

other x-rays would substitute the pretreatment lateral cephalogram.

It is ideal for showing the method of alveolar socket preparation in the treatment progress. However, the details were all described in the legend of Figure 6. We thought these words were enough to provide information to the readers.

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Successful long-term results for posterior airways and orthognathic surgery

An article published in the May 2022 issue of the American Journal of Orthodontics and Dentofacial Orthopedics aimed to correlate airway changes with surgical movements and other variables and the planning modalities to better understand how to control airway dimensions with treatment (Trevisiol L, Bersani M, Sanna G, Nocini R, D'Agostino A. Posterior airways and orthognathic surgery: What really matters for successful long-term results? Am J Orthod Dentofacial Orthop 2022;161:e486-97).

Although the article was quite informative and appreciated by most of us, we have some doubts, so kindly respond.

1. In the Material and Methods section (p. 487), it was mentioned in the second paragraph that the cone-beam computed tomography scans were done preoperatively, 21 days postoperatively, and 10-14 months postoperatively. Again in the seventh paragraph in the Material and Methods section, it was written that computed tomography (CT) images were acquired instead of the previously mentioned cone-beam computed tomography scans. So kindly explain the difference.
2. In the Statistical analysis section (p. 488), it was mentioned that minimal axial area (MAA) at T0 appeared to follow a nonnormal distribution, and a paired *t* test (parametric test) was used to verify

the presence of statistically significant differences in MAA values at the various time points (T0 – T1 and T0 – T2). When the data follows a normal distribution, a paired *t* test (parametric test) is employed; otherwise, a nonparametric test should be used for the comparison. Kindly explain why a parametric test was used here for the same.

3. This study compared posterior airway space and MAA values using a paired *t* test at various time intervals (T0, T1, and T2), including a sample size of 61 patients. A *t* test is designed to compare data when the sample size is <30, and a *z* test will accomplish the job when the sample size is >30. Why was a *t* test used instead of a *z* test for the comparison?
4. CT scan images of young adults and older adults (aged 17-61 years) were included in the study, making the sample nonhomogenous in terms of age. Muscles such as the genioglossus, suprahyoid, and infrahyoid affect the pharyngeal airway space, and the tonicity of these muscles decreases with age, negatively affecting the pharyngeal airway space. So kindly explain to us the reason for considering such a large age range of 17-61 years for this study?
5. All the surgical movements considered as independent variables were in sagittal directions. Why were subjects (39 out of 61) with 3-piece LeFort I osteotomy also included in the study, as 3-piece LeFort I changes the anatomy of the maxilla in sagittal and transverse dimensions? Changes in transverse dimension also influence the pharyngeal airway space. So kindly explain why subjects with 3-piece LeFort I osteotomy were included in addition to subjects with LeFort I osteotomy?

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Authors' response

First of all, we thank you for commenting on our article. We are glad you found it interesting, even if some points still need to be rightfully detailed. We hope you'll find an exhaustive explanation of your questions in the following answers.

1. The term "CT" in the seventh paragraph of Material and Methods was inadvertently abbreviated from

Table I. Statistical significance

Variables	Mean change to T0, mm ³ /mm ² (%)	P values (Student t test)	P values (Z test)	P values (Wilcoxon test)
Initial PAS gain (PAS T0 to PAS T1)	4562.64 (29.0)	<0.0001*	<0.0001*	–
PAS relapse (PAS T1 to PAS T2)	1696.21 (8.35)	0.009*	0.007*	–
Long-term PAS gain (PAS T0 to PAS T2)	2866.42 (18.2)	<0.0001*	<0.0001*	–
Initial MAA gain (MAA T0 to MAA T1)	100.20 (51.18)	<0.0001*	<0.0001*	<0.0001*
MAA relapse (MAA T1 to MAA T2)	22.31 (7.54)	0.077	0.072	–
Long-term MAA gain (MAA T0 to MAA T2)	77.89 (39.79)	<0.0001*	<0.0001*	<0.0001*

PAS, posterior airway space; T0, 1 week before surgery; T1, first postoperative CBCT performed 15–21 d after surgery; T2, second postoperative CBCT performed 10–14 mo after surgery.

Table II. Descriptive statistics for the age

Variable	No. of observations	Minimum	Maximum	First quartile	Median	Third quartile	Mean	Standard deviation (n – 1)
Age, y	61	17.000	61.000	19.000	22.000	26.000	24.246	7.622

“CBCT” and was not meant to indicate a spiral CT by any means. All the subjects' radiographic evaluations were done with the same CBCT scanner machine. If a patient had undergone a spiral CT instead of a CBCT, they would not have been included in this study.

- All the variables considered in this study seemed to follow a normal distribution at the Jarque-Bera test except for the minimal axial area (MAA) 1 week before surgery. This variable was also visually checked at the histogram and P-P plots and showed a normal tendency with a moderate skewness which does not forbid the use of parametric tests.¹ Wilcoxon test for paired samples was also applied to check if the use of a nonparametric test would have significantly different *P* values, but the significances did not change (Table I).
- In this study, Student *t* tests were used to compare the means of posterior airway space and MAA values at different time points. Although the *t* test is especially indicated when the sample size is <30, there is no contraindication to using it when the given sample size is >30. The Student *t* distribution for an infinite number of degrees of freedom (or subjects in this case) becomes a normal distribution as the *Z*-score. Therefore, for a larger sample size, the Student *t* test will give closer *P* values to the *Z*-score. In this study, the *Z* test would have given the same results in terms of mean comparison and thus statistical significance (Table I).
- This study was designed without any age limitation to verify if age and so, as you mentioned, muscle tonicity can affect the patient's airway volume change with surgery. Nevertheless, only 5 out of 61 were aged >35 years, with the mean age of

the population being 24 years (Table II). In the statistical analysis, age did not provide significant information on airway volume and MAA models (see Statistical analysis section and Tables V and VI in original article).

- All the surgical movements considered independent variables were indeed in the sagittal direction, but segmental LeFort was also considered a qualitative independent variable in the statistical analysis. This allowed us to verify if segmental surgery brought any difference in airway dimensions before considering the entity of maxillary expansion. As in none of the statistical models, this variable brings significant information; it is suggested that segmental LeFort does not significantly affect the airway volume in the evaluated anatomic area. A further possible explanation could be related to the mild amount of expansion (mean maxillary expansion of 3.4 mm at the first molar level).

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REFERENCE

- Fagerland MW. *t*-Tests, non-parametric tests, and large studies—a paradox of statistical practice? BMC Med Res Method 2012; <https://doi.org/10.1186/1471-2288-12-78>.