**WORKSHEET for Evidence-Based Review of Science for Emergency Cardiac Care**

**Worksheet author(s)**

| Christopher P. Holstege, MD | Date Submitted for review: 09-13-09 |

**Clinical question.**

In victims of a venomous snakebite (P) does application of suction (I) to the envenomation site, when compared to no therapy (C), improve outcome (O)?

**Is this question addressing an intervention/therapy, prognosis or diagnosis?** Intervention/Therapy

**State if this is a proposed new topic or revision of existing worksheet:** Revision

**Conflict of interest specific to this question**

Do any of the authors listed above have conflict of interest disclosures relevant to this worksheet? Published in area of interest

**Search strategy (including electronic databases searched).**

- PubMed
  - (*snakes*[MeSH Terms] OR *snakes*[All Fields] OR *snake*[All Fields]) AND (*suction*[MeSH Terms] OR *suction*[All Fields]) - 53
- AHA EndNote Master library
  - *snake* – 25
- Cochrane database for systematic reviews and Central Register of Controlled Trials
- Hand searches of journals, review articles, and books

**State inclusion and exclusion criteria**

Only articles in the peer-reviewed literature were included

No abstracts included

Studies that do not specifically answer the question were excluded

**Number of articles/sources meeting criteria for further review:**

6
# Summary of evidence

## Evidence Supporting Clinical Question

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grayson 1953</td>
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</tr>
</tbody>
</table>

*Level of evidence:*

- A = Return of spontaneous circulation
- B = Survival of event
- C = Survival to hospital discharge
- D = Intact neurological survival
- E = Other endpoint

*Italics = Animal studies*
## Evidence Neutral to Clinical question

<table>
<thead>
<tr>
<th>Level of Evidence</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
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<tr>
<td>Fair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lawrence 1996</td>
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<tr>
<td>Poor</td>
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</tbody>
</table>

**Level of evidence**  
A = Return of spontaneous circulation  
B = Survival of event  
C = Survival to hospital discharge  
D = Intact neurological survival  
E = Other endpoint  
*Italics = Animal studies*

## Evidence Opposing Clinical Question

<table>
<thead>
<tr>
<th>Level of Evidence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>
| Good              |   |   |   |   | Leopold 1960  
Bush 2000  
Alberts 2004 |
| Fair              |   |   |   |   | Holstege 2006 |
| Poor              |   |   |   |   |   |

**Level of evidence**  
A = Return of spontaneous circulation  
B = Survival of event  
C = Survival to hospital discharge  
D = Intact neurological survival  
E = Other endpoint  
*Italics = Animal studies*
In the past century, a number of studies have examined the utility of suction in the first aid therapy of snake envenomation. An initial descriptive case series suggested that suction was effective in treating snake envenomation victims (Grayson 1953, LOE 4). The first controlled animal study (Leopold 1960, LOE 5) demonstrated that suction provided no clinical benefit and actually demonstrated that death occurred earlier in the suction treated animals compared to the control animals. The author concluded: “suction may be conductive to a more rapid invasion of venom.” A retrospective case series examining the efficacy of different treatment modalities concluded that there is little support for the application of suction in the management of snake envenomation (Lawrence 1996, LOE 4). A simulated snakebite study in human volunteers determined that only 0.04% of a venom load was recovered by a suction device (Alberts 2004, LOE 5). The efficacy of a suction devise on rattlesnake envenomation was studied in a porcine model (Bush 2000, LOE 5). This study demonstrated no benefit and suggested injury may occur with suction. A case report of the application of suction to a snake envenomation victim demonstrated visual harm to tissue in the region of the application of the suction device (Holstege 2006, LOE 4).

Acknowledgements:

Citation List


(LOE 4, quality poor, supportive to hypothesis)


(LOE 5, quality good, opposing to hypothesis)


(LOE 4, quality fair, opposed to hypothesis)


(LOE 5, quality good, opposed to hypothesis)


(LOE 5, quality good, opposed to hypothesis)


LOE 4, quality fair, opposed to hypothesis)