

Evaluation of Fetal Facial Dysmorphology Criteria in Detailed Second-Trimester Ultrasonography and the Neonatal Period

Esra Öncü¹ · Zeynep E. Utkan Korun¹ · Mustafa Berber² · Filiz Bakar² · Mustafa Başbuğ¹

¹Department of Obstetrics and Gynecology, Yeditepe University Hospital, Istanbul, Turkey ²Department of Pediatrics, Yeditepe University Hospital, Istanbul, Turkey

CONTROL ID
4537689
Topic 06 · Fetal Anatomy

01 Background & Objectives

Detailed second-trimester ultrasonography routinely inspects the fetal face, yet subtle dysmorphic features associated with craniofacial anomalies and genetic syndromes are easily overlooked without a standardized, reproducible protocol.

This study builds on ISUOG-recommended facial parameters, adding orbital distances, nasal bone and profile, philtrum, mandible, ear morphology, and facial symmetry to form a single structured assessment.

OBJECTIVES

- Systematically evaluate fetal facial dysmorphology using **ISUOG-recommended parameters** together with additional morphometric measurements.
- Assess the **feasibility** of integrating this comprehensive evaluation into routine screening within **30 minutes**.
- Determine its **diagnostic value, reproducibility**, and correlation with postnatal findings.

02 Methods

DESIGN	Retrospective observational cohort study
PERIOD	November 2022 — June 2024
SETTING	Yeditepe University Hospital, Perinatology Unit, Istanbul
COHORT	51 singleton pregnancies undergoing detailed 2nd-trimester ultrasound
EXAMINER	Prenatal: single perinatologist for all scans, minimizing inter-observer variability. Postnatal: 2 neonatologists performed the newborn exams.

PARAMETERS ASSESSED

OD (R/L)	BOD	IOD	Nasal bone	Philtrum	Mandible	Ear length (R/L)
Ear morphology	Facial profile	Symmetry				

Same parameters re-assessed on neonatal exam after birth; prenatal/postnatal values matched per case for paired comparison.

STATISTICAL ANALYSIS

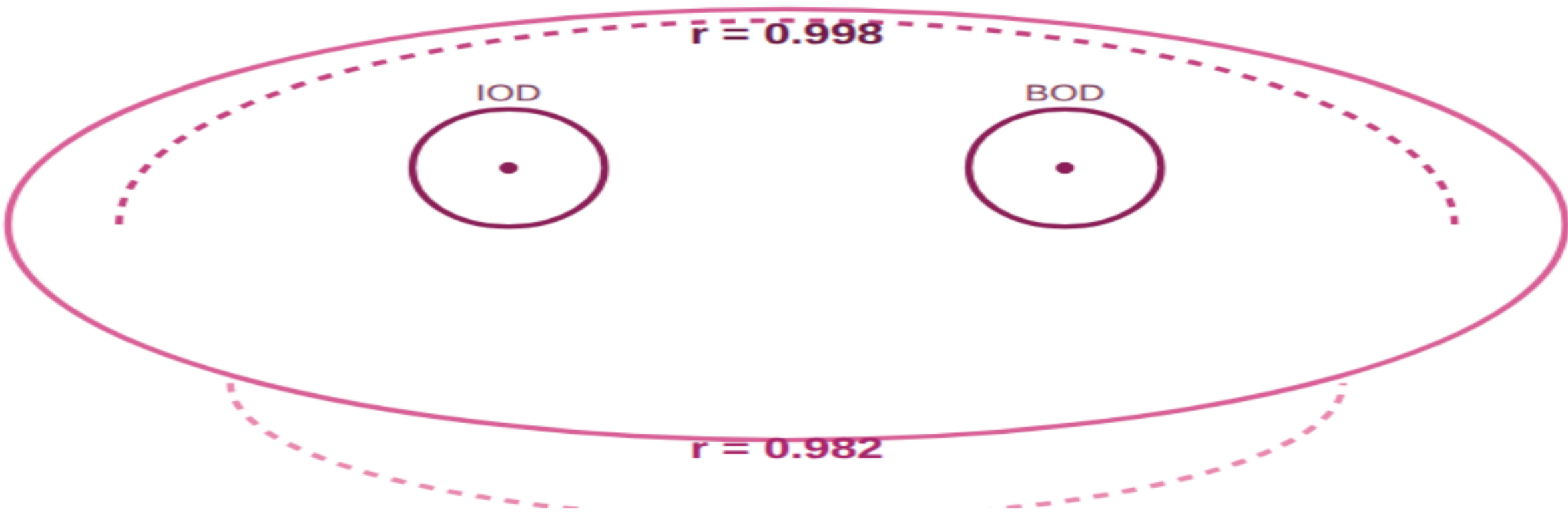
- Paired-samples t-test (prenatal vs. postnatal) and **Pearson correlation** (inter-parameter and prenatal ↔ postnatal)
- Significance set at $p < 0.05$; analysis in IBM SPSS 27
- Sample size confirmed by power analysis (G*Power, $d = 0.5$, 99% CI) → required $n = 48\text{--}52$

Facial evaluation was designed to fit **within the standard anomaly-scan window**, layering onto existing protocols without added visit time.

03 Results

51

SINGLETON PREGNANCIES ANALYZED · maternal age 33.9 ± 4.3 y (median 34, range 25–50)



Bilateral symmetry of paired prenatal structures — **right ↔ left orbital diameter** (top arc) and **right ↔ left ear length** (bottom arc), the two strongest inter-parameter correlations observed.

TABLE — PRENATAL VS. POSTNATAL FACIAL MORPHOMETRY (MEAN ± SD, MM)

Parameter	Prenatal	Postnatal	Δ	p
Orbital diam. (R)	10.01 ± 0.70	25.24 ± 2.87	−15.23	<0.001*
Orbital diam. (L)	10.01 ± 0.70	25.20 ± 2.73	−15.18	<0.001*
Binocular dist. (BOD)	34.06 ± 2.49	70.80 ± 1.34	−36.76	<0.001*
Interorbital dist. (IOD)	13.56 ± 1.49	19.12 ± 0.95	−5.56	<0.001*
Philtrum length	6.07 ± 0.81	9.50 ± 0.84	−3.43	<0.001*
Ear length (R)	16.87 ± 1.76	34.55 ± 1.53	−17.63	<0.001*
Ear length (L)	16.91 ± 1.76	34.24 ± 1.39	−17.33	<0.001*

Nasal bone length 7.68 ± 0.90 mm and mandible length 10.69 ± 1.28 mm recorded prenatally only. *Paired-samples t-test, all comparisons significant.

INTER-PARAMETER CORRELATIONS

Prenatal BOD ↔ IOD r = 0.808*	Prenatal OD ↔ BOD r ≈ 0.81*
Postnatal BOD ↔ IOD r = 0.525*	Postnatal Ear R ↔ L r = 0.361*
Prenatal ↔ Postnatal OD (R) r = 0.091 ns	Prenatal ↔ Postnatal Ear (L) r = 0.266 ns

* $p < 0.001\text{--}0.05$ · ns = not significant (all prenatal ↔ postnatal pairs, $p > 0.05$)

04 Conclusions

- Systematic second-trimester facial morphometry shows **high internal consistency and bilateral symmetry**, supporting coordinated craniofacial development in utero.
- Absolute prenatal measurements **do not directly predict** absolute neonatal values — expected given non-linear third-trimester growth — yet the structural relationships between parameters remain informative.
- Postnatal inter-parameter correlations were **consistently weaker** than prenatal ones, suggesting increased individual variability in growth after birth.
- Standardized facial assessment was **feasible within routine scan time** and did not require additional equipment or patient time.

CLINICAL IMPLICATIONS

Incorporating standardized fetal facial morphometric assessment into routine second-trimester ultrasound may improve **early detection of craniofacial anomalies and genetic syndromes**, adding a structural, reproducible layer to conventional anomaly screening.

NEXT STEPS

Validation in larger, multicenter cohorts; growth-referenced (percentile) curves rather than absolute values; syndrome-specific diagnostic accuracy studies.

TAKE-HOME

The fetal face grows as a coordinated, symmetric unit in the second trimester — a structural signature worth capturing routinely, even though it does not forecast exact neonatal size.

CLINICAL PREMISE

Coordinated, symmetric facial growth in utero may serve as a structural marker of normal craniofacial development, complementing existing anomaly screening.