# MENTAL FORAMEN: AN INDICATOR FOR GENDER ETERMINATION -A PANAROMIC STUDY

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## Abstract: -

**Introduction: -** Gender Determination Is an Important Part of Forensic Practice, Archaeology, And Many Medico-Legal Matters. The Skull Shows Distinct Sexual Dimorphism and Plays a Significant Role in Gender Identification. When Antemortem and Post-Mortem Information Is Unavailable, Then Dental Profiling Gives a Viable Solution. The Mandible Is Frequently Used for Sex Determination Because Of Its Durability and Distinct Morphological Characteristics. The Mental Foramen Is a Stable Anatomical Landmark Visible on Panoramic Radiographs as A Radiolucent Area and Can Assist in Accurate Gender Assessment.

**Aim and Objective:** To Determine Gender Based on The Vertical Distance from The Most Inferior Point of the Mental Foramen to The Inferior Border of the Mandible (D1) And from The Most Superior Point of the Mental Foramen to The Inferior Border of the Mandible (D2).

**Methodology: -** A Retrospective Study Was Conducted Using Digital Panoramic Radiographs Of 90 Subjects (45 Males And 45 Females) Aged 20–49 Years, After Obtaining Ethical Clearance. Radiographs Were Collected from The Department of Oral Medicine and Radiology, Drs. Sudha & Nageswara Rao Siddhartha Institute of Medical Sciences. Measurements (D1 And D2) Were Made on The Right Side of The Mandible Using Sidex 2.5 Software.

**Observation and Results: -** D2 Values Were Significantly Higher Than D1 Values in Both Sexes, And Statistically Significant Differences Were Observed Between Males and Females for Both Parameters ($P < 0.001$).

**Conclusion: -** Mental Foramen Can Serve as A Reliable Adjunct in Gender Determination, Panoramic Radiography Be Considered as an Effective Method in Forensic Identification, particularly in Cases Involving Fragmented Jaws and Mass Disasters.

## Introduction: -

Dentistry's Contribution to Human Identification Takes Two Basic Forms: Identification of Human Remains Based on Ante Mortem Dental Records, And Postmortem Dental Profiling in Circumstances When There Are No Ante Mortem Data[17] . A Postmortem Dental Profiling Provides an Answer When the Antemortem and Postmortem Information Cannot Be Compared to Identify Similar Traits, the Antemortem Information Is Not Available, or the Condition of the Remains Prevents Identification. [17].

Determining Gender, Ethnicity, And Age Are Just a Few of the Many Radiological Procedures That Can Help with Both Specific and Broad Identifications. This is Especially Done When Bodies Are Severely Destroyed, like in The Case of Explosions, Mass Tragedies, And Air Hurricanes from Decomposing and Damaged Dead Bodies. It Mostly Relies on Fractured and Accessible Skeleton Components. When Just Incomplete Remains Are Available, Accurately Determining Gender Becomes Extremely Difficult. Since Each Community

Has Unique Skeletal Traits, Sex Determination Requires Osteometric Standards That Are Specific to That Population. [2, 3, 4].

The Skull, together with The Mandible, Is Second Only to The Pelvis in Significance for Age, Sex, And Race Identification. (6) In Situations Where an Intact Skull Is Missing, the Mandible can be Crucial for Determining a Person's Sex Because It Is Frequently Found Mostly Intact and Is Thought to be the Most Resilient Facial Bone in Terms of Both Shape Retention and Fire Resistance. [19] It Is Robust Due to The Presence of a Thick Covering of Compact Bone. Because of Their Consistent Relationship to The Base of the Jaw, Mental Foramina Have Been the Most Frequently Utilized Reference Point in Morphometric Investigations of This Bone. [12]

The Mental Foramen (MF), Out of All the Anatomical Landmarks, Is Essential to The Dentist When Organizing a Surgical or Endodontic Intervention in The Premolar Region in Order to Prevent Issues Like Discomfort, Paresthesia, Or Numbness Following the Procedure. [1] The Clinical Significance of Identifying the Anatomical Location of the Mental Foramen is to Prevent Damage to The Mental Nerve During the Administration of Local Anesthesia.

The Mental Foramen Is Usually Found Close to The Apices of the Mandibular Premolars and Is Situated Bilaterally on the Buccal Cortical Plates of the Jaw. Forensic Practice Can Take Advantage of the Wall of the Foramen, Which Is Composed of Cortical Bone. The Mental Foramen Is One of the Many Stable Landmarks on the Mandible That Can Be Used to Evaluate Anatomical Landmarks in Oral Pathology and Forensics. [5,7,8,9]

A Variety of Techniques Have Been Attempted to Accurately Ascertain the Location of the Mental Foramen before Various Surgical Procedures [10]. Since Radiography Is Widely Available, Less Invasive, And Frequently Utilized in Clinic Procedures, It Is Possible to Determine the Sex of a Skull. [10] Digital Panoramic Radiographs Have Been Proven to Be Reasonably Reliable in Several Studies Assessing Different Radiographic Techniques for Localizing the Mental Foramen **(Peker et al., 2009; Yosue & Brooks, 1989).** Aside from That, Another Reason Panoramic Radiography Is So Prevalent Is That It Can Provide the Image of Both Jaws on a Single Film at a Lower Cost Than More Complex Techniques, While Also Taking Less Time and Requiring a Relatively Low Radiation Dose. Information Regarding the Location of Horizontal and Vertical Bony Anatomic Structures Can Be Obtained Using This Approach.

A Panoramic Radiograph Is a Two-Dimensional Image That Is Magnified in Both the Vertical and Horizontal Dimensions but Lacks Information in The Bucco-Lingual Direction. However, The Interest in Figuring Out the Visibility of Anatomical Components on These Films Is Justified by The Fact That Panoramic Imaging Is Readily Available in Dental Offices and Is Frequently Used for Evaluating Jaws. [15]. In The Panoramic Radiographs, The Foramen Is Shown as A Radiolucent Area. When Portable Units are used, they Can Be Used in Forensic Medicine. The Extra Oral Examination of the Dental Condition Is Possible with This Less Time-Consuming Method. [16]

## Materials & Methods: -

### Source of The Data

The Study Comprised Patients Reporting to The Department of Oral Medicine and Radiology. Drs. Sudha & Nageswara Rao Siddhartha Institute of Dental Sciences, Chinoutpalli, Andhra Pradesh, For Routine Dental Problems.

The Study comprises 90 Mandibular OPG Images of Males and Females of an age group ranging from 20 to 50 Years.

### Type of Study

* This Is a Retrospective Study

### Inclusive Criteria: -

- A Total of 90 Subjects (45maleand45female), Divided into Three Age Groups Ranging Between 20 and 49 Years.
- The Age Groups Are as Follows: -
  1-20-29 Years
  2-30-39 Years
  3-40-49years
- Patients Above 18 Years of Age with No Oral Maxillofacial Surgical Interventions & High-Quality Radiographs with Correct Positioning Will Be Included.

**Exclusive Criteria: -**

- OPGs with Any Errors, Any Pathological Lesions, Fracture or Developmental Disturbances of the Mandible and Edentulous Mandibles Are Excluded from The Study.
- Radiographs With Artefacts Or Other Lesions Which Interfere With Mental Foramen On Radiographs, Patients Who Underwent Surgical Interventions On Mandible, Presence Of Any Pathology Or Congenital Abnormality, Patients Below 20 Years Of Age, Partially Or Completely Edentulous Subjects And Radiographs Where Mental Foramen Is Not Visible Were Excluded.

**Method of Collection of the Data**

The Sample Size Is Divided into 3 Groups in Each Gender: Group I (20-30 Years), Group II (31-40 Years), and Group III (41-50 Years)

- Each Group comprises 15 Subjects.
- Each Group Comprises 30 Subjects.

**Armamentarium Used**

Digital Orthopantomogram,

Sidex 2.5 Software

**Procedure:**

• The Different Linear Measurements of the Human Mandible Are Compared with Age and Gender by Using Parameters Such as Gonial Angle, Mandibular Canal, And Vertical Position of Mandibular & Mental Foramen.

• All Measurements Were Expressed in Millimeters (Mm).

• Four Measurements Were Made.

**Method Of Examination Using OPG** (Orthopantomogram)

**OPG Examination:**

The OPG Technique Was Performed in The Oral Medicine and Radiology Department of Drs. Sudha and Nageswara Rao Siddhartha Institute of Dental Sciences, Chinoutpalli, Gannavaram

Mandal, Vijayawada. All Panoramic Radiographs Were Recorded with an Orthopantomogram, operating at 66kvp, 8ma; 14 Sec Under Standard Exposure Factors as Recommended by Manufacturer. The Patient Is Placed in A Standing Position with The Head Within the Circulatory Gantry Housing the X-Ray Tube and The Detectors.

Accurate Positioning of the Head Is Facilitated by Using Two Light Beam Markers. The Vertical Positioning of the Light Must Be Aligned with The Midsagittal Line of the Patient, Which Helps to Keep the Patient's Head Centered with Respect to The Rotational Axis. The Lateral Positioning of the Light Is Centered at The Level of Condyles, Indicating the Optimized Centre of the Reconstruction Area. The X-Ray Tube Detector System Rotates 180° Around the Head of the Patient. The Scanning Time Is 14 Sec, and the Output Is Automatically Adjusted During the 180° Rotation. The Patient Is Advised to Stay Until the Rotation Is Completed. The Areas of Interest Are Mental Foramen. The OPG Software Automatically Generates a Series of Images. The Areas of Interest Can Be Seen in Various Sections, And Measurements Were Done with The Help of an Inbuilt Software Tool.

**Technique of Radiography**

**Procedure:**

➤ The Subject Has to Be Positioned Comfortably in The Dental Chair, And His/Her Oral Cavity Was Thoroughly Examined, With Particular Attention to Rule Out the Conditions Mentioned in The Exclusion Criteria.

➤ Subjects Were Asked to Remove the Jeweler and Other Artefact-Causing Objects Such as Nose Rings, Earrings, Chains, Eyeglasses, Etc.

➤ The Date of Radiographic Taking, Identification Number, And Gender Were Recorded.

➤ The Exposure Parameters Were Adjusted According to The Patient's Size.

➤ The Digital Images Captured Were Viewed on Vista Soft 3.0 Software, and Measurements Were Recorded.

➤ Images That Are Adequately Exposed with No Errors and High Image Clarity Were Chosen for The Study. Analysis Was Done Using Vista Soft 3.0 Software.

**Method for Measuring the Parameters:**

The OPG Images Were Analyzed in DICOM (Digital Image Communication in Medicine) Format and Transferred to A Separate Workstation. The Measurements Were Done in A Quiet Room with

Dimmed Light. The Images Obtained Were Viewed in a Dell Inspiration Laptop (I7 Processor, 8gb Ram) At A 1366x768 Resolution, And Measurements Were Done.

Position of The Mandible: From the Superior Border of the Mental Foramen to The Inferior Border of the Mandible & From the Inferior Border of the Mental Foramen to The Inferior Border of the Body of the Mandible.

**The Parameters Measured Are: -**

D1–Vertical Distance of the Most Inferior Point of the Image of the Inferior Edge of the Mental Foramen to The Image of the Inferior Limit of the Mandible Base at The Shortest Line Connecting the Alveolar Crest &The Inferior Limit of the Mandible Base. (Figure 3).

D2-Vertical Distance of the Most Superior Point of the Image of the Superior Edge of the Mental Foramen to The Image of the Inferior Limit of the Mandible Base at The Shortest Line Connecting the Alveolar Crest &The Inferior Limit of the Mandible Base, Passing Through the Centre of the Mental Foramen. (Figure 4).

**Figure 1:-Orthopantomography System**

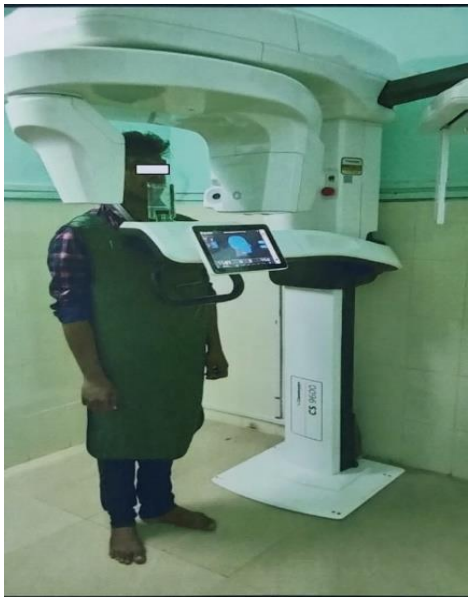


**Figure 2: - Showing Positioning of the Patient for Radiograph**

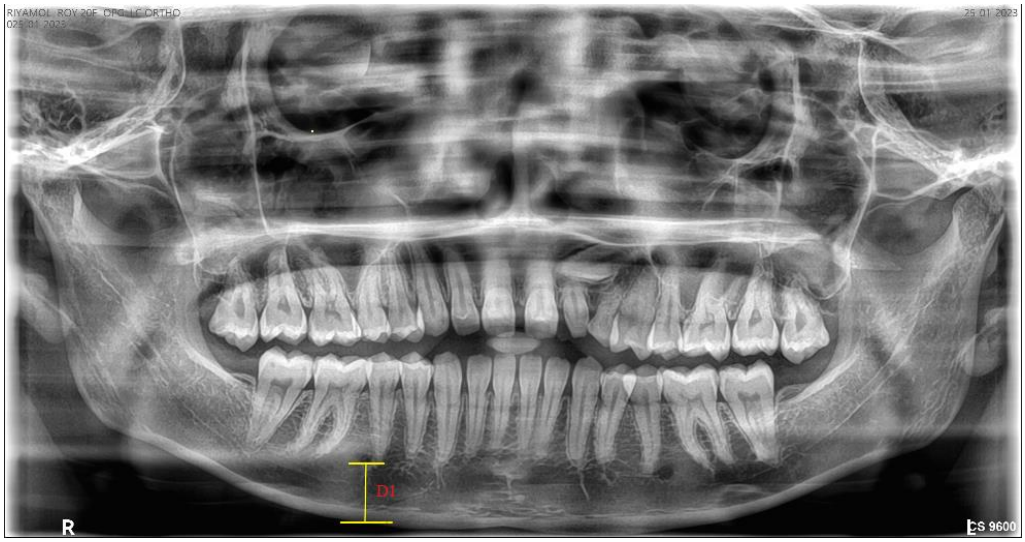



*Fig 3: - Distance from The Inferior Border of the Mental Foramen to The Inferior Border of the Mandible*

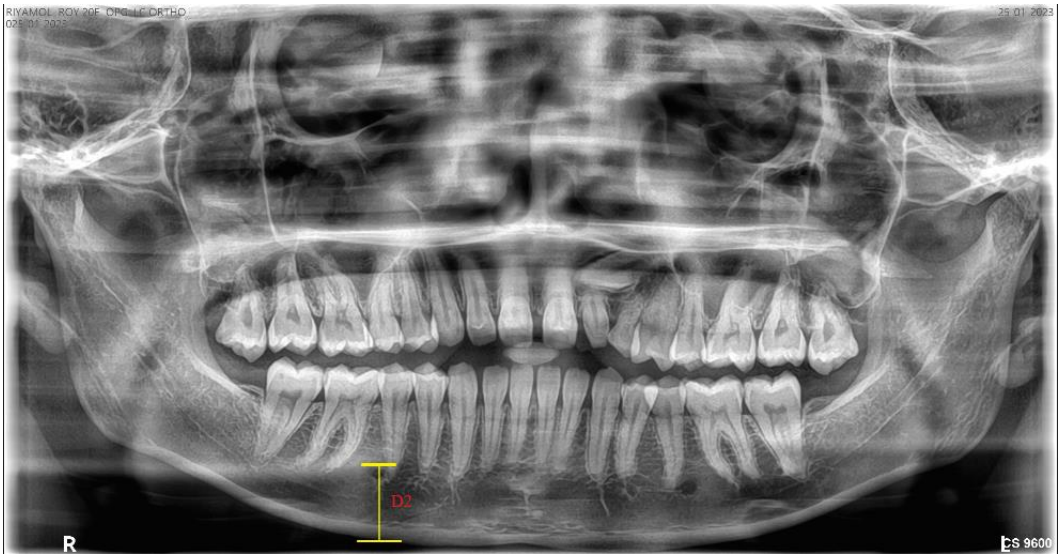



Fig 4: - Distance from The Superior Border of the Mental Foramen to The Inferior Border of the Mandible.

## Observation and Results: -

A Total of 90 Subjects (45 Males and 45 Females) Participated in The Study and Are Divided into 3 Groups Based on Their Age (I.E., 20-30 Yrs., 30-40 Yrs., 40-50 Yrs), And the Collected Data Is Entered into Microsoft Excel and Subjected to Statistical Analysis Using Spss Version 21.0. The

Data Is Checked for Normality Using the Shapiro–Wilk Test (P<0.304), and it shows the Data Is Normally Distributed. Descriptive Statistics and Inferential Statistics Such as the Paired T Test, were performed for Intra-Group Comparison and Intergroup Comparison Was Done with an independent T Test. The Level of Significance Was Set as P<0.05.

In the present study, the mean distance from The Superior Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D2, in The Age Group of 20-30 Years in The Males Shows 15.12±1.23, Whereas It Was 11.69±1.80 In Females, as shown in Table 1.

Also, The Mean Distance from The Inferior Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D1, in Male Was 12.38±1.01, whereas in The Female Was 9.41±1.44. As Shown in Table 1.

**Table 1: - Representing the Inter-Group Comparison Between D1 and D2 Among Males and Females in 20-30 Years.**

| Age Group | | Gender | Sample (N) | Mean | Std. Error Mean | 95% Confidence Interval | | P Value |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper | |
| 20-30years | D1 | Male | 15 | 12.38±1.01 | 0.26 | 2.03 | 3.90 | P<0.001** |
| | | Female | 15 | 9.41±1.44 | 0.37 | | | |
| | D2 | Male | 15 | 15.12±1.23 | 0.31 | 2.26 | 4.58 | P<0.001** |
| | | Female | 15 | 11.69±1.80 | 0.46 | | | |

**Independent T –Test, Statistical Significance Set as P<0.05***

**From Table 1, It Is Seen That D1 and D2 Values Are Higher in males than in females in the Females in The Age Group of 20-30 Years with A Highest Statistical Significance as P<0.001****

In the age group of 30-40-Years the Mean Distance from The Superior Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D2, in The Males Show 14.99±1.23, Whereas It Was 12.68±1.12 In Females, as shown in Table 2.

Also, The Mean Distance from The Inferior Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D1, in Male Show 11.78±1.30, whereas in Females It Was 10.06±0.87. As shown in Table 2.

**Table 2: - Representing the Inter-Group Comparison Between D1 and D2 Among Males and Females in 30-40 Years.**

| Age Group | | Gender | Sample (N) | Mean | Std. Error Mean | 95% Confidence Interval | | P Value |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper | |
| 30-40years | D1 | Male | 15 | 11.78±1.30 | 0.33 | 0.88 | 2.553 | P<0.001** |
| | | Female | 15 | 10.06±0.87 | 0.22 | | | |
| | D2 | Male | 15 | 14.99±1.23 | 0.31 | 1.42 | 3.19 | P<0.001** |
| | | Female | 15 | 12.68±1.12 | 0.29 | | | |

**Independent T –Test, Statistical Significance Set as P<0.05***

**From Table 2, It Is Seen That D1 and D2 Values Are Higher in males than in females in the Females in The Age Group of 30-40 Years with A Highest Statistical Significance as P<0.001****

In The Age Group of 40-50 Years the Mean Distance from The Superior Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D2, in The Males Show 14.79±1.68 Whereas in Females It Was 11.92±1. 23 As Shown in Table 3. Also, The Mean Distance from The Inferior

Border of the Mental Foramen to The Inferior Border of the Mandible I.E. D1, in Male Shows 12.32±1.57, Whereas It Is 9.59±1.40 In Females, as Shown in Table 3.

**Table 3: - Representing the Inter-Group Comparison Between D1 and D2 Among Males and Females in 40-50 Years.**

| Age Group | | Gender | Sample (N) | Mean | Std. Error Mean | 95% Confidence Interval | | P Value |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper | |
| 40-50years | D1 | Male | 15 | 12.32±1.57 | 0.40 | 1.60 | 3.84 | P<0.001** |
| | | Female | 15 | 9.59±1.40 | 0.36 | | | |
| | D2 | Male | 15 | 14.79±1.68 | 0.43 | 1.76 | 3.98 | P<0.001** |
| | | Female | 15 | 11.92±1.23 | 0.31 | | | |

**Independent T –Test, Statistical Significance Set as P<0.05***

**From Table 3, It Is Seen That D1 and D2 Values Are Higher in males than in females in the Females in The Age Group of 40-50 Years with A Highest Statistical Significance as P<0.001****

**Table 4: - Representing the Intra-Group Comparison Among Males and Females.**

| Age Group | Gender | | Sample (N) | Mean | Std. Error Mean | 95% Confidence Interval | | P Value |
|---|---|---|---|---|---|---|---|---|
| | | | | | | Lower | Upper | |
| 20-30years | Male | D1 | 15 | 12.38±1.01 | 0.26 | -3.266 | -2.213 | P<0.001** |
| | | D2 | 15 | 15.12±1.23 | 0.31 | | | |
| | Female | D1 | 15 | 9.41±1.44 | 0.37 | -2.812 | -1.747 | P<0.001** |
| | | D2 | 15 | 11.69±1.80 | 0.46 | | | |
| 30-40years | Male | D1 | 15 | 11.78±1.30 | 0.33 | -3.68 | -2.73 | P<0.001** |
| | | D2 | 15 | 14.99±1.23 | 0.31 | | | |
| | Female | D1 | 15 | 10.06±0.87 | 0.22 | -3.08 | -2.15 | P<0.001** |
| | | D2 | 15 | 12.68±1.12 | 0.29 | | | |
| 40-50 Years | Male | D1 | 15 | 12.32±1.57 | 0.40 | -2.97 | -1.96 | P<0.001** |
| | | D2 | 15 | 14.79±1.68 | 0.43 | | | |
| | Female | D1 | 15 | 9.59±1.40 | 0.36 | -2.99 | -1.65 | P<0.001** |
| | | D2 | 15 | 11.92±1.23 | 0.31 | | | |

**Paired T –Test, Statistical Significance Set as P<0.05***

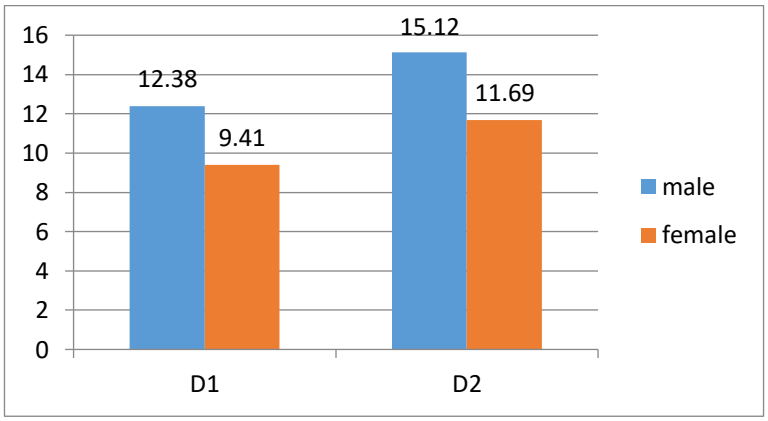
**From Table 4, It Is Observed That Both Males and Females Have Higher D2 than D1 with A Higher Statistical Significance of P<0.001***.**

But as When Comparison of D1 Between the Males and Females Show High Significant Difference of P <0.001, As Seen in Table 1,2,3,4.

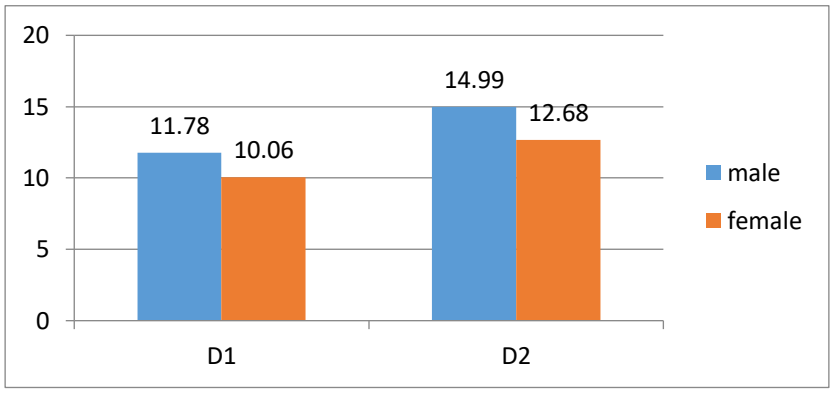
The Comparison of D2 Between the Males and Females Show High Significant Difference of P<0.001, As Seen in Table 1,2,3,4.

**The Following Are the Bar Diagrams Representing the Significant Difference B/W The D1 & D2 Values in males and Females: -**

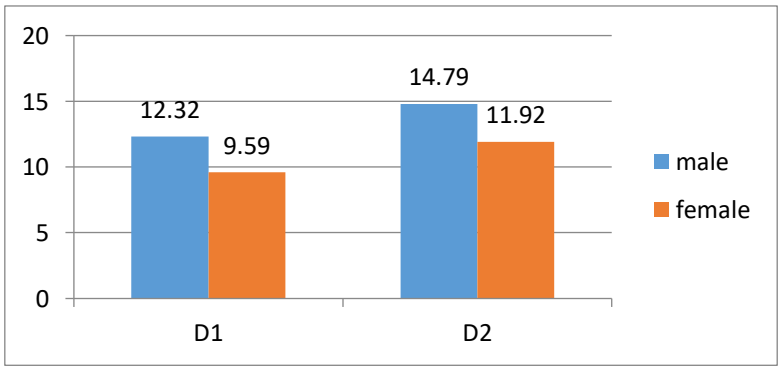
**Bar Diagram 1: - Representing the Mean D1 and D2 Values of Males and Females in the 20-30 Years Age Group.**




**Bar Diagram 2: - Representing the Mean D1 and D2 Values of Males and Females in the 30-40 Years Age Group.**




**Bar Diagram 3: - Representing the Mean D1 and D2 Values of Males and Females in the 40-50 Years Age Group.**



## Discussion: -

In Forensic Medical and Anthropological Contexts—Such as Those Involving Explosions, Conflict, And Missing Person Identification—Sex Determination Is an Essential Component. It's Also Crucial for Reconstructing Ancient Lives. The Three Main Facets of Biological Identity—Which Are Sometimes Referred to as the "Big Four" In Forensic Settings—Are Sex, Age, Height, And Ethnicity. [18] Identification of human remains relies on the comparison of ante-mortem records with post-mortem findings and forms the basis of investigations in crimes, natural disasters, and conflict-related fatalities. [59]. It Serves as The Foundation for The Investigation of Crimes, Natural Disasters, Or Atrocities Committed During Conflict, In Addition to Being a Requirement for Those Who Are Formally Pronounced Dead [60, 61].

Forensic Anthropology Assists in The Identification of Human Remains Through Both Qualitative and Quantitative Analysis, As Well as the Understanding of the Various Traits That Differ Among Individuals. These Attributes Comprise the Estimation of Height, Sex, Ethnicity, Age, Distinctive Features, And Biotype. [50,60]

Among skeletal elements, the pelvis and skull exhibit the greatest sexual dimorphism. When the complete skull is unavailable, the mandible serves as a reliable alternative due to its strength and resistance to postmortem damage. Its anatomical features remain relatively stable over time, making it useful for sex determination. [2, 3, 4, 6, 12]. The Current Study Evaluated the Mental Foramen's Location in Relation to The Mandible's Inferior Border Vertically. Its Inferior Border Has A 75% Probability of Being Used for Gender Determination, While Its Superior Border Has A 78% Probability, According to The Univariate Analysis. This Measure Was Less Sensitive but Had a High Level of Specificity. Otherwise, It Was Superior at Identifying Females Than Males.

The Stability of the Mandibular Lower Border Is Independent of the Alveolar Process Resorption Above the Mental Foramen. The Vertical Measures in Panoramic Radiography Are Therefore Useful in Therapeutic Settings. Due to The Stability of the Mental Foramen and Basal Bone, These Landmarks Serve as A Point of Reference for Our Research and Are Consistent with Studies Carried Out by Lindh Et Al. In 1995 And Guler Et Al. In 2005. [45]

**Linear Measurements Related to Mental Foramen:**

The mental foramen (MF) is a stable anatomical landmark located near the apices of the mandibular premolars and bordered by cortical bone. Studies have shown that the vertical distance between the MF and the inferior border of the mandible remains relatively constant, making it suitable for forensic analysis. the Studies Conducted by The Following Authors Conformed That the Distance Between Mental Foramen and The Inferior Border of the Mandible Remain Constant, and thus, making the Mental Foramen a Stable Landmark. [45,46,47,48,49,50,51,52] Hence, This Study Includes Two Factors I.E., The Distance Between, the Superior Border of the Mental Foramen to The Inferior Border of the Mandible and Inferior Border of the Mental Foramen to The Inferior Border of the Mandible. And Their Variation with Age.

For locating the Mental Foramen, Panoramic radiography (orthopantomogram) is preferred over periapical radiography due to its wider field of view, bilateral visualization, lower radiation dose, and reduced cost. It enables accurate two-dimensional localization of the mental foramen and assessment of vertical and horizontal bony dimensions. The radiographic appearance of the mental foramen is classified into four types; the distinctly separated type was selected for this study due to its clear visibility. [55]. In Forensic Medicine, Portable Panoramic Digital Radiography Systems Might Be Useful as They Provide Quick Assessments of the Extra Oral Structures and Dental Health [2, 3]. For This Reason, While Studying the Position of the Mental Foramen in Such Circumstances, We Find That Panoramic Radiographs Are Far More Useful and Convenient [19, 27].

According to The Authors, Yosue and Brooks, the Radiographic Appearance of Mental Foramen Can Be Classified into Four Types. [45]

- Type I: Mental Canal Is Continuous with The Mandibular Canal.
- Type II: Foramen Is Distinctly Separated from The Mandibular Canal.
- Type III: Diffuse with A Distinct Border of the Foramen.
- Type Iv: Unidentified Type, In Which the Mph Cannot be identified on Panoramic Radiographs Under Ordinary Exposure and Viewing Conditions.

Out of The Four Types Which Are Classified by Authors, Yosue, And Brooks, the Separate Type is Easy to Identify on Panoramic Radiograph, and So, Only This Type Was Selected for The Present Study.

They Confirmed That Males Grow at A Faster Rate and in A More Mature Manner Than Women Do, resulting in 5–9% Larger Craniofacial Dimensions in This Gender. Several Factors Can Regulate Bone Formation During the Adult Stage. The Development of Craniofacial Morphologic Variations Between the Genders Can Be Attributed to The Influence of Sex Hormones, Such as Progesterone and Estrogen, On the Rate of Bone Growth During This Phase.

Results showed that males had significantly greater mean D1 and D2 values than females across all age groups. In the 20–30-year group, mean D1 values were 12.38 ± 1.01 mm in males and 9.41 ± 1.44 mm in females, while mean D2 values were 15.12 ± 1.23 mm and 11.69 ± 1.80 mm, respectively. Statistically significant differences were observed between sexes for both parameters ($p < 0.001$). These findings confirm that vertical distances from the mental foramen to the mandibular inferior border are reliable indicators for gender determination.

The Study's Findings Indicate D2 Values Were Significantly Higher Than D1 Values in Both Sexes, And Statistically Significant Differences Were Observed Between Males and Females for Both Parameters ($P < 0.001$).

## CONCLUSION:

There is a Significant Difference in The Distance from The Mental Foramen to The Lower Border of The Mandible in Males and Females; The Technique Can Be Used as A Reliable Land Mark for the determination of Gender. Panoramic Radiography Is Efficient for Making the Proposed Measurements and Can Be Considered as An Additional Radiographic Method to Determine the Gender from Skeletal Remains, and This Technique Plays an Important Role Particularly in Mass Disasters, in Which the Jaws Are Available in Fragments.

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