

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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(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...

- 1. Your second (or more) time filling out this section of the survey for THIS tusk
2. And ALL existing tusk conditions were the same as the answers previously provided
Check this box and click, "Next Page."

Table with 5 columns: Right tusk, Left tusk, Both tusks, Unknown. Rows include: Presence of pericoronitis, Abrasions or signs of wear on the tusk(s), Previous tusk fracture without pulp exposure, Previous tusk fracture with pulp exposure that was endodontically repaired, Previous tusk fracture with pulp exposure NOT yet repaired, Tusk (small vestigial tusk in the alveolus), Supernumerary tusks, Metal crown/cap/circumferential reinforcement or support, Any composite/kevlar restoration.

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

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.

Table with 4 columns: Absent, Present, Present AND this barrier type was involved in the fracture. Rows include: Solid concrete, Concrete wall with holes at least the diameter of the tusk or wider, Steel gate(s), Mounted logs/timber/wood, Vertical bollards only, Vertical bollards with horizontal high-tension wire, Electrical "hot wire", Metal "D" ring mountings with high-tension wire or chains as a neonatal modification, Metal "D" ring mountings withOUT high-tension wire or chains in place, Other, Unknown.

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
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 the 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 - Cow(s) 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

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

- Yes
No