



## STUDY OF THE VARIATION OF THE PYRAMIDALIS MUSCLE AMONG NORTH INDIAN POPULATION

### Anatomy

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### ABSTRACT

**INTRODUCTION:** Pyramidalis is classified as a vestigial muscle which is frequently present. It is muscle of the anterior abdominal wall. It is thought to tense the linea alba. It has been used as a surgical landmark, source of muscle stem cells and in various surgical procedures.

**AIM:** The aim of this study was to recognise the variations in occurrence & shape of the pyramidalis muscle and its relevance in flap and graft.

**MATERIAL AND METHODS:** A total of 12 male cadavers from the Anatomy department were used in this study. Dissection of the lower anterolateral abdominal wall was made to ascertain the presence & shape of the muscle. There was no case of unilateral occurrence or supernumerary presence or agenesis and the predominant shape was triangular with no difference in shape on either side.

**CONCLUSIONS:** Our findings suggest that the incidence of agenesis of the pyramidalis muscle is not common and there are no significant differences in the sizes of the muscle on either side. So, this study provides valuable information on pyramidalis muscle which may help in appropriate understanding of anatomy, functions and clinical significance of the muscle.

### KEYWORDS

Pyramidalis muscle, rectus abdominus, linea alba

### INTRODUCTION

Pyramidalis is a triangular muscle in front of the lower part of rectus abdominis within the rectus sheath. It is attached by tendinous fibres to the front of the pubis and by the ligamentous fibres in front of the symphysis. The muscle passes upwards diminishing in the size as it runs upwards and ends in a pointed apex that is attached to the linea alba midway between umbilicus and pubis but may extend to a higher level. It varies much in size and may be larger on one side than on the other, or may be absent on one or both sides. Occasionally it may be double [1]. The precise function of pyramidalis muscles is unclear, but together the muscles are thought to tense the linea alba [2]. Also after long-term cryopreservation pyramidalis muscle specimens are used as a source of striated

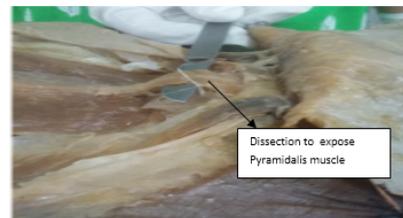
Muscle stem cells for treatment of post-prostatectomy stress urinary incontinence [3]. The first anatomist to refer to the pyramidalis was Massa (1536) [4] who assumed that this muscle assisted in the erection of the penis. Bergman et al (1996) [5] citing the Works of Riolan (1649) [6], Rolfinck (1656) [7], and Crooke (1650) [8] stated that the muscle is occasionally absent bilaterally or unilaterally. In later case it is almost invariably present on the right side. Even double pyramidalis on one side (total being three) (Winslow, 1749) [9] or on both sides (total being four) [10-13] have also been reported. Vallois (1926) [14] emphasized that this muscle is a constant feature of man and other primates so it may be related to the assumption of upright posture in man. When present the muscle tenses the linea alba. Its attachment to the linea alba is used by surgeons as a landmark for an accurate median abdominal incision [15]. Thus its presence and the knowledge is of paramount anatomical and clinical significance. The incidence of its absence depending on the side, sex and race varies greatly. So the present study was undertaken to find the same in population of this region.

### MATERIALS AND METHODS

The material comprised of Twelve (12 males) formalin fixed cadavers obtained from the Department of Anatomy of Medical Colleges in Jammu & Kashmir. Rectus sheath was dissected on both the sides. Presence of pyramidalis muscle and its shape was noted.

### RESULTS

Presence or absence: Out of the 12 cadavers, the pyramidalis muscle was bilaterally present in all the cadavers (100%). There was no case of unilateral occurrence or supernumerary presence or agenesis and the predominant shape was triangular with no difference in shape on either side.



89%, Loth (1912) [17] Black 79%, Vallois (1926) [14] Black 82%, Wagenseil (1927) [18] Chinese 99%, Mori (1964) [19] Japanese 94.5%. The earlier studies regarding Incidence of bilateral and unilateral presence and complete absence of Pyramidalis Muscle is as; Unilateral Bilateral (Didia et al [20] 2009 Nigerian - 91.67% & 8.33%, Natsis et al [21] 2015 Greek 14.6% & 79.2% & Present study 2018 North Indians 100% bilateral).

**Clinical implications:** Though literature on function of the pyramidalis has been very less defined yet it is definitely said to tense the linea alba. Some authorities consider it to be insignificant and vestigial, but it is frequently encountered by gynaecologists [22]. Lovering and Anderson studied the architecture and fibre type of pyramidalis muscle and estimated that this muscle generates even < 1% of the estimated force generated by the rectus abdominis in normal sized males [23]. This led them to comment that the relative importance of this modest amount of force on linea alba is not clear. However, on the contrary it is often harvested to conduct electrophysiological experiments [24]. Apart from this clinically the muscle is used as a source of striated muscle stem cells for the treatment of post prostatectomy stress urinary incontinence. After confirming its presence a complete removal of prostate gland without fear of injury to the urethral sphincter may be possible in patients with apical or T3 prostate cancer [3] and can also be used as a donor muscle for microsurgical transfer because of negligible donor site morbidity after its harvesting [25].

## CONCLUSION

In the present study pyramidalis was present in all the cases. There was no case of unilateral occurrence or supernumerary presence or agenesis and the predominant shape was triangular with no difference in shape on either side. Our findings suggest that the incidence of agenesis of the pyramidalis muscle is not common and there are no significant differences in the sizes of the muscle on either side. So, this study provides valuable information on pyramidalis muscle which may help in appropriate understanding of anatomy, functions and clinical significance of the muscle.

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