

Religious Slaughter and Animal Welfare— An Introduction for Animal Scientists

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EDITOR'S NOTE

This paper was originally presented by the authors to the Extension/Industry Group at the Reciprocal Meat Conference. It was the consensus of the AMSA Publications Committee and Board of Directors that it was an important topic to which meat scientists should have access, and thus warranted publication in the RMC Proceedings. The Committee Chairman asked the authors to revise, edit and shorten the manuscript, which they have done for this publication.

Both the Muslim and Jewish faiths have specific requirements for the slaughter of religiously acceptable animals. The major difference from the general practices in the US is that the animals are not stunned prior to slaughter. It is important that scientists involved in working with animals understand the implications of these differences. They need to consider the scientific information available about the effects of these practices on animals before reaching any judgments about the appropriateness of this form of slaughter. It is also important that they understand the importance of these practices to the people who follow these religious codes. We hope to discuss some information that may be useful to you in evaluating religious slaughter.

The Jewish dietary code is described in the original five books of the Holy Scriptures. The Muslim code is found in the Quran. Both codes were major advancements in the handling of animals in ancient times. For example, the Jewish code specifically forbade or forbids the use of limbs torn from live animals and the slaughter of both a mother animal and its child on the same day.

One way to view the rather comprehensive legal system of the Jewish faith is spelled out in the paragraphs below. We feel this explanation may help others understand the degree of significance of these religious practices to those of the Jewish faith (Grunfeld, 1972):

"And ye shall be men of a holy calling unto Me, and ye shall not eat any meat that is torn in the field" (Exodus XXII:30). Holiness or self-sanctification is a moral term; it is identical with . . . moral freedom or moral autonomy. Its aim is the complete self-mastery of man.

"To the superficial observer, it seems that men who do not obey the law are freer than law-abiding men, because they can follow their own inclinations. In reality, however, such men are subject to the most cruel bondage; they are slaves of their own instincts, impulses and desires. The first step towards emancipation from the tyranny of animal inclinations in man is, therefore, a voluntary submission to the moral law. The constraint of law is the beginning of human freedom. . . . Thus the fundamental idea of Jewish ethics, holiness, is inseparably connected with the idea of Law; and the dietary laws occupy a central position in that system of moral discipline which is the basis of all Jewish laws.

"The three strongest natural instincts in man are the impulses of food, sex and acquisition. Judaism does not aim at the destruction of these impulses, but at their control and indeed their sanctification. It is the law which spiritualizes these instincts and transfigures them into legitimate joys of life."

We hope that the above quote suggests the importance of the kosher dietary laws to people of the Jewish faith. Similar religious philosophies underpin the Muslim requirements. Thus, the ability to carry out ritual slaughter is extremely important to people of these two faiths.

The actual reference to slaughter in the Jewish Holy Scriptures is quite cryptic: ". . . thou shall kill of thy herd and of thy flocks, which the Lord hath given thee, as I have commanded thee . . ." (Deuteronomy XII:21). Clearly, it was assumed that people were familiar with the rules for kosher slaughter. These were a part of the "oral code." Eventually these rules were written down in the series of volumes called the Talmud and in other books. The Talmud contains an entire section on slaughter and the subsequent inspection of animals to insure that they are religiously "clean." The text includes detailed anatomical information in order to teach exactly what was to be done during slaughter and the subsequent post-mortem inspection, again illustrating the im-

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portance of these regulations in the daily life of the religion.

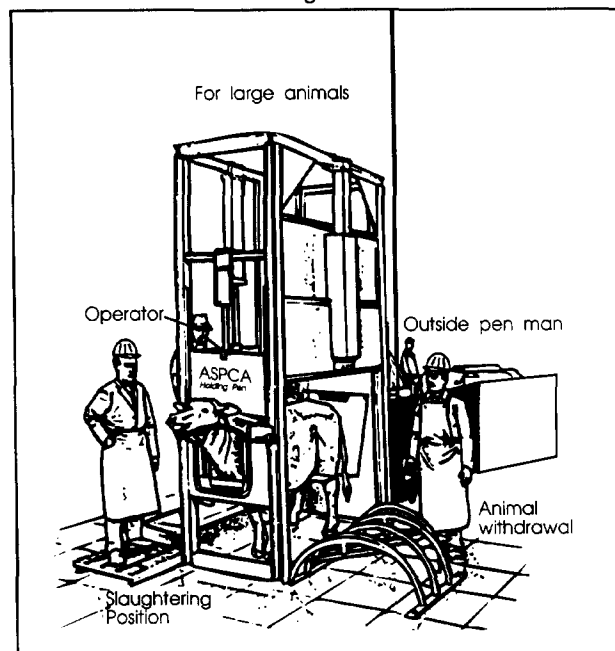
The Muslim rules are contained in verses in the Quran such as: "Forbidden unto you for food are carrion and blood and swineflesh, and that which hath been dedicated unto any other than Allah, and the dead through beating, and the strangled, and the dead through falling from a height, and that which hath been killed by the goring of horns, and the devoured of wild beasts, saving that which ye make lawful by the deathstroke, and that which hath been immolated unto idols. . . . This is an abomination." (Verse V:3 Holy Quran).

Any Muslim may slaughter an animal while invoking the name of Allah. In cases where Muslims cannot kill their own animals, they may use meat killed by a "person of the book," i.e., a Christian or a Jew. Again, stunning prior to slaughter is generally not the practice. However, a mild mechanical stunning prior to slaughter has been developed that has received approval from some Muslim authorities. Work in the 80's in New Zealand led to the development of a very sophisticated electrical stunning apparatus that met a Muslim standard where an animal must be able to regain consciousness in less than a minute and must be able to eat within five minutes. Electric stunning prior to Muslim slaughter is used in almost all sheep slaughter plants in New Zealand and Australia. Electric stunning of cattle is used in many New Zealand Muslim cattle slaughter plants and the practice is spreading to Australia. "Halal" slaughter in New Zealand and Australia may be carried out by regular plant workers while Muslim religious leaders are present and reciting the appropriate prayers. However, the larger Halal slaughter plants in Australia, New Zealand, and Ireland employ Muslim slaughtermen. Muslim slaughter without stunning is forbidden in New Zealand.

The Jewish religious codes require that allowed animals be slaughtered by a specially trained Jewish male, while the Muslims prefer that slaughter be done by a person of that faith. In the case of the Jewish dietary laws, a specially trained person of known religiosity carries out the slaughter. This person, the "shochet," is specifically trained for this purpose. He is trained to use a special knife, called the "chalef," to rapidly cut in a single stroke the jugular vein and the carotid artery without burrowing or tearing or ripping the animal. The knife is checked regularly for any imperfections which would invalidate the slaughter. This process, when done properly, leads to a rapid death of the animal. A sharp cut is also known to be less painful. All Muslims are permitted to carry out "halal" slaughter.

Given the importance of religious slaughter to people of these two major faiths, it is important that animal scientists look carefully at these practices before jumping to conclusions about whether these processes meet current animal welfare standards. It is most important to distinguish between those practices which are inherent to the religious requirements and for which more tolerance is probably justified versus those practices that are simply a reflection of how things have always been done or represent previous compromises with governmental regulations, and which could be improved if better methods are available and the industry and the religious community are willing to make the necessary changes. Hopefully, the following discussion will help make these distinctions.

Figure 1.



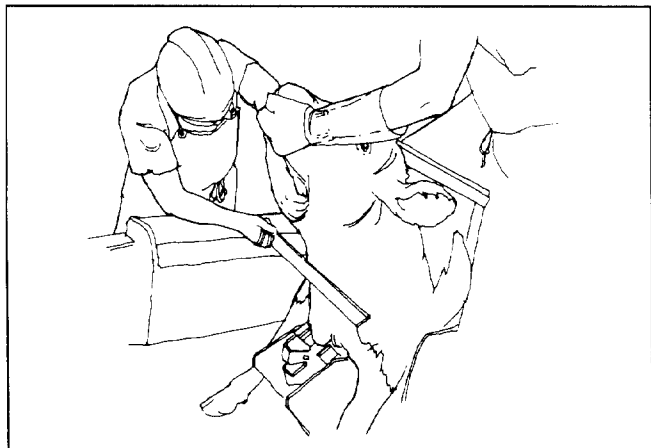
ASPCA holding pen which holds the animal in a standing position for kosher slaughter.

Currently, much of the religious slaughter in North America is done by shackling and hoisting of live animals. Besides possibly leading to bruises on the legs, the idea of an animal hanging live by one leg must be viewed as a questionable practice. The second author has observed shackling and hoisting in many plants. Adult cattle suspended by one back leg will often show visible signs of distress, such as bellowing and thrashing. The practice originated as a way for religious slaughter to meet modern slaughter regulations that require that the animal be kept off the ground at the time of slaughter. However, at this time, both authors feel that there are a number of acceptable alternatives so that this practice, (which probably does not meet the current animal welfare standard and is not inherently required by Muslim or Jewish religious law must be abandoned (Grandin, 1990; Regenstein and Regenstein, 1990). As illustrated above, some very fine alternatives exist. Both the Jewish and Muslim religions are concerned with the humane slaughter of animals, and the newer methods have been designed to be acceptable to them.

Grandin (1991a) describes her experiences with a properly-operating, ASPCA-approved kosher kill box (Figure 1), a readily available piece of equipment for religious slaughter. The animal stands upright in a narrow stall. A chin lift restrains the head and the body is held in position by a rear pusher gate. The belly is supported by a lift. She said "Recently, I participated in a ritual kosher slaughter—in this ritual, the way it was meant to be done, I must say. This was at a plant where the management really understood the importance and significance of what they were doing, and communicated this to their employees—and to the animals as well, I believe.

"As each steer entered the kosher restraining box, I manipulated the controls to gently position the animal. After

Figure 2.



Double Rail Center Track Restrainer for calves and sheep

some practice, I learned that the animals would stand quietly and not resist being restrained if I eased the chin-lift up under the animal's chin. Jerking the controls or causing the apparatus to make sudden movements made the cattle jump. Good operators learn how to make the device an extension of their hands. The more gently I operated the restraining box, the less pressure was required to control animal movement. Some cattle were held so loosely by the head-holder and the rear pusher gate that they could easily have pulled away from the rabbi's knife. I was relieved and surprised to discover that the animals don't even feel the super-sharp blade as it touches their skin. They made no attempt to pull away. I felt peaceful and calm.

"The kosher box has several features to make it easy to operate gently. Many kosher boxes squeeze the animal too hard, and the operators of these boxes cannot control the pressure brought to bear on the animal. These boxes can be easily modified to prevent oversqueezing. The belly lift should not lift the animal off the floor. Vertical travel of the belly lift should be restricted to 28 inches by welding a stop to the lift track. Pressure-limiting devices should be installed on the rear pusher gate."

One of the key components that made kosher slaughter so successful in this plant was the attention to animal handling. As Grandin often points out, a key component for excellent slaughtering is how the animal is handled prior to slaughter. The use of cattle prods, poorly designed handling systems, and rough and uncaring attitudes of plant or religious workers are all detrimental to the successful handling of animals prior to slaughter, regardless of whether the animals will be killed religiously or by the standard slaughter procedures approved for use in the U.S. Electrical stunning, carbon dioxide anesthesia and bolt gun stunning of the head can all be easily done improperly and unfortunately are, in some slaughter plants.

Carbon dioxide stunning has legitimate humane questions. In the Yorkshire breed of pig, carbon dioxide is humane because unconsciousness occurs before the agitation phase of the anesthesia induction starts (Forslid, 1987). In

other breeds of pigs, agitation will start prior to the onset of unconsciousness (Grandin, 1988). German researchers are concerned about possible animal welfare problems in stress-susceptible German Landrace pigs (Troeger and Woltersdorf, 1991). Therefore, carbon dioxide is a method where genetic factors may determine whether or not it is humane.

When captive bolt stunning is performed properly, the animal will become instantaneously insensible to pain. In sheep, the captive bolt will instantly abolish visual and somatosensory-evoked potentials (Daly et al., 1986). When cattle or sheep are shot with a well-maintained and properly aimed captive bolt gun, the animal will drop to the floor instantly and its corneas and eyelids will be unresponsive to the touch.

Electric stunning and electroconvulsive shock treatments both produce grand mal epileptic seizures. The electrical characteristics of head-only stunning equipment for pigs and electroconvulsive therapy equipment for people are very similar (Gregory, 1991; Abrams and Swartz, 1989). To induce instantaneous unconsciousness, sufficient amperage must pass through the brain to induce an epileptic seizure (Croft, 1952). Head-only stunning produces a reversible unconsciousness, whereas head-to-back or head-to-body electric stunning induces unconsciousness and cardiac arrest simultaneously.

Captive bolt and electric stunning are very humane when they are properly applied. However, improper application can result in great stress. All stunning methods trigger a massive secretion of epinephrine (Pearson et al., 1977; Van der Wal, 1978; Warrington, 1974). This outpouring of epinephrine is greater than the secretion which would be triggered by an environmental stressor or a restraint method. Since the animal is unconscious, it does not feel the stress. One can definitely conclude that improperly applied stunning methods would be much more stressful than kosher slaughter. Captive bolt stunning and cardiac arrest electrical stunning actually kill the animal and it will not recover. Head-only electrical stunning and CO₂ stunning render the animal insensible for about 30 seconds. The animal will fully recover if bleeding is delayed.

Scientific researchers agree that sheep lose consciousness within 2 to 15 seconds after both carotid arteries are cut (Nangeroni and Kennett, 1963; Gregory and Wotton, 1984; Blackmore, 1984). However, studies with cattle and calves indicate that most animals lose consciousness rapidly but some animals may have a period of prolonged sensibility (Blackmore, 1984; Daly et al., 1988). Other studies with bovines also indicate that the time required to become unconscious is more variable compared to sheep and goats (Levinger, 1976; Gregory and Wotton, 1984). The differences between cattle and sheep can be explained by differences in the anatomy of the blood vessels (Baldwin and Bell, 1963).

Observations by the second author of both calf and cattle slaughter indicate that problems with prolonged unconsciousness can be corrected. When a shochet uses a rapid cutting stroke, 95% of calves collapse almost immediately (Grandin, 1990). When a slower, less-decisive stroke was used, there was an increased incidence of prolonged sensi-

bility. Rapid loss of consciousness can also be enhanced by making the cut as close to the jaw as religious law will permit. Gentle, careful operation of the ASPCA pen is also beneficial. Bleed-out is also facilitated if the chin lift remains up and pressure exerted by the forehead bracket and upper neck restraint is released immediately after the cut. To enhance bleed-out and prevent meat quality defects, the ASPCA pen operator should avoid the application of excessive pressure by the belly lift and rear pusher gate (Grandin, 1992).

Bager et al. (1992) reports that calves appeared to have no reaction to the throat cut. Observations by the second author indicated that the special long, sharp knives used for shechita are important for humaneness. There is concern about Muslim slaughter of adult bovines with knives that are too short to make a single slice through the throat. More work is needed to train Muslim slaughtermen and improve the knives.

As already mentioned, the key intellectual consideration in looking critically at religious slaughter is to separate the effects of the pre-slaughter handling and the equipment used to restrain the animals from the actual act of religious slaughter. The ability to experimentally separate various variables needs to be carefully considered by any scientist before making a judgement concerning the acceptability of various slaughter methods.

As discussed previously, the meat industry should replace shackling and hoisting with humane restraint equipment. The use of this equipment is recommended by the American Meat Institute (Grandin, 1991b). Safety is another reason for eliminating shackling and hoisting. There are several good systems that are commercially available. They are the ASPCA pen and the double rail (center track restrainer) (Grandin, 1987). For small plants, a simple double rail restrainer can be built (Grandin, 1991c).

In Europe, cattle are held in a device called the Weinberg casting pen. It turns the animal over onto its back for kosher slaughter. Measurements of cortisol by Dunn (1990) in two different slaughter plants indicated that the Weinberg pen was more stressful than the ASPCA pen. An improved casting pen, the Facomia pen, is now available from France. Observations by the second author indicate that it is probably less stressful than the old-fashioned Weinberg pen, but it may be more stressful than the best upright re-

straint systems. Rushen (1986) has found that animals prefer upright restraint.

We would like to note that slaughter experiments ought to be done in a single plant using the same type of cattle. (For example, Angus run 20% higher in cortisol than Hereford.) Noise levels in the plant need to be consistent. Ideally, the hydraulics of the newer equipment will be quieter and less stressful. It is also important that the circadian rhythms of these indicator compounds are noted and properly accounted for. To determine the effect of inversion on cortisol levels in cattle, all other variables must be controlled. An accurate method for making this determination would be to modify a state-of-the-art Faconia (Weinberg) pen so that shechita could be performed in either a standing or an inverted position. This experimental design removes all other confounding factors and it would provide more meaningful cortisol measurements.

The ideal way to test various kosher boxes would be to present the animal with a choice. Grandin, in a recent article, has developed this "choice test" approach in more detail (Grandin et al., 1986; Rushen, 1986). After an animal has experienced restraint in both boxes, it is then allowed to choose which box it prefers. From this test, one can determine which method of restraint is less stressful.

The ASPCA pen, like any piece of equipment, can be used correctly or it can be abused. Grandin (1990a,c; 1992) has provided a detailed description of how to properly use this pen. Because this is the most widely available piece of special slaughter equipment in the U.S., it is important for those involved in its use, both plant and religious personnel, to understand how to use this pen. When used properly, as we have seen from her description, kosher slaughter is certainly as humane, if not more humane, than other techniques. The key is proper attention to the animal, human and machine parameters that must be properly combined to give a well-operated system.

We feel that the veterinarians, animal scientists working with slaughter operations and religious personnel at the plants must try to work together with the plant people to continue to insure that animals are always treated properly and that the process of kosher and halal slaughter is done with the utmost concern for the health, safety and welfare of both animals and people.

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