

Dear Reviewers and Editor:

We wish to re-submit the manuscript titled “Vertical direction impaction of kissing molars: A case report and review of the literature.” .

We are grateful for these suggestions and insights. The manuscript has been rechecked and the necessary changes have been made in accordance with the reviewers’ suggestions and marked in red font. The responses to all comments have been prepared and attached herewith.

Thank you for your consideration. We look forward to hearing from you.

1. Under the history of present illness section, the authors mention that the left maxillary wisdom tooth was extracted but the patient came with complaint about the right maxillary wisdom tooth. Can the authors comment on this?

Response to reviewers,

The right maxillary wisdom tooth was not removed when the patient visited the hospital. And the main reason for this visit was the patient's discomfort due to caries in #1 (the right maxillary wisdom tooth).

2. I am a bit confused about the dental numbering system employed in the manuscript, especially regarding number 39, can the authors shed some light on it?

Response to reviewers,

In the original paper, we adopted the FDI tooth numbering system proposed by the International Dental Union (Federation Dentaire Internationale) in 1970 and of worldwide applicability. The jaw is divided into four quadrants between the central incisors and the upper and lower dental arches. The first number refers to the tooth quadrant: right upper quadrant = 1, left upper quadrant = 2, left lower quadrant = 3, and right lower quadrant = 4. The second number refers to the individual tooth within a specific quadrant. In China, the use of FDI is mainstream. We occasionally use "9" to indicate the fourth molar in daily work, but according to the literature, it does not appear to be a standard practice.

Out of the existing mainstream tooth numbering systems, only the universal numbering system has numbering rules for supernumerary teeth. The Universal numbering system was adopted by the American Dental Association and mentioned as the ADA tooth numbering system as well. The Universal numbering system named a supernumerary tooth by adding 50 to the closest standard tooth number. The FDI and the Universal naming system are widely accepted all over the world. Therefore, to express more accurately, we turned to adopt the universal numbering system (ADA) in this study. **Page 6, line 26.**

3. "...refused the removal of both KMs and the impacted tooth 48", why was tooth 48 impaction not discussed in the manuscript?

Response to reviewers,

Thank you for your question. The tooth 48 (#32 by ADA) is a conventional horizontal impact of the mandibular third molar; removal of this type of impacted tooth is generally recommended. Thus, it was only briefly described at first, now we added the medical examination process procedure of 48 (#32 by ADA) teeth to the manuscript. **Page 6, line 22.**

4. Discussion Paragraph 3: "there is certain error in the incidence statistics", the statement needs a bit of discussion and detailing.

Response to reviewers,

Thank you for your question. During our literature review, we found that, in some papers on the incidence of KMs, the target survey participants selected were different, which led to inevitable errors in the incidence rate.

For instance, Yanik et al (1) reported the incidence of KMs with a large sample size: among 6,570 Turkish individuals, four cases with KMs (about 0.06% of cases). While Gulses et al (2) reported 2,381 patients with impacted third molars and found nine KMs (0.37%). It appears that the second study had a much higher incidence, however, the included population of Gulses was not healthy people, but patients with impacted third molars. These two studies, although with large samples, were too heterogeneous to allow for direct comparison or data merging. This was the intended meaning of that sentence. And I have modified the sentence to "Thus, although the studies included large populations, their heterogeneity precluded direct comparisons or data merging."

Page 10, line 22

Due to the low incidence of KMs, the varied inclusion criteria, study heterogeneity and little available evidence, we need a more detailed definition and clarification of the KMs for future research.

Reference

1. Yanik S, Ayranci F, Isman O, Buyukcikrikci S, Aras MH. Study of kissing molars in Turkish population sample. *Niger J Clin Pract.* 2017;20(6):659-64.
2. Gulses A, Varol A, Sencimen M, Dumlu A. A study of impacted love: kissing molars. *Oral health and dental management.* 2012;11(4):185-8.

5. Discussion Paragraph 3: The statement "We believe that the overlapping region of the occlusal surfaces should exceed 90% of the occlusal area of the smaller teeth and the acute angle formed by the long axis of the two teeth should not exceed 30 degrees to be considered as KMs" needs data to be analyzed from a lot more patients, hence authors should reconsider this claim.

Response to reviewers,

Until now, there has been no rigorous definition of KMs diagnosis. The inclusion criteria of KMs of previous studies were not consistent. In some cases, opposing teeth were not contacted crown-to-crown, and the acute angle formed by the long axis of the two teeth may even exceed 40°. Simultaneously, in some studies, the occlusal surface of the two teeth did not overlap with most of the occlusal surface and only one cusp contacted the kissing teeth. Inclusion of such inconspicuous kissing teeth into the KMs category significantly increased their prevalence.

Because the definition of KMs teeth is not strict at present, it is impossible to perform further analysis on its incidence. Here we provide our own proposal for the inclusion of diseases, not to regulate them. In view of the current need for consensus on KMs standards, we changed our conclusions to arise more attention on this issue. “We believe that the overlapping region of the occlusal surfaces and the acute angle formed by the long axis of the two teeth should be considered when identifying KMs.” Page 10,line4.

6.Discussion Paragraph 4: “...the included population was not that of ordinary people”, what does the authors mean by this?

Response to reviewers,

Thank you for your question. As previously mentioned, in Gulses’s study, the surveyed population was patients with impacted third molar, not the general population; therefore, we believed that the included population in that study was not ordinary people. We believe that an incidence rate survey study should target the general public, not a specific population. The heterogeneity of that study make to direct comparison between studies impossible. And I add “ in this” in that sentence to reduce ambiguity. Page 10 line 19

7.Discussion Paragraph 5: Last line: et al. or etc.?

Response to reviewers,

Thank you for pointing out these issues. As you pointed out ,the et al. in that place should be changed to etc. We have modified the text according to your recommendations. In addition, a professional editing service has proofread our manuscript before submission. Page11 line 6

8.Why did the authors discuss only Type A KMs? It will be helpful for the readers if all types are discussed.

Response to reviewers,

Thank you very much for your suggestion. In fact, we also discussed Type B and C in the original manuscript. We talked more about Type A because that's what this case report was about. We are very happy to accept your suggestion to discuss the type B and C cases together in the revised manuscript.

Page 12 line24

“In Type A and B KMs, the lower tooth is relatively more difficult to extract because of their deep position and proximity to the nerve. For Type C KMs, the difficulty is mainly determined by its embedding depth. The deeper the embedding depth, the more bone needs to be removed.”

Review 2

The authors should better describe the rarity of this particular case, compared with previous case reports

Thanks you very much for your suggestion. We mainly want to talk about this problem from three aspects.

Firstly, KM is a rare disease, with a very low incidence, according to the only large sample study, which (1) reported the prevalence of KMs with a large sample size: among 6,570 Turkish individuals, four had KMs (0.06% of cases).

Secondly, the reported KMs in previous studies were different from this case. Most of the panoramic films in the reported literature show tilted KMs (1, 3-7) (that is, type B by the classification we proposed). And the vertical direction, Type A, KMs were seldom reported .

Due to the rarity of vertically impacted KMs, we believe that KMs should be properly classified to promote the in-depth study of its causes and change the stereotypical understanding of the disease from the public.

1. Yanik S, Ayranci F, Isman O, Buyukcikrikci S, Aras MH. Study of kissing molars in Turkish population sample. Niger J Clin Pract. 2017;20(6):659-64.

Reported 4 cases of 4 Type B KMs.

3. Menditti D, Laino L, Cicciu M, Mezzogiorno A, Perillo L, Menditti M, et al. Kissing molars: report of three cases and new prospective on aetiopathogenetic theories. Int J Clin Exp Pathol. 2015;8(12):15708-18.

Reported 4 cases of 5 Type B KMs.

4. Lao A, Bi S, Cheng H, Lai T, Huang S, Zhao S. A combination of kissing molars, maxillary bilateral supernumerary teeth and macrodontia: a rare case report. BMC Oral Health. 2020;20(1):112.

Reported 1 case of 1 type B KMs

5. van Hoof RF. Four kissing molars. *Oral Surgery, Oral Medicine, Oral Pathology*. 1973;35(2).

6.

Reported 1 case of 2 Type B KMs

6 Nedjat-Shokouhi B, Webb RM. Bilateral kissing molars involving a dentigerous cyst: report of a case and discussion of terminology. *Oral Surgery*. 2014;7:107-10.

Reported 1 case of 1 Type B KMs and 1 Type C KMs.

7. Udagawa G, Kataoka T, Amemiya K, Kina H, Okamoto T. Bilateral kissing molars involving a dentigerous cyst: A case report and literature review. *Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology*. 2021.

Reported 1 case of 1 Type B KMs and 1 Type C KMs

Thirdly, due to the limited literature, KMs in an tilted direction may be regarded as its regular or defining feature by the public, and a report of KM teeth with different directions (vertically) has the potential to change the public's understanding of KMs teeth. At the same time, its pathogenic mechanism and possible treatment methods may differ from conventional tilting KMs.

Thus, we conducted a literature review and a classification of KMs to propose various inclusion criteria to increase professional awareness.

References:

1. Yanik S, Ayranci F, Isman O, Buyukcikrikci S, Aras MH. Study of kissing molars in Turkish population sample. *Niger J Clin Pract*. 2017;20(6):659-64.
2. Gulses A, Varol A, Sencimen M, Dumlu A. A study of impacted love: kissing molars. *Oral health and dental management*. 2012;11(4):185-8.
3. Menditti D, Laino L, Cicciu M, Mezzogiorno A, Perillo L, Menditti M, et al. Kissing molars: report of three cases and new prospective on aetiopathogenetic theories. *Int J Clin Exp Pathol*. 2015;8(12):15708-18.
4. Lao A, Bi S, Cheng H, Lai T, Huang S, Zhao S. A combination of kissing molars, maxillary bilateral supernumerary teeth and macrodontia: a rare case report. *BMC Oral Health*. 2020;20(1):112.
5. van Hoof RF. Four kissing molars. *Oral Surgery, Oral Medicine, Oral Pathology*. 1973;35(2).
6. Nedjat-Shokouhi B, Webb RM. Bilateral kissing molars involving a dentigerous cyst: report of a case and discussion of terminology. *Oral Surgery*. 2014;7:107-10.
7. Udagawa G, Kataoka T, Amemiya K, Kina H, Okamoto T. Bilateral kissing molars involving a dentigerous cyst: A case report and literature review. *Journal of*

Oral and Maxillofacial Surgery, Medicine, and Pathology. 2021.