LEG INJURIES TO COYOTES CAPTURED IN STANDARD AND MODIFIED SOFT CATCH® TRAPS

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ABSTRACT: Leg injuries of coyotes (*Canis latrans*) captured in standard No. 3 Soft Catch traps were compared with those captured in the same trap type modified with two additional coil springs. One hundred thirteen coyotes were trapped in southern California in conjunction with livestock predator control operations, 53 in standard traps, and 60 in modified traps. Observed injuries were similar in both trap types. The most frequent injuries were edematous hemorrhages and small cutaneous lacerations. Injuries, such as joint luxations and bone fractures, were noted more frequently for coyotes trapped in standard Soft Catch traps.

Key words: *Canis latrans*, coyote, capture, injury, trap

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INTRODUCTION

Foothold traps are commonly used to harvest coyotes for fur and as a depredation management tool. Opposition to the use of traps has increased in recent years due to public concern that foothold traps inflict unacceptable injuries to trapped animals. Recent research on padded traps has shown that the No. 3 Soft Catch[1] trap (Woodstream Corporation, Lititz, PA) can be used to successfully capture coyotes while producing only minor leg injuries (Olsen et al. 1986; Linhart et al. 1988; Linhart and Dasch 1992; Onderka et al. 1990; and Phillips and Mullis 1996). Other research has demonstrated that coyote traps with unpadded jaws typically cause more injury than padded models (Phillips et al. 1996). Despite the positive results with the Soft Catch trap, some field personnel with the U.S. Department of Agriculture's Animal Damage Control (ADC) Program have observed that the standard coil springs on the trap weaken after repeated use (M. Small, pers. comm. 1995). Reduced spring pressure may result in some coyotes escaping by pulling their foot from the trap, thereby reducing capture efficiency. To correct this problem, many Soft Catch traps used in California by ADC personnel have been equipped with two additional springs to increase the clamping force and closure speed of the trap.

The effect of this modification on leg injuries of trapped coyotes is undetermined. To make this determination, a study was conducted to compare coyote limb injuries associated with standard and modified Soft Catch traps used in coyote depredation control.

[1]Mention of commercial products is for identification and does not constitute endorsement by the authors or the federal government.

METHODS

Coyotes were captured by two experienced trappers (ADC Specialists) in southern California from February to August 1995. The two trappers had more than 50 years of combined experience in capturing coyotes. Coyotes were captured as part of routine livestock depredation control activities with all traps checked daily. Each trapper was issued 72 new No. 3 Victor Soft Catch traps, 36 of which were modified with the addition of a "taos lightning" spring kit (J. C. Conner, Newcomerstown, OH). Modification included the addition of a double torsion spring made of music wire and a longer spring pin. The springs in the kit were smaller and weaker than the No. 1.75 springs on the standard Soft Catch trap. The addition of the spring kit allowed each trap lever to be powered by two coil springs instead of one. Clamping force of the traps (2.1 kg/cm^2 for the standard trap and 3.6 kg/cm^2 after modification) was measured by attaching a tension load cell to one jaw of the trap and recording the pressure exerted on the load cell when the jaw is within approximately 1.24 cm (0.5 inch) of closure. All traps were equipped with a center-mounted, 36-cm kinkless chain connected with an in-line shock spring and anchored to a stake. Each captured coyote was euthanized and the trapped leg removed near the elbow or knee joint. All legs were tagged showing the name of the trapper, date, and trap type. Legs were sealed in plastic bags and frozen until necropsies were performed.

Necropsies were conducted at the University of Wyoming's State Veterinary Laboratory. The pathologist (ESW) performed the necropsies without knowledge of the trap type associated with a particular leg. Leg injuries were identified and assigned numerical scores based on a Trauma Scale (modified from the Olsen Scale, Olsen et al. 1986) developed through the international standards process (Jotham and Phillips 1994). Limb injury scores were compared among trap types with the Kruskal-Wallis Test (Siegel 1956).

RESULTS AND DISCUSSION

The authors examined 113 coyote legs; 53 from standard Soft Catch traps and 60 from modified Soft Catch traps. Some degree of edematous swelling or hemorrhage was observed in nearly all of the legs (96%) with no apparent difference among trap types (Table 1). Lacerations were noted in 83% of the legs from standard traps while only 73% of the coyotes captured in modified traps received cuts. The frequency of edematous swelling and laceration injuries was similar to the finding for coyotes captured in unpadded traps (Phillips et al. 1996).

A higher frequency of more serious injuries (those scoring 25 points or more) such as ligament severances, joint luxations, and bone fractures were associated with capture in the standard trap (Table 1). Fourteen joint luxations were noted in 53 legs (26%) taken from standard traps while only 4 (7%) were found in modified traps.

Five 100-point injuries were observed for coyotes captured in standard traps while none were noted for modified traps. These injuries included two major joint luxations, two compound fractures, and one major tendon severance.

Table 1. Frequency of limb injuries for coyotes captured in California from February to August 1995 with standard and modified No. 3 Victor Soft Catch traps.

		Occurrences by trap type			
		Standard (N = 53)		Modified (N = 60)	
Type of injury[a]	Points Scored	Number[c]	Percent	Number	Percent
Edematous swelling or hemorrhage[b]	5-15	51	96	57	95
Cutaneous laceration <2 cm	5	32	60	37	62
Cutaneous laceration >2 cm	10	12	23	7	12
Minor subcutaneous soft tissue maceration or erosion	10	3	6	1	2
Minor periosteal abrasion	10	12	23	15	25
Minor tendon severance or ligament severance	25	7	13	10	17
Major cutaneous laceration of foot pad	30	3	6	1	2
Joint luxation below carpus or tarsus	30	13	24	4	7
Major periosteal abrasion	30	0	0	1	2
Simple fracture at or below (distal to) carpus or tarsus	50	0	0	1	2
Amputation of 2 digits	50	1	2	0	0
Joint luxation above carpus or tarsus	100	1	2	0	0
Compound or comminuted fractures at or below carpus or tarsus	100	1	2	0	0
Major tendon or ligament severance	100	1	2	0	0

[a] Each injury category was considered separately and a coyote may be represented in more than one row. Total percent exceeds 100.

[b] Mild = 5 points, moderate = 10 points, and major = 15 points.

[c] Number of legs with this injury.

Median injury scores and the distribution of individual scores were similar for both trap types (χ^2 = 0.01865, 1df, P = 0.8914). Scores varied from 0 to 585 ($\bar{x}$ = 43.5) for the standard trap and from 0 to 110 ($\bar{x}$ = 26.2) for the modified trap. Coyotes captured in both standard and modified Soft Catch traps had relatively minor injuries compared to those noted in an earlier study of traps with unpadded jaws (Phillips et al. 1996). One possible explanation for the lower mean injury score associated with the modified trap is that the increased clamping force produced by the additional springs stabilized the trapped leg between the padded jaws. This reduced movement of the trapped leg may have reduced the likelihood of more injuries such as joint luxations and fractures.

In addition to reducing injuries to captured animals, the modifications to Soft Catch traps we studied may offer other advantages. Traps with increased spring pressure are more likely to function properly in moist or heavy soils thereby increasing capture efficiency. We recommend that trappers experiencing problems with coyotes springing traps without being caught or escaping from Soft Catch traps, consider modifying their traps with additional springs.

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LITERATURE CITED

JOTHAM, N., and R. L. PHILLIPS. 1994. Developing international trap standards—a progress report. Proc. Vertebr. Pest. Conf. 16:308-310.

LINHART, S. B., F. S. BLOM, G. J. DASCH, R. M. ENGEMAN, and G. H. OLSEN. 1988. Field evaluation of padded jaw coyote traps: effectiveness and foot injury. Proc. Vertebr. Pest. Conf. 13:226-229.

_____, and G. J. DASCH. 1992. Improved performance of padded jaw traps for capturing coyotes. Wildl. Soc. Bull. 20:63-66.

OLSEN, G. H., S. B. LINHART, R. A. HOLMES, G. J. DASCH, and C. B. MALE. 1986. Injuries to coyotes caught in padded and unpadded steel foothold traps. Wildl. Soc. Bull. 14:219-223.

ONDERKA, D. K., D. L. SKINNER, and A. W. TODD. 1990. Injuries to coyotes and other species caused by four models of footholding devices. Wildl. Soc. Bull. 18:175-182.

PHILLIPS, R. L., and C. L. MULLIS. 1996. Expanded field testing of the No. 3 Victor Soft Catch trap. Wildl. Soc. Bull. 24. (in press).

_____, K. S. GRUVER, and E. S. WILLIAMS. 1996. Leg injuries to coyotes captured in three types of foothold traps. Wildl. Soc. Bull. 24. (in press).

SIEGEL, S. 1956. Nonparametric statistics for the behavioral sciences. McGraw Hill Book Co., NY, 312 pp.