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## Pyramidalis Muscle: Overview

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### **Abstract:**

*According to free encyclopedia, there are approximately 640 skeletal muscles within the typical human and these muscles are classified based on regions with pyramidalis belonging to the trunk. Although the pyramidalis muscle is typically described to lie between the anterior surface of the rectus abdominus and the posterior surface of the rectus sheath, it is a small triangular shaped muscle with the wider inferior margin of the muscle attaches to the pubic symphysis and pubic crest, where as its narrow superior margin attaches to the linea alba. The muscle was described by Massa N who assumed that it assist in the erection of the penis. Pyramidalis muscle is present on one or both sides of the body in 82.6% of cases, more frequently absent in the female than in the male with no relationship between size of the individual and size of the pyramidalis muscle and the muscle is absent in 20% of normal human. Although the muscle acts as a tensor of the linea alba thereby assisting in increasing the intra-abdominal pressure as well as locally compressing the bladder, Clinically it also play a vital role in the marshal- Marchetti operation for Urinary incontinence and also provide flap for the treatment of small recalcitrant wounds in the foot and ankle region.*

**Keywords:** Pyramidalis

### **1. Introduction**

According to free encyclopedia, there are approximately 640 skeletal muscles within the typical human, and almost every muscle constitute one part of pair of identical bilateral muscles, found on both sides, resulting in approximately 320 pairs of muscles.

Muscles in the human body are classified based on regions; pyramidalis is a muscle of the trunk (Keith and Arthur, 1999).

Anatomical studies have reported considerable variation relative to the description of the abdominal rectus sheath (Richard and Larry, 2008). For example, the position and shape of the arcuate line is inconsistent (monkhouse and Khalique, 1986), while the presence of the pyramidalis muscle is reported to be as low as 30% ( Dickson, 1999) or as high as 90% (Anson et al, 1938), and there is considerable variation regarding its innervations (Tokita, 2006).

Although the pyramidalis muscle is typically described to lie between the anterior surface of the rectus abdominus and the posterior surface of the rectus sheath, there is considerable variation in the rectus sheath of the anterior abdominal wall( monkhouse and Khalique, 1986).

### **2. History**

The first anatomist to refer to the pyramidalis was Massa N. (1538) who assumed that this muscle assisted in the erection of the penis while Vesalius (1543) thought that it had the function of expressing Urine from the penis, "pene urieversum efformans musculum. Riolan (1649) noted that the muscle is occasionally absent, as did Crooke (1650), and Rolfinck (1656).

Rofinck also noted that occasionally only one of the two muscles was present, almost invariably on the right side.

A description of three pyramidalis was cited by Winslow (1749). Additional reports of variations in this muscle were given by Verheyen (1706), Sartorini (1724), Hammer (1765) (who described the presence of two pyramidalis on each side, or four in each body).

The muscle is a constant feature of man and other primates and may be related to the assumption of the upright posture in man (Ronald et al, 1995).

### **3. Gross Anatomy**

The pyramidalis is a small triangular shaped muscle that lies between the anterior surface of the rectus abdominus muscle and the rectus sheath (Richard and Larry, 2008).

The wider inferior margin of the pyramidalis muscle attaches to the pubic symphysis and pubic crest, where as its narrow superior margin attaches to the linea alba (Richard and Larry, 2008), with the medial border of the paired pyramidalis muscle meeting at the midline and forming a shape similar to a pyramid.

The vascular supply to the pyramidalis muscle is via the inferior and superior epigastric arteries, no detailed anatomical studies of its vascular pedicle exist( van et al,2003).

The motor nerve supply may occur in a variety of ways being through one of the lowermost thoracic nerves (11 or 12), the subcostal nerve, the first and/ or second lumbar nerves, the iliohypogastric, the ilioinguinal and/or genitofemoral nerves (van et al, 2003).

#### 4. Variation in Human

Pyramidalis muscle is present on one or both sides of the body in 82.6% of cases, more frequently absent in the female than in the male (Van et al., 2003). It tends to be more constant in native Africans (83.7%) and Asians (96.2%) than in Caucasians (79.3%) (van et al,2003).

The incidence and sizes of the muscles varies between subjects and even between sides within a subject; often the pyramidalis is present only unilaterally( sinha and Kumar, 1985).

There appears to be no relationship between size of the individual and size of the pyramidalis muscle(Anson et al,1938).

The muscle is absent in 20% of normal human (Keith and Anthur, 1999).

Both Gray's Anatomy (Goss,1948;Willanis and Warwick, 1980) and moris' Human Anatomy (Anson,1966) describe the incidence of the pyramidalis muscle to be 83-90%.

The size of the muscle seems to vary between 20 and 138mm in length; the average length is 6.82cm and the average width is 1.98cm. There is no correlation with general height or size of the abdomen(van et al,2003).

#### 5. Clinical Significance

As to its function, it is generally stated that the pyramidalis muscle acts as a tensor of the linea alba thereby assisting in increasing the intra-abdominal pressure as well as locally compressing the bladder (van et al, 2003). Although its precise function is unclear (Richard and Larry, 2008), the muscle is considered insignificant and vestigial by some, although it is frequently encountered by gynaecologists (Dickson, 1999) and often harvested to conduct etelectro-physiological experiments (coffield et al., 1997).

Its Clinical use has also been limited to occasional reports of a variation of the marshall- Marchetti operation for Urinary incontinence (parent,1973; de leval et al., 1984;Jurascheck et al., 1984). Pyramidalis flap had also been used Clinically for the treatment of small recalcitrant wounds in the foot and ankle region(van et al., 2003).

#### 6. Conclusion

Although pyramidalis is one among the smallest muscle in the body whose function cannot be precisely defined but it is said to have a host of other important clinical significant, so no muscle or part of the human body that is said to be vestigial.

#### 7. Acknowledgement

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#### 8. References

- i. Anson BJ(1966) editor, Moris, Human Anatomy . McGraw Hill; New York, Ny.
- ii. Anson,B.J., Beaton, L.E. and C.B. Mcvay.(1938) the pyramidalis muscle. *Anat. Rec.* 72: 405-411.
- iii. Anson. B.J. and Beaton, L,E . (1939) the pyramidalis muscle: its occurrences and size in American whites and Negroess.*Am. J. phys. Anthropol.* 25:261-269.
- iv. Coffield JA, Barky N, Zhang RD,Cadson J, Gomella LG,Simpson LL.(1997). Invitro Characterization of botulinum toxin types A,C and D action on human tissues: combined electrophysiologic, pharamalologic and molecular biologic approaches.*J pharamaiol Exp ther* 280; 1489-98.
- v. Crooke, H.(1650) *Myographia*. Landom.
- vi. De leval, J.Bouffiuoux, C., and Penders, L. (1984) Cure d'in continence parfixationdu vagin a unlambeau pyramidal, 200 observations. *Actaurolog Beig.* 52: 286-290
- vii. Dickson MJ(1999). The pyramidalis muscle. *J obstet Gynaccol.*19:300.
- viii. Goss CM, editor.(1948).*Gray's Anatomy*. Lea and febiger; philadeplia.
- ix. Hammer, W.C. (1765) *De musculorum varietate*. Dissertation, Erlangen.
- x. Jurascheck, F.,Dollfus, P., and Chapius, A. (1987). Surgical treatmentof the static perineal modification in spinal cordor caudal equinal lesions,. *Paraplegia.* 25: 475- 481.
- xi. Keith Lean Moore; Arthur F. Dalley (1999). *Anatomy*. Lippincott Williams & Wilkins. P180. ISBN 978-0-683-06141-3. Retrieved 1 december 2012.
- xii. Massa,N.(1536) *Liber introductorius Anatomiae, sive dissectionis corporis humani*. Venetiis. Cap. 21:37-38.
- xiii. Monkhouse WS, Khaliq A. (1986). Variations in the Composition of the human rectus sheath: A study of the anterior abdominal wall.*J Anat.* 145:61-6.
- xiv. Parent , B.(1973) la suspension du vagin aux pyramidaux, modification de intervention de marshall- marchetti. *J. Gynecol obstet Biol Reprod.* (Paris) 2: 553-560.
- xv. Riolan (fili), J. (1649) *opera Anatomica*.paris .83.
- xvi. Rolfinck, W.(1656) *Dissertationes Anatomicae*. Noribergae, 579-580

- xvii. Ronalt A. Bergman, Adel K. Afifi and Ryosuke M. Virtual Hospital: illustrated Encyclopedial of Human Anotomica variation: Opusl: Muscular system: pyramidalis, ww.vh. org/providers/ textbooks/ Anatomic variants/ text/p/49 pyramidalis:http.
- xviii. Santorini, G.D.(1724) Observationes Anatomicae. Ventiis. Cap. 9:160.
- xix. Sinha DN, Kumar V.(1985). Study of human pyramidalis muscle in indian subject. Anthropol Anz 43:173-7
- xx. Tokita K. (2006). Anatomical significance of the nerve to the pyramidalis muscle. A morphological study. Anat sci int. 81:210-24
- xxi. Van k. Landyt, M. Hamdi, ph. Blondeel, S. Monshey (2003). The pyramidalis free flap. Int. j. surg. Recons. Vol. (56) (6) pp585-592.
- xxii. Verheyen,P.(1706) Corporis Humani Anatomia. Lipsiae.pp. 59-60.
- xxiii. Williams L,Warwick R,(1980) editors : Grays Anatomy. Churcill Living shore; London.
- xxiv. Winslow, J.B. (1749) An Anatomical Exposition of the structure of the Human Body. London. I, p. 168.