

Tusk Fracture Epidemiology Part 1

Please fill out the following information for an elephant at your institution that has fractured their tusk(s).

Please record the institution code you were assigned for the study

1. Species of elephant
- Asian elephant (*Elephas maximus* sp.)
 - African elephant (*Loxodonta* sp.)

2. Stud Book Number of Elephant

3. Birth Date of Elephant (if unknown, please provide an estimate)

MM / DD / YYYY

4. To your best knowledge, did this elephant fracture its tusks prior to 2009?

- Yes
- No
- Unknown

5. If known, how many times did this elephant fracture its tusks prior to 2009?

6. How many times has this elephant fractured its tusks from 2009 to present? Note: You will be prompted to fill out this survey for each of these tusk fractures.

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Circumstances of the Fracture Previous Tusk Pathology Housing Factors Behavioral Factors Interventions Attempted Other elephants' tusk fractures

(Please re-record this elephant's stud book number here; thank you!)

7. Date fracture occurred. If unknown, provide an approximate date.

MM / DD / YYYY

8. What was the approximate weight in kilograms of the elephant at the time of fracture?

9. Which tusk was fractured?

- Right
- Left

10. Which was the approximate length of the tusk prior to it being fractured?

- < 1 ft
- 1 to 2 ft
- > 3 ft
- Unknown

11. What are the circumstances that led to the fracture? Check all that apply.

- Conspecific interaction
- Caught in enclosure/enrichment item
- Elephant slipped/fell/tripped
- Chronic wear to the tusk, leading to pulp exposure
- Unknown
- Other

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12. Please describe any existing tusk conditions at the time of fracture.

If this is...

- Your second (or more) time filling out this section of the survey for THIS tusk
- And ALL existing tusk conditions were the same as the answers previously provided

Check this box and click "Next Page."

	Right tusk	Left tusk	BOTH tusks	Unknown
Presence of pericoronitis (i.e. inflammation or infection of the soft tissue surrounding the gingival attachment of the tusk. This is essentially gingivitis.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Abrasions or signs of wear on the tusk(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Previous tusk fracture WITHOUT pulp exposure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Previous tusk fracture with pulp exposure that was endodontically repaired (ie, pulp cavity has a 'filling')	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Previous tusk fracture with pulp exposure NOT yet repaired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tush (small vestigial tusk in the alveolus (socket) of the main tusk that develops as the result of genetic instruction or injury)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Supernumerary tusks (congenital extra tusks; i.e., ectopic dental)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Metal crown/cap/circumferential reinforcement or support	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Any composite/kevlar restoration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Was there any other tusk or dental condition that was present at the time of fracture, including molar pathology (retained molars, twisted molars, deformed molars, fractured molars, deteriorated molars, abnormal wear)?

- Yes
- No
- Unknown

13a. If "Yes," please describe (age at time of problem, section of mouth affected, any treatments provided, outcomes)

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14. Where in the enclosure did the tusk fracture occur?

- Day room
- Training stall
- Other indoor stall
- Exhibit yard
- Small side yard
- Elephant restraint device
- Other
- Unknown

14a. If "other", please specify

15. What was the substrate the elephant was standing on at the time of fracture? Check all that apply.

- Concrete
- Rubber matting
- Grass
- Sand/loose dirt
- Packed dirt
- Unknown
- Other

15a. If other, please specify

16. Was the ground substrate directly involved with the development of the fracture? (ie, did the tusk fracture on the ground?)

- Yes
- No
- Unknown

17. What types of walls/barriers comprised the enclosure that the fracture occurred in?

If any of these material types were directly involved in the fracture (ie, if the tusk fractured on any of these surfaces), denote this by selecting the option in the last column.

	Absent	Present	Present AND this barrier type was involved in the fracture
Solid concrete	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Concrete wall with holes at least the diameter of the tusk or wider	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Steel gates(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mounted logs/timber/wood	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vertical bollards only	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vertical bollards with horizontal high-tension wire	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Electrical "hot wire"	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Metal "D" ring mountings with high-tension wire or chains as a neonatal modification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Metal "D" ring mountings withOUT high-tension wire or chains in place	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unknown	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. What were the feeding techniques employed at the time of fracture? Check all that apply.

- Piles on the ground
- Feed bowls on the ground
- Food dispersed on the ground
- Automatic feeder
- Elevated platform
- Puzzle feeder
- Hay nets suspended from the ceiling
- Other
- Unknown

18a. If other and/or clarification, please specify.

19. Were feeding behaviors directly involved with the development of the fracture? (ie, did the tusk fracture occur while the animal was feeding?)

- Yes
- No
- Unknown

20. Was this elephant managed by free contact or protected contact at the time of fracture?

- Primarily free contact
- Primarily protected contact
- Approximately 50% free contact, 50% protected contact
- Unknown

20a. From approximately what date had this elephant been managed by protected contact?

MM / DD / YYYY

21. Did the fracture occur when the elephant was interacting with a keeper/animal care manager?

- Yes
- No
- Unknown

21a. Please elaborate.

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22. How would you describe this elephant's social ranking within the herd at the time of fracture?

- No direct physical access to other elephants
- An established dominant animal to most other elephants in the herd
- An established subordinate to most other elephants in the herd
- Middle of the dominance hierarchy
- Time of social re-organization and elephant was attempting to MAINTAIN dominance
- Time of social re-organization and elephant was attempting to GAIN dominance
- Unknown

23. Including this elephant, were there any new elephants introduced to the herd within the previous 6 months of the time of tusk fracture?

- Yes
- No
- Unknown

23a. How many?

23b. Check All That Apply To This Elephant

- This elephant was a new arrival in the herd
- Was in the same enclosure/exhibit as a new elephant in the herd
- Partial physical contact to a new elephant (through barrier)
- Separated by at least one yard or stall from a new elephant
- Unknown

24. Including this elephant, were there any males in the herd in behavioral musth at the time of this elephant's fracture?

- Yes
- No
- Unknown

24a. How many?

24b. Check All That Apply To This Elephant

- This elephant was in behavioral musth
- Was in the same enclosure/exhibit as a male in behavioral musth
- Partial physical contact to a male in behavioral musth (through barrier)
- Separated by at least one yard or stall from a male in behavioral musth
- Unknown

25. Including this elephant, were there any females in the herd exhibiting estrus within the past 10 years? Check all that apply.

- Yes - Cows had behavioral and/or physical indicators of estrus
- Yes - Cow(s) confirmed to be in estrus by hormonal testing
- No
- Unknown

25a. How many cows in the herd were believed to be in estrus by either behavioral, physical or hormonal testing methods (including this elephant)?

25b. Check All That Apply To This Elephant

- This elephant exhibited behavioral and/or physical signs of estrus
- This elephant was confirmed to be in estrus by hormonal testing
- Was in same enclosure/exhibit as a female believed to be in estrus
- Partial physical contact to a female believed to be in estrus
- Separated by at least one yard or stall from a female believed to be in estrus
- Unknown

26. Were there any other social factors that were significant to the herd at the time of fracture?

- Yes
- No
- Unknown

26a. Please describe

27. Do you feel any of these social factors were related to the development of the tusk fracture?

- Yes
- No
- Unknown

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28. Which of the following interventions were attempted following this tusk fracture to help mitigate future fractures? Check all that apply.

- Re-directing behavior
- Addition of additional enrichment items to yard/enclosure
- Modification of social arrangements
- Modification of enclosure
- Modifying/trimming the tusks
- Protective crowns in absence of other tusk pathology
- None
- Other
- Unknown

28a. If "other," please describe.

29. If relevant, please elaborate on your approach to any of these techniques.

30. Please comment on any other variables you think may have been significant in the development of this tusk fracture that you feel may not have been reflected in the previous survey questions. (Optional)

31. (Optional) Do you have a fragment of the tusk from this fracture "and" would you be interested in submitting a sample of this tusk to an independent researcher for further analysis, pending appropriate and legal permitting?

- Yes
- No

32. Did "this" elephant develop any other tusk trauma resulting in cracks or fractures from 2009 to present?

- Yes
- No

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Circumstances of the Fracture Previous Tusk Pathology Housing Factors Behavioral Factors Interventions Attempted Other elephants' tusk fractures

33. Did any other elephants develop tusk fractures at your institution after 2009?

- Yes
- No