

Injuries and Blemishes in a Semi-feral Herd of Ponies

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SUMMARY

With the goal of characterizing the type and degree of injuries and blemishes incurred by horses living under natural social conditions, all members of a semi-feral herd of ponies were inspected on 4 occasions over a period of 28 months. Two occasions were during breeding/foaling season and 2 during non-breeding/foaling season months. On each occasion, each animal was examined ($N = 47-65$) and all injuries or blemish marks were recorded. Based on the types and number of injuries or blemishes, an injury/blemish grade was assigned for each inspection, ranging from 1 for no blemishes to 6 for more than 1 open wound. Almost all injuries and blemishes recorded were extremely mild. Only 12 of the 213 inspections and 14 of the 858 total injuries and blemishes involved wounds affecting tissues other than hair and skin.

Males had significantly greater mean injury/blemish grade than females ($P < .0001$). For all social categories and ages, the mean injury/blemish grade was significantly greater in the breeding/foaling season months than during the non-breeding/foaling season ($P < .0001$).

All foals were blemish-free at the non-breeding/foaling season inspections ($n = 24$) and relatively blemish-free (9 of 14) at the breeding/foaling season inspections. The rump and the barrel areas were the most common site of injuries or blemishes, both as a percentage of the total injury count and as a percentage of inspections involving those areas. These findings are consistent with the seasonal and gender patterns of aggressive behavior seen in this herd. Compared with reports of truly feral horse populations, it appears that injuries are fewer and less severe in this semi-feral herd. In addition, there appear to be fewer leg injuries in this semi-feral herd than has been described for truly feral horse populations.

Key words: *Horse, Equine, Semi-feral, Aggression, Injury*

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INTRODUCTION

Aggressive interactions are a conspicuous feature of behavior of horses living under natural social conditions. Aggressive behavior of varying intensity occurs within several distinct contexts. These include intermale interaction, both among bachelor stallions, between bachelor and harem stallions, among harem stallions, and among harem stallions and their postpubertal offspring remaining in the natal band; within-band intermare interaction; sexual interaction among stallions and mares; maternal and paternal protectiveness of young; and interband interaction, for example, expulsion of intruding adults or straying young nonband members and competition over limited resources.^{a-c:1-5} In spite of fairly high rates of aggressive encounters among males, serious injuries that contribute to mortality are believed to be relatively rare within natural social systems.^{a,b:2}

The goal of the work reported here was to characterize in detail over time injuries and blemishes within a semi-feral herd of ponies. Our specific objective was to catalog and describe injuries and blemishes by type and body area for each animal within a herd of semi-feral ponies over a 28-month period to evaluate the associations with season and social category, including gender and age.

METHODS

Study Herd

The study herd is located in Chester County, Pennsylvania, at the New Bolton Center of the University of Pennsylvania School of Veterinary Medicine. The climate is temperate, with 4 distinct seasons. The herd has been maintained on the same property since 1994, when 13 mature males and 13 mature females were assembled and allowed to organize and breed undisturbed. The animals are Shetland-size grade ponies that mature to 40 to 44 inches high at the withers and 200 to 250 kg in body weight. The herd is kept on approximately 50 acres of "old pasture" grasses and browse that support excellent nutritional condition for the herd for most of the year. Supplemental hay of similar grasses is provided when pasture grass becomes dormant during winter (mid-December through late February in most years). Water is

available in wetlands, streams, and a pond. Trace mineral and salt licks are provided. To maintain herd size to between 50 to 70 animals, 1 or 2 harem families are removed from the herd approximately every 2 years. During this study, herd size ranged from 47 to 65 individuals, with 6 to 9 harem bands and typically 1 bachelor band and 1 to 2 solitary bachelors.

Injury/Blemish Inspections

Inspections were conducted in May 2001 ($n = 47$), October 2001 ($n = 53$), June 2002 ($n = 48$), and October 2003 ($n = 65$). A total of 79 individual animals were present for 1 or more inspections. Of these, 12 had been with the herd since the initial assemblage in 1994, and the remaining 67 had been born into the herd. Thirty-five animals were present for all 4 inspections. The remaining 44 represented foals born into the herd after May 2001 ($n = 33$) and animals removed during the period of study ($n = 14$). Of these, 3 were present in the herd for 3 inspections, 23 for 2 inspections, and 18 for 1 inspection. The May and June inspections represented breeding/foaling season months. The October inspections were considered representative of non-breeding/foaling season months. In this herd, daily observations indicate that aggressive interactions involving injury or blemish diminish to almost none during winter months, and typically no new injury marks are observed. Therefore, systematic inspections were not done during winter.

At each inspection, each animal was systematically examined. Each injury mark or blemish was recorded on a body sketch, noting the location as shown in Figure 1, the type (eg, hair loss, skin nick or scuff, open wound, swelling), and the expected or known cause of the injury or blemish (eg, kick, nip, bite), if apparent.

Herd Social Organization and Behavior

As a part of general management and ongoing research, this herd has been observed at least twice daily. Records are maintained on group membership and changes, any observed reproductive behavior, and significant social events, such as bachelor harassment or stealing of a harem mare, that typically involve sexual and aggressive encounters. These records were used to obtain ages and social categories at each inspection, assist in interpretation of observed blemishes and injuries, and retrieve any records of wintertime observed injuries.

Data Summary and Statistics

For each inspection, a blemish/injury grade was assigned based on number and type of injuries observed in any body area. Grade 1 indicated no blemishes. Grade 2 indicated 1 to 2 minor blemishes involving hair only (missing hair with no observable skin or tissue lesion). Grade 3 indi-

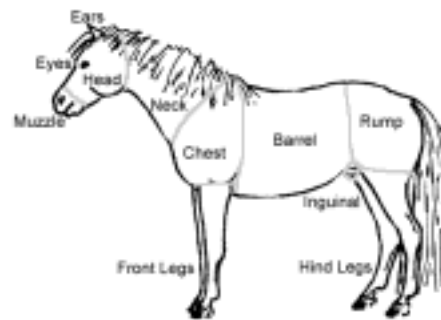


Figure 1. Body area designations for recording injuries and blemishes.

cated 3 or more minor blemishes. Grade 4 indicated 1 or more superficial skin lesions with no observable lesions to the underlying tissues with or without additional grade 2 or 3 blemishes. Grade 5 indicated the presence of a single open wound involving subcutaneous tissues with or without other blemishes. Grade 6 indicated 2 or more open wounds with or without other blemishes. Dependent *t* tests, independent *t* tests, and Fisher exact tests were used to evaluate differences in grade due to sex, social category, and season and differences in numbers of injuries and blemishes among body areas. Simple Pearson correlation was used to evaluate the association of injury/blemish grade with age.

RESULTS

All injuries and blemishes found during these inspections were minor. The majority involved missing hair or skin scrapes and scuffs, most likely from glancing contact of hooves or teeth rather than frank bite or kick wounds. Most were too small to judge the mode of injury. Of 213 inspections, 12 included 1 ($n = 10$) or more ($n = 2$) open wounds involving tissues beneath the hair and skin. Similarly, none of these open wounds were of size or shape sufficient to judge the mode of injury. With the exception of 2 instances of stallions with lacerations of the nares that healed as fingerlike protuberances, all recorded injuries and blemishes were no longer grossly visible after the subsequent seasonal hair coat change.

Table 1 summarizes the injury/blemish grades by social category, including gender and age for breeding/foaling season and non-breeding/foaling season inspections.

Gender and Social Category

Over all social categories and in both seasons, the mean injury/blemish grade for males was significantly greater than for females ($P < .0001$). Among adult males, the assistant harem stallions ($n = 3$ inspections) had the highest mean injury/blemish grade in both seasons.

Table 1 Summary of injury and blemish grade by social category, sex, and age groups and by season

	Injury/blemish grade											
	Breeding/foaling season inspections				Non-breeding/foaling season inspections				Overall			
	range	mean	SEM	n	range	mean	SEM	n	range	mean	SEM	n
Harem stallion	2-6	4.1	0.66	13	1-5	4.1	0.36	14	1-6	3.2	0.27	27
Newly deposited harem stallion					5	5		1	5	5		1
Assistant harem stallion ^A	4-5	4.3	0.33	3	4-5	4.3	0.33	3	4-5	4.3	0.21	6
Bachelor stallion	2-5	3.7	0.34	11	1-5	2.8	0.30	14	1-5	3.2	0.22	25
Young transitional male ^B	4	4		3	1	1		2	1-4	2.8	0.73	5
1–3-yr-old male still in natal band	1-5	2.9	0.29	14	1-2	1.9	0.27	17	1-5	2.3	0.21	31
Male foal	1-4	1.2	0.50	6	1	1		12	1-4	1.2	0.17	18
Overall male	1-6	3.4	0.18	50	1-5	2.2	0.17	64	1-6	2.7	0.13	114
Harem mare	1-6	2.6	0.26	25	1-3	1.2	0.10	23	1-6	1.9	0.18	48
Newly confiscated harem mare ^C	1-3	2.0	1.00	2	2-3	2.5	0.29	4	1-3	2.3	0.82	6
Yearling female on breeding rounds ^D	4	4		1					4	4		1
Young transitional female ^B	3	3.0		2	1-3	1.8	0.48	4	1-3	2.2	0.40	6
1–3-yr-old female still in natal band	1-3	2.1	0.23	8	1-2	1.2	0.12	11	1-3	1.6	0.16	19
Female foal	1-4	1.5	0.19	8	1	1		12	1-2	1.2	0.09	20
All foals	1-2	1.5	0.23	14	1	1		24	1-4	1.2	0.10	38
Overall female	1-6	2.4	0.17	46	1-3	1.3	0.08	53	1-6	1.8	0.10	99
Overall herd	1-6	2.9	0.13	96	1-5	1.8	0.11	116	1-6	2.3	0.09	213

^AAn assistant harem stallion is a mature stallion allied with a harem stallion, as described by Berger² and Stevens.⁴ The assistant rarely contacts harem mares but lingers nearby and shares the defense of the band. One of the 2 stallion alliances had been in place for 6 years, forming after the main harem stallion had established and held his harem for 2 years. The second alliance formed during the course of this study. A 3-year-old stallion formed a new harem with 1 mature mare. A same-age bachelor band companion followed, eventually becoming an assistant harem stallion.

^BMale or female in the process of leaving the natal band,⁸ in this case ranging in age from 1 to 3 years of age. The process typically involves moving from their natal band to temporary gangs on an hourly to weekly or even monthly basis, until they leave permanently.

^CNewly confiscated harem mare. The acquisition process typically includes intense intermale aggressive interaction and harassment of the mare.

^DIn this herd, fillies begin ovarian cycling between 10 and 14 months of age. When in estrus, they typically come and go from their natal band several times per day on "rounds" of visits to 1 or more bachelor bands, transitional gangs of young males, or harem stallions for multiple copulatory interactions. Most fillies conceive on their first observed estrus and remain in their natal band for that pregnancy.

Ranking second were the harem stallions during the breeding/foaling season, followed by the transitional males during the breeding/foaling season, then bachelors during both seasons, and then harem stallions during the non-breeding/foaling season. Of the 12 out of 213 inspections that included 1 or more open wounds involving subtissues, 11 of these were adult males and 1 was an adult female.

Among females, the 1 yearling female on breeding rounds and the 6 young transitional females, combined as 1 group (n = 7), had higher mean injury/blemish grades than harem mares, longtime resident or newly confiscated ($P < .01$).

Season

Over all animals, and for each social category, mean injury/blemish grade was significantly greater in the breeding/foaling season than in the non-breeding/foaling season ($P < .0001$). During the 2 October inspections, 72 of 118 (61%) inspections were blemish-free; only 11 of the 118 (6%) inspections had a grade of 4 or greater. During the May and June inspections, only 18 of 95 (19%) inspections

were blemish-free; 37 of 95 (39%) had a grade of 4 or higher. These proportions are highly significantly different (Fisher exact, $P < .0001$). For 8 harem stallions that were present for at least 1 inspection in each season, mean blemish/injury grade was significantly greater during the breeding/foaling season inspections (dependent t test, 7 df , $P < 0.05$). Of the total of 12 of 213 inspections that included 1 or 2 open wounds, 7 of these were in breeding/foaling season and 5 in non-breeding season months.

Age

All foals were blemish-free for both non-breeding/foaling season inspections (total of 24 inspections). For the breeding/foaling season inspections, 9 of 14 inspections were blemish-free. For both adult males and adults females, mean blemish/injury grade was not associated with age ($P > .05$).

Body Area Affected

Table 2 summarizes the percentage of injuries and blemishes by area of the body and the percentage of in-

Table 2 Injuries and blemishes by body area

	Body Area Percent (rounded to whole numbers) of total 858 Injuries/blemishes	Percent of 213 inspections with body area affected
Rump	39	42
Barrel	32	37
Neck	7	15
Chest	7	15
Head	6	16
Hind legs	4	9
Muzzle	3	9
Front legs	1	4
Ears	1	2
Eyes	<1	<1
Inguinal	0	0

spectations that included 1 or more injuries or blemishes in each body area. The rump and barrel areas had the highest percentages of total blemish counts (39% and 32%, respectively) and the highest percentage of inspections with 1 or more injuries or blemishes (42% and 37%). The neck, chest, and head had intermediate counts, with the legs, ears, eyes, and inguinal area having the fewest injuries and blemishes. The front legs had fewer injuries and blemishes than the hind legs.

DISCUSSION

The patterns of injuries and blemishes among social categories and across season found in this study are consistent with levels of aggression in this herd observed and recorded in daily herd health records. The finding of primarily superficial hair and skin scuffs is also consistent with daily observations. Over a period of 10 years with an average of 60 animals in the herd at any time (approximately 600 animal years), 9 instances of injury serious enough to warrant veterinary consultation were observed (minimum twice daily individual animal observation). These included 3 eye injuries, 1 bite abscess on the neck, 1 wire puncture of a foot, 1 vulvovestibular laceration, 1 pelvic fracture (2-year-old foaling mare), and 2 joint dislocations (1 stallion and 1 aged mare). One stallion was found dead, with evidence of falling while fighting with other stallions during icy conditions. Except for the dislocations and pelvic fracture, injuries resolved uneventfully with conservative or no treatment. One of the dislocations (stallion) and the bite wound occurred during a period of extended intermale fighting during the spring breeding and foaling season and were judged to be related to social interaction. The remaining 7 injuries were judged to be unrelated to social interaction.

Methodologic differences preclude direct comparisons of our data with published quantitative information on truly feral horses. Nonetheless, some summary data available in the literature are interesting for general comparison. Feist's 6-month (May to November) study of Pryor Mountain feral horses included a population of 270 animals, with 78 mature males and 79 mature females. Thirty-five deaths were noted. Fourteen of these were mature males, and 14 were mature females. The remaining 7 were young animals of undetermined sex. For 3 of the 14 deaths of mature males, complications of injury from aggressive interaction were considered contributing factors. Specific injuries were jaw fractures in 2 horses and skull fracture in the third horse, all consistent with kick injuries. For the mature female deaths, none had signs of injury consistent with aggressive interactions.^a

In a 5-year study of an isolated herd of feral horses (N = 58–149) in Nevada, Berger² observed that "96% of adult males in any given year" had bite wounds. In 98 total mature males, 4 years and older, seen over the 5 years, 21% had open sores and 13% had leg injuries. In his long-term study of Assateague ponies, Keiper¹ found that young males and some females in transition from their natal band incurred bite wounds that became infected and led to their death. In this semi-feral herd, open bite wounds are extremely rare and relatively minor compared with descriptions of truly feral horses. Across the 4 inspections in this study, none of the few wounds involving underlying tissues could be judged as to the mode of injury. In our semi-feral herd, young males in transition from their natal band had relatively higher frequency of blemishes, but no open wounds.

In Welsh's^b observation of the Sable Island horses, several skulls of mature males with well-healed fractures were found. This was evidence that fracture injuries presumably from aggressive interactions were not necessarily fatal. In our herd, we have no indication that animals are incurring and recovering from fractures. This includes no observed lameness or other clinical sign of fracture and postmortem examination of some individuals after leaving this herd.

For truly feral herds, then, it appears that the frequency and severity of injury are greater than observed in our semi-feral herd. A percentage of deaths related to injuries from aggressive interactions, though small, has been consistently reported for truly feral populations. In our semi-feral herd, no deaths related to injury occurred over the course of this study. Over the 10-year history of the herd, injury-related deaths included one assistant harem stallion found dead with spinal trauma with evidence of slip on ice near fence, one harem mare euthanized due to pelvic fracture, and one harem mare euthanized due to front limb dislocation. Truly feral herds may have greater pressure for resources within

and between herds, leading to greater and more severe aggression. They may also have more rugged terrain on which to fight and at times perhaps less familiar environment than our semi-feral herd. For example, in the Granite Range, Berger's² illustrations depict stallions fighting on the edge of rocky cliffs. In contrast, the substrate of this semi-feral herd is mostly heavy sod that provides good footing and cushion during serious intermale fights.

One difference in injury patterns for truly feral populations appears to be a higher rate of leg injuries and open bite wounds to the legs than observed in our semi-feral herd. Berger² noted that 14% of aggressive encounters included bites to the legs, while only 6% included bites to the body. In our semi-feral herd, leg biting is more often observed in play fighting⁶ and sparring among bachelors³ than in frank fighting. In frank fighting, grasping bites are rarely delivered to the legs. Rather, the target stallion drops to the knees,⁴ effectively protecting the legs with the body. The soft sod substrate in this semi-feral enclosure may be more conducive to dropping down and may better protect the limbs when down than the truly natural environments like the Granite Range in the Berger studies.² Rather than to the legs, bites and nips resulting in wounds are almost always to the neck, head, and chest.

Two assistant harem stallions were included in this study. As a social category, these had the highest mean injury grade. Each had a greater injury grade than the main harem stallion for each inspection, which is consistent with our observations of the behavior of these particular harem and assistant harem stallions. In each alliance, the assistant harem stallion appeared to engage in far more aggressive encounters with outside stallions than did the main harem stallion. This is also consistent with behavior observation of truly feral herds.^{d;2,7}

Although there apparently are no published data for comparison, the injury rate of this semi-feral herd appears to be less than for horses pastured under domestic conditions. Several interrelated factors may account for the differences. One factor may be the physical proportions (small) and conformation (stocky) of our Shetland-size ponies compared with those of horses. The ponies are relatively fatter than most horses, which may allow them to better cushion or deflect kicks and bites. Their legs are easily tucked under and protected by their round bodies. The kicks of ponies, though powerful, are not likely as powerful as those of horses. Another important difference in these ponies when compared with most pasture assemblages of horses is the stability of the social order. Also, most of the animals in this herd have been born into the herd and have maintained long-term stable relationships in which most disputes are settled without frank aggres-

sion. In contrast, pastured domestic horses often undergo regroupings at regular intervals that typically provoke social aggression. Regroupings may also involve unfamiliar facilities. The gender composition of domestic groups is highly variable, with geldings as opposed to stallions. Although anecdotal, our experience suggests that social aggression sometimes tends to be prolonged among geldings as compared with stallions. Also, in pastured domestic horses it is common to provide water from a single concentrated source than from a stream or pond and to provide supplemental feeds that are highly palatable. The resulting food- and water-related aggression seems much more frequent and intense than water- or forage-related aggression in naturally foraging herds. Also, artificial obstacles, especially in areas where highly palatable feeds are offered, provide modes of injury for pastured domestic herds. Tight spaces that do not allow submissive animals to escape are also more common in domestic herd situations than in this semi-feral herd.

These data and observations provide useful information for planning and management of mixed-sex pasture herds, whether for semi-feral exhibit or domestic production.

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