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CONTENTS

ETIOLOGY OF CIRCULAR CARIES	829
Olga Kokoceva-Ivanovska	829
Efka Zabokova-Bilbilovska	829
Mijoska Aneta	829
BIOCOMPATIBILITY AND REACTION OF DENTAL POLYMERS IN ORAL ENVIRONMENT .	835
Natasha Stavreva	835
Biljana Kapusevska	835
STUDY OF THE SIZE OF THE ANGLE OF THE MANDIBLE.....	841
Svetlana Jovevska.....	841
Mihajlo Petrovski	841
DENTAL SCANNERS IN PROSTHODONTICS	845
Blagoja Dashtevski	845
Aneta Mijoska.....	845
Marjan Petkov.....	845
Vanco Spirov	845
Oliver Dimitrovski.....	845
TEETH EXTRACTION WITH ROOT DELACERATION ON THE ORTHODONTIC INDICATIONS	
.....	853
Pavel Stanimirov.....	853
Greta Yordanova.....	853
DIFFERENCE IN CRANIOFACIAL CHARACTERISTICS IN ATTRACTIVE MALE AND FEMALE	
FACES	859
Sofija Carceva Shalja.....	859
Sandra Atanasova	859
Mihajlo Petrovski	859
ORAL TISSUE CONDITION IN PROSTHODONTIC GERIATRIC PATIENTS	865
Aneta Mijoska.....	865
Gordana Kovacevska	865
Georgi Tomov.....	865
INTRODUCTION TO ORTHODONTIC EDUCATION IN BULGARIA OF DIGITAL	
TECHNOLOGIES AND 3D ARCHIVING	869
Greta Yordanova.....	869
Martin Mladenov	869
INDICATIONS FOR MOLAR EXTRACTION DURING ORTHODONTIC TREATMENT.....	873
Sandra Atanasova	873
Sofija Carceva Salja.....	873
Ljubica Prosheva	873
COMPOSITE RESTORATIONS IN DENTISTRY.....	879
Aleksandar Andreevski.....	879
INFLUENCE OF GROWTH IN TREATED CLASS III GROWING PATIENTS WITH FACE MASK	
THERAPY AND UNTREATED PATIENTS.....	883
Sofija Carceva Shalja.....	883
Sandra Atanasova	883
POSITION OF THE MENTAL FORAMEN IN CORELATION WITH THE LOWER PREMOLARS: A	
PANORAMIC RADIOGRAPHIC STUDY	889
Mihajlo Petrovski	889
Svetlana Jovevska.....	889
Olivera Terzieva-Petrovska	889

PREVALENCE OF DENTAL CARIES IN CORRELATION WITH ORAL HYGIENE	895
Ivona Kovacevska.....	895
Natasha Longurova.....	895
Katerina Zlatanovska.....	895
THE SIGNIFICANCE OF TRAINING AND EDUCATION IN ACCURATE EVALUATION OF NATURAL TOOTH COLOR	901
Julija Zarkova	901
Ivan Nacevski	901
Vesna Korunovska Stefkovska	901
FUNCTIONAL RECOVERY OF VOICE FUNCTION IN PATIENTS WITH LARYNGEAL DYSFUNCTION: OBSERVATIONAL STUDY	905
Galina Mratskova	905
Damyam Petrov	905
THE INFLUENCE OF HYPERPROLACTINEMIA ON THE LEVEL OF FSH AND LH IN WOMEN	911
Mire Spasov.....	911
Verica Spasova	911
ACREDITED MOLECULAR METHODS FOR DETECTION OF INFECTIONS CAUSED BY HIV, HEPATITIS B VIRUS AND HEPATITIS C VIRUS	917
Belinda Gelmanovska.....	917
Vaso Taleski	917
FLUORESCENT IN SITU HYBRIDIZATION AND IMMUNOHISTOCHEMISTRY FOR SUBTYPING “NON-CLASSIFIABLE” RENAL CELL CARCINOMAS	921
Atanas Ivanov	921
Vili Stoyanova	921
JEJUNAL ADENOCARCINOMA: A CASE REPORT	925
Gordana Bozhinovska Beaka.....	925
Biljana Prgova Veljanovska	925
Milka Zdravkovska.....	925
Irena Eftimovska Rogac	925
Nadica Bozhinovska	925
THE ROLE OF TUMOR MARKERS CA 125, CA 72-4 AND CA 19-9 IN DETECTION AND MONITORING OF THE COURSE OF DISEASE OF OVARIAN CARCINOMA AND CARCINOMA OF THE UTERINE BODY	931
Kristina Petkova	931
Venci Chalkov	931
SPLenic ABSCESS IN PATIENT WITH CHRONIC PANCREATITIS: A CASE REPORT	937
Gordana Bozhinovska Beaka.....	937
Biljana Noveska-Petrovska.....	937
Biljana Prgova Veljanovska	937
Nadica Bozhinovska	937
ROLE OF GOUT IN ATRIAL FIBRILLATION.....	943
Antoniya Kisheva	943
DEVELOPMENT ROLE AND IMPORTANCE OF FETAL AUTOPSY SCIENTIFIC PURPOSES - REVIEW OF THE LITERATURE.....	947
Tanya Kitova	947
BARRIERS TO THE EFFECTIVENESS OF DISEASE MANAGEMENT IN PEOPLE WITH DIABETES MELLITUS	953
Boryana Levterova	953

DYABETTE CONTROL PROGRAM AND PREVENTION OF THEIR CONDITIONS - PROPOSALS AND GUIDELINES	959
Varvara Pancheva.....	959
Valentin Vassilev.....	959
ALGORITHM OF COMPLEX PROGRAM FOR TREATMENT AND REHABILITATION IN DEGENERATIVE DISEASES OF THE VERTEBRAL COLUMN IN THE CERVICAL AREA. PREVENTION OF CERVICAL ARTHROPATHY.....	963
Petya Kasnakova.....	963
THE DIAGNOSIS OF DAUCUS CAROTA AS ALERGOGEN ON THE IMMUNE SYSTEM IN WHITE LABORATORY RAT	969
Mire Spasov.....	969
Icko Gjorgoski	969
THE DIAGNOSIS OF PHLEUM PRATENSE AS ALERGOGEN ON THE IMMUNE SYSTEM IN WHITE LABORATORY RAT	975
Hristijan Spasov.....	975
Mire Spasov.....	975
Icko Gjorgoski	975
Majlinda Ademi.....	975
INCREASED MEASLES MORBIDITY AND PUBLIC AWARENESS OF THE RISKS OF REFUSING IMMUNIZATION FOR THIS DISEASE	981
Ivelina Dobрева	981
Pavlina Teneva	981
Tsvetana Bojkova	981
PERSPECTIVES IN HEALTH CARE FOR CHILDREN WITH SPECIAL NEEDS IN CHILDREN'S AND SCHOOL HEALTH.....	985
Monika Obreykova.....	985
Galina Terzieva.....	985
MYOPIA IN PRE-SCHOOL CHILDREN AND MOBILE PHONES	991
Aleksandar Dodevski.....	991
Strahil Gazepov	991
Biljana Dodevska.....	991
Alen Georgijev	991
VISUAL SCREENING OF SCHOOL CHILDREN IN THE MUNICIPALITY OF SAPAREVA BANYA IN SOUTHWESTERN BULGARIA.....	995
Slavena Stoykova	995
Ekaterina Petrova.....	995
WETTABILITY – ANOTHER PARAMETER FOR GOOD FITTING OF A SILICONE-HYDROGEL DAILY DISPOSABLE CONTACT LENS	1001
Nikola Peev	1001
SUCCESSFUL COGNITIVE AGING - COGNITIVE RESERVE AND NEUROPLASTICITY	1005
Antonia Yaneva	1005
Kristina Kilova	1005
Teodora Dimcheva	1005
THE ROLE OF ACUPUNCTURE IN THE REHABILITATION OF PARALYSIS OF N.FACIALIS	1009
Lence Nikolovska	1009
Stefanija Gjorgieva.....	1009
Mire Spasov	1009

NEED FOR TRAINING OF HEALTHCARE PROFESSIONALS FROM OUTPATIENT CARE FOR BURNS INJURIES	1013
Anushka Dimitrova.....	1013
CARE AND TREATMENT IN PATIENTS WITH HEPATITIS B IN THE MUNICIPALITY OF PRILEP	1019
Panova Gordana.....	1019
Boshevska Viktorija	1019
Liljana Simonovska	1019
Iva Paneva	1019
Lenche Nikolovska	1019
Mire Spasov	1019
Gjorgji Shumanov.....	1019
ACUTE VENLAFAXINE OVERDOSE WITH POSITIVE URINE IMMUNOASSAY FOR TRAMADOL – CLINICAL AND DIAGNOSTIC OVERLAP - CASE REPORT AND LITERATURE OVERVIEW	1027
Pereska Zanina.....	1027
Janicevic-Ivanovska Danijela	1027
Bekjarovski Niko.....	1027
Simonovska Natasha.....	1027
Babulovska Aleksandra	1027
DRUG-INDUCED NEUTRALIZING ANTIBODIES TO TNF- α BLOCKES IN PATIENTS WITH INFLAMMATORY JOINT DISEASES FOLLOWED BY 24-MONTHS.....	1033
Krassimir Kraev.....	1033
Mariela Geneva-Popova	1033
Velichka Popova.....	1033
Stanislava Popova.....	1033
INFORMATION AND KNOWLEDGE OF THE ANTIBIOTICS AND THE ANTIBIOTIC RESIDENCE OF THE POPULATION FROM THE SOUTHEAST REGION OF REPUBLIC OF NORTH MACEDONIA	1039
Milka Zdravkovska.....	1039
Marija Darkovska-Serafimovska	1039
Gordana Bozinovska-Beaka	1039
Svetlana Zivkova	1039
SIMPLE LIQUID CHROMATOGRAPHY METHOD WITH UV DETECTION FOR DETERMINATION OF BROMAZEPAM IN SOLID PHARMACEUTICAL DOSAGE FORMS	1045
Irena Brcina	1045
Marija Darkovska Serafimovska	1045
Tijana Serafimovska	1045
Trajan Balkanov	1045
Biljana Gjorgjeska.....	1045
CONSUMPTION ANALYSIS OF MOST PRESCRIBED ANTIBIOTICS FINANCED BY THE HEALTH INSURANCE FUND IN REPUBLIC OF NORTH MACEDONIA	1051
Elena Drakalska.....	1051
Bistra Angelovska.....	1051
Veneta Zdravkova.....	1051
MICROBIOLOGICAL DIAGNOSIS AND IMPORTANCE OF INFECTIONS CAUSED BY INFLENZAE – A VIRUS.....	1057
Zivadinka Cvetanovska	1057
Vaso Taleski	1057

POISONOUS SNAKES OF BULGARIA: CLINICAL AND EPIDEMIOLOGICAL ANALYSIS	1063
Olimpiada Atmazhova	1063
Evgenia Barzashka	1063
Iskra Petkova	1063
BODY FAT DISTRIBUTION AND LIPID PROFILE CHANGES AFTER WEIGHT LOSS – A CASE REPORT	1071
Slavica Shubeska Stratova	1071
Danijela Janicevic Ivanovska	1071
FACTORS FOR OBESITY IN STUDENTS FROM THE SCHOOLS	1077
Antoaneta Grozeva	1077
INFLUENCE OF SUNSHINE ON THE SERUM LEVELS OF VITAMIN D	1081
Ivelina Dobрева	1081
Pavlina Teneva	1081
Valya Trencheva.....	1081
GEOMEDICAL TOURISM – OUTDOOR HEALTH CARE FACILITIES ANTI-GEOPATHIC STRESS TREATMENT	1087
Krasimira Staneva.....	1087
APPLICATION OF BLASTWARE SOFTWARE FOR MEASURING MICROCOLIMIC CONDITIONS	1093
Naim Baftiu	1093
Raif Bytyqi	1093
Overall, the number of measurements	1096
Percentage	1096
APPLICATION OF BIOPRINTING IN CONTEMPORARY MEDICINE (REVIEW).....	1099
Desislava Bakova	1099
Kristina Kilova	1099
Maria Semerdjieva.....	1099
CBRN EVENT - DO WE NEED MEDICAL INTELLIGENCE	1103
Elena Valkanova.....	1103
Rostislav Kostadinov.....	1103
ACUTE PANCREATITIS	1107
Redzep Emurlai	1107
PALLIATIVE CARE AND EUTHANASIA – CONVERGENCE POINTS AND PUBLIC ATTITUDES	1113
Nikola Sabev.....	1113
SOCIOECONOMIC CHARACTERISTICS OF PATIENTS WITH TENSION HEADACHE IN MUNICIPALITY OF VELES	1119
Elena Manchevska.....	1119
Toshe Krstev.....	1119
Gordana Panova.....	1119
SEASONALITY IN THE APPEARANCE OF INTRA HOSPITAL INFECTIONS	1127
Emilija Chapevska.....	1127
PEDAGOGICAL COMPETENCE OF MENTORS DURING THE PRE-GRADUATION TRAINEESHIP OF FUTURE NURSES	1131
Snezhana Dragusheva.....	1131
Penka Petleshkova.....	1131
Tanya Paskaleva	1131

THE ROLE OF THE PATRONAGE NURSE IN THE PREVENTION AND EARLY DETECTION OF DISEASES IN CHILDREN UP TO 12 MONTHS OF AGE	1135
Donka Kostadinova	1135
Gordana Panova.....	1135
STANDARDIZATION AS AN APPROACH TO IMPROVING THE QUALITY OF CLINICAL AND LABORATORY WORK	1143
Denitsa Trancheva	1143
CONCEPTS FOR RESEARCH OF PATIENTS SATISFACTION	1149
Alexander Alexandrov.....	1149
STUDY ON ACCESSIBILITY TO MEDICAL CARE IN BULGARIA – PATIENT’S OPINION....	1153
Darina Mineva	1153
LEVEL OF CONFLICT IN PUBLIC HOSPITALS	1157
Ekaterina Raykova.....	1157
Maria Semerdjieva.....	1157
EXTRA RESOURCES POOL - A PREREQUISITE FOR HOSPITAL DISASTER RESILIENCE....	1163
Mariya Georgieva	1163
Rostislav Kostadinov	1163
STRATEGIC PLANNING OF UNIVERSITY SCIENTIFIC PUBLISHING HOUSE TO THE MEDICAL UNIVERSITY - PLOVDIV	1167
Kristina Kilova	1167
Todor Stoev	1167
STUDENT SATISFACTION BY QUALITY OF TRAINING IN SUBJECT “HEALTHCARE MANAGEMENT”	1175
Kamelia Bogdanova	1175
TRENDS IN THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE FIELD OF HEALTHCARE - A LITERARY REVIEW	1181
Kristina Kilova	1181
Denis Milkov	1181
Tanya Kitova	1181
Nonka Mateva.....	1181
THE ACADEMIC FORMATION OF NEW LOGOPEDIANS IN ALBANIAN MEDICAL FACULTIES	1189
Aurela Basha.....	1189
Lidra Ballhysa.....	1189
CHARACTERISTICS OF THE HEALTH CARE SYSTEM	1195
Wioletta Świeboda.....	1195

STUDY OF THE SIZE OF THE ANGLE OF THE MANDIBLE

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Abstract: The mandible is a paired bone that develops within the mandibular arch, embedding teeth and forming an articulation of the jaw with the cranium. Morphological changes are brought about by aging. The gonial angle, or the angle of mandible, is formed by the line tangent to the lower border of the mandible and the line tangent to the distal border of the ascending ramus and condyle ie the lower jaw angle is formed by the ramus line (RL) and the mandibular line (ML), where RL is the tangent to the posterior border of the mandible and ML is the lower border of the mandible through the gnathion (gn) With age the masticatory muscles change in function and structure with decreased contractile activity and lower muscle density. The gonial angle can be used as a tool in forensic odontology, but has received less attention. The aim of this study was to evaluate the angle of mandible comparing mandibular bones and OPGs. The study further intends to evaluate the variation in age using the gonial angle as a parameter. A total of 50 mandibles and 50 OPGs were included in the study. The study materials were obtained from the Department of Anatomy and the Department of Radiology of Simple methodology was employed for obtaining data. The gonial angle in mandibular bones was measured as the angle formed by the base of the mandible and the posterior border of the ramus by the scale of protractor, which is placed over the angle of mandible in such a way that the base of the protractor coincides with the base of the mandible. The angle was recorded in degrees. The gonial angle in OPG was measured by a line drawn tangential to the lower border of the mandible and the line drawn tangential to the posterior border of the ramus and the condyle. The intersection of these two lines formed the gonial angle which was measured using a protractor in the same way. The angle was recorded in degrees. All the readings were recorded and the mean value was calculated. The present study shows various values of gonial angle in OPG and mandibular bones. No significant difference was observed between these two. On comparison of gonial angle the mandibular bone showed slightly greater value than OPG

The mean value of the gonial angles were found to be slightly more in mandibular bones and were lesser in OPG. There seems to be a difference in the gonial angle with different age groups but not significant. Both mandibular bones and OPGs showed almost similar readings. Thus gonial angle serves as an adjuvant and additional forensic parameter which guides for age group assessment, subject to odontological status.

Keywords: Mandible, Gonial angle, OPG, Ramus

INTRODUCTION

The mandible is a paired bone that develops within the mandibular arch, embedding teeth and forming an articulation of the jaw with the cranium. Morphological changes are brought about by aging. The gonial angle, or the angle of mandible, is formed by the line tangent to the lower border of the mandible and the line tangent to the distal border of the ascending ramus and condyle ie the lower jaw angle is formed by the ramus line (RL) and the mandibular line (ML), where RL is the tangent to the posterior border of the mandible and ML is the lower border of the mandible through the gnathion (gn). [1][2] With age the masticatory muscles change in function and structure with decreased contractile activity and lower muscle density. The gonial angle can be used as a tool in forensic odontology, but has received less attention. The aim of this study was to evaluate the angle of mandible comparing mandibular bones and OPGs. The study further intends to evaluate the variation in age using the gonial angle as a parameter.

MATERIALS AND METHODS

A total of 50 mandibles and 50 OPGs were included in the study. The study materials were obtained from the Department of Anatomy and the Department of Radiology. Simple methodology was employed for obtaining data. The gonial angle in mandibular bones was measured as the angle formed by the base of the mandible and the posterior border of the ramus by the scale of protractor, which is placed over the angle of mandible in such a way that the base of the protractor coincides with the base of the mandible. The angle was recorded in degrees. [fig.1] [fig.2] The gonial angle in OPG was measured by a line drawn tangential to the lower border of the mandible and

the line drawn tangential to the posterior border of the ramus and the condyle. The intersection of these two lines formed the gonial angle which was measured using a protractor in the same way. The angle was recorded in degrees.[fig.3] All the readings were recorded and the mean value was calculated.

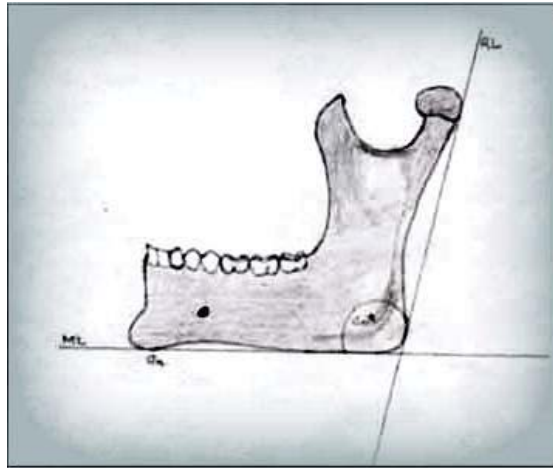


Fig 1(a)

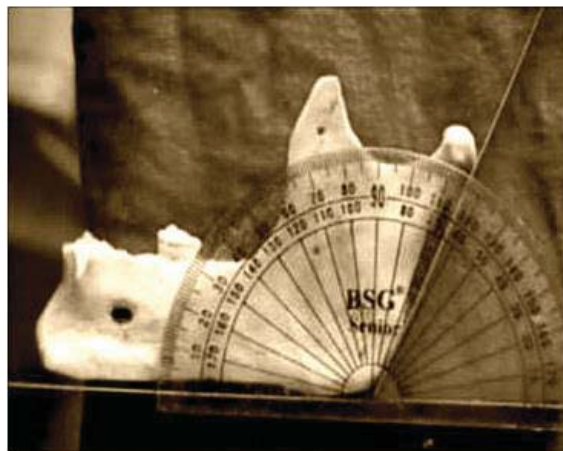


Fig 1(b)

Fig 1(a) and Fig 1(b): measuring angle of mandible in mandibular bone

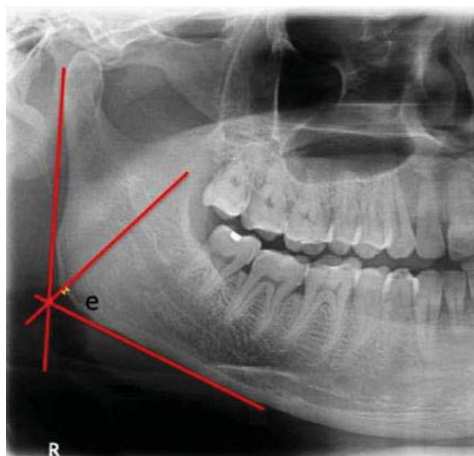
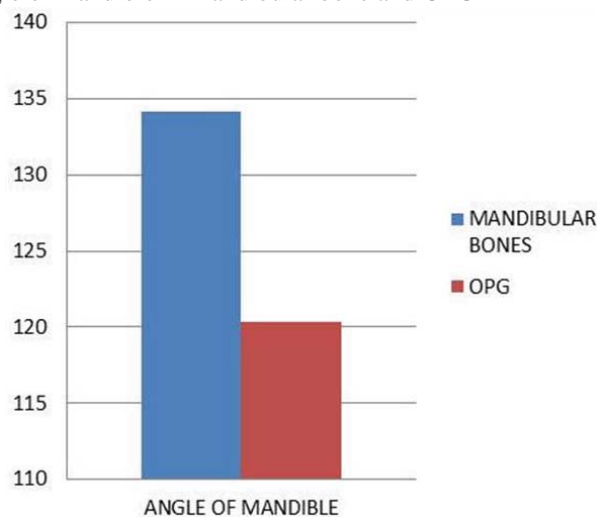


Fig 2 : measuring angle of mandible in OPG

RESULTS

The muscle functioning should preserve the bony structure of the gonial angle and symphyseal regions irrespective of the dental status and age, the gonial angle has been found to vary with the type of dentition and also with age.[4-6] The present study shows various values of gonial angle in OPG and mandibular bones. No significant difference was observed between these two. On comparison of gonial angle the mandibular bone showed slightly greater value than OPG.[graph.1] Mean angle of mandible in mandibular bone and OPG



Graph 1

DISCUSSION

Cross-sectional studies have promoted the concept that the gonial angle (GoA) could be used as an indicator of age and gender. However, such views hold little significance as increasing literature shows contrary and variable results. In our study, we came across the variability in the gonial angle. We could not find any significant difference between the OPGs and mandibular bones. Other studies showed increase in gonial angle with increasing age.[3] [7] However, the results of the present study were not statistically significant enough to be reliable and lead to any conclusive results. Difference in the gonial angle of the two sexes has been found in the previous studies, and the general trend was that the gonial angles in males are greater than those measured in females.[2] [10] Findings concerning gender differences may also be explained by the fact that, on average, men have greater masticatory force than women.[11] However, the present study did not focus on the correlation between genders with gonial angle it just compared the gonial angles in bones and OPGs. [14] 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.[8][9][16–18] The antegonial region will have resorption in the edentulous individuals, perhaps due to the reduced muscle function in this region in comparison with that of the gonial angle. Muscle function tends to preserve bone at its point of insertion; therefore, the structure of the gonial region will be maintained by the insertion of the medial pterygoid and masseter muscles.[12-15][19-22] When teeth are present, the muscular activity associated with mastication preserved the angle from any change in size. With loss of teeth, the bone undergoes remodeling and causes an increase in size occurs. There have been studies carried out on other factors that could affect the gonial angle, the postural and functional interrelationships of the cheek, lips and tongue in edentulous individuals can alter the gonial angle.[23] [24] Resorption of the bone at the posterior or inferior border of this region, the area of the masseter muscle insertion, leads to increasing obtuseness of the mandibular angle. The considerable transformative changes in gonial angle may be attributed to several factors, and it is known that the mandible does not follow one characteristic pattern throughout life. As most of the data available is based on cross-sectional studies, there is a need for a large longitudinal study to ascertain a definitive conclusion and the reliability of gonial angle as sole indicator of age, gender, and dentition status.

CONCLUSION

The mean value of the gonial angles were found to be slightly more in mandibular bones and were lesser in OPG. There seems to be difference in the gonial angle with different age groups but not significant. Both mandibular

bones and OPGs showed almost similar readings. Thus gonial angle serves as an adjuvant and additional forensic parameter which guides for age group assessment, subject to odontological status.

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