

### Study of Position of Vermiform Appendix

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### Abstract

**Introduction:** Vermiform Appendix is a vestigial organ situated in the right iliac fossa. The base of the appendix is attached to the posteromedial wall of the caecum but its tip varies in position. In inflammation of appendix, the symptoms vary the depending upon the position of tip. The aim of the study to observe the number of appendix, and location, position, distance between its base and ileocaecal junction, location of the base in relation to the wall of the caecum and relation of the base to the spin umbilical line.

**Material and Methods:** The study was done in 50 cases during abdominal surgeries at Government Rajaji hospital, Madurai Medical College, Tamilnadu, India.

The parameters were studied and compared with other studies.

**Results:** We observed Duplicated appendix in one case and the retrocecal position (50%) was the commonest followed by pelvic position.

**Conclusion:** Vermiform appendix has greater clinical significance as it is involved in many diseases such as appendicitis, carcinoma and diverticulitis.

Knowing the various positions of vermiform appendix and its relations to ileocaecal junction and to spin umbilical line will be helpful to understand the possible outcome of the diseases of appendix and also in its surgical interventions.

**Keywords:** appendicitis, position, retrocaecal, vermi form appendix, spin umbilical line.

## Introduction

The Vermiform Appendix has been considered as a vestige of evolution with a tendency to become diseased and as a bane to humanity. This “worm like” structure can now be argued to be very useful in reconstructive surgical techniques and make the appendix a useful organ. The Appendix is a narrow worm like structure present in the right iliac fossa, arising from the posteromedial wall of the caecum about 2 cm below the ileo-caecal junction and has no constant anatomical position. The appendix is suspended by a peritoneal fold called meso appendix covering its variable length and carrying the blood supply to the organ, by appendicular artery [1]. Failure of the mesoappendix to reach the tip reduces the vascularization to the tip of the organ making it more liable to gangrene. [2].

Its position in the abdomen corresponds to the Mc Burney’s point. The position of base of appendix is constant lying 2cm below ileo-caecal valve [3]. The ultimate position of the appendix is profoundly influenced by the changes in position and shape which the caecum undergoes during development and growth.

Vermiform appendix has greater clinical significance as it is involved in many diseases such as appendicitis, carcinoma and diverticulitis. Studying various positions of vermiform appendix is helpful to understand the possible outcome of the appendicitis by specific location of site of pain and also in surgical management of appendicitis.

## Material and methods

50 Vermiform appendixes were studied during abdominal surgeries conducted at surgical theatres in Government Rajaji hospital, Madurai Medical College, Tamil nadu, India. During surgical procedures, vermiform appendix was observed for its number, location,

position, distance between its base and ileocecal junction, location of the base in relation to the wall of the caecum and relation of the base to the spin umbilical line. The values were noted and photo graphs were taken for documentation.

## Results

In the present study, appendix was found to be single in 98% and in one case it was duplicated [Fig 1].



Fig 1: Duplication of appendix

Appendix was located in right iliac fossa in 28(56%) cases, in right lumbar region in 6 (12%) cases, umbilical region in 4 (8%) cases and in inguinal region in 12 (24%) cases. Retrocaecal position was observed in 25 cases (50%) [ Fig 2] followed by pelvic position in 12 cases (24%), preileal position in 5 cases (10%), paracaecal (6%) and subcaecal position were observed in 3 cases (6%) each and the least common position was postileal in 2 cases (4%).

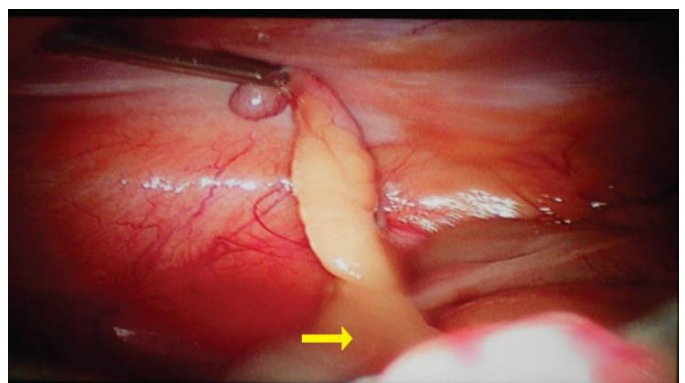


Fig 2: Retrocaecal position of appendix (yellow arrow)

The base of the appendix was located in the posterior wall of the caecum in 54%, in the lower pole of caecum in 30%, in the anterior wall in 8% and located in the lateral wall in 8 % of cases.

The distance between base of the appendix and ileocaecal junction ranged between 1.5cms – 3.5cms with an average distance of 2.25cm. The position of base of appendix to spino umbilical line is represented in the table. [Table 1]

Table 1: Position of base of appendix to spinoumbilical line.

Sn.	Relation to spino-umbilical line (SUL)	No of cases	%
1.	Along SUL	19	38
2.	Above SUL	11	22
3.	Below SUL	20	40

**Discussion**

Vermiform appendix is a narrow tube which arises from the posteromedial caecal wall, approximately 2 cm below the end of the ileum.

Anomalies of the appendix are extremely rare, with a reported incidence of 0.004 to 0.009. Bifid appendix was reported by Ayoub RM et al [4] and Griffiths EA et al [5].

According to Modified Cave-Wallbridge classification, duplicated appendix was divided into four types. Type A, partial duplication of the appendix;

Sn.	Name of the study	Retro Caecal %	Pelvic %	Pre Ileal %	Post ileal%	Para caecal %	Sub caecal%	Ectopic /Others %
1.	Wakeley [12]	65.28	31.01	1	0.4		2.26	0.05
2.	Ajmani et al [13]	68	20	1	10	-	-	1
3.	Golalipour MJ et al [14]	32.4	33	18	2.6		12.8%	32.4% (retro colic)
4.	Ahmad Ghorbani et al		55.8	1.5				
6.	Uma Maheswar Rao et	66	26	2	2	-	4	
7.	Sudha K et al [17]	40	28	8	8	-	16	-
7.	Present study	50	24	10	4	6	6	

Type B1 (bird type), two appendices are placed symmetrically on both sides of the ileocaecal valve; Type B2 (taenia coli type), one appendix is in the usual place, and the other is far along with the taenia coli; Type C, duplication of the caecum and appendix; Type D (horseshoe type), one appendix has two openings in the caecum. Double appendix in our case belongs to type A [6]. It may occupy different locations in the abdomen [Table 2]. Different locations of appendix in the abdominal cavity depends upon the stage of development and rotation of gut [7].

Table 2: location of appendix by various authors

Sn.	Name of the study	Right iliac Fossa %	Right Lumbar %	Subhepatic %	Umbilical %	Inguinal %
1.	Arindo	96	-	4	-	-
2.	Reshma et al [9]	40	20	40	-	-
3.	Present Study	56	12	6	4	12

The tip occupies most commonly retrocaecal or retro colic position and then pelvic position. Other positions like sub caecal, preileal or post ileal occurs especially when a long appendicular artery allows greater mobility. Position of appendix in our study was compared to other authors [Table 3].

Table 3: Position of appendix compared to various authors.

FFFF In the case of such a mobile part of the gut as the appendix, and taking into account the rapid and extensive changes which the neighboring parts undergo, together with the changes in position which the appendix itself undergoes as it follows the caecum, it is obvious that it must be subject to more or less accidental circumstances which will modify its ultimate position and account for the many and various positions in which it may be found [10].

The position of the vermiform appendix is of great interest, not only because of its evolutionary significance but also because of its pathological and surgical importance. Appendicitis was a common medical problem in man and woman at all ages from childhood to old age. The position of the organ may alter its clinical presentation, surgical approach and prognosis of the appendix related diseases [11].

The most common position in male and female was retrocaecal in 55% and 56% respectively [18].

Bhagavan Naik et al [19] reported situs inversus totalis in 16 years old male. on laparoscopy it was (L) sided appendicitis and Laparoscopic appendectomy done.

In a study of Philip mwachaka et al [20], spin umbilical line was measured and Mc Burney's point was taken at the proximal two – third of the spin umbilical line. The relationship of Mc Burney's point and base of appendix was classified as cephalad, caudad or along spin umbilical line. The base of the appendix was located along spin umbilical line in 25 cases (52%), below and medial to the line in 9 cases (15%) and above and lateral in 14 cases (29%). In half of the cases, the base of the appendix was not corresponding to Mc Burney's point. Thus most appendixes were located approximately at midpoint at spin umbilical line and not exactly at Mc

Burney's point. In the Present Study, the base of appendix were along the spinoumbilical line only in 19 cases (38%). In remaining cases, it was below and medial in 20 cases (40%) and above and lateral in 11 cases (22%).

The distance which separated the base of the appendix to the ileocaecal junction varied between 1.6- 2.5cm in 36 (72%) of cases, 2.6- 3.5 cm in 12 (24%) of cases, 3.6- 4.5 cm in 2 (4%) of cases [16].

### Conclusion

Knowledge of the variations of vermiform appendix is essential for accurate diagnosis and treatment of the pathology of the organ. Appendicitis is the common clinical condition of appendix. Anatomic variations in the position of the inflamed appendix lead to deviations in the usual physical findings.

Appendicitis in different positions may mimic other diseases like colitis, ureteric colic, pelvic inflammatory disease, torsion of ovarian cyst, ruptured tubal gestation, sub hepatic- hepatitis or biliary colic.

At present, appendectomy for appendicitis is the most commonly performed emergency operation in the world. Failing to recognize these anomalies may lead to failure of treatment and complications.

### References

1. Richard Snell. Clinical Anatomy. The Abdomen. Part II The Abdominal Cavity. 9<sup>th</sup> edition 2012:182.
2. Rahman MM Khalil M Sultana SZ et al. Extent of meso appendix of vermiform appendix in Bangladeshi people. Journal of Bangladesh soc physiol, 2009 June; 4(1) 20 -23.
3. Chummy. Sinnathamby. Last's Anatomy, Regional and Applied. 12<sup>th</sup> Edition 2012: 255 – 257

4. Ayoub RM, Khrais IAQ, Al-Shweiki OAM, Roto AT, Obeid at FW. Bifid appendix: a case report and a review of literature. *J Surg Case Rep*. 2019 Apr 29; 2019 (4): rjz132. doi: 10.1093/ jscr/rjz132. PMID: 31049194; PMC ID: PMC6487676x-bifid appendix
5. Griffiths EA, Jagadeesan J, Fasih T, Mercer-Jones M. Bifid vermiform appendix: a case report. *Curr Surg*. 2006 May - Jun; 63 (3): 176 - 8. doi: 10. 1016/ j. cursur. 2006. 02. 001. PMID: 16757368.
6. Yassin, Rami & Mohmed, Mhmod & Fekadu, Tekeste. Acute appendicitis with appendix duplicity in Eritrea: A case report. *Clinical Case Reports*. 2022, 10. 1002/ ccr3.6635.
7. Susan stand ring. *Gray's Anatomy* 41<sup>st</sup> edition 2016. Chapter 66, Large Intestine: pg 1142
8. Arindom Banerjee, L Anil Kumar, Aru Nabha Tapador, M. Pranay. Morphological Variations in the anatomy of caecum and appendix. A cadaveric study. *National Journal of clinical anatomy* 2012; Vol (1); pg. 30-35.
9. Reshma Mohammad, Dr. Subhadra Devi Velichety, K. Thyagaraju et al. Morphological features and Morphometric parameters of human fetal vermiform appendix at different gestational ages. *International journal of anatomy and research* 2013; Vol (2): 18-25
10. Karpelowsky J S, Bickler S, Rode H; Appendicitis – pitfalls and medicolegal implications, *South Afr Med J*, 2006; 96(9): 866872.
11. Bakheit MA, Warille AA. Anomalies of the vermiform appendix and prevalence of acute appendicitis in Khartoum. *East Afr. Med J*, 1999.16(6): 338 -340.
12. Wakeley CPG. The position of the vermiform appendix as ascertained by an analysis of 10,000 cases. *J Anat* 1933; 67: 77-83
13. Ajmani ML, Ajmani K. The position, length and arterial supply of vermiform appendix. *Anat An Z*. 1983; 153 (4): 369 – 74
14. Golalipur M J, Arya B, Azar hoosh R, Jahan Shahi M; Anatomical variations of vermiform appendix in South East Caspian Sea [G o r g o a n - I r a n], *J. Anat Soc India*, 2003; 52(2): 141- 143.
15. Ahmad Ghorbani, Mehdi Foroozesh, Amir Mohammed Kazemi far et al Variation in Anatomical Position of vermiform appendix among Iranian popular tion. *Anatomy Research International: Vol 2014, Article ID 313575*.
16. S. Umamaheswara Rao, K. Chitti Nara Samma, B. Shaha jeer. Vermiform appendix in adults. *Journal of evidence-based medicine and Healthcare*; April 6, 2015, Vol 2(14): 2047 – 2051.
17. Dr. K. Sudha, Dr. V. Munia pan, A Study of Morphology of Vermiform Appendix In 50 Cases, *Indian Journal of Applied Research* volume - 7 | Issue - 4 | April-2017 | Issn - 2249-555x | If: 4.894 | Ic Value: 79.9
18. Chaudhari Manisha L, Kapadia Divyesh M, Kanani Sanjay. A study of Morphology of vermiform appendix in 200 cases. *International journal of medical research and health sciences* 2013 September; 2 (4): 780 – 785
19. M Bhagavan Naik, K. Sugunkara Rao. Laparoscopic Appen dicectomy in Situs Inversus total is. *J. Evolution of Med and Dental science* 2015; Vol 4 (29) April; 5064-5067.
20. Philip Mwachaka, Hemed El busai dy Simon Sinkeet. Variations in the position and length of the vermiform appendix in a black Kenyan population. *ISRN anatomy Vol 2014. Article ID 871048*.