

Original Research

Assessment of gonial angle growth patterns according to age and gender

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ABSTRACT:

Background: The gonial angle can also be a handy tool in near age assessment in extreme situations like mass disaster, remains of human dead exhumed and murderous mutilations, missing individuals, etc. The present study was conducted to assess gonial angle growth patterns according to age and gender. **Materials & Methods:** 90 patients age ranged 5-55 years underwent panoramic radiographs (OPG) taken by panoramic unit. The gonial angle was measured as the angle formed by the base of the mandible and posterior border of ramus by the scale of protractor, which is placed over the angle of the mandible in such a way that basic line or base of protractor coincides with the base of the mandible. **Results:** Group I (age group 5-15 years) had 16, group II (5-25 years) had 20, group III (25-35 years) had 25, group IV (35-45 years) had 15 and group V (45-55 years) had 14 subjects. The mean gonial angle in group I had 145.6, group II had 141.2, group II had 132.8, group IV had 130.5 and group V had 127.3 degrees gonial angle. The mean gonial angle (degrees) in group I in males was 145.2 and in females was 146.4, in group II was 140.6 and 140.5, in group III was 132.5 and 133.9, in group IV was 130.7 and 129.3 and in group V was 128.6 and 126.5 in males and females respectively. The difference was non-significant ($P > 0.05$). **Conclusion:** Younger females had higher gonial angle values than males. As age advanced, gonial angle decreased.

Key words: gonial angle, Male, female

Received: 11 August, 2021

Accepted: 16 September, 2021

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This article may be cited as: Firdous W, Mohammad M. Assessment of gonial angle growth patterns according to age and gender. Int J Res Health Allied Sci 2021; 7(5): 96-99.

INTRODUCTION

Correct assessment of gonial angle values are important in order to establish gender and age when analysing human remains.¹ In this context, assessment of the anatomic gonial angle values according to age and gender has been analysed before as panoramic radiography (orthopantomography) a useful tool to measure the gonial angle that offers similar results to lateral radiography.² The gonial angle can also be a handy tool in near age assessment in extreme situations like mass disaster, remains of human dead exhumed and murderous mutilations, missing individuals, etc. However, gonial angle as a tool in forensic odontology has received little attention.³ Apart from the normal assessment of age and gender, identification of human remains can be attained through various landmarks and measurement of many parameters on the mandible. However, gonial angle as a tool in forensic odontology has received little attention.⁴ The morphological change in the gonial

region in the edentulous individual compared to a young individual has received little attention in the literature. Literature holds diverse studies, where a few observed no significant change in gonial angle, with others concluding gonial angle to be greater in edentulous individuals than in dentate ones.⁵ The present study was conducted to assess gonial angle growth patterns according to age and gender.

MATERIALS & METHODS

The present study comprised of 90 patients age ranged 5-55 years. The material was collected from various departments of Govt Dental College and Hospital, Srinagar who had come to the hospital for different treatment procedures. Ethical approval for the study was obtained before starting the study.

Data such as name, age, gender etc. was recorded. All underwent panoramic radiographs (OPG) taken by panoramic unit. The gonial angle was measured as the angle formed by the base of the mandible and

posterior border of ramus by the scale of protractor, which is placed over the angle of the mandible in such a way that basic line or base of protractor coincides with the base of the mandible. The angle was recorded

in degrees. The mean of five consecutive measurements of each gonial angle was performed. Results thus obtained were assessed statistically. P value less than 0.05 was considered significant.

RESULTS

Table I Age wise distribution

Groups	Age group	Number
Group I	5-15	16
Group II	15-25	20
Group III	25-35	25
Group IV	35-45	15
Group V	45-55	14

Table I shows that group I (age group 5-15 years) had 16, group II (5-25 years) had 20, group III (25-35 years) had 25, group IV (35-45 years) had 15 and group V (45- 55 years) had 14 subjects.

Table II Assessment of gonial angle in different groups

Groups	Mean	P value
Group I	145.6	0.01
Group II	141.2	
Group III	132.8	
Group IV	130.5	
Group V	127.3	

Table II, graph I shows that mean gonial angle in group I had 145.6, group II had 141.2, group II had 132.8, group IV had 130.5 and group V had 127.3 degrees gonial angle. The difference was significant (P< 0.05).

Graph I Assessment of gonial angle in different groups

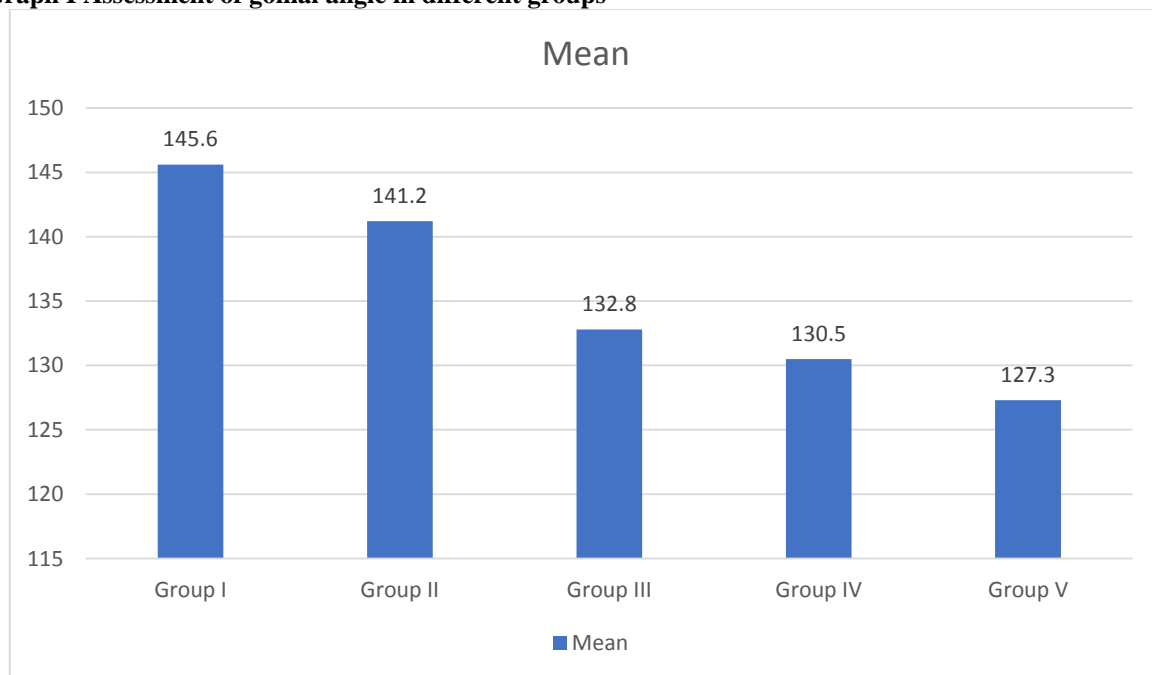


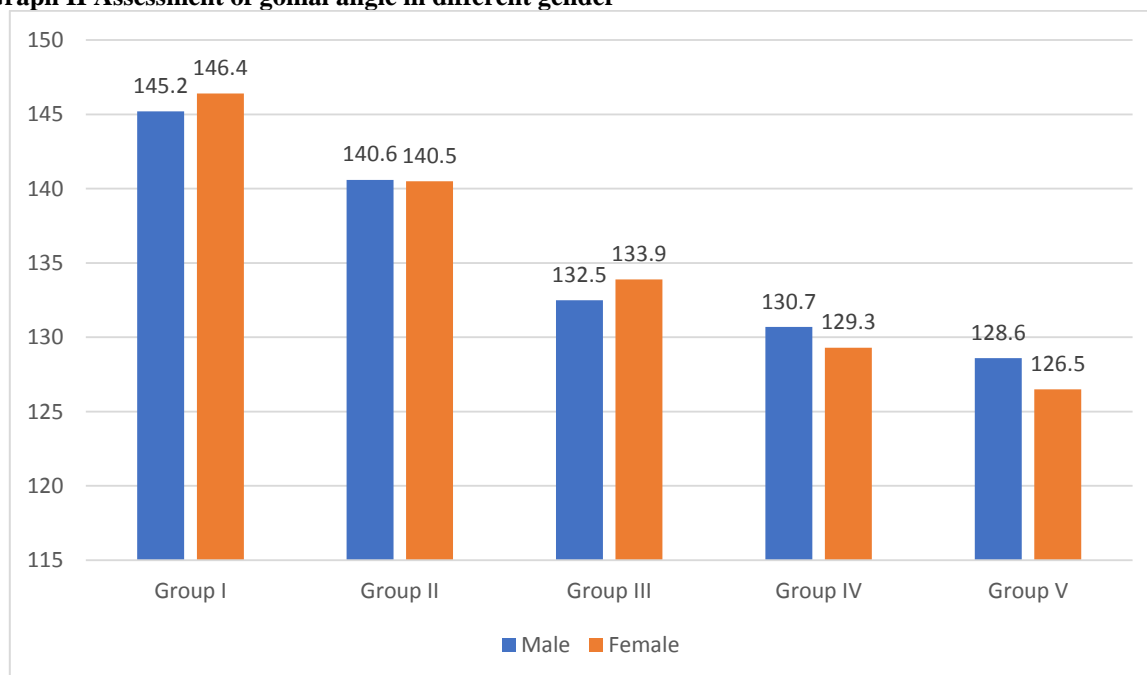
Table III Assessment of gonial angle in different gender

Groups	Male	Female	P value
Group I	145.2	146.4	0.91
Group II	140.6	140.5	0.94
Group III	132.5	133.9	0.81
Group IV	130.7	129.3	0.96
Group V	128.6	126.5	0.97

Table III, graph II shows that mean gonial angle (degrees) in group I in males was 145.2 and in females was 146.4, in group II was 140.6 and 140.5, in group III was 132.5 and 133.9, in group IV was 130.7 and 129.3 and

in group V was 128.6 and 126.5 in males and females respectively. The difference was non-significant ($P > 0.05$).

Graph II Assessment of gonial angle in different gender



DISCUSSION

Orthodontic diagnosis and treatment planning involves detailed study of dental occlusion, hard tissue relationships and soft tissue proportions. The orthodontic diagnosis database is derived from three major sources: History, clinical examination and evaluation of diagnostic records including dental casts, radiographs and photographs.⁶ Cephalograms and orthopantomogram (OPG) are routinely taken for every orthodontic patient. The goal of cephalometric analysis is to evaluate the horizontal and vertical relationship of five major functional components of the face: The cranium and cranial base, skeletal maxilla, skeletal mandible, the maxillary dentition and alveolar process and the mandibular dentition and alveolar process.⁷ The vertical relationship of these structures is as important as the horizontal relations, as the treatment plan and the outcome is affected by the vertical relationships and the growth pattern of the patient. The external gonial angle is an important angle of the craniofacial complex. It is significant for the diagnosis of craniofacial disorders.⁸ Gonial angle is one of the important parameters giving an indication about the vertical parameters and symmetry of the facial skeleton. The gonial angle is measured by taking the tangent to the posterior border of the ramus and tangent to the lower border of the mandible on lateral cephalogram.⁹ The present study was conducted to assess gonial angle growth patterns according to age and gender.

In present study, we observed that group I (age group 5-15 years) had 16, group II (5-25 years) had 20, group III (25-35 years) had 25, group IV (35-45

years) had 15 and group V (45- 55 years) had 14 subjects. Maron et al¹⁰ aimed to ascertain the gender and age differences in the gonial angle values involving 266 subjects. Panoramic radiographs were carried out in order to measure the gonial angle values. We found significant differences between females and males in the subgroups aged ≤ 10 years old (128.6 ± 3.4 vs 126.8 ± 4.5 , $p = 0.017$), 16–20 years old (119.1 ± 5.6 vs 122.3 ± 7.7 , $p = 0.011$), 21–25 years old (117.6 ± 5.2 vs 120.8 ± 7.0 , $p = 0.016$) and 26–30 years old (117.5 ± 5.4 vs 120.6 ± 5.4 , $p = 0.019$) but not in the subgroup aged 11–15 years old (123.4 ± 5.2 vs 123.5 ± 5.4 , $p = 0.927$). A significant negative correlation was found between age and gonial angle values ($r = -0.365$, $p < 0.001$). In sum, females under 10 years of age have significantly higher values than males. The angle values decreased until the age of 11–15 years of age when there were no significant gender differences. Thus, the males aged over 16 years old presented significantly higher values than the females. The decrease in gonial angle values seems to slow or stop from 21 years onwards.

We observed that mean gonial angle in group I had 145.6, group II had 141.2, group II had 132.8, group IV had 130.5 and group V had 127.3 degrees gonial angle. Upadhyay et al¹¹ evaluated relationship between complete loss of teeth and changes in the gonial angle; the study further intends to evaluate any variation in gonial angle with age and gender. A total of 185 subjects (91 males; 89 females) were included in the study and were divided into five groups on the basis of the chronological age. Physico-forensic anthropometry and lateral cephalometric methods

were used to record the gonial angle. The present study showed definite decrease in the gonial angle with advancing age, but the intergroup analysis does not follow a significant pattern. The study showed no correlation of gonial angle with gender. However, the study observed a 60 increase in gonial angle for edentulous subjects.

We observed that mean gonial angle (degrees) in group I in males was 145.2 and in females was 146.4, in group II was 140.6 and 140.5, in group III was 132.5 and 133.9, in group IV was 130.7 and 129.3 and in group V was 128.6 and 126.5 in males and females respectively. In a study conducted by Bhullar et al¹², gonial angle measurements were made on lateral cephalograms and orthopantomograms of 98 patients - 44 males (mean age 25.9 years) and 54 females (mean age 21.3 years). One-way analysis of variance demonstrated no significant differences between the values of gonial angles determined by lateral cephalogram and panoramic radiography. Pearson correlation showed a high correlation between cephalometric and OPG gonial angle value.

CONCLUSION

Authors found that younger females had higher gonial angle values than males. As age advanced, gonial angle decreased.

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