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Original Research Article

Analysis of facial asymmetry in various facial forms

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Abstract

Introduction: Facial symmetry refers to the balanced size, shape, and position of facial components, though perfect symmetry rarely exists. Minor asymmetries, often with the left side larger than the right, are common and may result from developmental, functional, traumatic, or pathological factors.

Aim: Analysis and evaluation of facial asymmetry in different facial forms.

Materials and Methods: Seventy-five subjects aged 15–35 years from the Department of Orthodontics, Mithila Minority Dental College, were categorized into Euryprosopic, Mesoprosopic, and Leptoprosopic groups.The photographs were cropped by using Adobe photoshop and analysis was done by Digimizer software. The photographs were analysed for 5 horizontal and 3 midline parameters. ANOVA test was performed to analyse the significant difference (at $P \leq 0.05$).

Results: Significant differences were found in both vertical and horizontal facial parameters among the three facial types, with Leptoprosopic individuals showing the highest values. However, no significant asymmetry was observed between the right and left sides in any group.

Conclusion: Distinct vertical and horizontal facial proportions were observed across facial types, especially in Leptoprosopic individuals. Despite these variations, facial symmetry was maintained across all groups, supporting its relevance in orthodontics and facial reconstruction.

Keywords: Facial asymmetry, Digimizer software, Adobe photoshop

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1. Introduction

Facial symmetry refers to the balanced alignment of facial features in terms of size, shape, and position, while asymmetry denotes noticeable differences between the two sides of the face.[1] Perfect symmetry is rare due to biological and environmental influences, and minor asymmetries are often perceived as natural rather than unattractive. Facial asymmetries can arise from developmental, functional, pathological, traumatic, or hereditary factors, and are typically more pronounced in the lower face.[2] Patients frequently report concerns about uneven facial proportions, differences in fullness, and asymmetry in the size or shape of facial elements. These perceptions are often influenced by self-observation in mirrors or digital images.[3] Additionally, craniofacial morphology—categorized as dolichocephalic, brachycephalic, or mesocephalic—plays a role in how asymmetry is perceived. Although facial asymmetry can be classified as dental, skeletal, muscular, or functional, clear distinctions between normal and pathological cases are often lacking, making diagnosis somewhat subjective.[4] Facial esthetics are significantly influenced by symmetry and the type of facial profile. Features such as an elongated face or steep mandibular plane tend to be perceived as less attractive. While mild asymmetry is frequently observed in the general population, it can affect psychological well-being and social interaction. Conventional diagnostic tools like radiographs and cephalometric analysis, though accurate, are expensive, invasive, and not always feasible for large-scale or routine assessments.[5] Previous research has predominantly focused on general asymmetry using radiographic tools, with limited emphasis on differences across specific facial types such as Euryprosopic, Mesoprosopic, and Leptoprosopic.[5] This presents a gap in the literature regarding how facial form influences patterns of asymmetry. To bridge this gap, the present study employs a cost-effective, non-invasive

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method using standardized digital photographs, analyzed via Adobe Photoshop and Digimizer software. The novelty of this research lies in its comparative approach: assessing both vertical and horizontal symmetry across different facial types, and analyzing facial thirds (upper, middle, and lower regions) to provide a more comprehensive understanding of morphological variations.[6]

2. Materials and Method

This cross-sectional observational study was conducted in the Department of Orthodontics and Dentofacial Orthopaedics, Mithila Minority Dental College and Hospital, Darbhanga, Bihar. The study duration spanned from December 2022 to December 2024. Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was collected from all participants and their guardians prior to inclusion. A total of 75 subjects **(Table 1)**, aged between 15 to 35 years, were randomly selected from patients attending the Outpatient Department of Orthodontics and Oral Medicine. The age group was chosen to ensure the inclusion of individuals who had completed pubertal growth, thereby minimizing variability due to developmental changes in facial proportions.[7] Subjects were equally distributed into three facial type categories: Euryprosopic, Mesoprosopic, and Leptoprosopic, with 25 individuals in each group.

2.1 Sample size derivation

Level of significance (α error) = 5%, Power = 80%, Type of test = two-sided

Formula of calculating sample size is

$$n = \frac{Z^2 P(1-P)}{d^2}$$

Table 1: Sample size derivation for study population (n = 75)

p	Estimated population P=20% prevalence of perceived facial asymmetry.	0.25
1-α	Confidence level	0.95
Z	Z value associated with confidence	1.96
d	Absolute precision	0.1
n	Minimum sample size	73

2.2. Method of data analysis

Statistical analysis will be performed using Statistical Product and Service Solution (SPSS) version 21 for Windows (SPSSInc, Chicago, IL).

1. Descriptive quantitative data will be expressed in mean and standard deviation respectively.
2. Descriptive qualitative data will be expressed in percentage/proportion.
3. Confidence interval is set at 95% and probability of alpha error (level of significance) set at 5%. Power of the study set at 80%.
4. Comparison of mean measurements of facial asymmetry between different facial patterns was done using One way Anova F test.
5. Comparison of frequency and percentage of facial asymmetry between different facial patterns was done using Chi square test.

2.3. Inclusion criteria

1. Age between 15 to 35 years
2. Individuals exhibiting general frontal facial symmetry
3. Relaxed lip posture during photography
4. Systemically healthy individuals
5. Provided informed consent

2.4. Exclusion criteria

1. Clinically visible gross facial asymmetry
2. History of orthodontic treatment or orofacial surgery
3. Presence of systemic diseases or congenital anomalies

2.5. Materials and equipment used

1. **Frontal facial photographs** captured using Canon EOS 1500D DSLR camera
2. **Laptop** with Windows OS and Microsoft Office 2021
3. **Adobe Photoshop CS** for cropping and standardizing images
4. **Digimizer Software** for landmark-based measurement and facial asymmetry analysis

2.6. Facial form classification criteria

Facial forms—Leptoprosopic, Mesoprosopic, and Euryprosopic—were classified based on the Facial Index (FI), which is a widely accepted anthropometric measurement calculated using the formula:

Facial Index = (Facial height / Facial width) × 100

Facial height was measured from nasion (N') to menton (Me), and facial width was recorded as the bizygomatic width, i.e., the distance between the two zygions (Zy–Zy). According to martin and sellar[5,11,29], facial types were defined as follows:

1. **Leptoprosopic (long/narrow face):** FI > 88.0
2. **Mesoprosopic (average face):** FI = 84.0–87.9
3. **Euryprosopic (broad/short face):** FI < 83.9

Each subject's facial index was calculated using linear measurements derived from standardized frontal photographs analyzed with Digimizer software. Subjects were then grouped into their respective facial form categories based on the calculated FI. **Equal distribution was ensured by selecting 25 subjects in each group**, allowing for balanced comparison across facial types.

2.7. Photographic standardization protocol

All frontal facial photographs were taken under standardized conditions to ensure consistency and accuracy. Subjects were

seated upright with their heads oriented in a Natural Head Position (NHP), confirmed by aligning both the Frankfort Horizontal Plane (a line from the tragus to infraorbital rim) and the Interpupillary Line parallel to the floor. A Canon EOS 1500D DSLR camera mounted on a tripod was positioned at eye level, at a fixed distance of 1.5 meters from the subject, perpendicular to the facial midline. The camera settings, including focal length and ISO, were maintained uniformly across all captures.

Photographs were taken against a plain, neutral-colored background in a well-lit room with diffused natural lighting to avoid shadows and reflections on the face. Subjects were instructed to maintain a neutral facial expression, with lips gently closed and facial muscles relaxed. Hair and accessories that could obstruct facial landmarks were removed. The same operator captured all photographs to minimize operator-dependent variability. These standardized images ensured reliable identification of anatomical landmarks and accurate measurement of facial proportions using Digimizer software.

2.7. Methodology

1. Digital frontal photographs were taken with the subject's head aligned such that the Frankfort Horizontal Plane and Interpupillary Line were parallel to the floor.
2. Photographs were cropped using Adobe Photoshop CS.
3. Cropped images were analyzed using Digimizer Software for evaluating facial asymmetry.
4. Measurements were taken based on five horizontal and three midline parameters using identified landmarks.

2.8. Anatomical landmarks **(Figure 1)**

1. **Craniofacial points:** Nasion (N'), Menton (Me), Pronasale (Prn), Gonion (Gor/Gol)
2. **Ocular points:** Pupils (P), Endocanthus (Enr/Enl), Exocanthus (Exr/Exl)
3. **Nasal points:** Ala of the Nose (Alr/All)
4. **Oral points:** Labiale Superius (Ls), Chelion (Chr/Chl)

2.9. Reference planes **(Figure 4)**

1. Interpupillary Line (PP')
2. Mid Facial Plane (Mfp)

2.10. Parameters measured

2.10.1. Horizontal parameters (distances from mid facial plane) **(Figure 2)**

1. Mfp–Enr
2. Mfp–Enl
3. Mfp–Exr
4. Mfp–Exl
5. Mfp–Alr
6. Mfp–All
7. Mfp–Chr
8. Mfp–Chl
9. Mfp–Gor
10. Mfp–Gol

2.10.2. Midline parameters **(Figure 3)**

1. Mfp–Prn
2. Mfp–Ls
3. Mfp–Me

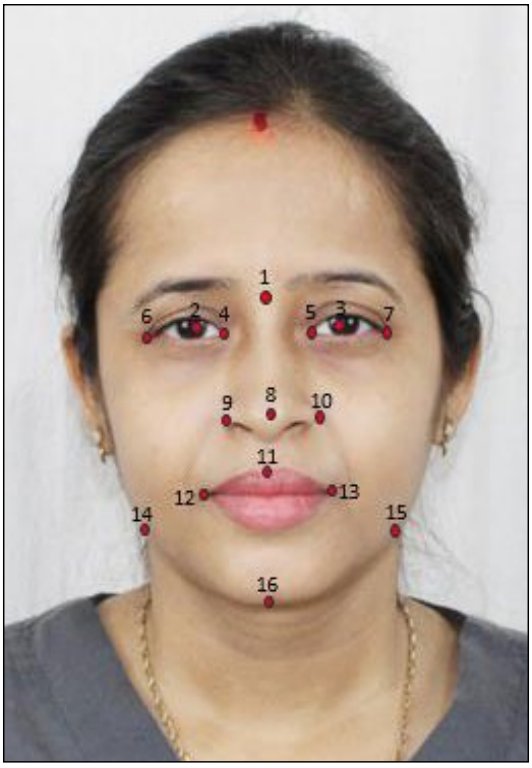


Figure 1: Landmarks on frontal facial photographs (1. Nasion 2. Right pupil 3. Left pupil 4. Right endocanthus 5. Left endocanthus 6. Right exocanthus 7. Left exocanthus 8. Pronasale 9. Right ala of the nose 10. left ala of the nose 11. Labiale superious 12. Right chelion 13. Left chelion 14. Right gonion 15. Left gonion 16. Menton)

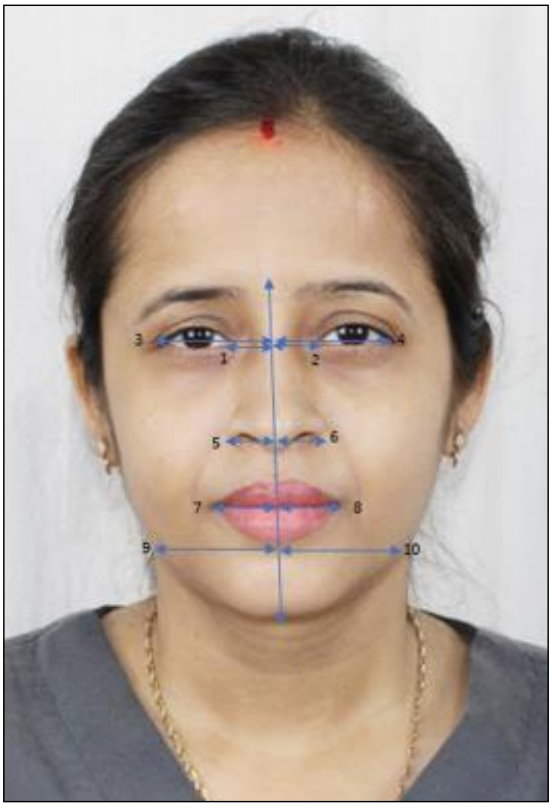


Figure 2: Horizontal parameter (1. Mfp-Enr 2. Mfp-Enl 3. Mfp-Exr 4. Mfp- Exl 5. Mfp-Alr 6. Mfp- All 7. MfpChr 8. Mfp- Chl 9. Mfp- Gor 10. Mfp-Gol)

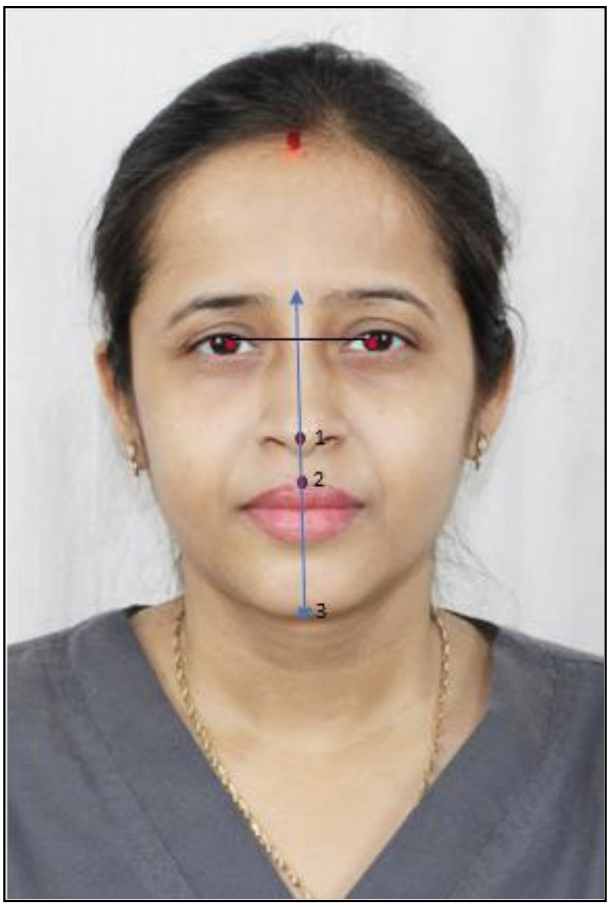


Figure 3: Midline Parameters **(**Mfp-.Prn, 2. Mfp-Ls, 3. Mfp- Me')

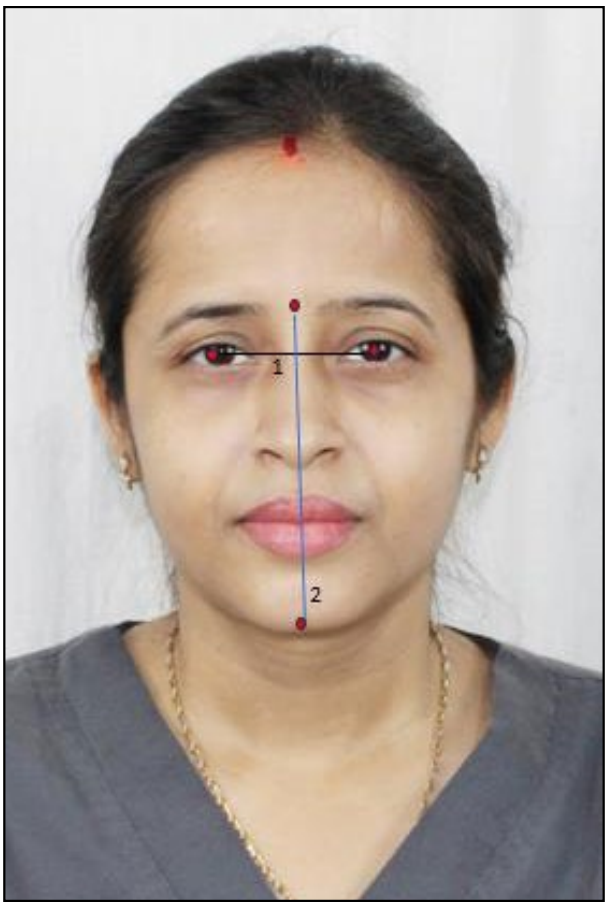
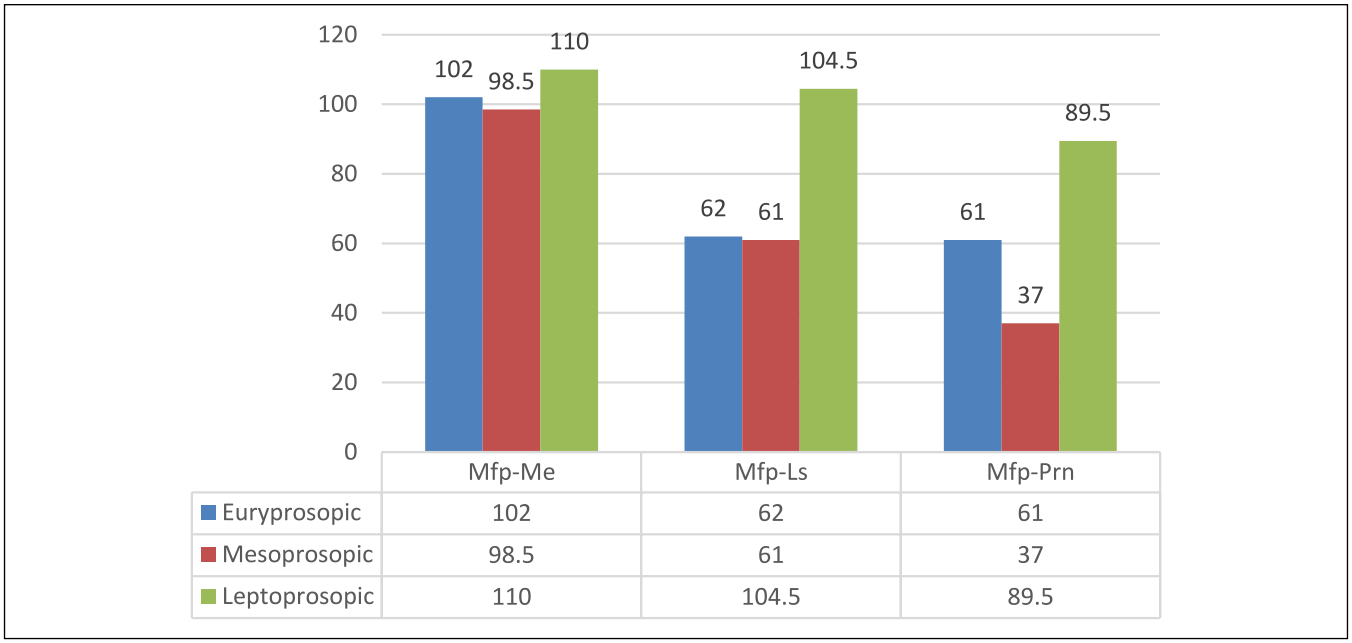


Figure 4: Refrence plane (1. Interpupillary line, 2. Mid facial plane.)

3. Result

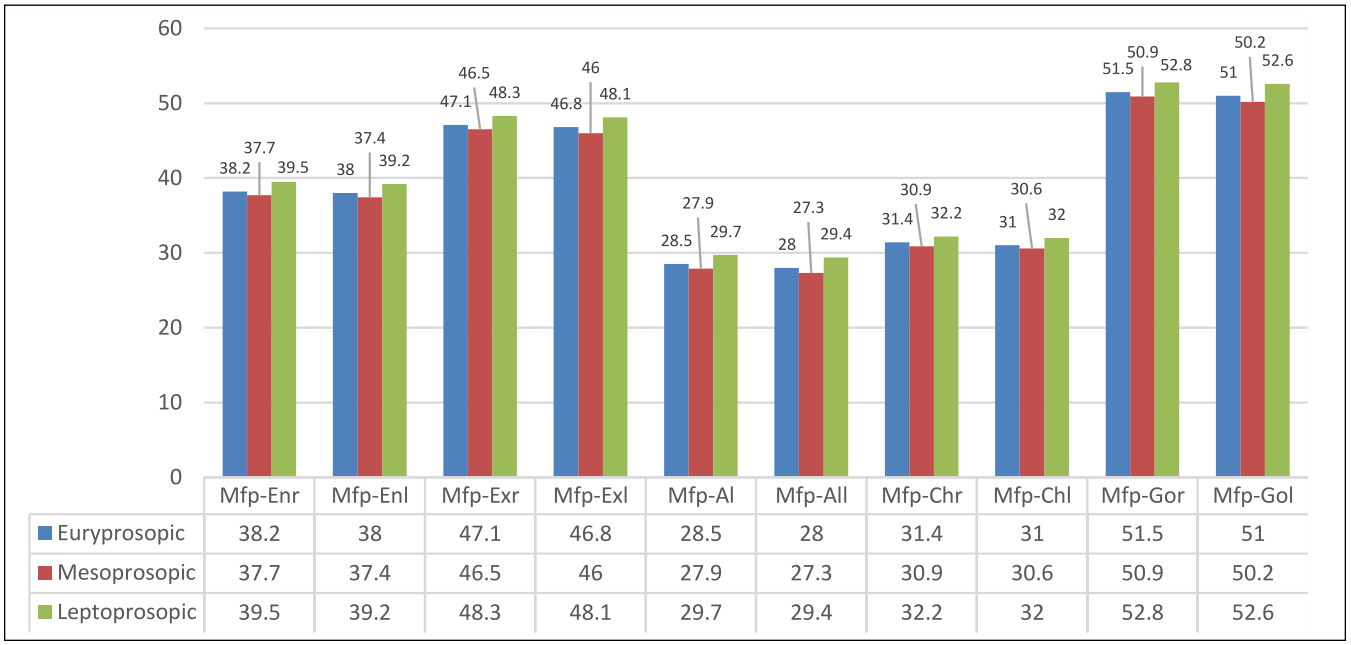
Table 2: Comparitive analysis of vertical and horizontal facial parameters among facial types

Parameter	Facial type comparison	Significance	Direction of difference
Vertical Parameters			
Mfp-Me (Midface)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Highest in Leptoprosopic
Mfp-Ls (Lower Face)	Leptoprosopic >> Euryprosopic ≈ Mesoprosopic	Significant	Leptoprosopic dominant
Mfp-Prn (Nose)	Leptoprosopic >> Euryprosopic > Mesoprosopic	Significant	Highest in Leptoprosopic
Horizontal Parameters			
Mfp-Enr / Enl (Nasal)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Leptoprosopic widest nasal base
Mfp-Exr / Exl (Cheek)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Higher cheek projection in Leptoprosopic
Mfp-Al / All (Alveolar & Total)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Greater total width in Leptoprosopic
Mfp-Chr / Chl (Chin)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Most pronounced chin in Leptoprosopic
Mfp-Gor / Gol (Jaw)	Leptoprosopic > Euryprosopic > Mesoprosopic	Significant	Stronger jawline in Leptoprosopic
Side Symmetry (R vs. L)	All Parameters	Non-Significant	Facial symmetry maintained across all types
Statistical Methods Used	One-Way ANOVA, Tukey HSD Post Hoc, Independent t-test, Shapiro-Wilk, Levene's Test	$p < 0.05$ considered significant	



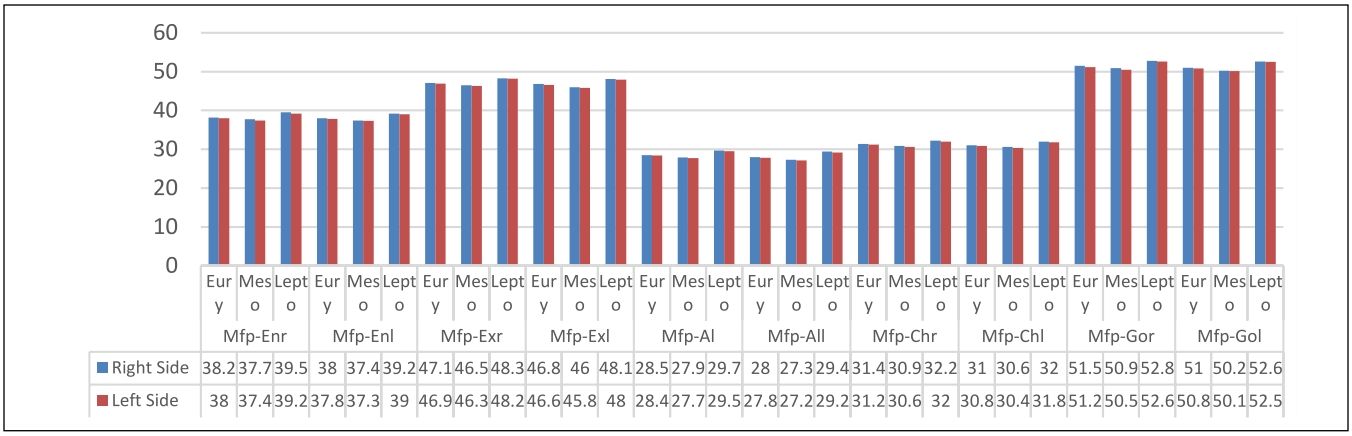
	Mfp-Me	Mfp-Ls	Mfp-Prn
Euryprosopic	102	62	61
Mesoprosopic	98.5	61	37
Leptoprosopic	110	104.5	89.5

Figure 5: Mean vertical facial parameter differences



	Mfp-Enr	Mfp-Enl	Mfp-Exr	Mfp-Exl	Mfp-Al	Mfp-All	Mfp-Chr	Mfp-Chl	Mfp-Gor	Mfp-Gol
Euryprosopic	38.2	38	47.1	46.8	28.5	28	31.4	31	51.5	51
Mesoprosopic	37.7	37.4	46.5	46	27.9	27.3	30.9	30.6	50.9	50.2
Leptoprosopic	39.5	39.2	48.3	48.1	29.7	29.4	32.2	32	52.8	52.6

Figure 6: Mean horizontal facial parameter differences



	Mfp-Enr			Mfp-Enl			Mfp-Exr			Mfp-Exl			Mfp-Al			Mfp-All			Mfp-Chr			Mfp-Chl			Mfp-Gor			Mfp-Gol		
	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto	Eury	Meso	Lepto
Right Side	38.2	37.7	39.5	38	37.4	39.2	47.1	46.5	48.3	46.8	46	48.1	28.5	27.9	29.7	28	27.3	29.4	31.4	30.9	32.2	31	30.6	32	51.5	50.9	52.8	51	50.2	52.6
Left Side	38	37.4	39.2	37.8	37.3	39	46.9	46.3	48.2	46.6	45.8	48	28.4	27.7	29.5	27.8	27.2	29.2	31.2	30.6	32	30.8	30.4	31.8	51.2	50.5	52.6	50.8	50.1	52.5

Figure 7: Right-left side comparis0n for horizontal and vertical parameters in all facial types

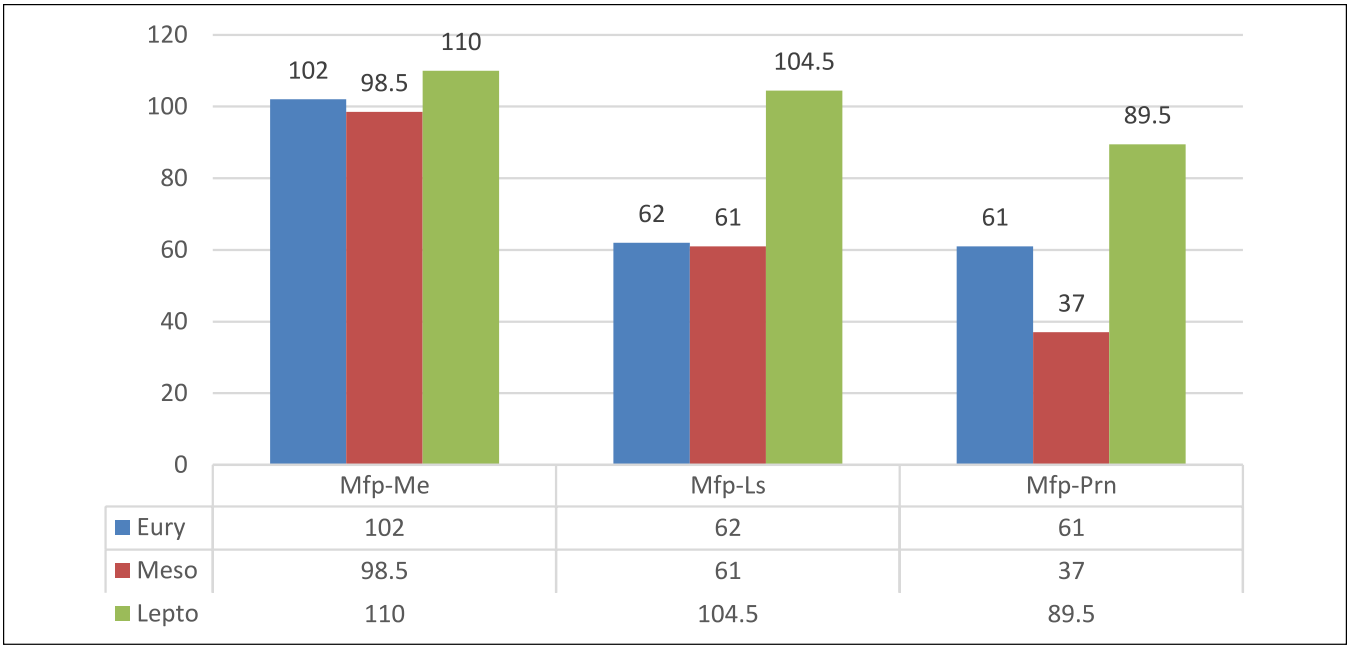


Figure 8: Overall facial symmetry index comparison among different facial forms

4. Discussion

"Beauty is truth,that is all
Ye know on earth, and all ye need to know."

—John Keats, *Ode on a Grecian Urn*

Facial asymmetry is a well-documented anatomical phenomenon and is often considered a normal variation in human morphology. The present study aimed to evaluate the presence and degree of facial asymmetry in individuals with different facial types—Leptoprosopic, Mesoprosopic, and Euryprosopic—through standardized photographic analysis using Digimizer software. The methodology employed in this study offers a practical and cost-effective alternative to traditional radiographic techniques for soft tissue evaluation.

The study results showed that Leptoprosopic subjects consistently exhibited higher vertical and horizontal measurements, particularly in the parameters involving midface (Mfp–Me), upper lip (Mfp–Ls), and nasal region (Mfp–Prn). **(Table 2)** These findings suggest that individuals with a longer and narrower facial form naturally possess larger linear facial dimensions. This does not necessarily indicate pathological asymmetry but reflects inherent morphological characteristics. These observations are consistent with earlier anthropometric studies[8], who reported that facial proportions vary significantly with facial form and should not be universally interpreted as asymmetrical across different populations.[8]

In contrast, Mesoprosopic individuals showed the lowest values in most parameters, which aligns with their classification as having an average, more balanced facial structure. This intermediate group likely represents a more symmetrical craniofacial phenotype, as also supported by studies like Rajpara et al. and Peck et al., which noted that mesoprosopic faces are often perceived as more esthetically harmonious.[9,10]

A notable finding of the present study was that there were no statistically significant differences between the right and left sides for both horizontal and vertical measurements within each facial type. This suggests that, despite dimensional differences among facial types, bilateral symmetry was generally preserved across all groups. These results are in line with the findings of Ferrario et al. and Ercan et al.[11], who concluded that minor facial asymmetries are commonly present but fall within acceptable esthetic and functional limits.[7,12]

Although several studies, such as those by Haraguchi et al. and Shah and Joshi, have reported a tendency for the left side of the face to be slightly larger or more prominent,[13,14] our study did not find a significant left-right dominance. This may be due to sample size, ethnic variation, or measurement technique. Moreover, functional factors like chewing side preference or sleeping posture can influence minor asymmetry, as suggested by Shaner et al. and **Ferrario et al.**[15,16]

The study also supports the idea that facial asymmetry is more commonly expressed in the lower third of the face, especially around the gonion, menton, and oral commissures. These findings are comparable to those of Song et al., who noted greater asymmetry in the mandibular region due to functional laterality and jaw deviations.[17]

From a clinical standpoint, these results underscore the importance of interpreting facial asymmetry relative to facial form. A chin projection or nasal deviation in a Leptoprosopic individual may be within normal limits for that facial type but could be interpreted as disproportionate in a Mesoprosopic individual. Therefore, clinicians must be cautious in labeling natural morphological variations as pathological.

The digital photographic protocol used in this study—consisting of standard head positioning, landmark-based

analysis, and calibrated measurement using Digimizer software—proves to be a reliable and reproducible method for chairside diagnosis. Compared to costly imaging techniques such as CBCT or stereophotogrammetry, this method is accessible and can be routinely used in orthodontic or surgical planning settings.[5,6] It also aligns with the growing emphasis on soft tissue evaluation in modern orthodontics.

The diagnostic method used in this study—standardized frontal photography combined with computer-assisted analysis—becomes an effective chairside diagnostic tool due to its simplicity, non-invasiveness, affordability, and reproducibility. Unlike conventional radiographic methods, which are time-consuming, expensive, and expose patients to radiation, this approach only requires a digital camera and readily available software. It allows clinicians to evaluate facial proportions and symmetry in a structured and quantifiable way, using clearly defined landmarks and reference planes. By identifying subtle asymmetries and measuring deviations in facial thirds, this tool enhances the precision of diagnosis, especially in borderline or esthetically sensitive cases. Moreover, it provides visual documentation that helps in treatment planning, monitoring progress, and improving patient communication. Since the method does not require specialized equipment, it can be seamlessly integrated into daily clinical workflow, making it a valuable support system for orthodontic, prosthodontic, and surgical assessments. The ability to correlate photographic findings with skeletal and dental patterns further strengthens its reliability as a diagnostic aid in real-world practice.

5. Conclusion

This study assessed facial asymmetry across Leptoprosopic, Mesoprosopic, and Euryprosopic facial types using standardized photographic analysis. Significant vertical and horizontal dimensional differences were observed, with Leptoprosopic faces showing the highest values, yet no significant right-left asymmetry was found, aligning with existing evidence that mild asymmetry is normal in healthy individuals.[16,7,12]

The results highlight the clinical value of facial form-based assessment, as morphological differences influence asymmetry perception.[8,9] The use of digital photographs and Digimizer software proved to be a reliable and accessible diagnostic method.[5,6]

However, the findings should be cautiously interpreted due to the limited sample size and lack of observer reliability testing, which may affect generalizability and reproducibility.[15,7] Future research should incorporate larger, diverse samples and validate reliability statistically.

In conclusion, facial symmetry is largely preserved regardless of facial type, and digital photographic analysis can serve as a practical tool in routine orthodontic and craniofacial diagnostics.[16,10]

6. Summary

Facial symmetry refers to the balanced alignment of facial features, while asymmetry involves differences between the two sides of the face. Perfect symmetry is rare due to biological and environmental factors; mild asymmetry is natural and can enhance aesthetics.

6.1. Facial asymmetry is classified into

1. **Dental:** Misalignment of teeth
2. **Skeletal:** Bone structure differences
3. **Functional:** Habits like unilateral chewing
4. **Muscular:** Uneven muscle development Causes include genetics, development, trauma, functional habits,and environmental factors like prenatal stress. Facial asymmetry is common, especially in the lower third (mandible, chin). The left side is often slightly larger.

6.2. Face types

1. **Dolichocephalic:** Long, narrow
2. **Brachycephalic:** Short, broad
3. **Mesocephalic:** Balanced.

6.3. Diagnostic methods

6.3.1. Assessment tools include

Clinical exams,Extraoral photography,Radiographs (e.g., cephalograms), Stereophotogrammetry (3D imaging) This study used digital photos and computer analysis for standardized, cost-effective evaluation.

6.4. Key Findings

Mild asymmetry is common and often unnoticeable to individuals, Leptoprosopic faces showed the most asymmetry; mesoprosopic, the least,Most variation occurs in the lower face, Right-left measurement differences were minimal and statistically insignificant, Asymmetry may relate to emotional expression (left side more expressive) and one-sided chewing habits.

6.4.1. Clinical implications

Most asymmetries require no treatment. Options for concerned patients include: Orthodontic adjustments,Sliding genioplasty (chin surgery), Soft tissue enhancements (fillers, implants).

6.4.2. Future research

Further studies with larger, diverse samples are recommended, combining soft tissue photogrammetry with skeletal imaging for improved diagnostics.

7. Patient Consent

A written and informed consent has been taken from the patient.

8. Source of Funding

None.

9. Conflict of Interest

None.

References

1. Choi KY. Analysis of facial asymmetry. *Arch Craniofac Surg*. 2015;16(1):1–10.
2. Anshu Agarwal, Tikku T, Maurya RP, Srivastava K, Khanna R, Sneh L, et al. Evaluation of facial asymmetry in subjects with Class I and Class II molar relation. *Sch J Dent Sci*.2018;5(5):315-321.
3. Lu SM, Bartlett SP. On facial asymmetry and self-perception. *Plast Reconstr Surg.* 2014;133(6):873e–81e. doi: 10.1097/PRS.0000000000000211.
4. Missier MS, George AMG. Estimating the prevalence of facial asymmetry in the South Indian population. *Sch J Dent Sci*. 2021;8(1):14–18. doi:10.36347/sjds.2021.v08i01.003
5. Williams RP, Rinchuse DJ, Zullo TG. Perceptions of midline deviations among different facial types. *Am J Orthod Dentofacial Orthop.* 2014;145(2):249–55. doi: 10.1016/j.ajodo.2013.02.034.
6. Lee MS, Chung DH, Lee JW, Cha KS. Assessing soft-tissue characteristics of facial asymmetry with photographs. *Am J Orthod Dentofacial Orthop*. 2010;138(1):23–31. doi: 10.1016/j.ajodo.2008.08.029.
7. Kumar SS, Subrahmanya RM. Facial asymmetry in skeletal Class II malocclusions. *RRJDS*. 2014;2(1):79–86.
8. Farkas LG, Cheung G. Facial asymmetry in healthy North American Caucasians. *Angle Orthod.* 1981;51(1):70–7. doi: 10.1043/0003-3219(1981)051<0070:FAIHNA>2.0.CO;2.
9. Shyagali TR. Evaluation of facial asymmetry in esthetically pleasing faces. *J Orthod Res*. 2014;2(2):79–84. doi: 10.4103/2321-3825.131118
10. Peck S, Peck L, Kataja M. Skeletal asymmetry in esthetically pleasing faces. *Angle Orthod*. 1991;61(1):43–8. doi: 10.1043/0003-3219(1991)061<0043:SAIEPF>2.0.CO;2.
11. Ercan I, Ozdemir ST, Etoz A , Sigirli D, Tubbs RS, Loukas M, et al. Facial asymmetry in young healthy subjects evaluated by statistical shape analysis. *J Anat. 2008*;213(6):663–69. doi: 10.1111/j.1469-7580.2008.01002.x.
12. Ferrario VF, Sforza C, Poggio CE, Tartaglia G. Distance from symmetry: a three-dimensional evaluation of facial asymmetry. *J Oral Maxillofac Surg.* 1994;52(11):1126–32. doi: 10.1016/0278-2391(94)90528-2.
13. Haraguchi S, Iguchi Y, Takada K. Asymmetry of the face in orthodontic patients. *Angle Orthod*. 2008;78(3):421–426. doi: 10.2319/022107-85.1.
14. Shah SM, Joshi MR. An assessment of asymmetry in the normal craniofacial complex. *Angle Orthod*. 1978;48(2):141-8. doi: 10.1043/0003-3219(1978)048<0141:AAOAIT>2.0.CO;2.
15. Shaner DJ, Peterson AE, Beattie OB, Bamforth JS. Assessment of soft tissue facial asymmetry in medically normal and syndrome-affected individuals. *Am J Med Genet*. 2000;93:143–54.
16. Ferrario VF, Sforza C, Miani A, Tartaglia G. Craniofacial morphometry by photographic evaluations. *Am J Orthod Dentofac Orthop*. 1993;103(4):327–37. doi: 10.1016/0889-5406(93)70013-E.
17. Song WC, Koh KS, Kim SH, Hu KS, Kim HJ, Park JC, et al. Horizontal Angular Asymmetry of the Face in Korean Young Adults with reference to the eye and mouth. *J Oral Maxillofac Surg*. 2007;65(11):2164–8. doi: 10.1016/j.joms.2006.11.018.

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