Self-injurious Biting in Laboratory Animals: A Discussion

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This discussion took place on the Laboratory Animal Refinement & Enrichment Forum [LAREF] e-mail list in January, 2004. The participants were Kate Baker, Tulane NPRC, Covington, Louisiana; Sonja Banjanin, University of Toronto, Canada; Jas Barley, Southampton General Hospital, England; Lorraine Bell, University of Colorado-Health Science Center, Denver; Ernie Davis, NIH Animal Center, Poolsville, Maryland; Joseph Garner, University of California, Davis; Ann Lablans, Queen's University, Kingston, Canada; Viktor Reinhardt, Animal Welfare Institute, Washington, D.C.; and Chris Sherwin, University of Bristol, England. Viktor Reinhardt, moderator of LAREF, edited the responses.

Reinhardt: "Self-injurious biting is probably the most serious example of self-injurious behavior (SIB). It occurs primarily in singly-caged laboratory primates, about 10% of which are affected (Platt et al., 1996). Transferring the subject to compatible social housing is currently the most effective therapy for this pathology (Line et al., 1990; Reinhardt, 1999; Alexander & Fontenot, 2003).

"Self-injurious biting is occasionally also seen in socially housed primates. Do group/pair-housed animals show this behavioral pathology spontaneously or is it triggered by specific events? I remember two individually caged rhesus males who required surgical care of self-inflicted bite wounds on several occasions. After they were paired with compatible partners, the self-biting stopped, until the two 'had' to be separated for research reasons. Both inflicted serious injuries on themselves in the first hour of separation. Needless to say, they were released from the research protocols and reunited with their buddies. From then on, no more self-biting was observed."

Baker: "I have videotaped rhesus macaques and have the impression that self-injurious biting occurs more often in singly-housed than in socially-housed animals. Among pair-housed individuals, unfortunately, the primary trigger for self-injurious biting appears to be mildly aggressive behavior from cagemates who occasionally supplant or swat subordinate partners. In this context, self-biting does not result in visible injuries, so I accept it for the sake of keeping pairs together. Also, no telling how much worse it could get if such animals were transferred to single-housing. Pair-housed animals occasionally self-bite when one of the partners is removed for whatever reason. It is my experience that most animals can cope with that extremely disturbing situation, but a few cannot, and those need to be re-paired as quickly as possible."

Lablans: "We have a male rhesus who has always been paired but once in a while he will 'chase' and bite his own leg. He typically does that upon being returned to his cage after a short chair-restraint procedure."

Reinhardt: "Monkeys may look relaxed and 'okay' while being chaired, but this does not necessarily mean that the whole situation is not experienced as frustration, discomfort, or distress. Returning to the home cage may be such a relief for this male that he vents some of the built-up tension in a behavioral pathology that he developed for whatever reason when he was a kid. Do you know his rearing history?"

Lablans: "He came to us as a very unusual animal to begin with. When I released him from his cage to have the run of the room, he would come over and sit with me on the floor. This makes me believe he had more contact with humans than the average rhesus we receive here."

Reinhardt: "Perhaps he was a pet? There is a very interesting old article that describes self-injurious biting in such an individual (Tinklepaugh, 1928)."

Davis: "I have observed self-injurious biting in group-housed, nursery-reared rhesus. This behavior doesn't appear to be spontaneous within the social context, as often found in singly housed animals. It is usually elicited by some negative event or state of arousal during a stressful situation. However, there are exceptions. For example, I recently saw one animal bite himself while playing with companions. It appeared to be normal rough and tumble play, which he seemed to enjoy. Yet, he would bite one of his wrists and sometimes an ankle during these play bouts. This case, however, is probably not typical since the animal was nursery reared, which is likely to affect normal neurological development."

Garner: "Self-biting is a classical SIB that falls into two basic categories, stereotypical or impulsive/com-pulsive behaviors. Both are 'inappropriate' repetitive activities, which involve different areas of the brain, have different prognoses, and respond to different drugs. Movements are always oriented to the same target [e.g., eye-poking] in the case of stereotypies, while they have flexible goals in the case of impulsive/compulsive behaviors [e.g., hair-pulling-and-eating]. I wonder, under which category does the self-injurious biting of monkeys fall? What does this behavior actually look like?"

Reinhardt: "In my own experience with rhesus and stump-tailed macaques, self-biting occurs in the following two sequences of events and circumstances:

Subject is extremely bored, shows no signs of excitation but repeats over and over again the same movement patterns - for example circling, pacing or somersaulting - interjected by sham biting of specific body parts. This behavior often goes unnoticed because there is no visible abrasion/laceration, plus the subject usually doesn't show the behavior when there is a distraction, e.g., personnel entering the room.

Subject is extremely frustrated (high emotional arousal, e.g., shaking, intense staring, piloerection), e.g., when fear-inducing personnel approach the cage with the subject having no option of escape or attack. The animal predictably attacks specific sites of the body, for example always the right wrist or always the left upper thigh. This typically leads to noticeable abrasion over time - first local alopecia, followed by mild inflammation - but may also dramatically result in a serious laceration (Figure 1). Typically, an animal self-inflicts serious lacerations of the same body part several times on different occasions. This circumstance often necessitates amputation of the repeatedly injured and sutured limb."

Figure 1: Individually caged rhesus macaque with laceration on elbow resulting from self-injurious biting.

Baker: "In my institutions self-biting seems to be triggered more often when attending personnel leave rather than enter the room. For this reason I think a lot of thought needs to go into what kind of relationship is established between staff and an animal that self-bites in their presence. Perhaps we all have biases, but I like to believe that the visits, at least from enrichment personnel, are positive! If they aren't, I'm going home right now..."

Garner: "Behaviors that occur when you leave the room might have been suppressed by your presence. For instance if the animal sees you as an interesting and fun thing to interact with, it might suppress other behaviors, such as self-biting, in order to give you all his/her attention while you are there. Once you leave the room, the suppressed behavior will rebound.

"The impression that I get from the information shared on this forum is that primate self-biting behaviors are directed identically to one point on the body and therefore constitute stereoypical SIB."

Self-injurious biting is not restricted to primates. Sherwin: "I remember seeing a video of a mixed breed domestic pet dog that would suddenly behave towards its left rear leg as if it were another dog trying to steal its food. It would growl, snarl and then eventually bite its own leg, very hard. An abnormal dog for sure and only one example, but I don't think SIB is limited to primates."

Banjanin: "Large dogs who do not get enough exercise can end up chewing on their hind extremities, to such an extent as to expose the bone. Although I was not a witness to this myself, it has come up a couple of times from different vets."

Bell: "During my two years working with dogs and cats in a research laboratory I never saw an animal display self-injurious behavior, but when I worked in small animal veterinary practices I saw several cats requiring tail amputation as a result of self-injurious biting, and dogs biting their own feet repeatedly."

Obviously, companion animals, including primates, do not necessarily enjoy more species-appropriate living conditions than laboratory animals. Barley: "Having seen how some people keep their pets and the cruelty inflicted through, at best, ignorance but often indifference, I don't think it's safe to take it as a given that animals at home are having a good time. In a lot of cases they would be much better off in the lab, at least as far as regular food, cleanliness, and caring goes."

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Editor's Note: A Self-Injuring Primate Reports: Several years ago I read that sometimes self-inflicted injuries on primates are on both sides of the body and on bilaterally symmetrical places, and that this might have something to do with acupuncture points and pathways. If true, this might explain why repeated stimulation of these areas, while injuring the tissue on the surface, paradoxically rewards the animal or helps it feel better.

At about the same time that I read this, I was undergoing a lot of stress, and developed patches of eczema on my wrists. I've never had eczema before or since. I'd find myself scratching the eczema, and if I wasn't paying attention to what I was doing, I'd scratch the patch on my left wrist to the point where it would bleed. In a curious, perverse way, the scratching felt good and relieved some of the stress (but only momentarily). The stressor was a big pile of stuff in one of the rooms of my house, and every time I entered the room, I'd find myself scratching.

I wondered whether this eczema and self-injury of mine would show this bilateral symmetry, and it did. The two patches of eczema were the same size, on the inner edge of each wrist. I don't know if this location lines up with acupuncture pathways. However, I scratched the left side more, and that's the only one that bled. Could it be that I was scratching the left side more because I'm right handed? Or does the acupuncture theory not hold up?

With hindsight, I wonder if displacement was one of the motivations for scratching. Whenever I went into the cluttered room, I perceived (subconsciously, perhaps) the pile of clutter as a physical and psychological barrier to the rest of the room, a room that was important to me - I felt blocked. Frustrated from taking direct action to solve the problem, I took some action - against myself.

One weekend my husband and I tackled the pile of stuff and cleared the room. The eczema and scratching disappeared almost overnight. - Elva Mathiesen