

## Variation of Human Placental Attachment of Umbilical Cord

Roma Patel<sup>1</sup>, Sumit Babuta<sup>2\*</sup>

<sup>1</sup>Associate Professor, Department of Anatomy,  
Dr. Kiran C. Patel Medical College and Research Institute, Bharuch, Gujarat, India.

<sup>2\*</sup>Associate Professor, Department of Anatomy, S. M. S. Medical College, Jaipur, Rajasthan, India.

### ABSTRACT

**Introduction:** The umbilical cord normally attached to placenta at the central portion, variations at the site of attachment of umbilical cord are thought to result from the process known trophoblast in which the chorionic frondosum or the early placenta migrates with advancing gestation to ensure a better blood supply from a more richly vascularised area.

**Aim:** Our study aims to find out different types of variations in umbilical cord attachment to placenta by dissection method.

**Methods:** Placentas for this study were obtained from the OBG Department and collected by the Department of Anatomy NIMS Medical College Jaipur. The placentas were washed, cleared, dissected and site of placental attachment to umbilical cord were observed. Variations in the type of insertion were noted.

**Results:** Majority of the placentas showed central attachments of the cord. Few abnormal placentas were observed with furcate and marginal insertions of the umbilical cord.

**Conclusion:** This study gives important idea about placental

attachment of umbilical cord, hence, the present study useful for Clinicians, Anatomist, Physician and Gynaecologist for proper clinical diagnosis and treatment of disease.

**Keywords:** Placenta, Umbilical cord, Marginal, Furcate.

### \*Correspondence to:

**Dr. Sumit Babuta,**  
Associate Professor,  
Department of Anatomy,  
S.M.S. Medical College, Jaipur, Rajasthan, India.

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### INTRODUCTION

The word placenta comes from Latin - flat cake and Greek - "Plakous" which means "flat, slab like." The umbilical cord is a conduit between the developing embryo and the placenta. It is embryologically derived from both mother and fetus and normally contains two arteries and one vein, buried within Wharton's jelly and all enclosed within a layer of amnion. The probability of identifying congenital anomalies will be much higher with careful cord assessment in the earlier period of gestation.<sup>1</sup>

Each lobe of placenta called maternal cotyledon. If the placenta viewed from maternal side, it is rough, irregular, and 15–20 polygonal area called cotyledon and appears as convex areas bounded by grooves. The fetal surface is smooth, shiny, translucent covered by amnion, chorionic plate, and provide attachment of umbilical cord.<sup>2</sup> Human placenta covers approximately 15–30% of internal surface of uterus.<sup>3</sup>

The umbilical cord is normally attached to the placenta near the center, but it may attach ecentral (attached near center) and marginal (attached near margin also called Battledore placenta); it is related with IUGR, preterm labor, and furcate (blood vessels

divide before reaching placenta); it is associated with early delivery because they are heavier more voluminous villi with more trophoblast and syncytial knots, velamentous (blood vessels attached to amnion and ramify before reaching the placenta); and it is allied with low birth weight, low Apgar score, growth retardation, esophageal atresia, spina bifida.<sup>4</sup>

### MATERIALS AND METHODS

The present study was conducted in the Department of Anatomy in collaboration with Obstetrics and Gynecology, Department of Anatomy, S. M. S. Medical College, Jaipur, Rajasthan, India. The human placenta with attached umbilical cords was collected after the delivery. T

he patient history was taken from hospital documents. A total of 80 human placenta specimens were studied. The human placenta along with its attachment was observed grossly and photograph was taken with camera. The data were analyzed and written in tabulated form.

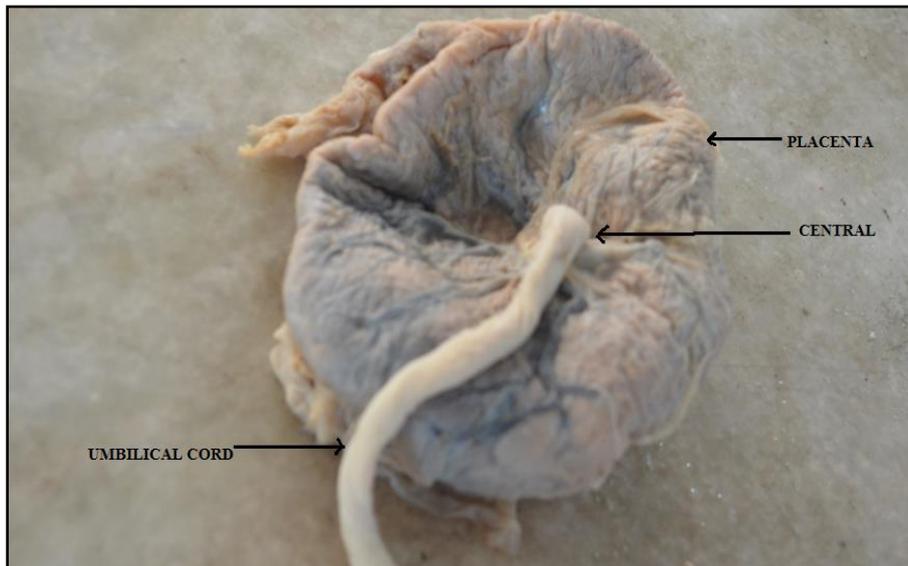


Figure I: Central attachment of umbilical cord

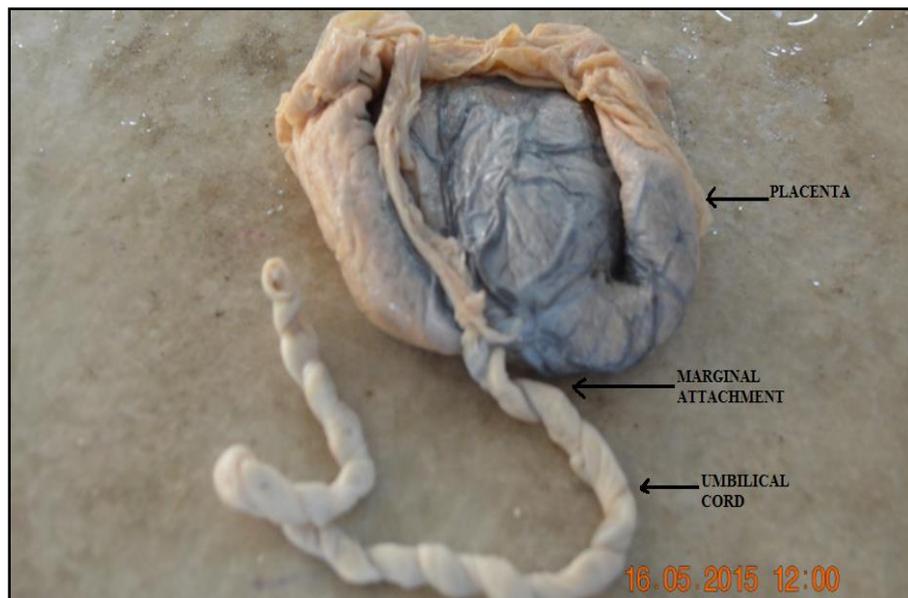


Figure II: Marginal attachment of umbilical cord

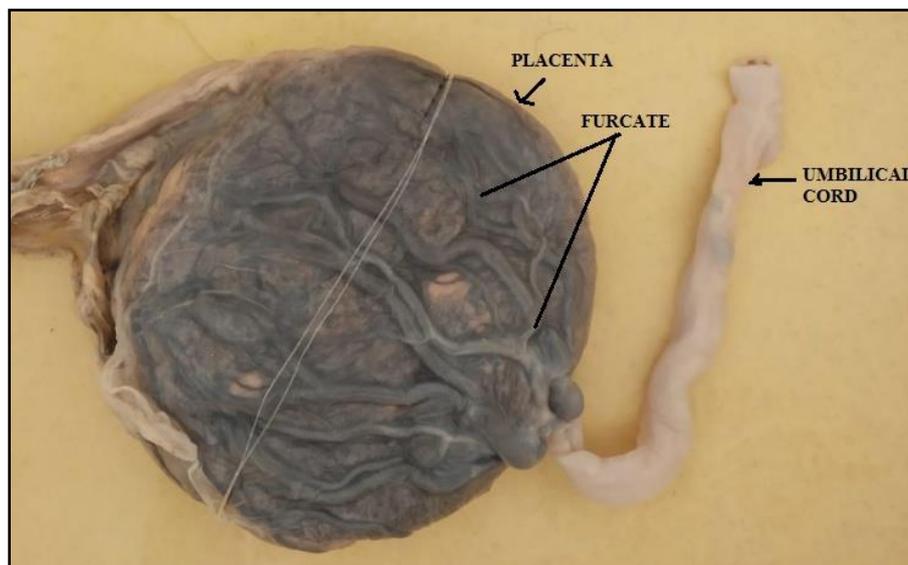


Figure III: Furcate attachment of umbilical cord

**Table I: Distribution of umbilical cord attached with placenta in present study**

Types of umbilical attachments	Number of placentas	Incidence
Central	56	70%
Marginal	20	25%
Furcate	4	5%

**Table 2: Comparison of Previous Studies with current study**

Author	Method of Study	Number of Specimen	Variations		
			Types	Number	Percentage
W.Sepulveda et al	Colour Doppler	825	Central	774	93.81
			Marginal	83	5.21
			Velamentous	8	0.96
Waldo.Sepulveda et al	Sonography	138	Central	127	92.2
			Marginal	10	7.2
			Velamentous	01	0.75
Jason H Collin et al	According to literature		Furcate	1	1
Donald N Di Salvo et al	Sonography	54	Central	38	70.37
			Marginal	12	22.22
			Velamentous	04	7.41
Current Study	Dissection	80	Central	56	70
			Marginal	20	25
			Furcate	04	5

## RESULTS

A total of 80 placentas were studied and site of attachment of the umbilical cord was examined. Three different types of cord insertions were observed. [Table I] Out of these, the commonest cord insertion was centric type, seen in 56 cases (70%) [Fig I]. 20 cases having marginal types placentas (25%) [Fig II]. Furcate insertion of the cord was found in 4 cases (5%) [Fig III].

## DISCUSSION

There are many factors that can affect fetal wellbeing during labour and delivery, such as the good functioning of the placenta and good supply of nutrients and oxygen from the maternal blood circulation to the fetus. Variations in umbilical cord insertions may alter fetal well-being. In our study, 20 (25%) showed marginal attachment, which was associated with the previous study Donald et al.<sup>5</sup> Sepulveda et al.<sup>6</sup> Waldo Sepulveda et al.<sup>7</sup> Manikanta et al.<sup>8</sup> Asra et al.<sup>9</sup> Arora et al.<sup>10</sup> and Yousuf et al.<sup>11</sup> In our study, 4 (5%) explains furcated attachment of umbilical cord with placenta which was correlated with the study of Manikanta et al.<sup>8</sup> and Arora et al.<sup>10</sup> whereas velamentous attachment absent in current.

## CONCLUSION

Abnormalities in the placental attachment of the umbilical cord can result in various complications of pregnancy and adversely affect the fetal outcome as well. Knowledge of the variations in attachment of the umbilical cord is very significant and of extensive use to obstetricians as well as anatomists. Frequently abnormal cord insertions may be associated with intrauterine growth retardation, preterm labour and congenital abnormalities.

## REFERENCES

1. Kinare A. Fetal environment. Indian J Radiol Imaging. 2008; 18(4): 326-344.
2. Borton C. Placenta and placental problems. Patient Plus 2006; 20:159.

3. Sadler TW. Langman's Medical Embryology. Fetus and Placenta. 11th ed. New Delhi: Wolters Kluwer (India) Pvt Ltd.; 2011. 101-2.
4. Yousuf MS, Tarannum Y, Naval KP. Variations in the placental attachment of umbilical cord and its clinical significance. J Med Dent Sci 2015;4(70):1-7.
5. Salvo DN, Benson CB, Laing FC. Sonographic evaluation of the placental cord insertion site. Am J Radiol 1998;170:1295-8.
6. Sepulveda W, Rojas I et al. Prenatal detection of velamentous insertion of the umbilical cord: A prospective color doppler ultrasound study. J Ultrasound Obstet Gynecol 2003;21:564-9.
7. Sepulveda W, Wong AE, Gomez L, Alcalde J. Improving sonographic evaluation of the umbilical cord at the second-trimester anatomy scan. J Ultrasound Med 2009;28:831-5.
8. Manikanta R, Geetha SP, Nim VK. Variations in placental attachment of umbilical cord. J Anat Soc India 2012;61:1-4.
9. Asra A, Suseelamma D, Sarita S, Ramani TV, Nagajyothi D. Study of morphological variations of 50 placentae with umbilical cords and its developmental relevance. Int J Anat Res 2015;3:1259-66.
10. Arora NK, Khan AZ et al. Variations in placental attachment of umbilical cord. Ann Int Med Dent Res 2016;2:110-2.
11. Yousuf MS, Tarannum Y, Naval KP. Variations in the placental attachment of umbilical cord and its clinical significance. J Med Dent Sci 2015;4(70):1-7.

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