Catnip Mice for Novice Skin Suturing and Tail Vein Injection Training: A Pilot Study

M.A. McCrackin, DVM, PhD, DACVS, DAACLAM, CMAR, Roxanna Swagel, RLATg, ILAM

1Research Services, Ralph H. Johnson VAMC, 2Department of Comparative Medicine & Division of Laboratory Animal Resources, MUSC, Charleston, South Carolina

ABSTRACT

Teaching basic hand skills to laboratory animal technicians, graduate students, research staff, and postdoctoral fellows is an important task of the laboratory animal veterinary staff. Non-animal alternatives are desired for teaching these skills to beginners, but models that are size appropriate for mice and encourage proper skill development can be difficult to find. Catnip mice were used in a traditional classroom setting for training beginners in techniques of skin suturing and tail vein injections in mice. Catnip mice were mounted onto cardboard squares using Velcro® and had lateral tail veins drawn with indelible marker. Catnip mice have multiple properties that are conducive to beginners learning proper techniques. For skin suturing training, they are size appropriate, have hair that can be clipped, are covered with material that separates after incision and can hold sutures securely, and have a hard frame that prevents passing suture needles too deeply below the skin. The tail is realistically sized and the length is optimal for learning how to position the tail for injections. The mounting method provides adequate stabilization of catnip mice for gentle manipulations but will fail if students are too aggressive either with suturing or injection techniques. Students provided feedback using a Likert-like scale on a questionnaire of 23 items, including experience level, skill development, overall impression of suturing training, tail vein injection training, and their overall impression of the model. Mouse preparation – clip hair

SKIN SUTURING TRAINING: METHODS

Mouse preparation – clip hair

Dorsal skin incision

Self-adhering Velcro® fastens mouse to cardboard

Dorsal skin incision

Incision opens – exposes rubber core

Suturing with 5-0 monofilament nylon

Even tension ensures knot security

Simple continuous pattern completed

TAIL VEIN INJECTION TRAINING: METHODS

Lateral tail veins drawn using permanent marking pen.

Gentle caudal tension on tail and level up position of needle easily demonstrated.

Stable hand positions and bracing of syringe practiced. Tail material provides resistance to needle insertion.

Mouse preparation – clip hair

Data for tail vein injection is based on 5 students. One MD/PhD student did not practice tail vein injections.

OVERALL STUDENT FEEDBACK

Student Raw Scores

| MD/PhD | Animal Tech | Animal | IACUC Admin. | Post | MD/PhD

| Raw | Mean | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Mean | 3.0 | 3.0 | 2.0 | 1.5 | 1.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Standard Error | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

Conclusions

We recently updated a semester course in laboratory animal science at our institution. The course was advantaged for graduate level credit and research staff auditing in addition to historical attendance requirements for new laboratory animal technicians. A fresh approach to surgical and biosafety training would equip all students in the class and embrace the replacement of live animals by inanimate models. Later, aseptic technique, draping, and refinement of tissue handling can be layered onto these basic skills using cadavers and eventually live animals.

Simultaneously, common challenges for novices in mastering laboratory techniques such as tail vein injection are syringe handling and stabilization, angle of skin and vessel entry, and positioning of the tail and syringe. Acquiring these skills does not require live animals and can be more difficult for novices when simultaneously learning to restrain the animals.

Our objectives were to

1) Determine if catnip mice were an engaging and realistic model for novice training
2) Assess the practical use of catnip mice in a traditional classroom setting
3) Collect student feedback about the utility of the catnip mouse model

Student experience pre-training

Eight students were enrolled in the class at the time of the catnip mouse training sessions. Six of the eight students were available to evaluate engagement and evaluation statements using a Likert-like scale as follows:

1 = Strongly disagree
2 = Disagree
3 = Agree
4 = Strongly agree

Five of the six students had no previous formal instruction in suturing or tail vein injection of laboratory rodents.

<table>
<thead>
<tr>
<th>Experience</th>
<th>Student Raw Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience suturing techniques</td>
<td>3.6</td>
</tr>
<tr>
<td>Experience suturing live mice or models</td>
<td>3.8</td>
</tr>
<tr>
<td>Experience with tail vein injections in mice or rats</td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience</th>
<th>Student Raw Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience suturing techniques</td>
<td>3.6</td>
</tr>
<tr>
<td>Experience suturing live mice or models</td>
<td>3.8</td>
</tr>
<tr>
<td>Experience with tail vein injections in mice or rats</td>
<td>3.0</td>
</tr>
</tbody>
</table>

References

Surgical Research Laboratory of the Division of Laboratory Animal Resources at the Medical University of South Carolina, Charleston, South Carolina. We acknowledge the medical library and IACUC administrative staff for their contribution to this work.

*The contents of this poster do not represent the views of the Department of Veteran Affairs or the United States Government.

OVERALL STUDENT FEEDBACK

Student Raw Scores

<table>
<thead>
<tr>
<th>MD/PhD</th>
<th>Animal Tech</th>
<th>Animal</th>
<th>IACUC Admin.</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw</td>
<td>Mean</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Mean</td>
<td>3.0</td>
<td>3.0</td>
<td>2.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Standard Error</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

ACKNOWLEDGEMENTS

This work was supported by the Post VA to VA Medical Center and the Surgical Research Laboratory of the Division of Laboratory Animal Resources at the Medical University of South Carolina, Charleston, South Carolina. We acknowledge the medical library and IACUC administrative staff for their contribution to this work.

*The contents of this poster do not represent the views of the Department of Veterans Affairs or the United States Government.