

Predictive Value of cervical length and progressive shortening as an measurement for identifying women at increased risk of preterm birth.

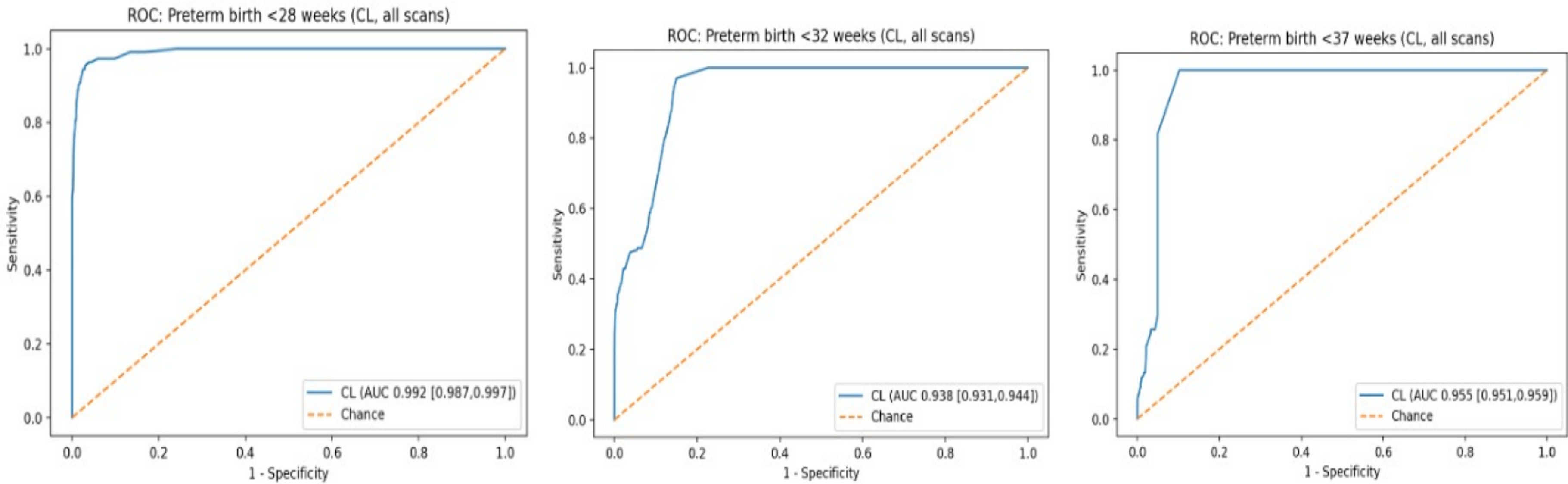
Prashant Acharya, Foram Prashant Acharya

Objectives: We wanted to evaluate the relationship between cervical length and preterm birth, including delivery before 37, 32, and 28 weeks of gestation along with the predictive performance of progressive shortening of cervical length, both as an absolute measurement and as a gestational age–adjusted Z-score, for identifying women at increased risk of preterm birth.

Methods: Cervical measurements from 16,522 pregnancies between 12 and 32 weeks of gestation were analyzed to generate gestational age–specific reference centiles and Z-scores. Pregnancy outcomes were used to assess the predictive performance of cervical length for preterm birth at <37, <32, and <28 weeks. Gestational age– adjusted cervical length demonstrated excellent discrimination and calibration for preterm birth, particularly for early preterm delivery. Progressive shortening was defined as minimum 4 mm shortening of cervical length in successive scan between FTS and 2nd trimester scan.

Results: Receiver operating characteristic analysis demonstrated excellent discrimination of cervical length for preterm birth. The area under the curve (AUC) for prediction of delivery before 37 weeks was 0.955 (95% CI 0.949–0.961) using cervical length in millimeters and improved to 0.960 (95% CI 0.954–0.966) when gestational age–adjusted Z-scores were applied. Discrimination was strongest for early preterm birth, with AUCs exceeding 0.99 for prediction of delivery before 28 weeks.

Conclusion: Absolute length of cervix of < 25 mm and progressive shortening of cervix has excellent correlation of preterm birth prediction. Both along with cervical shortening by mechanical pressure on fundus has good predictive value and can be used in clinical practice



16522 total patients	mean (Range)	mean (Range)	mean (Range)	mean (Range)
Parameter	<28 weeks (n=96)	28-32 weeks (n=154)	33-36 weeks (n=1560)	>37 weeks (n=14712)
Age (years)	mean 22 (range 18-39)	22.5 (18-41)	230 (18-40)	21 (18-36)
BMI (kg/m²)	26.3 (18.3-34.2)	27.2 (19.2-36.1)	252 (19.5-29.7)	24.5 (22.5-32.7)
Smoker/ Tobacco	12 (1.25)	12(7.78)	120 (7.6)	324 (1.99)
Past Obstetric History	42 (43.75)	30 (19.48)	100(6.4)	656(4.03)
Nulliparous	42 (43.75)	60 (38.96)	620(39.74)	7475 (45.95)
Delivery > 37 weeks	12 (12.5)	(20.77) 32	(39.74) 620	(73.55) 11964
Delivery 16-23 weeks	54 (56.25)	20 (12.98)	(3.84)60	(2.42) 395
Delivery 24-33 weeks	15(15.62)	84 (54.54)	(8.97) 140	(6.88) 1120
Delivery 34-36 weeks	15 (15.62)	18 (11.68)	(47.43) 740	(17.12) 2786
Cervical length (mm)	18.8 (2-24)	25.2 (22-34)	28.9 (26-33)	35.2 (31-50)

Curve	Degree	Equation form	Coefficients (highest power → constant)				
5th centile (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	-7.308683823e-05, 0.005899046552, -0.1874072387, 2.694144106, 15.67763317				
10th centile (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	2.610979903e-05, -0.002396707688, 0.06628199072, -0.6219004424, 32.97971514				
25th centile (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	7.082196307e-05, -0.007447574411, 0.2754152951, -4.319322647, 57.98607003				
50th centile (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	-3.275452057e-05, 0.0009542683079, 0.02791828638, -1.198544229, 45.55828659				
95th centile (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	-0.0003402554282, 0.02648301655, -0.7481684213, 9.178589515, -1.323284629				
Mean (mm)	4.00	a4*GA^4 + ... + a1*GA + a0	-4.149492613e-05, 0.002481902236, -0.04984354025, 0.3629463355, 34.52518699				
log(SD) (ln mm)	3.00	a3*GA^3 + ... + a1*GA + a0	-0.0002069032237, 0.01292181108, -0.2426773254, 2.681636601				