

The hard hitting tooth – does a scheduled teeth check reduce the number of mice found dead with malocclusion?

JESSICA CIUPA

Cancer Research UK, Cambridge Institute

Correspondence: jessica.ciupa@cruk.cam.ac.uk

Introduction

Malocclusion is a common dental disorder for laboratory mice. Characterised with improper alignment of teeth, if the incisors of the mouse have become overgrown or are missing it can significantly impact Animal Welfare. (NC3Rs, 2021).

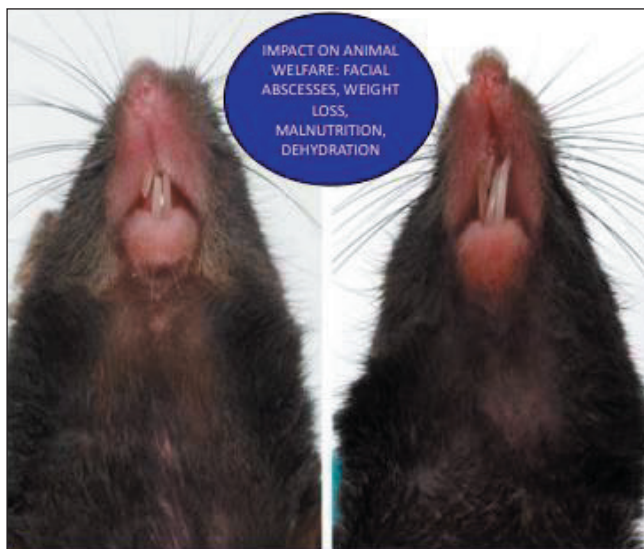
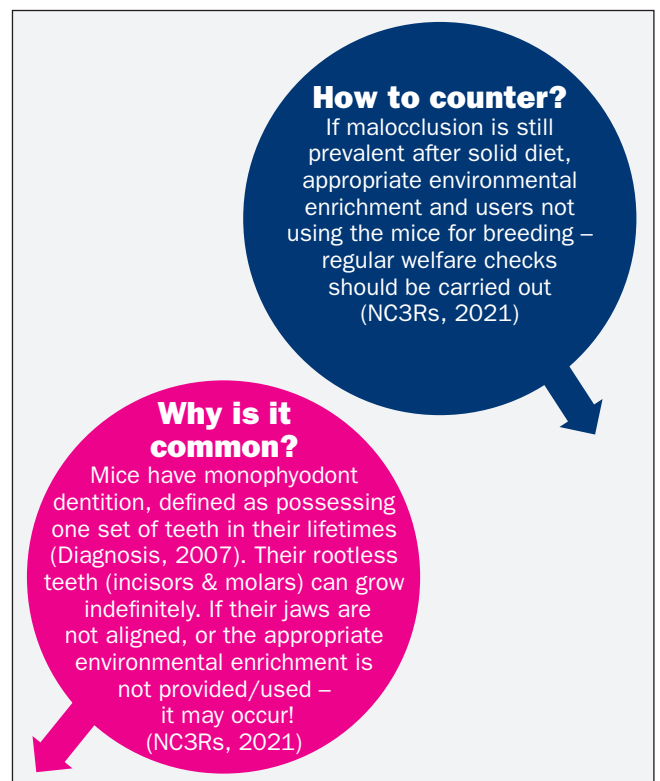


Figure 1. Example of malocclusion mice (NC3Rs, 2001).

Malocclusion is evident around the first 2-5 weeks of age for mice (NC3Rs, 2021). Therefore, it is hypothesised that a regular welfare check, the POST WEAN CHECK (PWC) at 5 weeks, would:

- Significantly increase the health concerns (HC) found as more mice would be diagnosed and caught before being found dead.
- Therefore a significant decrease in mice found dead with malocclusion is expected after the PWCs implementation.



Methods

A retrospective data analysis of the HCs from September 2020 to March 2021 were compared to September 2021 to March 2022. The implementation of the PWC was the end of March 2021.

Using the AniBio database, key word searches were carried out on the HC, producing reports which had mentioned; malocclusion, malformed, misaligned, overgrown, top, bottom and teeth. To make sure no HC was missed a

similar search for the common misspelling of the words was additionally carried out. For the MCMS database health concerns under the bracket of 'misaligned teeth' and 'weight loss' were used. Lines that had stated to be prone to malocclusion were omitted. The data is analysed using a two sample Poisson rate test and a Chi-squared test.

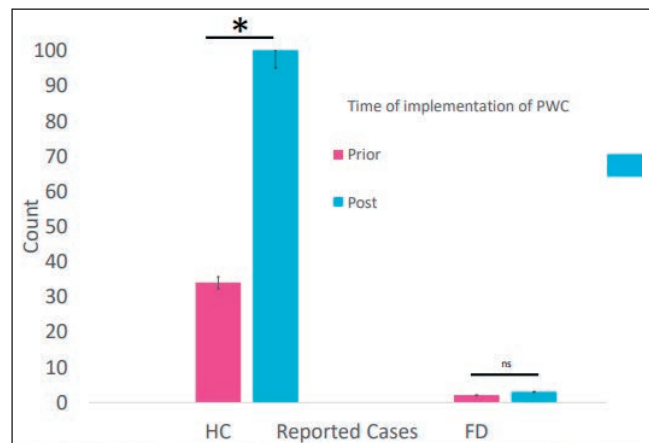


Figure 2. A bar chart to show the impact of PWC on reported cases of malocclusion.

Results

There was a significant increase in HCs of malocclusion found after the PWC implementation. As (Comparative error = 15.47) < (Difference = 66)

Therefore, the two values are significantly different.

No significant decrease of found dead mice reported after the implementation of PWC. A chi-squared goodness of fit test was performed, and the proportions did not differ between the life status of the mice found with malocclusion, $X^2(1, 139) = 0.537^*$, $p = .386$

Discussion

The results show that more cases of malocclusion were identified after the implementation of the PWC. There were 36 malocclusion cases before the PWC and 103 after the implementation. This suggests that more mice were diagnosed and thus given a humane endpoint/teeth clipping before severe suffering seen in maloccluded mice found dead. However, a chi-squared test analysis to determine whether a proportional difference in found dead reported after the implementation of the PWC found no significance. The assumptions were violated due to the low number of found dead reported prior and post the PWC.

To investigate the second hypothesis, further research can compare two facilities: (1) with a regular PWC and (2) without a regular PWC. A timed experiment with images of maloccluded dead mice, should be used to determine

whether an implementation of PWCs can improve a technician's ability to identify malocclusion. Therefore providing an explanation for a lack of significant decrease in found dead reported after the implementation – as the result is unexpected as a significant increase in diagnosis was seen.

Additionally, further analysis into relative proportions, of number of births to cases of malocclusion, can suggest a possible reasoning for a lack of significance found for the second hypothesis.

Acknowledgements

BRU Core, and in particular, Sally Ashworth, Nicky Jacobs, Brendan Doe and Tony Davidge.

References

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