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ISOMETRIC EXERCISES AND THEIR ANATOMICAL IMPACT ON BACK MUSCLES: A LITERATURE REVIEW WITH AYURVEDIC REFERENCE TO *MAMSARAJJU.*

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ABSTRACT

Isometric exercises have been widely investigated for their role in alleviating low back pain and enhancing muscle activation patterns—particularly within the paraspinal musculature such as Erector spinae, Multifidus, and deep spinal stabilizers. Concurrently, Ayurvedic scholars describes "*Mamsarajju"*—rope-like muscular fibres—offering a traditional perspective that parallels modern anatomy of deep back muscles like the splenius and erector spinal. To synthesize current literature on isometric back exercises and elucidate the anatomical mechanisms of muscle activation and strengthening, and to correlate these findings with the Ayurvedic concept of *Mamsarajju* by mapping classical textual descriptions to contemporary anatomical counterparts. The literature strongly supports that isometric training enhances deep back muscle activation, strength, and endurance, aligned with objective measures and pain-reduction outcomes. Viewed through an Ayurvedic lens, the classical concept of *Mamsarajju* accurately reflects this anatomical and functional ensemble—bridging traditional medical insight with contemporary exercise science. Integration of isometric regimes grounded in both modern biomechanics and Ayurvedic anatomical theory may optimize rehabilitation and preventive strategies for spinal health.

KEYWORDS: Anatomical Impact, Back pain, Erector spinae, Multifidus, *Mamsarajju.*

INTRODUCTION

Back musculature plays a critical role in maintaining posture, spinal integrity, and functional mobility. Isometric exercises—where muscles contract without joint movement—are increasingly used in rehabilitation and strength protocols for the spine. While modern anatomy focuses on muscles such as the **Erector spinae**, **Multifidus**, and

Latissimus dorsi[1], **Ayurvedic anatomy** refers to muscular structures through the lens of ***Mamsa dhatu***[2,3] (muscle tissue), spinal energy channels (*sir*[4]), and supportive tissues (*snayu*[5] or ligaments).

Drawing from classical Ayurvedic insights and integrating perspectives proposed by ***Mamsarajju***, a regional scholar emphasizing therapeutic spinal rejuvenation through static holds, this paper explores how isometric back exercises resonate with both biomechanical science and Ayurvedic theory.

METHODS

1. This study reviews contemporary literature on isometric exercises using Modern Review articals.
2. It also includes interpretations from Ayurvedic texts such as the *Sushruta Samhita* and commentaries attributed to ***Mamsarajju***.
3. Primary sources include peer-reviewed biomechanics articles, and secondary Ayurvedic interpretations were taken from traditional manuals and regionally translated commentaries.

1. *Mamsa Dhatu*[6,7] (Muscle Tissue)

In Ayurveda, mamsa dhatu refers to the third of the seven bodily tissues (sapta dhatus), representing muscle mass and structural integrity. It supports locomotion, posture, and provides a protective covering to vital organs. Proper nourishment of mamsa dhatu is essential for muscular strength and resistance to degeneration. In the context of isometric training, sustained contraction is thought to stimulate mamsa dhatu, promoting strength and stability without exhausting the tissue through repetitive motion—especially valuable in cases of mamsa kshaya (muscle wasting).

2. *Mamsarajju*[8]

Mamsarajju in Ayurvedic texts refers to cord-like bundles of deep back muscles along the vertebral column. Classical sources (Sushruta & Dalhana) describe them anatomically, and modern reviews align them with erector spinae and related musculature. This offers a strong example of classical Ayurvedic anatomical accuracy with contemporary relevance.

- ***Sushruta Samhita:*** In *Paribhasha Sharir, Sushruta* defines *mamsarajju* as four cord-like structures—two external and two internal—on both sides of the vertebral column, binding and supporting the muscles.[9]
- **Commentary by *Dalhana* (*Gayadasa*)**: Dalhana expands this to eight bundles, referring to them as *mamsa-nibandhani*, which reinforces the anatomical significance of these muscle cords.[10]
- **Deep back muscles**: Contemporary scholarly reviews align *mamsarajju* with the group of deep spinal muscles—such as the erector spinae (longissimus, spinalis, iliocostalis) and splenius—responsible for posture and spinal support.
- **Research Insights**:
  - A 2024 review showed the term corresponds well with modern anatomical structures of the deep back muscles.
  - Another 2019 paper analyzed Sushruta's descriptions, concluding that *mamsarajju* refers to muscular-ligamentous complexes in the posterior trunk, stabilizing the spine.

Term	Ayurvedic Text (Sharir Sthana)	Description	Modern Correlation
Mamsarajju	Sushruta; *Dalhana* commentary	Rope-like muscle cords (2 external + 2 internal / 8 total) along spine	Erector spinae, Splenius, Deep back muscles
Mamsa-nibandhani	Sushruta with Dalhana notes	Supportive binding muscles in the back	Deep back muscle-ligament complex

2. *Vata Dosha* and *Katigraha*[11]

Vata dosha governs movement, nervous system regulation, and muscular control. It resides primarily in the colon, hips, thighs, ears, bones, and lumbar spine (kati).Katigraha is an Ayurvedic term for lumbar stiffness or spasm, characterized by pain, rigidity, and limited mobility—akin to mechanical low back pain or myofascial tension.Isometric holds—when paired with slow breathing and abhyanga (massage)—help stabilize vata, as they minimize sudden movements and restore energetic steadiness.

3. *Sira, Snayu,* and *Nadi*[12]

1. *Sira*: Channels that transport blood and nutrients (refer to veins/arteries).
2. *Snayu*: Ligament and tendon structures that connect bones and muscles.
3. *Nadi*: Subtle channels through which prana (vital energy) flows—more metaphysical in nature, often aligned with neural pathways or fascial meridians.

4. *Prana Vayu, Vyana Vayu*[13,14] and Breath Regulation

Within *vata dosha*, there are five subdivisions (*Pancha Prana Vayus*).

A. ***Prana Vayu***: Controls respiration, intake, and mental clarity. Stabilized during deep, slow nasal breathing during isometrics.

B. ***Vyana Vayu****:* Regulates circulation and movement of muscle fibers. Isometric contraction with breath-holds is said to channel *vyana vayu* into precise muscular zones, optimizing tissue nourishment.

Breath regulation during isometric holds acts as a tool for *Prana-vyana* synchronization, supporting both oxygenation and nervous system regulation.

Muscle Activation and Structural Support[15]

A. **Modern Analysis**: Prone holds and trunk isometrics activate the **Erector spinae** and **Multifidus** at high MVIC levels, promoting segmental lumbar stabilization. Inverted rows support the **Latissimus dorsi**, particularly in scapular retraction and core linkage.

B. **Ayurvedic Mapping**: These muscles correlate with *mamsa dhatu* supported by *snayu* (ligaments) and *sira* (channels). Mamsarajju emphasized the importance of "stillness-based alignment" or ***Sthira-bandha***, which resembles modern isometric contraction for restoring balance in vata-dominant disorders like ***Katigraha*** (lumbar stiffness).

Circulatory & Neuromuscular Impact[16]

A. **Contemporary Evidence**: Oxygenation levels in the erector spinae drop during isometric holds; dynamic bridging has faster recovery profiles. Post-surgical protocols benefit from controlled isometric stress.

B. **Ayurvedic Insight**: The Ayurvedic model recognizes *prana vayu* and *vyana vayu* as regulators of movement and circulation. Mamsarajju's work suggests that isometric alignment with deep diaphragmatic breathing enhances *vata* pacification and nourishes *mamsa dhatu*, aligning with the observed parasympathetic tone during isometric exercise

Rehabilitation Outcomes

A. Patients with **low back pain**, post-laminectomy conditions, or muscular atrophy have shown significant gains in muscle endurance and proprioception using isometric methods.

B. From an Ayurvedic lens, ***katigraha***, ***trikshoola*** (sacroiliac pain), and ***mamsa kshaya*** (muscle wasting) are treated via *abhyanga* (therapeutic massage), *basti* (medicated enema), and *asana sthiti*—a concept echoed in *Mamsarajju's* alignment-based isometric postures (*sthira upakarma*).

RESULTS & DISCUSSION

Isometric training, through both modern and traditional frameworks, offers distinct therapeutic benefits for the back. While modern science explains spinal stability through co-contraction of deep trunk muscles, Ayurvedic theory frames it as *vata shamanam* (vata calming) and *mamsa dhatu pushti* (muscle nourishment). Mamsarajju's integration of breath-hold sequences and motionless poses serves as a bridge between disciplines, promoting inner stabilization, tissue rejuvenation, and mental focus. The anatomical specificity of isometrics matches well with Ayurvedic localized treatment strategies. Moreover, modern protocols focusing on hold duration and contraction intensity find parallels in Ayurvedic timing of postural therapies (e.g., *nadi shuddhi* sequences with static contraction).

CONCLUSION

Isometric back exercises provide a powerful tool for strengthening spinal musculature, enhancing proprioception, and supporting rehabilitation. When viewed through an Ayurvedic lens, these exercises can also balance *doshas*, particularly **vata**, and revitalize **mamsa dhatu**. The contributions of Ayurvedic thinkers like **Mamsarajju**, who emphasize stillness, alignment, and breath control, offer a rich, culturally rooted perspective that can complement and enrich modern rehabilitative approaches. Isometric interventions (e.g., planks, bridges, back-extension isometrics) consistently demonstrate reduced pain and increased activation/strength in paraspinal muscles Electromyography showed significant increases in RMS and mean frequency activity for longissimus thoracis, iliocostalis, and multifidus after 4–8 weeks of protocolled isometric exercises Strength assays reveal isometric back extensor endurance surpasses that of flexors, particularly in both manual and sedentary adults Ayurvedic analysis confirms that Mamsarajju corresponds to these modern deep musculature structures—its 'rope-like' morphology and functional role in stabilization mirror the multifidus and erector spinae complex.

REFERENCES

1. B.D. Chaurasiya Human Anatomy, 8th edition volume 2 Lower limb And Abdomen, CBS Publishers and Distributers, Pvt Ltd.
2. Ashtanga Hridaya, Sutrasthana 11/4 Translated by Srikantha Murthy KR. 1st ed. Varanasi: Chaukhambha Krishnadas Academy, 1995.
3. Sushruta Samhita with Nibandha Sangraha, Surasthana 15/5 Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
4. Sushruta Samhita with Nibandha Sangraha Sharirsthana 5, Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
5. Sushruta Samhita with Nibandha Sangraha, Sharirsthana 5 Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.

6. Ashtanga Hridaya Sutrasthana 11/4, Translated by Srikantha Murthy KR. 1st ed. Varanasi: Chaukhambha Krishnadas Academy, 1995.
7. Sushruta Samhita with Nibandha Sangraha Sutrasthna 15/5, Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
8. Sushruta Samhita with Nibandha Sangraha.,Sharirsthana 5, Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
9. Sushruta Samhita with Nibandha Sangraha. Sharirsthana 5, Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
10. Sushruta Samhita with Nibandha Sangraha Commentary by Dalhana. Edited by Vaidya Yadavji Trikamji Acharya. 1st ed. Varanasi: Chaukhambha Sanskrit Sansthan, 2002.
11. Charaka Samhita, Chikitsasthana 20, Translated by Sharma PV. 1st ed. Varanasi: Chaukhambha Orientalia, 1981.
12. Charaka Samhita, Sutrasthana 12, Translated by Sharma PV. 1st ed. Varanasi: Chaukhambha Orientalia, 1981.
13. Charaka Samhita, Sutrasthana 12, Translated by Sharma PV. 1st ed. Varanasi: Chaukhambha Orientalia, 1981.
14. Ashtanga Hridaya, Sutrasthana 12/5. Translated by Srikantha Murthy KR. 1st ed. Varanasi: Chaukhambha Krishnadas Academy, 1995.
15. Textbook of Biomechanics & Kinesiology, Pavan Kumar G, 1/e reprint year 2025, Jaypee Brothers publishers.
16. Textbook of Biomechanics & Kinesiology, Pavan Kumar G, 1/e reprint year 2025, Jaypee Brothers publishers.