
MULADHARA CHAKRA: A SCIENTIFIC REVIEW OF ITS ANATOMICAL, NEUROPHYSIOLOGICAL, AND PSYCHOPHYSIOLOGICAL CORRELATES

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ABSTRACT

Muladhara Chakra is traditionally regarded as the root energy center in yogic philosophy, associated with stability, survival, grounding, and bodily support. In modern scientific interpretation, it may be examined through anatomical, neurophysiological, and psychophysiological perspectives rather than as a discrete measurable structure. This review explores potential correlations between *Muladhara Chakra* and the pelvic floor, perineal region, coccygeal structures, sacral plexus, autonomic nervous system, and stress regulation. The article also evaluates yogic practices linked with *Muladhara*, including Mula Bandha, breath control, and meditation, in relation to pelvic muscle activation, autonomic balance, and interoceptive awareness. Current evidence suggests plausible functional associations, but direct biomedical validation remains limited. Further controlled studies are required to clarify the physiological relevance of this traditional concept.

KEYWORDS: *Muladhara Chakra*; pelvic floor; sacral plexus; autonomic nervous system; *Mula Bandha*; grounding; yoga physiology; interoception; stress regulation; neurophysiology

INTRODUCTION

The *chakra* system originates from classical Indian yogic traditions (1) and describes subtle energy centers distributed along the body. *Muladhara Chakra*, located at the base of the spine in traditional literature (2), is considered the foundational center governing survival, security, stability, and physical grounding. It is symbolically associated with the earth element and functionally linked with basic bodily and emotional resilience.

From a scientific standpoint, chakras are not recognized as anatomical structures in conventional medicine. However, their associated practices and symbolic descriptions may correspond to measurable somatic and autonomic processes. *Muladhara* is especially relevant because its traditional location overlaps with the pelvic and perineal region, where important musculoskeletal, neural, and visceral control mechanisms exist. This makes it a useful subject for interdisciplinary review.

MATERIALS & METHODS

This article is a narrative review based on available literature concerning *Muladhara Chakra*, yoga-based pelvic practices, pelvic floor anatomy, autonomic nervous system regulation, and related psychophysiological studies. Sources included peer-reviewed anatomical and clinical publications, yoga research, and studies addressing stress physiology, body awareness, and breath regulation. The review also considered published work that specifically compared *Muladhara* with pelvic autonomic anatomy (3).

The review approach was qualitative and interpretive. Information was organized into four domains: traditional descriptions of *Muladhara*, possible anatomical correlates, neurophysiological mechanisms, and the effects of associated yogic practices. No experimental participants were involved, and no primary data were collected. The objective was to synthesize existing knowledge into a scientific framework suitable for academic presentation(4)

RESULTS

The review identified several plausible correlations between *Muladhara Chakra* and biomedical structures or functions. The pelvic floor musculature, sacral plexus, coccygeal nerves, and inferior hypogastric plexus were the most frequently discussed anatomical associations. These structures are involved in postural support, continence, pelvic organ function, and autonomic regulation.

Yogic techniques associated with *Muladhara*, especially *Mula Bandha* and grounding-based breathing, may activate pelvic floor muscles and improve somatic awareness (5). Breath-centered practices may also enhance parasympathetic activity, reduce stress responses, and improve emotional regulation. In addition, meditation and body-focused attention may support interoceptive processing and perceived stability (6). However, the evidence remains indirect, and no study has established *Muladhara* as a discrete biological entity.

DISCUSSION

The findings support a cautious scientific interpretation of *Muladhara Chakra* as a traditional concept that may reflect integrated pelvic and autonomic functions. Its association with the pelvic floor is anatomically plausible because the region contains key structures involved in support, elimination, reproduction, and neuromuscular control. The sacral and coccygeal networks further strengthen this correlation by providing neural links to lower-body regulation.

From a neurophysiological perspective, *Muladhara*-related practices may work through multiple pathways. Pelvic floor engagement can improve core stability and body awareness, while controlled breathing can alter autonomic tone and reduce sympathetic arousal. These effects may contribute to a subjective sense of grounding, safety, and emotional steadiness (7). The concept of "rooting" may therefore be understood as a combination of somatic, neural, and psychological regulation.

Despite these interesting parallels, the evidence base is still limited. Most available literature is conceptual, descriptive, or based on indirect anatomical resemblance. Future research should use objective biomarkers such as electromyography, heart rate variability, cortisol, and neuroimaging to test whether *Muladhara*-associated practices produce reproducible physiological changes. Until then, the chakra should be treated as a culturally meaningful framework rather than a confirmed biomedical structure.

CONCLUSION

Muladhara Chakra can be interpreted scientifically as a traditional model that may correspond to pelvic, neural, and autonomic processes involved in grounding and self-regulation. Its associated practices, including *Mula Bandha*, breath control, and meditation, may influence pelvic floor function, stress reduction, and emotional balance (8). Although these effects are biologically plausible, direct scientific validation is still insufficient. A

multidisciplinary research approach is needed to explore its physiological relevance more rigorously.

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