

BEHAVIORAL MANIFESTATIONS OF DISEASE

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Behavioral changes may be associated with disease states in at least three ways: as indicators of the presence of disease from other causes, as the principal pathologic process and as normal behaviors that are mistaken for abnormalities.

Behavioral changes can be extremely useful for alerting caregivers to the presence of disease if normal behavior is well understood. As for all animals, the range of behaviors that may be exhibited by otherwise healthy individuals is broad. This necessitates a familiarity on the part of caregivers with species typical behaviors and normal individual behavior patterns. Some specific examples of behaviors indicative of disease as well as some normal behaviors that may be interpreted incorrectly as indicative of abnormality follow.

FEEDING BEHAVIOR

Appetite reflects a fundamental physiologic need for energy. Healthy animals require sufficient daily intake of calories to meet expenditure requirements. Appetite is a relatively sensitive, but non-specific, indicator of an animal's general state of health. A diminished appetite commonly indicates malaise or pain but usually is not a reliable mark of a specific condition, although oropharyngeal, dental or gastroenteric disorders should be ruled out.

Vomiting, outside of some individuals' routine of regurgitation and reingestion, nearly always indicates a gastrointestinal disorder, especially when associated with diarrhea (See Veterinary Medical Management, this volume). This is most often caused by viral or bacterial infections; however special attention should be paid to the potential for ingestion of items provided for behavioral enrichment and subsequent bowel obstruction or perforation. For example, when steel-belted tires suspended by chains from the enclosure ceilings at Yerkes Regional Primate Research Center, were provided to chimpanzees, orangutans and gorillas, they sustained minimal damage and exhibited long functional life spans in the African apes' enclosures. They were, however, generally stripped and consumed in short order by the orangutans (R. Brent Swenson, personal communication).

EXCRETORY BEHAVIOR

Due to the long hair of some adult males, there may be an accumulation of fecal matter or a persistent dampness around the genital area. This may lead to dermatitis or fly-strike (R. Brent Swenson, personal communication). This seems to be more likely to occur in

males who are especially sedentary. Orangutans have been observed to drink their own or a conspecific's urine (R. Brent Swenson, personal communication). This poses no particular health problem for the animals.

MOTHER-INFANT BEHAVIOR

Normal mother-rearing is an important component in the development of competent adult behaviors for all non-human primates. However, orangutans seem to be more elastic in their abilities to compensate for less than optimal social experiences during their development (R. Brent Swenson, personal communication). Even so, failures of mother-infant care can occur. Injuries have been inflicted on infants as a result of over zealous maternal attentiveness as well as intentional aggression directed toward the infant. In one instance at Yerkes Regional Primate Research Center, a mother established a pattern of excessive grooming of her infant, to the extent that she removed the fingernails and stripped the abdominal skin centrifugally from the umbilicus. These behaviors intensified with subsequent infants so that the trauma was more extensive and occurred earlier with each birth. In another case, a female cared normally for her infant for several weeks, and then suddenly inflicted bite wounds resulting in the loss of both of the infant's arms (R. Brent Swenson, personal communication). The incident was presumably a maladaptive response to environmental stress.

Normal orangutan mother-infant behavior varies widely. Some mothers have been observed to carry their infants on top of their heads, suspend a vocalizing infant by its limbs or carry the infant low on the ventrum so that nursing is difficult to observe for prolonged periods of time (See Development, Reproduction and Birth Management Chapter, this volume). Close monitoring by caregivers will help determine normal maternal behavior for each individual. The mother-infant relationship is a reciprocal one. Various behaviors of each invoke specific responses in the other. For instance, nuzzling and vocalization by the infant induce the mother to position the infant to facilitate suckling. Failure of appropriate care may result from either incompetent maternal behaviors or inappropriate infant behaviors. Physical illness in either mother or infant sufficient to suppress normal behaviors in one may interrupt reciprocal responses on the part of the other. When abnormal mother-infant relationships are recognized, it should prompt an evaluation of the physical health of both before concluding that the problem is a result of maternal incompetence.

Suckling can be easily missed in the neonatal period unless continual observations are performed. During the active periods of the dam, the

infant may spend all of its time away from the nipple while still obtaining adequate milk during the evening hours. In the first 12 to 24 hours of life, it is not critical that nursing take place, although it is normal for it to occur (See Development, Reproduction and Birth Management Chapter, this volume). If the infant is inactive, silent and difficult to rouse, even when the mother becomes active, the mother should be anesthetized to gain access to the infant. A thorough physical examination should be performed on the infant to rule out inanition, dehydration, neonatal sepsis or congenital abnormalities. One condition that affects orangutans more than any other ape is the hyperinfestation syndrome caused by *Strongyloides stercoralis*. Infants and juveniles seem to be far more susceptible to this life threatening complication of parasitism than adults (See Veterinary Medical Management, this volume).

ACTIVITY

Activity, like appetite, can be a reasonably sensitive though poorly specific, indicator of the presence of disease. Young orangutans are usually the most active age class. All animals have individual activity patterns that are characteristic and consistent. The utility of activity patterns as indications of disease lies in familiarity with the *individual* activity characteristics of each animal and recognition of significant deviation from those characteristics. For example, an animal that normally spends its day on top of a climbing structure and who suddenly chooses to remain on the ground may represent an animal with a new illness, even if the total activity level has not noticeably decreased. It is the departure from the normal pattern and not the change in overall quantity that is important.

SELF-DIRECTED BEHAVIOR

Spontaneous self-directed behavior that is also injurious has not been a major problem in the orangutan (R. Brent Swenson, personal communication). It is, however, a species that tolerates pain with remarkable stoicism. Surgical incisions need to be watched closely post-operatively, and intra-operative closures of surgical wounds need to be meticulously and thoroughly accomplished to minimize the animal's interest in the wound. A dramatic example of pain threshold was observed in a female with a vaginal laceration into the cul-de-sac led to a prolapse of a portion of the colon through the vagina. She proceeded to withdraw the entire colon and a portion of the small bowel through the laceration, rending all of the mesenteric attachments (R. Brent Swenson, personal communication).