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OPEN PEER REVIEW

Spheno-Occipital Synchondrosis Fusion Degree as an Age Estimation Tool: A Cone-Beam Computed Tomography Study

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About this report

This open peer review (OPR) report shows the public comments made on this article during peer review, by the reviewers, the associate editor and the editor-in-chief, for every revision round, together with the authors' replies. Comments appear only with the consent of the people who wrote them. Reviewers who chose to sign their report are named; the others are shown as "Referee". Comments are edited for language only, and confidential remarks to the editors are not included.

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1 Original submission

3 comments · 11 Dec 2020 – 10 Jan 2021

Referee 1 Reviewer

MINOR REVISION 11 Dec 2020

Overall, it can be said that this study was well designed and relatively well written, but it needs to be edited as follows:
1. Method: The cross-sectional study is unidirectional, and the word retrospective must be deleted.
2. Statistical analysis:
2.1. It must be stated which variable(s) the Mann-Whitney test was used to compare according to sex. Moreover, why was the Mann-Whitney test used rather than the T-independent test? If it was because of a non-normal distribution, the statistical test used to determine this must be mentioned.
2.2. The type of ANOVA must be specified, along with the variable(s) whose means were compared and the variable on which the comparison was based.
3. Table 1: Why were wider age groups not used? With this method of age grouping, the sample size is small, which negatively affects the statistical power of the study.
Moreover, the distribution of samples must first be determined across both genders and then within each gender.
4. Table 2: These two columns must be deleted, and a p-value column must be added as the last column.
5. Table 3: The columns for adjusted coefficients, t and 95% CIs must be deleted. The R2 must be reported below the table for the two models.

Associate Editor

MINOR REVISION 9 Jan 2021

Dear authors,
I studied your manuscript.
Thank you for considering IJR for your research submission.
There are some questions and problems mentioned by our reviewers. Your action is needed.
Best regards,

Editor-in-Chief

MAJOR REVISION 10 Jan 2021

Dear authors,
Your article needs Major Revision.
Regards

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Revision 1

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Reply to Reviewers' Comments:

Reviewer 1:

Thanks for your valuable comments;

Q: *1. Method: The cross-sectional study is unidirectional and retrospective word must be deleted.*

R: *These words are deleted and this sentence is corrected." The medical ethics committee of the Shiraz University of Medical Sciences approved this research"*

Q: *2.1. Must be mentioned Mann-Whitney test was used for determining difference of what variable(s) according to sex. Moreover, why used of Mann-Whitney rather T-independent test? If, because of non-normal distribution; it must be mentioned that using by what statistical test?*

R: *Kolmogorov-Smirnova and Shapiro-Wilk tests were applied to assess the normal probability distribution. The distribution was non-normal, thus the Mann-Whitney test was applied to indicate difference of age and SOS fusion stage according to sex.*

Q: *2.2. Must be added what type of ANOVA and for comparison of the mean of what variable(s) based on what variable?*

R: *Analysis of variance (One-way ANOVA) was employed to compare the mean of ages with SOS fusion stages based on gender.in the mean values of the samples.*

Q: *3. Table 1: Why was not used of wider group for age? According to this method of age groups, the sample size is small and negatively effects on study statistical power of the study. Moreover, firstly it must be determined the distributions of samples in both gender and then in each gender.*

R: *Based on literature, the maximum age for closure of SOS is 25 year- old, thus we could not consider wider age range. Moreover, we decided to assess the exact time of SOS fusion, so we could not select age group and we should study exact age of subjects. Last point is corrected and the distributions of samples in both gender were defined.*

Q: *4. Table 2: These two columns must be deleted and it be added p-value column in last column.*

R: *Table 2 Descriptive statistics for spheno-occipital fusion degree in samples.*

P -value	SD	Mean age years	N	Sex	Stage
.000	1.54	8.85	26	Male	Stage 0
	1.25	7.63	16	Female	
	1.23	12.25	16	Male	Stage 1
	1.13	9.57	7	Female	
	1.65	14.31	13	Male	Stage 2
	0.67	12.5	12	Female	
	2.78	20.34	59	Male	Stage 3
	3.27	20.25	91	Female	

Q: *5. Table 3: Columns of adjusted coefficients, t and %95 CIs must be deleted. The R2 must be reported in bellow of table for two models.*

R: *Table 3 Linear regression parameters to predict the age in both genders according to spheno-occipital fusion degree.*

R^2	Standardized beta coefficient	Unstandardized Coefficients		Model	
		std. error	B		
0.710		0.676	6.476	Constant	Female
	0.844	0.257	4.493	Stage	
0.809		0.404	8.492	Constant	Male
	0.900	0.176	3.854	Stage	

Reviewer 2:
Thanks for your valuable points;

Q: *1- please describe the novelty of this research and the difference with previous studies like reference No:5*

R: *"Previous studies have shown variation in the time of fusion in different global populations because genetic, geographical, and socioeconomic status can affect age estimation (16-19). Regarding the late ossification of SOS, clinicians should have enough knowledge about it (4). Considering lack of any study in evaluation of SOS in age estimation using CBCT images in Iranian population, this research scrutinized to assess the degree of SOS fusion for age estimation in cases aged between 6 and 25 years based on CBCT images. This CBCT analysis is the first to examine the timing of SOS closure in the Iranian adolescent population and based on the linear regression formula, we present the formulas for age prediction in this population."*

Q: *2-Compare the accuracy ,preference,priority of this method with other age estimation methods.*

R: *" Different methods, such as hand-wrist maturation, tooth mineralization, the fusion of medial clavicular epiphysis, cervical vertebrae maturation (CVM), and spheno-occipital synchondrosis (SOS) have been used to determine skeletal age in adolescents (8-12). Hand-wrist radiography as a method of choice has long been applied by orthodontics to assess skeletal maturation. One of the shortcomings is the difficulty in the differentiation of landmarks leading to the wrong prediction of growth. Previous studies revealed significant positive relationship between hand-wrist skeletal maturity indices and stage of spheno-occipital fusion for both sexes. Using SOS fusion for skeletal maturity evaluation will eliminate the need for extra hand-wrist radiation and also will be helpful for patient's growth assessment (12-14). Assessment of the CVM by lateral cephalometry, which is routinely applied in orthodontics, was introduced as an appropriate replacement of the hand-wrist method. Sometimes, this method is not suitable to figure out the exact maturity stage. In view of strong correlation exists between the fusion of the SOS and CVM employing SOS closure ".degree will facilitate skeletal age estimation (2, 5, 15, 16)*

2 Revision 1

3 comments · 3 Feb 2021 – 2 Mar 2021

Referee 1 Reviewer

MINOR REVISION 3 Feb 2021

Thanks to the authors for addressing the previous comments. Now, it should only be noted that if the outcome data were not normally distributed and the Mann-Whitney test was used to compare binary variables, the non-parametric Kruskal-Wallis test should be used to compare variables with more than two categories instead of the one-way analysis of variance test.

Associate Editor

MINOR REVISION 1 Mar 2021

Dear authors,
Thank you for your clear response.
One more question from our reviewer must be clarified.
Best regards,

Editor-in-Chief

MINOR REVISION 2 Mar 2021

Dear authors,
Your article needs Minor Revision.
Regards

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Revision 2

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Dear Reviewer #2,

Thanks for allocating your valuable time to review this manuscript exactly;

Q: *Now, it should only be noted that if the outcome data was not normally distributed and the Mann-Whitney test was used to compare binary variables, the non-parametric Kruskal-Wallis test should be used to compare variables over two states, instead of the one way analysis of variance test.*

R: The mentioned point is corrected in the manuscript.

3 Revision 2

3 comments · 10 Mar 2021 – 6 Jun 2021

Referee 1 Reviewer

ACCEPT 10 Mar 2021

Thank you to the authors for making the proposed revisions to the manuscript. This draft is now acceptable in terms of methodology.

Associate Editor

ACCEPT 8 Apr 2021

Dear authors,
Thank you for considering and addressing our reviewers' points.
Your manuscript is now accepted for publication in IJr.
Best regards,

Editor-in-Chief

MINOR REVISION 6 Jun 2021

Dear authors,
Your article needs Minor Revision.
Regards

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Revision 3

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Reply to reviewers

First of I apologize for my delay. We thank the associate editor for your remarks on the manuscript " Spheno-occipital synchondrosis fusion degree as an age estimation tool: A Cone Beam Computed Tomography Study" and appreciate your valuable time and contribution. I have edited the manuscript point by point based on your suggestions.

1-Q: please don't abbreviate in title.

R: Spheno-occipital synchondrosis fusion degree as an age estimation tool: A Cone Beam Computed Tomography Study

2-Q: please correct in line 11: "..... were assessed in terms of degree of SOS ....."

R: CBCT images from 240 (126 females and 114 males) patients aged 6 - 25 years were assessed in terms of the degree of SOS fusion by a four-stage scoring system.

3-Q: lines 13 and 14 [and 104 and 105 and 120] kruskal wallis test does not assess the difference in means [rather assesses difference in medians]. Please correct the sentence in this ergard.

R: Analysis of variance (ANOVA) was employed to assess the differences in the median values of the samples.

4-Q: please add objective part for paper according to journal format.

R: **Objectives:** This research was done to assess the degree of SOS fusion in Iranian cases through cone-beam computed tomography (CBCT).

5-Q: please add manufacturer data of SPSS.

R: Data analysis was done by IBM SPSS for Windows version 26 (IBM Corp., Armonk, N.Y., USA)

6-Q: inn line 101, please correct: "normality of distribution"

R: Kolmogorov-Smirnova and Shapiro-Wilk tests were applied to assess the normality of distribution.

7-Q: please use the same method for R2 [r2 in line 183 and 184 should be R2]

R: The obtained R^2 value indicated the fitness of the model. The R^2value normally ranges from 0 to 1. When the R^2 value is close to 1, it indicates that the considered model could explain much of the total variation of the dependent variable (y). In our study, the R^2 value was 0.71 and 0.8 for females and males, respectively, which indicates the better fitness of the model to data compared with other studies (4, 31).

8-Q: please delete title Conclusion and begin paragraph with "In conclusion"

R: In conclusion, a four-stage system can be used for the Iranian population aged 6-25 years old.

9-Q: references 20 and 21 are before reference 19. Please write refs in a sequential order. [and references 24 and 25 are before 22-23]

.R: the order of refs is corrected

.Q: p-value 0.000 should be written as <0.001-10

.R: this point is corrected

Q: figure legend 1, showed should be shows-11

R: Figure 1. Mid-sagittal image shows the spheno-occipital synchondrosis fusion stages.

4 Revision 3

1 comment · 6 Mar 2022

Editor-in-Chief

MINOR REVISION 6 Mar 2022

Dear authors,
Before starting the review process for your article, it is necessary to clarify the following items:

Please mention the ethical code and provide its web address.
If the web address (link) for the ethics committee approval is not available, please upload the official approval document from the ethics committee.

Please clarify the source of funding and mention the grant number with its web address, or upload the official grant approval document.

Regarding the importance of “conflict of interest” clarification, the corresponding author should fill out the “ICMJ form” and upload it during the submission process. (The form exists in the “conflict of interest” section of the site: https://brief.land/iranjradiol/knowledgebase/category/tree.html#conflicts_of_interest.html).

References 7,3,10,14,23 and 30 are old. Please replace them with newer references.

Regards

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Revision 4

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

Q: Please mention ethical code with the link address.
If the web address (link) of ethical committee approval is not available, please upload official approval document ethics committee.

R: Ethics committee document is added.

Q: Please clarify the financial resource and mention the number grant with the link address or upload official approval grant number.

R: Document is added.

Q: Regarding the importance of “conflict of interest” clarification, corresponding author should fill the “ICMJ form” form and upload in the submission process. (The form exists in “conflict of interest” section of the site: https://brief.land/iranjradiol/knowledgebase/category/tree.html#conflicts_of_interest.html).

R: ICMJ form is completed and added.

Q: References 7,3,10,14,23 and 30 are old. Please replace them with newer references.

R: References are corrected.

5 Revision 4

1 comment · 29 Mar 2022

Editor-in-Chief

MINOR REVISION 29 Mar 2022

Dear authors,
Your article needs Minor Revision.
Regards

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Revision 5

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

We thank the associate editor's for comments and appreciate his/her valuable time and contribution. We have edited the manuscript to address all their concerns.

Q: *The authors had written the "Kruskal-Wallis test was employed to compare the mean of ages" and I asked them "lines 13 and 14 [and 104 and 105 and 120] kruskal wallis test does not assess the difference in means [rather assesses difference in medians]. Please correct the sentence in this regard." And the authors have corrected the paper in this regard as: "Analysis of variance (One-way ANOVA) was employed to compare the median of ages". Again, this sentence is wrong because the ANOVA test assesses difference of mens and Kruskal wallis test compaes the medians. In addition, We don't know what is in fact the test used in the analysis. If the test is ANOVA, it uses "means" and if the test is Kruskal-wallis, it uses "median". Please clarify and correct this point in all similar and related parts in paper.*

R: Thanks for your careful consideration. Corrections are made.

Q: *please add title "objective" at the beginning of this paragraph: "Considering lack of any study in evaluation ……."*

R: As you mentioned title "objective" is added.

6 Revision 5

1 comment · 21 May 2022

Editor-in-Chief

MINOR REVISION 21 May 2022

Dear authors,
Your article needs Minor Revision.
Regards

7

Revision 6

AUTHORS' RESPONSE TO REVIEWERS

Authors' reply to reviewers

The next pages contain the authors' point-by-point reply to the comments of this revision round, as submitted with the revised manuscript. It is published as the authors wrote it.

We thank the associate editor's for comments and apologize for misunderstanding.

Q: I asked the authors: “in lines 13 and 14 [and 104 and 105 and 120] kruskal wallis test does not assess the difference in means [rather assesses difference in medians]. Please correct the sentence in this regard.”
And they changed the median to means [in ANOVA test] but they mentioned the variables did not show normal distribution in K-S test. If the variables are not normal, they cannot use ANOVA [instead they should use kruskal wallis test]. So there is a confusion in this regard. Please gat an advice from a statistician and correct the paper in this regard.

R: Corrections are made.

7 Revision 6

1 comment · 30 May 2022

Editor-in-Chief

ACCEPT 30 May 2022

Dear authors,
Your article is acceptable for publication in IJR.
Regards