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Role of *Rasaushadha* Formulations in management of Musculo-Skeletal Disorders: An Ayurveda Perspective

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Abstract Musculo-skeletal disorders (MSDs) are a major cause of morbidity worldwide, leading to pain, disability, and reduced quality of life. Ayurveda, the ancient Indian medical system, offers a holistic approach to managing MSDs through herbo-mineral formulations known as *Rasaushadhis*. These formulations, prepared using specific pharmaceutical techniques such as *Shodhana* (purification), *Marana* (incineration), and *Bhavana* (trituration), enhance bioavailability, potency, and safety. This review explores the role of *Rasaushadha* formulations in the treatment of musculo-skeletal disorders, their mechanism of action, and their therapeutic potential in modern healthcare.

Introduction

Musculo-skeletal disorders (MSDs) are a major health concern affecting millions of individuals globally. These disorders encompass a wide range of conditions, including arthritis, osteoporosis, gout, and muscular dystrophies, which cause chronic pain, restricted mobility, and diminished quality of life. Conventional treatments, such as non-steroidal anti-inflammatory drugs (NSAIDs), corticosteroids, and physiotherapy, primarily provide symptomatic relief. However, long-term reliance on these treatments may lead to side effects such as gastrointestinal complications, organ toxicity, and dependency[1].

Ayurveda, an ancient system of medicine, offers a comprehensive approach to managing MSDs by addressing the root causes rather than just alleviating symptoms. *Rasaushadha* formulations, which are herbo-mineral preparations, play a significant role in the Ayurvedic treatment of musculo-skeletal disorders[2]. These formulations are processed through specialized techniques such as *Shodhana* (purification) and *Marana* (incineration), enhancing their potency, bioavailability, and therapeutic efficacy. By balancing the disturbed *Doshas—Vata*, *Pitta*, and *Kapha—Rasaushadhis* aid in reducing inflammation, strengthening bones and muscles, and improving overall joint function[3]. This review explores the role of *Rasaushadh* formulations in the treatment of MSDs, their pharmacological actions, and their potential integration into modern musculo-skeletal healthcare.

Ayurvedic Perspective on Musculo-Skeletal Disorders

According to Ayurveda, MSDs are primarily caused by an imbalance in *Vata Dosha*, which governs movement, bone health, and nervous function. Other doshas—Pitta (inflammation and metabolism) and *Kapha* (stability and lubrication)—also play significant roles in disease pathology. Aggravation of *Vata* leads to depletion of synovial fluid, dryness in joints, and reduced flexibility, resulting in conditions like arthritis, osteoporosis, and

muscular atrophy. *Pitta* imbalance contributes to inflammatory disorders like gout and rheumatoid arthritis, while *Kapha* derangement leads to excessive stiffness and joint swelling[4].
Ayurvedic management of MSDs aims at pacifying aggravated doshas through dietary modifications, herbal therapies, and specialized treatments such as *Panchakarma*. *Rasaushadh* formulations, prepared with herbo-mineral ingredients, play a crucial role in restoring balance by nourishing bone tissues, reducing inflammation, and promoting rejuvenation. *Rasayana* therapy, a branch of *Ayurveda* focusing on longevity and tissue repair, enhances the efficacy of these formulations in musculo-skeletal care.[5]

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***Rasaushadh* Formulations and Their Mechanism of Action**

Rasaushadhis are herbo-mineral and metal-based preparations extensively used in Ayurvedic treatments. Their therapeutic efficacy is enhanced through the following mechanisms:

- Nano-medicine properties: The micronization process (*Marana*) enhances absorption and bioavailability, making these medicines effective in smaller dose[6].
- Synergistic action: The combination of metals, minerals, and herbs potentiates the overall therapeutic effect.
- Immuno-modulation: *Rasaushadhis* act as *Rasayanas* (rejuvenators) that enhance tissue regeneration and immune function[7].

Key Rasaushadha Formulations in MSD Management

Musculoskeletal disorders (MSDs) involve a spectrum of conditions affecting bones, joints, muscles, and associated connective tissues. Ayurveda prescribes *Rasaushadha* formulations, which incorporate metals and minerals processed through traditional purification methods, to alleviate pain, inflammation, and degenerative changes. These formulations are known for their rapid action, enhanced bioavailability, and sustained therapeutic effects. This section outlines key *Rasaushadha* formulations utilized in the management of MSDs.

Important *Rasaushadha* Formulations for MSD Management

1. ***Mahavatavidhwansa Rasa*[8]**
   - Composition: Includes *Parada (purified mercury), Gandhaka (sulfur), Tamra Bhasma (calcined copper), and Vatsanabha (Aconitum ferox).*
   - Therapeutic Action: Exhibits analgesic, anti-inflammatory, and neuroprotective effects, making it effective for rheumatoid arthritis and neuralgic disorders.
   - Mechanism: Enhances synovial fluid integrity and mitigates inflammatory cytokine release, thereby reducing pain and stiffness.
2. ***Trayodashanga Guggulu*[9]**
   - Composition: Contains *Guggulu (Commiphora mukul), Ashwagandha (Withania somnifera), Shuddha Vatsanabha, and Rasa Sindura (mercuric sulfide).*

- Therapeutic Action: Used for sciatica, osteoarthritis, and spinal disorders due to its potent anti-inflammatory and bone-strengthening properties.
- Mechanism: Regulates inflammatory mediators and modulates bone metabolism, supporting cartilage repair.

3. ***Rasaraj Rasa***[10]
   - Composition: Includes *Swarnabhasma (gold ash), Rajata Bhasma (silver ash), Vanga Bhasma (tin ash), and Abhrak Bhasma (mica ash).*
   - Therapeutic Action: Beneficial in neuromuscular disorders, paralysis, and degenerative joint diseases.
   - Mechanism: Enhances mitochondrial energy production and neuromuscular coordination, improving muscle function and reducing fatigue.
4. ***Vatakulantaka Rasa***[11]
   - Composition: Contains *Shuddha Parada, Shuddha Gandhaka, and Loha Bhasma (iron ash).*
   - Therapeutic Action: Indicated for chronic arthritis, spondylosis, and inflammatory musculoskeletal conditions.
   - Mechanism: Acts on pain pathways by modulating nerve conduction and inflammatory response, reducing stiffness and enhancing mobility.
5. ***Vishamushti Rasa***[12]
   - Composition: Includes *Shuddha Vatsanabha, Pippali (Piper longum), and Shuddha Tankana (Borax).*
   - Therapeutic Action: Effective in muscle spasms, fibromyalgia, and neuralgic pain.
   - Mechanism: Works as a neuromuscular relaxant and pain modulator by influencing neurotransmitter release and cellular metabolism.
6. ***Lakshadi Guggulu***[13]
   - Composition: Contains *Laksha (Laccifer lacca), Asthisamhruta (Cissus quadrangularis), Guggulu, and Kapikacchu (Mucuna pruriens).*
   - Therapeutic Action: Primarily used in osteoporosis, fractures, and degenerative bone conditions.
   - Mechanism: Stimulates osteoblastic activity, accelerating bone healing and improving mineral deposition in bone tissues.

Safety Considerations of Rasaushadha in MSD Management[14]

1. Purification and Processing (*Shodhana* and *Samskara*): *Rasaushadha* formulations undergo meticulous purification and detoxification (Shodhana) to render the metals and minerals biologically safe and non-toxic. Classical procedures, including Swedana (steaming), *Mardana* (grinding), and

Marana (calcination), enhance their bioavailability while minimizing toxicity. However, deviations from these methods may lead to adverse effects.

2. Standardization and Quality Control: Ensuring the safety of *Rasaushadha* necessitates rigorous standardization. Parameters such as particle size, elemental composition, and heavy metal content must be regulated to align with pharmacopeial standards. Analytical techniques like ICP-MS (Inductively Coupled Plasma Mass Spectrometry), AAS (Atomic Absorption Spectroscopy), and XRD (X-ray Diffraction) facilitate quality control.

3. Dosage Precision and Toxicity Mitigation: The dose-dependent nature of *Rasaushadha* mandates precise administration to prevent cumulative toxicity. Classical texts emphasize *Anupana* (adjuvants), which play a crucial role in facilitating proper assimilation and reducing potential toxicity.

4. Metabolic Transformation and Elimination: *Bhasmas* (calcined metal preparations) in *Rasaushadha* undergo biotransformation upon ingestion, leading to nanosized particles that facilitate systemic absorption. The body's ability to metabolize and excrete these formulations influences their safety profile. Improper metabolism may result in hepato-renal stress or bioaccumulation, necessitating proper patient monitoring.

5. Long-Term Safety and Clinical Validation: While *Rasaushadha* has been traditionally used for centuries, modern pharmacovigilance data on long-term administration is limited. Preclinical and clinical trials assessing chronic toxicity, pharmacokinetics, and interactions with conventional medications are necessary to validate their safety.

Challenges in the Use of *Rasaushadha* for MSDs[15]

1. Regulatory and Ethical Constraints: Due to concerns about heavy metal toxicity, global regulatory bodies have imposed strict regulations on Ayurvedic herbo-mineral drugs. This has led to challenges in legal approval and international acceptance of these formulations.

2. Lack of Standardized Manufacturing Practices: The heterogeneity in the preparation of *Rasaushadha* across different manufacturers results in inconsistencies in potency and safety. Good Manufacturing Practices (GMPs) and adherence to AYUSH guidelines are crucial for ensuring reproducibility.

3. Scientific Validation and Evidence-Based Research: Despite their historical efficacy, limited randomized controlled trials (RCTs) and mechanistic studies exist to substantiate the safety and efficacy of *Rasaushadha* in MSDs. Bridging this gap through interdisciplinary research is necessary.

4. Patient-Specific Considerations and Contraindications: Certain patient groups, such as those with pre-existing renal, hepatic disorders, or heavy metal hypersensitivity, may be at a higher risk of adverse effects. Proper clinical assessment and individualized therapy are essential for mitigating risks.

5. Integration with Modern Medicine: Co-administration of *Rasaushadha* with allopathic drugs poses potential risks of drug interactions, affecting metabolism and therapeutic outcomes. Integrative pharmacology research can aid in optimizing complementary therapeutic strategies.

Conclusion

Rasaushadh formulations offer a promising alternative for managing musculo-skeletal disorders, with their rapid action, low therapeutic dose, and holistic benefits. While concerns regarding safety persist, proper preparation and quality control can mitigate risks. Integrating these formulations with modern healthcare could

enhance therapeutic outcomes in MSD management. *Rasaushadha* formulations play a pivotal role in the management of musculoskeletal disorders, offering multi-dimensional therapeutic benefits such as pain relief, anti-inflammatory action, and tissue regeneration. Their efficacy, however, depends on proper purification, precise dosage, and standardized preparation. Integrating these formulations with contemporary research will further enhance their therapeutic potential and safety profile in MSD management.

References

[1] National Academies of Sciences, Engineering, and Medicine; Health and Medicine Division; Board on Health Care Services; Committee on Identifying Disabling Medical Conditions Likely to Improve with Treatment. Selected Health Conditions and Likelihood of Improvement with Treatment. Washington (DC): National Academies Press (US); 2020 Apr 21. 5, Musculoskeletal Disorders. Available from: https://www.ncbi.nlm.nih.gov/books/NBK559512/

[2] Chaudhary A, Singh N. Herbo mineral formulations (rasaoushadhies) of ayurveda an amazing inheritance of ayurvedic pharmaceutics. Anc Sci Life. 2010 Jul;30(1):18-26. PMID: 22557419; PMCID: PMC3336271.

[3] Sujatha Pushpakanthi Hewageegana HG, Hewageegana AU, Ashanthi Menuka Arawwawala LD. Purification, Detoxification, and Incineration Methods of Minerals and Metals in Traditional Medicine Formulations of Sri Lanka. Evid Based Complement Alternat Med. 2021 Jan 15;2021:6634553. doi: 10.1155/2021/6634553. PMID: 33510804; PMCID: PMC7822661.

[4] Joshi K, LC Harjpal, Singh S, Ayurvedic approach to managing Joint Disorders: Case Studies. J Ayu Int Med Sci. 2024;9(8):239-246. Available From https://jaims.in/jaims/article/view/3428

[5] Chhayani Bhavin J. and Maninder Singh Bayal (2025); THE SIGNIFICANCE OF RASAUSHADHIS IN AYURVEDA *Int. J. of Adv. Res.* (Feb). 1378-1383] (ISSN 2320-5407). www.journalijar.com

[6] Gunasekaran T, Haile T, Nigusse T, Dhanaraju MD. Nanotechnology: an effective tool for enhancing bioavailability and bioactivity of phytomedicine. Asian Pac J Trop Biomed. 2014 May;4(Suppl 1):S1-7. doi: 10.12980/APJTB.4.2014C980. PMID: 25183064; PMCID: PMC4025268.

[7] K. Rohitha, G. Swarupa Rani, & A. Vijaya Laxmi. (2025). Role of Rasayana Prophylaxis in Degenerative Disorders: A Comprehensive Review. *International Journal of Ayurveda and Pharma Research*, *13*(1), 111-115. https://doi.org/10.47070/ijapr.v13i1.3505

[8] Tyagi, Anushka & Khan, Aziz & Mishra, Nayan & Saxena, Shivangi. (2022). Structural, Morphological Characterization and Antibacterial Activity of Mahavat Vidhwansan Rasa.

[9] Shivani Gupta, Yadu Nandan Dey, Pushpendra Kannojia, Amit Kumar Halder, Deepti Sharma, Manish M. Wanjari, Shridhar Chougule, Sharad Pawar, Atul Kaushik, Sudesh N. Gaidhani, Shailendra Gurav, Analgesic and Anti-inflammatory Activities of Trayodashang Guggulu, an Ayurvedic Formulation, Phytomedicine Plus, Volume 2, Issue 3, 2022, 100281, ISSN 2667-0313, https://doi.org/10.1016/j.phyplu.2022.100281.

[10] RJ, KNM, GS, KT, J.S.Tripathi . Randomized Controlled clinical trial of Rasaraj Rasa and Vajigandhadi Basti in the management of Post-Stroke Depression (PSD). AAM. 2023; 12(3): 272-283. doi:10.5455/AAM.51720

[11] Shraddha Patel, Govind Sahay Shukla, Rajaram Agarwal, Manisha Goyal, Ravi Pratap Singh. Rasamritam: A Comprehensive Study on Rasausadhies and Their Therapeutic Guidelines. International Journal of Ayurveda and Pharma Research. 2024;12(5):131-143. https://doi.org/10.47070/ijapr.v12i4.3259

[12] Manuprasad KS, Honwad SV, Swayamprabha S, Sunil Kumar KN. A comparative analytical study of Ashodhitha Kupilu (Strychnos nux-vomica Linn.) Shodhitha Kupilu and Vishamushti Vati. J Ayu Herb Med 2016;2(4):112-116

[13] Rajoria K, Singh SK, Sharma RS, Sharma SN. Clinical study on Laksha Guggulu, Snehana, Swedana & Traction in Osteoarthritis (Knee joint). Ayu. 2010 Jan;31(1):80-7. doi: 10.4103/0974-8520.68192. PMID: 22131690; PMCID: PMC3215328.

[14] Mahajon, Bidhan; Ota, Sarada; Khanduri, Shruti; Sharma, Bhagwan Sahai; Kumar, Sanjaya; Srikanth, Narayanam. Safety profile of Ayurveda Rasoushadhi: An appraisal of technical reports on quality and safety of selected Rasakalpa—Metal and mineral-based Ayurvedic formulations. Journal of Drug Research in Ayurvedic Sciences 7(4):p 221-228, Oct–Dec 2022. | DOI: 10.4103/jdras.jdras_73_22

[15] Sharma, V. K., Mahajon, B., Jameela, S., Khanduri, S., Jain, A. K., Rana, R., Singh, R., Srikanth, N., & Dhiman, K. S. (2024). Safety and Prescription Trends of Rasa Aushadhis(Ayurveda Herbomineral Formulations): A Critical Appraisal of Reported Medical Practices from CCRAS Experience. *Journal of Natural Remedies*, *24*(3), 589–599. https://doi.org/10.18311/jnr/2024/34139