain on the Death Adder was an essential part of teaching potential snake handlers about the idiosyncrasies of snakes and that argument has no relevance here.

However the case as reported by Lucas is further evidence that pain and not anything else is the main driver of snakes biting people.

Also from Queensland in 2007, Tom Parkin was bitten by a Taipan he was illegally catching after he

"tailed" it (Anonymous 2007).

For those without experience in catching Taipans, they are not particularly inclined to bite as wild snakes. The "flight" response is overwhelming, even to the degree that these snakes will to greater extent than most others actually crawl backwards to escape a potential predator.

Put another way, a Tiger or Brown from Victoria is more likely to bite when being pursued than is a Taipan, although obviously the likely consequences of a Taipan bite are far worse.

The obvious question then becomes, is "tailing" a snake painful?

In a word the answer is "yes".

Besides the fact the sex organs are in that region of the snake, the bones are fine and these reptiles haven't spent the last 100 million years evolving a rear end with the ability to be tail handled by humans. With the rare exceptions of arboreal breeds, most species of snakes feel extreme pain when "tailed" and this is seen in many snakes that will free handle or even hook handle readily and without incident, but will thrash uncontrollably if tail handled, including for example most elapids.

ANOTHER RED-BELLIED BLACK SNAKE BITE

While it is well-known that Red-bellied Black Snakes are potentially dangerous, though deaths from bites from the taxon are rare, the fact is that most keepers of this taxon in Australia do free handle their "pets" daily and bites from this taxon remain rare.

Most reptile keepers admitted to hospital for snakebite seem to be bitten by Tiger Snakes, Taipans and Death Adders.

The reasons for bites vary, but in the case of the first two taxa, it seems that specimens can appear to be tractable for years and then without apparent reason bite their handler. In the case of Death Adders, the cause of bites are either unexpected strength in pull-back when necked, or unexpected strike range (it being underestimated).

Keepers are rarely bitten by Brown Snakes and this is perhaps due to the fierce reputation of the genus and the general precautions taken as a result of this reputation, combined with the fact that very few are actually kept in captivity.

Returning to the Red-bellied Black Snakes, they are as a rule so much more placid than all the other large elapids in terms of their disinclination to bite, that to make one actually bite is near impossible for captive snakes.

They can crawl all over you, head butt you and yet it seems almost impossible to prize their mouth's open (unless you squeeze them painfully).

However, I am aware of yet another bite from this taxon.

The victim was Neville Burns, a snake based in Sydney who said he was "tailing" the snake when it bite him. In his case, he was carted off to hospital, he got very ill and in the end lost a finger from the bite.

While tailing the snake would inflict pain and discomfort, this taxon does actually have a reasonable degree of strength (prehensility) in the tail, and grabbing a snake by the vent region may not in my opinion be sufficient pain to induce most wild or captive snakes of this taxon to bite.

However in 2007, a post on the website "aussiereptilekeeper" of Neville Burns doing a live snake demonstration at Ettalong, NSW gave the game away.

Shown was a photo of him "tailing" an adult Eastern Brown Snake. Depicted was Burns holding the snake by the very tip of the tail (not the vent). From the photo, the snake looked in pain and there's no doubt that without constant twisting of the tail, the snake would bite the holder as soon as it could.

Again pain becomes the prime suspect of the cause of the earlier bite of Neville Burns.

THE STATISTICS FROM EARLIER STUDIES IN TERMS OF PAIN DRIVING BITES

It's said that "there are lies, damned lies, and statistics".

In the case of snakebites, it gets worse in that the statistics may be based on lies or even be inconsistent in themselves.

If a person fronts hospital in Australia for snakebite and says they were bitten because they were whacking a snake over the head with a shovel, they are liable for prosecution for killing a "protected" reptile. Even if the bitten person doesn't know this, the medical people will, and as a result such a cause of bite is unlikely to be reported.

A person may kick a snake with their boot and get bitten on the leg and then allege they accidentally trod on the snake.

However it's worth relating my own experience in terms of this.

On no less than four occasions I have trodden on elapids in the bush and not been bitten.

Once was a Marsh Snake (*Hemiaspis signata*) at Engadine, NSW, an Eastern Brown Snake at Waterfall, NSW, and two Red-bellied Black Snakes, one at Warren in NSW and one at Blackheath, NSW. All instances were in the late 1970's or early 1980's.

In all cases the snakes actually squirmed and I felt

the snakes and jumped off them.

In no cases was I bitten.

In all case flight had been the dominant response, even with what would have been an element of pain.

Snake handler Federico Rossignolli has trodden on deadly snakes many times in his pit shows spanning the period 1994-2004 and never got a bite that way. His response had also been to jump off the snake as he felt it squirm.

When in the pit, he even wore socks and no shoes, for that very reason!

This is all mentioned to show that while it is possible to get bitten by a snake in the real world by treading on a snake, or via a host of other ways, it remains far easier to get bitten if inflicting pain on a snake, such as by picking them up by the tail.

It's here that the statistics come back into play and when objectively analyzed corroborate the hypothesis in this paper.

While there are no recorded statistics in terms of the percentage of bites resulting after pain was inflicted on snakes, these can be reliably inferred at a conservative level in terms of what's been published and corroborate my own observations and results as given above.

Munro and Pearn 1978 as cited by White 1987, did an analysis of snakebite statistics in Australia.

The majority of bites were in the field, which is the same result as for White 1981 and 1983. In other words "food bites" in snake keeper's cages don't account for a major portion of venomous snake bites here in Australia.

For the record, the above authors did account for herpetologists in various manifestations when compiling their figures and this is detailed in their papers.

From here however the statistics start to get misleading. This is because the circumstances of the bites is not accurately given (even as reported), meaning it becomes hard to separate so-called "warning" bites (little or no pain on snake and usually little or no envenomation), which may arise in a situation of a person walking near a snake, versus those arising from the inflicting of pain, such as when a snake is grabbed by the tail, resulting in a likely serious bite with full envenomation.

However from the figures published by White (1987), it is clear that the trend of pain driving snakebites is evident. His results were based on South Australian hospital admissions at three facilities over periods of 5, 9 and 10 years and are likely to have yielded similar results to those for other parts of Australia, albeit different species compositions.

The clear majority of bites were shown to be on the upper limbs of the bite victims.

In 40 years of studying these reptiles, I've never seen snakes jumping up and biting people on the hands or arms.

In other words the snakes are being picked up!

Even allowing for the possibility of someone getting bitten while accidentally placing their hand on a resting snake, the position of upper limb bites dominating remains clear.

With most people, both novice and expert either pinning snakes by the head region or "tailing", both of which cause pain to snakes, it becomes a certainty that snakes are biting most people in Australia as a result of pain being inflicted on them and not as a result of any other form of "aggression".

In other words if pain is not inflicted on a snake, then the likelihood of a bite is considerably less. That's because the snakes prefer to flee.

Yes, a wild snake may try to bite if picked up mid-body, but in terms of the overall likelihood, this is far less likely than when the snake is grabbed from either end. Also noting that the most common response is "flight", it makes sense to assume the majority of snakes grabbed by people are actually "tailed" as that's the only "grabbable" part for the approaching person.

While using the hand to jiggle the snake to prevent it getting up and biting is stock in trade for experienced snake people such as myself, it is not necessarily easy to do in the case of novices and wild snakes.

When doing "snake handling courses", I find the majority of trainees unable to tail jiggle a warm elapid to keep it's head away from them at the time they commence the course.

This inevitably results in bites.

Using venomoids (see above), this obviously isn't an issue.

Transposing these results to the wider population, the inevitable result must be people getting bitten when "tailing" snakes. End result: deaths and hospital admissions.

White 1987 reported that the overwhelming majority of victims bitten said that they had not intentionally provoked the snakes to bite. White gave one statistic of 75% of respondents claiming no provocation of the snakes to bite, while another figure of 60% was given.

Averaging the percentages to 66%, it is clear that this percentage is roughly opposite to the percentage bitten on the upper limbs (arms), namely those who picked up the snakes.

The anomaly can only be explained by concluding that many victims bitten on the arms did not believe picking up a snake was provoking it to bite.

However it was in fact the act of picking up the snake and inflicting pain at the same time (by "tailing" or "necking") that led to the bite.

Again the inevitable conclusion must be that pain inflicted on the snakes, not "aggression" was the main driver of bites for these Australian venomous snakes.

The above authors also noted the times of the bites and most were at times the snakes were active (during the day for the relevant species, all of which were diurnal), again indicating that the majority of people had been bitten when picking up mobile snakes, again indicating that "tailing" was the most common means of grabbing snakes and getting bitten.

So-called reptile experts who should know better, are actually fuelling the public fear and paranoia about allegedly "aggressive" venomous snakes as seen in the following examples I've taken from the internet about Taipans.

Examples of what I mean are seen in the following examples:

The ("Australian Venom Research Unit") AVRU website at: http://www.avru.org/general/general_taipan.html, states:

"The **taipan**, or coastal **taipan** is an **aggressive** and highly venomous snake"

The University of Sydney's site written by Chris Thompson at:

<http://www.usyd.edu.au/su/anaes/venom/snakebite.html> reads:

"The Taipan ... It is an aggressive, large, slender snake"

"Reptile Awareness Displays" website written by Allan Burnett, at:

<http://www.radoa.com/gpage.html> states:

Coastal Taipan ... It is a fast moving and aggressive snake.

These sorts of comments copied widely are simply not true.

Burnett's company does live snake shows in pits at agricultural shows and expos, and whips up a sort of hysteria about how "aggressive" these and other snakes are and their alleged desire to kill people, the end point being the need for viewers to buy their "essential" \$10 snakebite kits.

They sell heaps of them!

The problem in this case is that the desire to make money has clouded the facts.

The false material bounces around the web and elsewhere to supposedly “authoritative” and “unbiased” sites like “wikipedia”, as seen at:

<http://en.wikipedia.org/wiki/Talk:Taipan>

where it is written:

“This site {1} from the University of Melbourne explains that Taipans are not docile at all, and are in fact quite aggressive.”

In the case of the original source was serially convicted wildlife smuggler David John Williams, boasting numerous convictions, including for wildlife smuggling and cruelty to reptiles in 1997, being fined \$7,500 at Cairns Magistrate’s Court.

Now doing a thesis at the University, of Melbourne Williams actively promotes himself as being unusually skilled or brave, or doing “the dirty work” in handling Taipans, traits he often claims others allegedly lack, all due to the innate “aggression” of the species.

This view he peddled on the ABC TV Show *Foreign Correspondent* in early 2008, see link at: <http://www.abc.net.au/correspondents/content/2008/s2170684.htm>.

In this program he was shown after being allegedly bitten in late 2007 when “tailing” a captive Taipan for the camera and then allegedly became a proud survivor of a bite from the world’s deadliest snake (see link at: <http://www.thenational.com.pg/030308/wkender4.htm>).

However, the usual response of these Taipan snakes to people is “flight” with “fight/bite” or “aggression” only becoming relevant when and after pain is inflicted on the snake, usually in the context of it being physically stopped and immobilized, or in the case of Williams, by his own words on countless webforums, when “tailing” the sizeable snake.

Adult Taipans, including the one depicted on the broadcast, are usually quite heavy and tailing without mid-body support (as shown in the film clip) will inflict considerable pain on the held part of the body.

No Taipan will be aggressive and without extreme provocation (in the case of snakes being in pain) attack a person or any other animal many times larger, except perhaps by rare accident. Even snakes aren’t that stupid!

However with the bites to people generally being on the upper limbs, rather than the legs, the likely point of accidental attack, even this potential event, must be regarded as unlikely.

In summary there’s no evidence to suggest Taipans or for that matter any other Australian elapid is “aggressive” and the term in the context of

Australian snakes at least, should be dropped.

CLOSE TO THE MARK

David John Williams, is a long-time Australian (and more recently New Guinea) based snake handler who is also the master of unashamed self promotion.

His prior form however includes convictions for wildlife smuggling and animal cruelty related offences including in March 1997 for which he was fined \$7,500.

He was also caught for rigging votes in an online hotels promotion competition in 2008 run by ACCOR Hotels Group by using or controlling a single IP Address to post thousands of votes for himself. As a result he was disqualified from the contest.

He’s also repeatedly plagiarized the scientific findings of others, committed outright scientific frauds and more.

Hence I am loathe to quote any statements by him and use them to aid the hypothesis in this paper.

However, in the context of what is known about Williams, I shall refer to one of his countless internet posts, this one being on the website “venomdoc.com” and his 135th one there as of 2003.

On Thu Nov 13, 2003, he extolled the alleged bravado of himself in terms of free-handling deadly elapids, the claim of his thread being that he was of course better than other mere mortals with less experience than himself and who had to rely on sticks and tongs to handle their snakes.

Following my own upstaging of his “free handling” skills in 2004, courtesy of my use of venomoids, Williams (critical of everything Hoser) reversed his tune and made numerous claims online and in writing to the authorities that free-handling is (now) dangerous for the handler and (only since 2004), apparently sends the “wrong message” to children who see this, the idea being that all kids who see Hoser in action will rush into the bush, free handle snakes, get bitten and die.

(For the record, no kids (anyone under the age of 30) have died from snakebite in Victoria, since “Snakebusters/Raymond Hoser” started doing reptile demonstrations in Victoria, in spite of over a million people having seen Snakebusters).

Fortunately the 2003 post remains on the internet as of May 2008, contradicting his later posts and the salient parts of his boasting are repeated here.

At the thread at:

<http://www.venomdoc.com/forums/viewtopic.php?t=134&start=0>

in a thread he started and he himself titled:

“The death of the REAL venomous herper”

Williams wrote:

“Okay folks here’s an observation that should provoke some debate ...

At a recent scientific meeting I went to a dinner where the topic of handling venomous snakes came up, and one of the people at our table (a **VERY** eminent authority BTW) defended my traditional freehandling practices but observed that I was one of a dying breed of herpetologist whose work with venomous animals used skills that my contemporary peers had foresworn in favour of “*Gentle-Giants, grabsticks and trapboxes*”.

Thinking about this later I had to agree that I would be lucky to count on one hand the number of venomous keepers I know with comparable handling skills today, yet even 20 years ago in Australia there were a number of herpers who caught and handled venomous snakes with little more than basic hook and a hoopbag. Since that time I have seen these people slowly leave the profession ... mainly due to changing lifestyles (young families, new jobs, mortgages to pay, etc) or loss of interest, and few have come up through the ranks to replace them.

In fact if you look at herp society memberships (in Australia at least) very few new keepers have any interest in venomous snakes, and most aspire only to the day when they purchase their first green tree python or woma ...

Notice that I said “**purchase**” ... does anyone else here find it just a little bit sad that herpers these days get all their animals packaged in disposable containers

When I was a kid, I thrived on innumerable hours running around in vacant lots, parkland and the local bush ... learning how to actually find and observe reptiles by trial and error ... and in time learn’t enough to be able to take on the local venomous species with routine efficiency. When I was 10, I released a brown snake (*Pseudonaja textilis*) under a sheet of tin in grassland across the road from home ... and for several weeks the snake turned up under the same piece of tin every couple of days ... and tolerated the dumb kid who would lift up the sheet of metal, prop it with a stick and then lie in the grass for hours watching it glare back at me.

Anyway I digress ...

But who can tell me what has happened to **REAL** herpers

Is there anyone else out there anymore with the skills and the experience to tail a wild taipan ... crawl head first into a rattlesnake den to see what the occupants are doing ... spend hours calmly sitting under a 90 metre eucalypt waiting for a monitor lizard to abandon its perch ... or just simply spend a day in the bush catching, photographing and releasing whatever you find

Or do all venomous herpers keep their charges at arms length in a metal deathgrip ... and gain their experience with new taxa by ordering online from www.itbites-donttouchit.com or browsing the deli cups in some cavernous convention centre And sure I know that freehandling is dangerous ... but then please explain why in over 30 years I have never been bitten freehandling a snake ... but some of my contemporaries who use grabsticks, gloves and tongs have been nailed 15, 20 or even 30 times in less than a third of that time Am I a dinosaur

Is the REAL venomous herper (like George Cann, Charlie Tanner, Eric Worrell and me too I guess) a species destined for extinction

Or should my *art* be protected and preserved ... and ultimately passed down to another generation

Cheers

David”

I reproduced the entire passage by Williams, including his highlights and capitals so that I’m not accused of quoting out of context, but the relevant part is what I re-quote below:

“And sure I know that freehandling is dangerous ... but then please explain why in over 30 years I have never been bitten freehandling a snake ... but some of my contemporaries who use grabsticks, gloves and tongs have been nailed 15, 20 or even 30 times in less than a third of that time”

Interestingly in 2007, it was the new David Williams, now a sworn opponent of free handling, who according to himself got bitten while tailing a Taipan and inflicting pain on the said snake.

As no one else has until now answered this very salient question by Williams, I shall do so some 5 years after he asked it.

In simple terms free handling does not as a rule inflict pain on a snake and therefore removes the main driver for snakes to bite.

While this paper is not an open advertisement for people to free handle snakes, because of the obvious risks, as even acknowledged by Williams, what Williams failed to note in his post was that it was the pain inflicted by tongs and the like that was driving snakes to bite his less experienced contemporaries, rather than necessarily any lack of "expertise" on their part.

In terms of inflicting pain, Williams also comes close to the mark, when he wrote above:

"Or do all venomous herpers keep their charges at arms length in a metal deathgrip".

Yes, a snake in a "deathgrip" will almost certainly be suffering pain and therefore want to bite it's captor.

TONGS

These devices have been covered elsewhere (see Hoser 2007a) and clearly inflict pain by the way they forcibly stop snakes escaping. Snakes that struggle in tightened tongs risk broken ribs and as a rule will tend to bite, including the tongs themselves.

See the Bruce George videos for excellent footage of this.

As pain intensifies, the discrimination of what is to be bitten tends to reduce, meaning that the tongs themselves may be bitten in haste.

Snakes only bite tongs for one reason and that is when they are in pain.

In many years of observations, I have never seen a snake crawl up to a set of tongs sitting on the ground and proceed to bite it.

Likewise for any other metallic objects.

Pain alone drives snakes to bite tongs!

TONGS MARK 2

Scott Grant made a detailed statement on 4 May 2008, of another case of pain inflicted by Tongs and the end result.

It occurred in 2007 during a so-called snake handling course, conducted by newly licensed novice snake handler Sean McCarthy in Victoria. The 13-odd participants including Grant, were made to pick up an adult Tiger Snake using a set of tongs.

According to Grant, the snake was clearly agitated and in pain and when grabbed by the tongs would try to bite anything that came close to it's mouth.

Midway through the handling, as in after about half the participants had used tongs to grab the struggling snake, the pain inflicted on the snake became so intense that it turned and bit itself.

The snake allegedly subsequently died as a result of injuries sustained by the tong grabbing.

Again, pain was the obvious driver of the snake biting.

On 24 April 2008, a resident of Flowerdrum Crescent Templestowe caught an adult female Tiger Snake by using a set of tongs as sold from Sean McCarthy's website (www.snakehandler.com.au). The snake was not aggressive in any way until grabbed with the tongs and bit them repeatedly. Within an hour of being lifted with the tongs and placed in a wheelie bin, the snake had died a painful death.

Autopsy revealed broken ribs around the heart/lung area and severe internal bleeding, complications from the latter being a likely cause of death.

Again, the pain inflicted on the snake was what made it attempt to bite.

DEATH ADDERS (GENUS *ACANTHOPHIS*)

These are unusual among Australian elapids in that physically in appearance and shape and in many ecological respects, they equate more with vipers and even crotalids than other Australian elapids, to which they are more closely related (albeit quite distantly).

With the venomoid Death Adders, the results were remarkably similar as to what was seen with the other elapids.

For decades Death Adders have been kept and handled by myself using hooks and when necessary "pinned", and "necked".

That the snakes lived and bred, is testament to the fact that as a method of handling and keeping, what I did was certainly adequate.

As for most elapids, these snakes seem to tolerate these handling methods, but will at times jerk somewhat as a hook is slipped underneath them.

That the snakes often retain a general dislike to being handled or picked up in any way, indicates that at best these snakes tolerate being hook handled, rather than actually liking it. Ditto for other snakes moved about this way.

South Australian *A. antarcticus* are somewhat unusual for the genus in that they do not like being hook handled at all and always jump off them, meaning handling them has been problematic. Part of the problem relates to their size, weight and shape and that they tend to feel discomfort (pain), when handled with sticks.

A venomoid South Australian *A. antarcticus* that was "aggressive" soon lost her aggression after being venomoided and didn't attempt to bite when free handled on a daily basis. The same occurred with an *A. woolfi*, another taxon that is generally regarded as being of unpredictable temperament.

This snake would strike when approached with a hook, but lost all aggression after being free handled.

When free handling this particular snake in the period immediately post venomoid operation, my underlying belief based on the snake's past behavior was that one or more bites from this snake was inevitable. As it transpired, no bites actually happened in this period and the snake has long since been totally tractable. See for example the snake in two top photos at:

<http://www.smuggled.com/sbssch2.htm>

The expectation of bites was seen in a number of other newly devenomized elapid snakes and as a rule the expected bites never eventuated.

Because Death Adders are so-called "ambush predators", the risk of a food bite is high if one puts their hand near their head in a cage (or within strike range). Hence care is taken when lifting them out of the cage if it is thought the snakes are likely to confuse your hand with food. However, once the (venomoid) snakes are lifted out and free handled, their lack of interest in biting the handler is the same as for all other elapid taxa and it's clear that the snakes can differentiate between the human keeper and their food.

One of the reasons advanced for pythons being more inclined to bite than venomoid and presumably other elapids (excluding Death Adders) is that the snakes are heavier in build and slower to flee than the elapids, so a "fight" response becomes a relatively more attractive alternative to "flight".

A second reason is that pythons also have a head designed to bite and hold onto prey, which means that they will more readily bite an animal much larger than themselves, whereas for an elapid, biting something much larger has higher injury risk.

In theory Death Adders physically equate more with pythons than the other Australian elapids in terms of head muscularity and stocky build. However the fundamental driver for bites remains pain.

ANOTHER DEATH ADDER BITE – PAIN INDUCED

While talking Death Adders, it's also worth noting the 12 June 2008 bite of novice snake handler, John Deutscher (Arup 2008). Working closely with Simon Watharow, founder of the company "Snakehandler", both are strong proponents of the use of Tongs to handle snakes. On the internet site "aussiepythons.com" and elsewhere Deutscher posted in 2006, a stinging series of attacks on my very public free handling of Death Adders, claiming it had a high bite risk (see for example Deutscher 2006).

Deutscher was hostile to me on the basis that I had refused his repeated requests to supply him with venomoid snakes (in line with all requests we got/get). Our refusal had been in 2004 and since then he'd turned hostile.

In June 2008, Deutscher was rushed to hospital for a Death Adder bite that according to the medical people who treated him, required an urgent shot of anti-venom. Reptile keepers in Australia usually avoid publicity about such events, due to the fact that bites of keepers are used by the authorities as an excuse to try to ban private ownership of snakes.

However, in this case Deutscher argued with the doctors about how he was treated for the bite some hours after he had recovered and as a result the story was leaked by the medical people to the media early the next day.

It soon emerged that Deutscher had in fact had several Death Adder bites over recent years, involving a number of trips to hospital. When it was asked on "www.aussiereptilekeeper.com" and www.reptilesaustralia.com.au if he had been freehandling the snake, Deutscher made it clear that he hadn't been (Deutscher 2008), and went on to stress this point.

The question was asked in the context that the poster thought free-handling was risky and dangerous (not argued here). However what Deutscher's answers and his stick handling of Death Adders as shown in the media the next day did reveal was that the snakes kept biting him as a result of the pain he was inflicting on him.

He even said "My mistake. I certainly wasn't freehandling."

In fact not long earlier, his mentor, Simon Watharow, a major tong proponent, had also been carted off to hospital and got anti-venom from a Tiger Snake bite.

He originally said the bite had occurred after he'd grabbed it with tongs, but later claimed that hadn't happened, but without giving a new version of what actually led to the bite. Again in the absence of contrary information, it seems pain is what made the snake bite.

VENOM YIELDS

There are numerous factors which dictate venom yield, including the amount of venom the snake has "on hand", the way the snake bites it's target and even the relative position and movement of the target. A detailed analysis of these is beyond the scope of this paper. However in the context of snakebites many herpetologists, including Pearn 1988, have differentiated between so-called "defensive" bites and "offensive" bites.

However there has been no formal distinction, other than a general belief that for "defensive" bites a snake does not intend to inject venom, whereas for "offensive" bites that is their intention.

There is also a widespread belief that snakes can actually regulate and control their venom yield. In

reality there is no evidence for this and the contrary is effectively true.

Venom is pumped through the fang system like saliva is through the other saliva glands.

Venom is pumped through the fangs when the muscular sheath over the lower fang is depressed, or alternatively pressure is applied to the upper jaw (venom gland region) as the snake bites down. Either way, the venom is effectively squeezed out.

The yielding of venom is an involuntary response to this.

This is seen when a rubber-band is placed over the fangs to “bleed venom” before commencement of the venomoid operation. The snake has no control at this stage and it is direct push-pressure that yields the venom.

Likewise when a snake is “milked” of venom by being forced to bite on a rubber covered beaker.

Venom is actively “pumped” when an ambush predator such as a Death Adder bites onto it’s prey and holds on and “pumps” it’s mouth tighter.

However this is most probably instinctive and not as a result of a conscious desire to pump venom into prey. Venomoids do this in the same way as their venomous counterparts, further indicating that they don’t know they are devenomized.

If one is to split venomous snakebites into the terms “defensive” and “offensive”, then they are best split using the following criteria, which I hereby define as:

Defensive bite: Where a snake strikes with a view to deterring a potential predator that has not inflicted physical pain or restraint on the snake.

Offensive bite: Where a snake bites as a response to inflicting of pain, restraint or to envenomate a food item.

In terms of feeding, Australian elapids do not generally release the food item unless or until it struggles sufficiently to hurt the biting snake (noting that some snakes will release after the “bite”, being a bite hard enough to “pump” in venom).

BITE PATTERNS FOR FEEDING SNAKES

Pain inflicted bites for Australian snakes are similar in that the affected snake will usually bite hard and repeatedly on the attacker until the grip of the attacker is released. One such example was of the Red-bellied Black snake that bit the man called “lovemysnakes” as given above.

“Food bites” for given taxa vary considerably.

By way of examples feeding and biting patterns of larger Australian elapids are as follows:

- Coastal Taipan – Bite and pull the prey back into the hide area, while

retaining a grip on the prey with it’s long fangs.

- Inland Taipan – Chew onto prey with multiple bites and letting go if and when it bites back.
- Red-bellied Black Snake / Copperhead – Bite hard, ram forward into object with head and then chew.
- King Brown Snake (*Cannia australis*) / Collett’s / Blue-bellied Black Snakes (*Panacedechis*) – Chew food item.
- Eastern Brown Snake – Bite and pull back into a body coil that holds the food item.
- Tiger Snake – Bite and chew food item, even if struggling.
- Death Adders – Bite and hang onto struggling item until well after prey stops moving. Only then does snake move jaws to start feeding process.
- For the Australian pythons the general feeding response is to bite and pull back into coils that then constrict. This is most pronounced in younger snakes. In *Aspidites*, juveniles feed this way, while adults often bite and then use their body to squash the prey against an object, but without any coiling.

Once the snake has commenced the feeding response and the prey item appears dead, the feeding pattern for all snakes is stereotyped in that the mouth relocates to the narrowest point (usually head), whereupon the item is swallowed in a familiar manner.

CARPET PYTHONS

Pet Carpet Pythons are generally free-handled, docile and rarely bite, except for “food”.

Here I report on two Queensland Carpet Pythons (*Morelia macdowelli*).

The first was captive here for several years and died from virus related complications, aggravated by old age in 2007. The snake never attempted to bite myself except when very ill, and in obvious pain. It died shortly thereafter.

A second incident involved an adult Carpet Python that was found by police in a tree at Melliodora Drive, in suburban Endeavour Hills, (a Melbourne suburb) on 19 December 2007.

I was called to catch the 2 metre snake in a tree.

The snake was plucked off a branch and I handled it for about 15 minutes to appease a number of TV film crews and newspaper photographers, who'd arrived at the scene on invitation of the police to film the "killer python on the loose in the suburbs".

The snake had swallowed something large, as seen by the huge lump in it's midsection, and after being moved about by myself (tormented?) for about 15 minutes, the previously tractable snake bit me on the leg.

After it's long teeth were carefully extricated from my leg, the snake was placed in a plastic tub, within which it immediately regurgitated a Magpie (large bird)(Ryan 2007).

Again the driver of the bite was apparently pain and discomfort.

The owner was reunited with the escaped pet the same day and reported that as a rule the snake never attempted to bite.

FREE HANDLING SNAKES – WARNING

From a snake animal welfare perspective, free handling snakes, by supporting the snake's body weight mid body and with care is vastly superior to any other method involving devices such as sticks, hooks, tongs or even "necking" and "tailing".

Hence non-dangerous individuals should as a rule be free handled, even if it is thought to increase the risk of bite to the handler.

However if the snake is dangerously venomous (that means not a venomoid or non-venomous taxa), then free-handling carries inherent risks that put the risk of bite way above the aforementioned means of handling (if done properly) on the basis that if a snake can bite, it may at some stage do so. This paper presents ample evidence of this.

Hence nothing here should be taken as advocating the non-use of sticks and other tools to handle snakes as appropriate. This does not include the use of bone-breaking tongs.

While human welfare (and risk avoidance) is generally placed above that of the snakes, it should be remembered that handling methods used should be those which minimize the risk of stress or injury to the relevant snake.

In summary, the only guaranteed way to avoid snakebite is to avoid snakes!

In summary the only way to avoid envenomation from a venomous snake is to have a venomoid or again not go near one. However venomoids should not be used as a shortcut for keepers not competent to keep venomous snakes to be able to keep them. Remember, the offspring will be venomous.

Furthermore, persons who unnecessarily use sticks and tongs to handle snakes regarded as harmless

are guilty of an act of animal cruelty and should be prosecuted under laws prohibiting such conduct.

CONCLUSIONS BASED ON THE EVIDENCE

This paper is based primarily on Australian taxa. While it is my firm belief that most of the outcomes documented here can be transposed to non-Australian taxa, this is by no means certain.

The key finding: alleged "aggression" by snakes is not a cause of bites of humans.

Pain inflicted on snakes is the root cause of most snake bites involving people.

Realizing that pain is a major driver for snakebites and not "aggression" has important implications for snake catchers, snake keepers and the wider general public.

More than ever, herpetologists should be aware that in all situations, the risk of adverse snakebite can be minimized immediately and at later dates by reducing pain and discomfort on the affected snake, whether by "necking", "tailing" and "pinning".

If catching wild snakes, minimizing pain will also reduce likelihood of adverse bite.

In other words, don't wrestle the snakes. Simply get them into a container or bag as quickly and painlessly as possible.

Use forced restraint only as needed.

For captive snakes, if painful handling is minimized, then the risk of a bite is also reduced if and when the handler inadvertently gives the snake the opportunity to bite.

This isn't just at the time of handling, but at future handling events, where a previously mishandled snake will recall the pain inflicted and may seek to preemptively bite what it thinks is the source of the pain (a handler).

However if a snake hasn't experienced pain when handled in the past, it is less likely to bite a handler in the future, even if an opportunity arises.

The lay public should be correctly educated on the actual risks posed by snakes, including that if a snake isn't handled or stopped in any way, then bite risk in Australia is so remote as to be almost non-existent. Our company "Snakebusters" has been actively educating people in Australia in this regard for some time.

However we have at times been effectively undermined by a number of self-appointed experts who have improper motives for promoting the false idea that deadly snakes bite people primarily because of "aggression", with the aggressive urge to bite being a natural instinct of snakes.



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