

ORIGINAL ARTICLE

Anatomical Understanding of Vitapa Marma by Means of Cadaveric Dissection

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ABSTRACT:

Background: *Marma* are those spots on the body which are painful on application of pressure and shows abnormal pulsation. *Marma* are conglomeration of muscles, vessels, neuro-connective tissue, bones & joints. There are 107 *Marma*. Individual *Marma* are categorized on different groups on the basis of various aspects such as *Rachananusara*, *Parinamanusara*, *Sthananusara*, *Pramananusara* etc. *Vitapa Marma* is the *Adhoshakagata*, *Vaikalyakara Marma* of 1 *Anguli Pramana*. The explanation of the *Vitapa Marma* in the classical texts cannot specify the particular anatomical entity so the study is undertaken to fulfill the deficit knowledge. **Objectives:** To evaluate the *Snayu & Sira* component of *Vitapa Marma*. To evaluate structural entity of *Vitapa Marma* in relation to given *Pramana* and *Viddha Lakshana*. **Materials and methods:** Cadaveric Study. Observation of the structures exposed during cadaveric dissection and correlation with textual description were done and the conclusion was drawn. **Results & Conclusion:** *Vitapa Marma* lies on the inguinal region at the superficial inguinal ring. The anatomical components of this *Marma* are the structures related to and passing through superficial inguinal ring.

Keywords: *Vitapa Marma*, Inguinal region, superficial inguinal ring.

INTRODUCTION

In the earlier period, the *Marma* science was more developed in the wars where the warriors used to destroy

their enemies by targeting the vulnerable points i.e. *Marma* points of enemies, since persons injured in the vital spots die immediately; if anyone survives by the efficiency of

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the physician he is sure to suffer from deformities.¹ Even slight injury to the *Marma*, will produce severe pain/troubles; so the diseases localized in the *Marma Sthana* should be treated with great care and effort by the expertise *Vaidya*.² *Marma* are conglomeration of *Mamsa*, *Sira*, *Snayu*, *Asthi* and *Sandhi*.³ There are 107 *Marma*. *Marmas* are classified on different groups on the basis of various aspects.⁴ *Sushruta* mentioned *Vitapa* as *Snayu Marma*⁴ while *Vagbhata* mentioned it as *Sira Marma*.⁵ *Vitapa Marma* is of 1 *Angula*^{6,7} and is considered as one of the *Adha-Shakhagata Marma*.^{4,8} *Vagbhata* mentioned *Vitapa* is in between *Muska* and *Vamkshana*⁹ while *Sushruta* explain its location between *Vamkshana* and *Vrishana*.¹⁰ *Acharya* mentioned it as *Vaikalyakara Marma*. While explaining the *Viddha Lakshana* of *Vitapa Marma* *Sushruta* has mentioned *Alpa Shukrata* and *Shandya*.¹⁰ *Vagbhata* mention *Shandata*.¹¹ The gross explanation of the *Vitapa Marma* and different opinions of the Acharyas in the classical text book need to be clarified by analyzing the structural component in the particular region within the area of given pramana. This will be helpful to surgeon to avoid the injury to that *Marma* while performing surgical interventions.

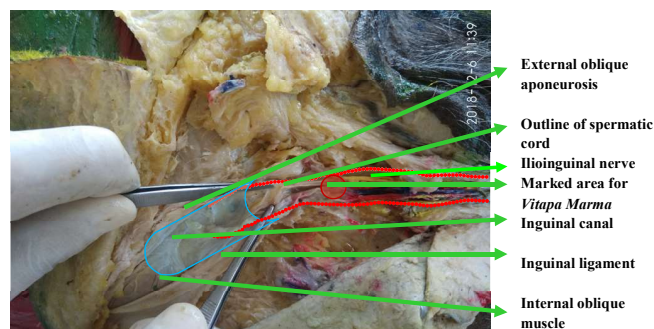
MATERIALS AND METHODS

Study Design: The present study was observational gross anatomy in cadaveric conducted in the Dissection Hall of Department of Rachana Sharir of Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital, Hassan. **Cadaveric Study:** By following Cunningham's manual of practical anatomy layer by layer dissection of 3 human cadavers (2 male and 1 female) in the inguinal region was done in the dissection hall of Rachana Sharir department, Sri Dharmasthala Manjunatheshwara college & Hospital, Hassan and observations of *Vitapa Marma* on the basis of classical description was made and all the necessary information were collected and photographs were taken. Critical analysis of the collected information from the various sources was done. Correlation and critical analysis between those explored structures after dissection and classical description were done and conclusion was drawn.

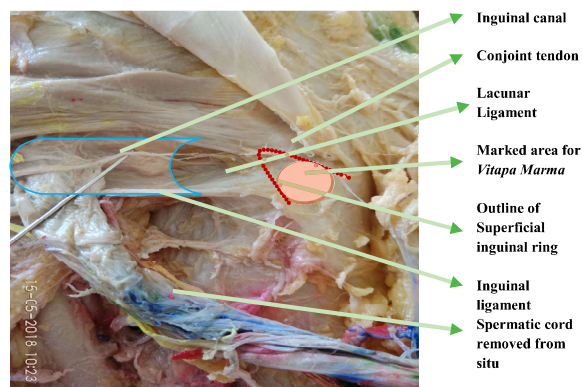
OBSERVATIONS AND RESULT

By following the Cunningham's Manual of Practical Anatomy layer by layer dissection of 3 human cadavers was done and the observation of the dissection is listed in the table number 1:

Superficial inguinal ring and the structures passing through the superficial ring i.e. spermatic cord in male, round ligament of uterus in female and ilioinguinal nerve in both lies in the marked area of the *Vitapa Marma*. The average dimension of superficial inguinal ring observed was 1.95cm in 1st male cadaver, 1.95 cm in female cadaver, 1.95cm in 2nd male cadaver and 1.95 in 2nd male cadaver. Table no: 2



Photograph No: 1 (Male Cadaver)



Photograph No: 2 (Male Cadaver)



Photograph No: 3 (Female Cadaver)



Photograph No: 4 Taking measurement of Superficial inguinal ring

DISCUSSION

Vitapa Marma is situated in between *Vrishana* and *Vankshana*.¹⁰ *Vagbhata* mentioned it's located in between *Muska* and *Vamkshana*.⁹ *Muska* and *Vrishana* is the scrotal sac enclosing the male gonad i.e. testis.^{12,13} and in case of female the homologous organ for the scrotum is labia majora.¹⁴ At the root of penis a point which indicates the beginning of median raphe of the scrotum which is lower part of pubic symphysis can be taken for the landmark of *Vrishana*. *Vankshana* is *Adhoshakhagata Sandhi*.¹⁵ which is the hip joint. The landmark given for the hip joint is the mid inguinal point.¹⁶ The location of the *Vitapa Marma* may be midway between the mid inguinal point and lower part of pubic symphysis in the groin region at level of superficial inguinal ring. The *Vitapa Marma* is 1 *Angula*. One *Angula* is approximately 2 cm.¹⁷ The length of the superficial inguinal ring is 2.5 cm from apex to base and width is 1.25 cm at base.¹⁸ In the present observation the marked area lies at the level of superficial inguinal ring. The average dimension of the superficial inguinal ring is 1.95 cm, 1.95 cm & 1.95 cm in 1st male, 2nd male and female cadaver respectively. The *Anguli Pramana* of *Vitapa Marma* and dimension of superficial inguinal ring is approximately equal to each other so, structural entity of superficial inguinal ring and the structures emerging out through it is *Vitapa Marma*. *Sushruta* has mentioned the *Vitapa Marma* as *Snayu Marma*.⁴ *Snayu* are the binding structure in the body that binds the *Mamsa*, *Asthi* and *Medha*.¹⁹ In the present study the observation made at superficial inguinal ring which was formed as triangular interval of the external oblique aponeurosis beyond pubic tubercle, spermatic cord in male, round ligament in female and ilioinguinal nerve passed through this opening which are the *Snayu* component. *Vagbhata* mentioned *Vitapa Marma* as the *Sira Marma*.⁵ The structure that allows the continuous flow through it is known as *Sira*.^{20,21} In the present study superficial and deep external pudendal vessels in both, artery to ductus deferens, testicular artery, cremasteric artery, pampiniform plexus of vein in male, was observed along the region of *Vitapa Marma*. These may be the *Sira* component of the *Vitapa Marma*. *Acharya Sushruta* and *Vagbhata* mentioned it as *Vaikalyakara Marma*. *Sushruta* mentioned the *Viddha Lakshana* of *Vitapa marma* as *Alpa Shukrata* and *Shandya*¹¹ whereas *Vagbhata* mentioned *Viddha Lakshana* as *Shandya*.²² The ductus deferens in the spermatic cord is responsible for transporting the

sperm.²³ If it is obstructed or injured, the sperm flow is obstructed that lead to decreased sperm count or absence of the sperm in semen during ejaculation that affect reproduction.²⁴ Testicular artery interruption in the region of the spermatic cord leads to infarction of testis.²⁵ Thus, testicular artery and artery for ductus deferens and other arteries and pampiniform plexus of vein are responsible for maintaining the tissue perfusion with nutrition and oxygen. The impact of injury in these particular vessels result in the ischemic condition of the testis, ductus deferens, even the structures of spermatic cord etc. followed by infarction and necrotic changes which ultimately lead to infertility or sterility. The round ligament of the uterus is one of the main mechanical and primary support of the uterus.²⁶ The normal position of the uterus is anteversion and ante flexion. Long axis of vagina and long axis of the cervix of uterus forms 90 degree called anteversion. Anti-flexed orientation of uterus is where the long axis of the body of uterus makes an angle of 125 degree with the axis of the cervical canal i.e. forward bending of the uterus on itself.²⁷ The ligament pulls the fundus forwards and maintains the anteversion and ante flexion of the uterus.^{28,29} The impact of injury to the round ligament may lead to malposition of uterus, prolapse of the uterus, which ultimately affects the sperm propagation, conception, implantation leading to infertility.

CONCLUSION:

The *Vitapa Marma* lies on inguinal region over superficial inguinal ring. Its dimension is 1.95 cm which is approximately equal to the *Pramana* of *Vitapa Marma* which is 1 *Anguli*. The presence of the neuro-connective tissue such as coverings of the spermatic cord in male, round ligament of uterus in female, ilioinguinal nerve, genital branch of genito femoral nerve, inguinal ligament it is *Snayu Marma*. The presence of vascular structures and ducts such as pampiniform venous plexus, testicular artery, cremasteric artery, ductus deference in male, it is *Sira Marma*. So, the superficial inguinal ring and structure passing thorough it can be considered as the *Vitapa Marma*.

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Table no:1 observation of cadaveric dissection

Cadaver No	Superficial fascia	Deep to superficial fascia	Inguinal canal	Posterior wall and floor of inguinal canal	Deep structures
Cadaver 1 (Male body)	<ul style="list-style-type: none"> ➤ Superficial circumflex iliac vessel, superficial epigastric vessels and superficial external pudendal vessels. ➤ The superficial external pudendal vessels were passing near to the marked area. 	<ul style="list-style-type: none"> ➤ External oblique aponeurosis, inguinal ligament & its extensions, superficial inguinal ring. ➤ Superficial inguinal ring lies at the marked area. 	<ul style="list-style-type: none"> ➤ Ilioinguinal nerve and spermatic cord ➤ External spermatic fascia, cremasteric fascia and internal spermatic fascia ➤ Ductus deferens, artery to ductus deferens, testicular artery, pampiniform venous plexus, genital branch of genito-femoral nerve, remnant of processus vaginalis 	<ul style="list-style-type: none"> ➤ Conjoint tendon, reflected part of inguinal ligament, lacunar ligament, medial end of inguinal ligament and fascia transversalis ➤ lacunar ligament and medial end of inguinal ligament were observed at marked area 	<ul style="list-style-type: none"> ➤ Pubic bone-superior pubic rami, pubic tubercle, pecten pubis & body of the pubis. ➤ Pubic crest and pubic tubercle was at marked point
Cadaver 2 (Female body)	<ul style="list-style-type: none"> ➤ Superficial circumflex iliac vessel, superficial epigastric vessels and superficial external pudendal vessels. ➤ The superficial external pudendal vessels passed near to the marked area. 	<ul style="list-style-type: none"> ➤ External oblique aponeurosis, inguinal ligament, superficial inguinal ring ➤ Superficial inguinal ring was at the marked area. 	<ul style="list-style-type: none"> ➤ ilioinguinal nerve and round ligament of uterus ➤ Both emerge from superficial inguinal ring which was at the marked area. 	<ul style="list-style-type: none"> ➤ Conjoint tendon, inguinal ligament and lacunar ligament ➤ Lacunar ligament and medial end of inguinal ligament was at marked point 	<ul style="list-style-type: none"> ➤ Body of pubic and superior ramus of pubis ➤ Pubic crest and pubic tubercle was at marked point

<p>Cadaver 3 (Male body)</p>	<ul style="list-style-type: none"> ➤ Superficial circumflex iliac vessel, superficial epigastric vessels and superficial external pudendal vessels. ➤ The superficial external pudendal vessels passed near to the marked area. 	<ul style="list-style-type: none"> ➤ External oblique aponeurosis, inguinal ligament, superficial inguinal ring. ➤ Superficial inguinal ring was at the marked area. 	<ul style="list-style-type: none"> ➤ Ilioinguinal nerve and spermatic cord ➤ External spermatic fascia, cremasteric fascia and internal spermatic fascia ➤ Ductus deferens, artery to ductus deferens, testicular artery, pampiniform venous plexus, genital branch of genito-femoral nerve, remnant of processus vaginalis uperf 	<ul style="list-style-type: none"> ➤ Conjoint tendon, inguinal ligament and lacunar ligament ➤ Lacunar ligament and medial end of inguinal ligament was at marked point 	<ul style="list-style-type: none"> ➤ Body of pubic and superior ramus of pubis ➤ Pubic crest and pubic tubercle was at marked point
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Table no:2 Measurement of Superficial inguinal ring

Cadaver no:	Dimension of superficial inguinal ring				Average dimension		Average dimension of both side =(R+L)/2
	Right side		Left side		Right side	Left side	
	Vertical extension (vr)	Horizontal extension (hr)	Vertical extension (vl)	Horizontal extension (hl)	$R=(vr+hr)/2$	$L=(v-l+hl)/2$	
1.	2.6 cm	1.5 cm	2.4 cm	1.3 cm	2.05 cm	1.85 cm	1.95 cm
2.	2.4 cm	1.9 cm	2.6 cm	1.4 cm	1.9 cm	2 cm	1.95 cm
3.	2.6 cm	1.5 cm	2.4 cm	1.3 cm	2.05 cm	1.85 cm	1.95 cm
Average dimension of superficial Inguinal Ring							1.95 cm
v-vertical extension, h-horizontal extension, r-right, l-left							