

Suction as Initial Treatment of Venomous Snake Bites

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Introduction

- ◆ Recommendations concerning first aid for venomous snake bites have changed over the last few decades and remains an area of controversy. Techniques such as tourniquets, cryotherapy, compression and immobilization (Australian method) as well as incision and suction have all been considered appropriate first line therapies.
- ◆ Most of these techniques have fallen out of favor with many experts as they lack strong scientific support and are fraught with potential complications.
- ◆ In the United States, a product found in retail, camping and sports stores around the country called the Extractor™ (Sawyer Products) is touted by the manufacturer as "recommended medically as the only acceptable first aid device for snakebites." This device applies approximately one atmosphere of suction (750 millibars) and is supported by two published abstracts. One abstract demonstrated reduction of the amount of venom in injected rabbits by 34%, and the other showed extraction of microgram amounts of venom in two humans bitten at a "rattlesnake rodeo."



Objective

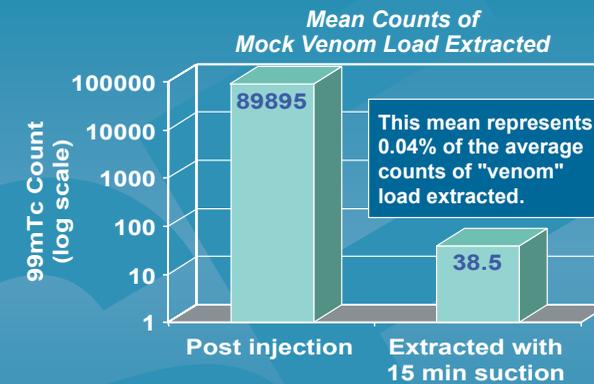
- ◆ To evaluate suction as generated by the Extractor™ (Sawyer Products) for treatment of venomous snakebites using radiolabeled "mock venom" in a human model.

Methods

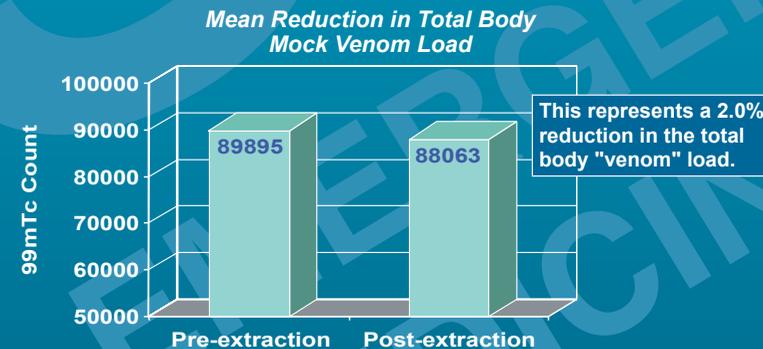
- ◆ A mock venom (one milliliter of normal saline containing 5.0 mg albumin, 2.5 mg aggregated albumin and maximum 0.11 mg stannous chloride) labeled with one mCi of technetium (99mTc) was injected in the right leg of volunteers.
 - This was done using a slightly angulated 16 gauge hypodermic needle one cm into the right lateral lower leg of eight supine male volunteers ages 28-51.
 - The volume of mock venom, the proteinaceous character of the mock venom, the diameter, shape and length of needle were all chosen according to literature on venom specifications and average rattlesnake fang dimensions.
- ◆ After the leg was injected, the wound was allowed to bleed for a period of three minutes at which time the Extractor™ was placed on the wound.
 - The blood removed by the extractor was collected after five and fifteen minutes of suction.
 - A 1991 Siemens Diacam was used to take measurements of the radioactive counts. In order to keep track of all counts, measurements were taken of any area where the radioactivity could accumulate including: the syringe before injection, the injected leg, in the blood that oozed from the wound after three minutes, in the blood extracted with the Extractor™ at five and fifteen minutes, in the leg after suction, in the needle after injection, in the pelvis of the volunteer, in the chest of the volunteer and in the background of the research area.
 - In order to assure that all counts present were detected, the counter was independently tested. The Siemens Diacam was tested to the level of one microCi or 0.001% of the "venom" injected which was easily detected as 258 counts on average above background.

Results

- ◆ All eight volunteers had significant "envenomations" with 89895 counts in the leg on average post injection.
- ◆ The mean counts found in the blood extracted in the fifteen minutes of suction was 38.5 counts (95 % CI= -33 to 110) when corrected for background.



- ◆ The counts in the leg post extraction when corrected for initial bleeding from the wound, radioactive decay, and counts in the pelvis and chest varied from the pre extraction leg by a mean of -1832 counts (95% CI= -3863 to 20).



Conclusions

- ◆ The Extractor™ is capable of producing significant suction at the wound site. This is evident in that the device extracted blood over the fifteen minutes of suction and left a suction mark several hours post experiment.
- ◆ However, the Extractor™ was unable to remove the mock venom from our simulated snake bites.
- ◆ Our data suggests that the use of this device in particular and suction in general may not be useful for reducing the total body venom load after a venomous snake bite.