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Author

Buyukmihci, Nedim

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Restraint of Non-human Primates in Laboratories

Nedim C Buyukmihci, V.M.D.¹

Summary

This paper discusses the issues surrounding the restraint of non-human primates in laboratories. It points out the suffering caused by restraint methods such as typical housing and so-called primate chairs in particular.

Keywords: animal welfare, captivity, housing, injury, laboratories, non-human primates, pole and collar, primate chairs, research, restraint, restraint chair, restraint device, steel cages

Non-human primates (primates²) in captivity are often restrained in some manner, either manually, through the use of a cage with a squeeze device, a “pole and collar” or by a restraint chair or similar device in which they 'perform' so that data can be obtained. There are serious welfare issues surrounding the restraint of non-human primates³. Regardless of their source, non-human primates are wild animals; they can only be tamed and have not developed the domesticated status of animals such as cattle or dogs. They continue to be stressed, distressed and fearful when in captivity. Further, being restrained is a fundamental fear for all wild animals, particularly because this makes them vulnerable to predation; essentially all primates in captivity are prey as well as predator species. As a result, being restrained causes extreme anxiety and stress, sometimes even distress where the animal is unable to cope with the stress and may go into shock and sometimes die.

Primates are often handled by use of a “pole and collar” in order to remove them from their cages for whatever reason⁴. This involves placing a permanent metal or plastic collar around the neck of the individual. The collar has openings which can be 'grabbed' by the end of a specially designed pole. The individual then can be dragged around by the neck until they acquiesce to being manoeuvred in this manner. Almost all individuals vigorously object to being treated in this manner and it can take many weeks for them to acquiesce. Some become too aggressive for this method to be used. Restraining individuals in this manner is patently inhumane, but continues to be used. It is, however, not considered best practice in Europe⁵.

Even without the types of direct restraint mentioned above, a primary restraint for the primates is the cage in which they are kept. It is axiomatic that keeping non-human primates in laboratories, regardless of place of birth, for whatever purpose, is contrary to their welfare and well-being. The wide spectrum of needs, desires and options for life and well-being cannot be provided adequately

1 Emeritus Professor of Veterinary Medicine, University of California; contact: ncbuyukmihci@ucdavis.edu; Copyright © 2023 Nedim C Buyukmihci.

This paper is a 'work in progress' and is part of a series on exploitation of non-human beings by human beings. See the first paper ([Buyukmihci 2022-12-01](#)) for arguments on the moral value of non-human animals in general.

I do not believe non-human primates should be kept in captivity for any purpose that is not in their interests. Exceptions might be sanctuaries where individuals are either being rehabilitated for return to their natural homes or being provided a suitable and life-long home because they are likely to fair poorly if released into a free-living state. Any statements I make, therefore, with respect to improving situations in laboratories, are in no way supportive of this immoral situation.

- 2 Purely for the sake of convenience, I may refer to primates other than human beings as "primates", recognising that all are primates of one kind or another; there is no intention to imply that any, even a human, is morally superior or intrinsically more valuable than another.
- 3 [Committee 2011](#); [Gauquelin-Koch et al 1996](#); [Graham et al 2012](#); [Jennings et al 2009](#); [Morton et al 1987](#); [National Research Council 2011](#); [Vogel et al 1991](#)
- 4 [McDonough et al 2021](#)
- 5 [Jennings et al 2009](#)

in such a setting⁶. Two of these needs include direct social interaction with multiple compatible conspecifics⁷, especially those of their natal group, and access to sufficient space and environmental enrichment, including access to the outdoors and a natural substrate such as an earthen floor with abundant vegetation⁸, so that species-specific behaviour is facilitated. In particular, there is considerable evidence that housing these individuals singly is inhumane and that it compromises the reliability or usefulness of data derived from them⁹. Despite this, and despite the legal requirement “*for a physical environment adequate to promote the psychological well-being of primates*”¹⁰, the norm is to house these individuals without any meaningful enrichment, in virtually barren steel cages, without any *meaningful* (not just auditory, olfactory or visual as is the case for most) contact with conspecifics¹¹. When environmental 'enrichment' is provided, such as with 'toys' or other novel items, the value is transient and inconsequential¹², especially if there is no concurrent social enrichment¹³. There may be little to no value whatsoever, such as by increasing cage size¹⁴. Items used for 'enrichment' may even cause the death of an individual¹⁵. Even when social 'enrichment' comprises housing with one compatible conspecific, the physical situation still lacks in anything that allows the individuals the choices and behavioural opportunities that are important for physical and emotional well-being in these species. Further, the lack of exercise in such an abnormal environment can lead to an increase in susceptibility to infections¹⁶.

In every research institution with which I have been involved, I observed first hand considerable stereotypical and other aberrant behaviour in baboons, macaques, marmosets and tamarins. These included repetitive circling, pacing, rocking, side-to-side movements, somersaulting or spinning; so-called floating limb movements; self-directed behaviour often resulting in hair loss (alopecia); self-injurious behaviour resulting in sometimes serious lacerations of limbs or other body parts (self-mutilation); states of being obtunded. These behaviours were more marked and more frequently seen in individuals who were singly housed. At the very least, they indicated maladaptation of the individuals to their environment.

To reduce the inherent stress of captivity, the primates must be provided the best possible environment to give them the best possible life within the severe constraints of being in captivity in the first place. Meaningful social contact is the core requirement, but should be augmented by other forms of enrichment. At the very least, the individuals must be provided a more naturalistic environment, including access to the outdoors and natural substrates, including troughs of water¹⁷. Given that they will be deprived of a normal life, be subjected to treatments and procedures that people would never inflict on even consenting humans, and ultimately be killed, they are 'owed' at least this much. The Refinement principle of the 3Rs demands this¹⁸.

6 I am aware that some entities, such as the California National Primate Research Center ([CNPRC](#)), provide semi-natural outdoor enclosures for some of the primates. Nevertheless, the individuals are still restricted to captivity, cannot make important life choices they could if free, are regularly removed for research projects (and often killed) and the offspring of mothers are often removed soon after birth to be raised without a mother in a so-called nursery.

7 [Bellanca & Crockett 2002](#); [Bourgeois & Brent 2005](#); [Crockett et al 1994](#); [Doyle et al 2008](#); [Gilbert & Baker 2011](#); [Lutz et al 2003](#); [Reinhardt & Reinhardt 1991](#); [Scott et al 2003](#); [Visalberghi & Anderson 1993](#)

8 [Alejandro et al 2022](#); [Beisner & Isbell 2008](#); [Beisner & Isbell 2009](#)

9 [Castell et al 2022](#); [Gottlieb et al 2015](#); [Graham & Schuurman 2015](#); [Hannibal et al 2017](#); [Kraemer et al 1984](#); [Lutz 2018](#); [Niehoff et al 2010](#); [Novak et al 2013](#); [Olsson et al 2007](#); [Pomerantz et al 2022](#); [Schapiro 2002](#); [Wang et al 2022](#); [Wooddell et al 2019](#)

10 [USDA 2012](#)

11 [National Research Council 2011](#)

12 [Bayne et al 1993](#); [Bloom & Cook 1989](#); [Line 1987](#); [Line & Morgan 1991](#); [Novak et al 1998](#)

13 [Lutz & Novak 2005](#); [O'Neill 1988](#)

14 [Crockett et al 2000](#); [Kaufman et al 2004](#); [Line et al 1989](#)

15 [Lazar 2012](#)

16 [de Araujo et al 2022](#)

17 [Anderson et al 1994](#); [Parks & Novak 1993](#)

18 [NC3Rs 2022](#)

Restraining non-human primates, particularly in chairs, is inhumane, regardless of any previous 'training' or forced acclimation¹⁹. There is no legal proscription for using these chairs in whatever fashion the researcher desires, even for prolonged periods. The National Research Council states that the latter should be “*avoided unless it is essential for achieving research objectives*”²⁰. Thus, as with essentially every other inhumane situation in the laboratory, the “objectives” of the research overrule any welfare issues.

One way of reducing, but not eliminating, the stress of restraint is to either train the individual to 'accept' the restraint²¹, such as in a chair, or reduce the level of restraint to a minimum, such as training them to present their arm for blood sampling²². The training can involve either positive or negative reinforcement. The latter is axiomatically problematic from a welfare perspective. What is poorly appreciated, however, is that even so-called positive reinforcement has a component of negativity when wild or non-domesticated animals are involved.

Using the restraint chair as an example, the individual usually has her or his limbs tied down, may have a strap across the waist or chest, may have a yoke around their neck, and may be additionally restrained by having the head fixed in space through the use of a post surgically implanted into the skull²³. This is an extreme form of restraint and no non-human primate willingly permits this. Struggling, biting and crying out ('vocalisation') are associated with marked changes in blood serum markers and other parameters demonstrating the stressed condition of the individuals and compromised well-being²⁴. In order to get the primate to enter the chair and be restrained, he or she has to be 'trained' to overcome their extreme and innate aversion to this. Although using 'positive' reinforcement is preferable, one needs to create a situation where the aversion to restraint is overcome by the 'pleasurable' or less unpleasant aspect of the alternative, which might be a food item. Nevertheless, the individual is always stressed to some degree, even after training, because the fundamental aversion to restraint has not been removed, rather it is being tolerated. It is, therefore, never the case that a truly humane end-point is achieved regardless of how the individual is trained. A simple analogy might be giving a much-desired reward to a person for doing something that causes her or him pain or is otherwise undesirable. The event is no less painful or undesirable, but the person tolerates it because they value the reward.

Some might consider fluid (such as juice) rewards as being positive reinforcement training. This usually is not the case because in order to get the individuals to overcome their fear of restraint, one generally has to deprive them of all fluids sufficiently to create a physiologic demand for fluids or thirst. That is, one needs to create a state of dehydration, the severity of which depends on the resistance of the individual to respond to the fluid rewards. As such, essentially all forms of fluid reward schemes must be considered *negative* reinforcement. Furthermore, it is erroneous and dangerous to conclude that the individuals are voluntarily going into a chair when one has deprived them of a substantial amount of fluids. The physiologic stress this causes overrides any aversion to the chair. It may take a lesser or greater degree of deprivation in order to reach this stage, depending on the individual. The situation is compounded when restraint is increased by using head fixation in addition to the chair. It is often stated that the animal is provided their daily fluid needs at the end of a 'training' session. Given that the non-human primates almost certainly are unaware of this, at least early in 'training', the degree of anxiety and discomfort they would experience as a result of thirst would be substantial.

The same concerns apply to making the primates perform tasks while in the chair. It is still not the case that they are behaving 'willingly'. They may have an intense thirst that is only alleviated if they do certain things ('work', 'perform').

19 [Reinhardt et al 1990](#)

20 [National Research Council 2011](#)

21 [Scott et al 2003](#)

22 [Reinhardt 2003](#)

23 [Sajad et al 2022](#)

24 [Bass et al 2009](#); [Bouyer et al 1978](#); [Morrow-Tesch et al 1993](#)

There is probably also a degree of learned helplessness associated with the monkeys 'accepting' or going 'willingly' into chair restraint. Although there appear to be no studies that directly address this issue, it can be inferred from other studies²⁵.

One might argue that we train dogs, for example, to do things and do not consider that a compromise to their welfare. It should be appreciated, however, that the two situations (wild versus domesticated) are fundamentally different. Dogs have thousands of years experience of being in human company and generally have developed a friendly and trusting relationship with human beings. Being manipulated by people, when aversive stimuli are not involved, is generally not unpleasant. Because the dog often considers the human being to be 'pack leader', there is an innate desire to please or cooperate. If the dog is not being 'asked' to do something innately painful or unpleasant, he or she is not overcoming some primal fear such as in the case of non-human primates (or other wild animals).

It has been shown that non-human primates in a research setting mask signs of pain²⁶. This can logically and rationally be extended to cover the issue of other negative impacts such as the stress endured by being chaired. There is no way to know for certain what the individual is experiencing emotionally. One cannot, however, depend solely on external signs in non-human primates, any more than can be done in human primates, to determine whether there is a negative impact.

There are physical complications associated with the chairing of non-human primates, particularly when done for extended periods²⁷. These are not ameliorated by training. Moreover, chairing is not just a welfare issue. The data derived from such chairing may be compromised²⁸.

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26 [Plesker & Mayer 2008](#)

27 [Bryant 1980](#); [Byrd 1979](#); [Florence et al 1995](#); [Henry & Bowman 1971](#); [Klein & Murray 1995](#); [Vogel et al 1991](#)

28 [Bass et al 2009](#); [Capitanio et al 1998](#); [Chen et al 2008](#); [Florence et al 1995](#); [Gauquelin-Koch et al 1996](#); [Landi et al 1990](#); [Lee et al 2013](#); [Mason 1972](#); [Mason & Mougey 1972](#); [Mason et al 1973](#); [Norman et al 1994](#); [Reinhardt et al 1990](#); [Shirasaki et al 2013](#); [Tatsumi et al 1990](#)

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