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Therapeutic Potential and Mechanisms of Laksha Guggulu: A Comprehensive Review



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ABSTRACT

Background: "Guggulu preparations are well known in Ayurveda, among which Laksha Guggulu is relatively unexplored in therapeutics. Limited clinical studies are available on this formulation. It is primarily indicated for internal use in bhagna (fractures) and asthi-chyuti vikara (bone disorders) but can also be beneficial for osteoporosis, osteopenia, and arthritis." **Aim:** Comprehensive information encompassing pharmaceutical aspects, quality control parameters, and clinical mode of action of Laksha Guggulu. **Objective:** To compile all available references in classical texts and analyze the ingredients, preparation methods, therapeutic utility, and conceptual mode of action of Laksha Guggulu. **Material & methods:** Different classical books and online databases were searched for references to Laksha Guggulu and its individual ingredients. **Discussion:** Laksha Guggulu is an effective polyherbal remedy that helps prevent bone degeneration by providing essential natural calcium, promoting faster healing in bone fractures. **Conclusion:** Laksha Guggulu aids in pain reduction and management of osteoporosis due to its Vata-balancing nature. The individual components possess balya (strengthening), sandhanakara (unification), and vranaropana (wound healing) properties, enhancing tissue repair and assisting in bone fracture healing.



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INTRODUCTION:

Guggulu, a well-known therapeutic agent in Ayurveda, has been acclaimed for its health benefits since ancient times. With increasing emphasis on natural excipients over synthetic drugs due to their lower side effects and higher therapeutic value, this review focuses on the therapeutic efficacy of Laksha Guggulu, a formulation specifically indicated in classical texts for managing bone fractures (bhagna) and other bone-related disorders. In ancient classics there is very specific description of the *Bhagna* and their management. *Acharya Sushruta* has mentioned the detailed basic fundamental treatment of *Bhagna*. *Laksha Guggulu* is indicated as one of the critical formulations used in the managing of bhagna.

Aim of the Study: Comprehensive information encompassing pharmaceutical aspects, quality control parameters, and clinical mode of action of Laksha Guggulu.

Objectives: To compile all available references in classical texts and analyze the ingredients, preparation methods, therapeutic utility, and conceptual mode of action of Laksha Guggulu.

Material & Method:

This review included Ayurveda texts, modern literature, contemporary journal articles, previous studies, and relevant websites to gather comprehensive data on the drug characteristics and indications of Laksha Guggulu.

Table:1 Different references of *Laksha Guggulu* in Texts

S. N.	Reference	Contents	Used Part	Proportion	Indication
1.	<i>Chakradatta</i> ⁰¹ <i>Bhaishajya Ratnawali</i> ⁰² , <i>Vrunda Madhava</i> ⁰³ , <i>Vanga Sena</i> ⁰⁴ , <i>Yoga Ratnakara</i> ⁰⁵ , <i>Gada Nigraha, Vruhata</i> <i>Yogatarangini,</i> <i>A.F.I.</i> ⁰⁶	1. <i>Laksha</i> 2. <i>Asthisamhrta</i> 3. <i>Kakubha</i> (<i>Arjuna</i>) 4. <i>Ashwagandha</i> 5. <i>Nagabala</i> 6. <i>Pura (Guggulu)</i>	Resin Stem Stem bark Root Root Resin	1 Part 1 Part 1 Part 1 Part 1 Part 5 Parts	<i>Asthibhagna,</i> <i>Muktasthi</i> (<i>Asthi-chyuti</i>), <i>Asthi ruja.</i>

Method of Preparation⁰⁷:

The preparation of *Laksha Guggulu* follows the standard method of *Guggulu* preparation. Purvakarma involves selecting dried and authenticated raw ingredients. Laksha, Asthi-shrunkhala, Arjuna, Ashwagandha, and Nagabala are ground into a fine powder, passing an 85-number mesh. These are then mixed homogeneously. In Pradhana karma, guggulu is boiled with an equal amount of water until it reaches a thick consistency, after which the fine powders are added with continuous stirring. After mixing thoroughly, the vessel is removed from the heat, and the mass is pounded with a small amount of ghrita. Paschat karma involves forming the mixture into vati (tablets) and storing them in an airtight container.

Quality Control Parameter⁰⁷:

The quality control parameters of *Guggulu Kalpana* are –

- Organoleptic properties (Color, Odour, Appearance, Touch),
- Physio-chemical properties (LOD, pH, Ash values, Extractive values etc.),
- Test for heavy metals,
- Microbial contamination,
- Test for Aflatoxins,
- Pesticide residue
- Weight variation,
- Disintegration time (Not more than 60 min),
- Hardness,
- Friability test etc. should be evaluated.

Table 02- Standard Physico-chemical values of *Laksha Guggulu*⁰⁷

S.N.	Physicochemical Parameter	Standard Value
1.	Loss on drying	≤12 %
2.	Total ash	≤11%
3.	Acid insoluble ash	≤2.5%
4.	Alcohol soluble extractive	≥22%
5.	Water soluble extractive	≥17.5%
6.	pH	Between 4.71-5.19

Properties of Ingredients:

Ayurveda view:

Laksha Guggulu is a combination of a total of six ingredients. *Rasa-panchaka* of the contents is as follows (Table 03)-

Table 03: Rasapanchaka of ingredients of Laksha Guggulu

S. N	Dravya	Rasa	Guna	Virya	Vipaka	Doshagh nata	Karma	Therapeutic use
1.	<i>Laksha</i> ⁰⁸ <i>Laccifer lacca</i>	<i>Kashaya</i>	<i>Laghu, Snigdha</i>	<i>Sheet (Anushna)</i>	-	<i>Kapha & Pitta hara</i>	<i>Artinuth, Balya, Raktadosha hara, Vranaropana etc.</i>	<i>Urah Kshata, Vrana, Kustha etc. Bhagna</i> ⁰⁹
2.	<i>Asthi samhrta</i> ¹⁰ <i>Cissus quadrangularis</i>	<i>Madhura</i>	<i>Laghu, Ruksha</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vata & Kapha hara</i>	<i>Bhagna sandhanakara, Balya, Vrushya etc.</i>	<i>Asthibhagna, Arsha etc.</i>
3.	<i>Kakubha</i> ¹¹ <i>(Arjuna)</i> <i>Terminalia arjuna</i>	<i>Kashaya</i>	<i>Ruksha & Laghu</i>	<i>Sheeta</i>	<i>Katu</i>	<i>Kapha & Pitta hara</i>	<i>Sandhanakara</i> ¹² , <i>Raktapittahara, Vranaropana, Hrudya etc.</i>	<i>Kshata, Kshaya, Raktavikara, Vrana etc (Raktasrava, Bhagna)</i> ¹³
4.	<i>Ashwagandha</i> ¹⁴ <i>Withania somnifera</i>	<i>Katu, Tikta, Kashaya</i>	<i>Snigdha & Laghu</i>	<i>Ushna</i>	<i>Katu</i>	<i>Vata Kapha hara</i>	<i>Balya, Rasayana, etc.</i>	<i>Kshaya, Shopha, Granthi etc.</i>
5.	<i>Nagabala</i> ¹⁵ <i>Sida veronicaefolia Lam</i>	<i>Madhura, amla & Kashaya</i>	<i>Guru,</i>	<i>ushna</i>	<i>katu</i>	<i>Vata-pitta hara</i>	<i>Kandu, kustha hara, vrana hara, rasayana</i> ¹⁶ <i>etc.</i>	-
6.	<i>Pura</i> ¹⁷ <i>(Guggulu)</i> <i>Commiphora mukul</i>	<i>Tikta & Katu</i>	<i>Laghu, Snigdha, Picchila, Sukshma . Sara [Nava Guggulu]</i>	<i>Ushna</i>	<i>Katu</i>	<i>Tridosha hara</i>	<i>Bhagna sandhanakara</i> ¹⁸ <i>Vrushya, Shothahara, Rasayana etc,</i>	<i>Vata vyadhi, Sotha, Krostuka shirsha vata etc.</i>

Modern view:

The six ingredients with proven phytoconstituents and pharmacological actions are as follows (Table-04)-

Table 04: Ingredients Phytochemical & their Pharmacological Actions

S.N.	INGREDIENTS	PHYTOCHEMICALS	PHARMACOLOGICAL ACTIONS
01.	<i>Laksha (Laccifer lacca)</i> ¹⁹	Polyphenols, resins, alkaloids, and tannins, anthraquinones, laccaic acids, and erythrolaccins, carbohydrate etc.	Bone healing properties, Anti-arthritis activity, Potent anti-cancer activity etc.
02.	<i>Asthi shrunkhala (Cissus quadrangularis)</i> ²⁰	Flavonoids, Vitamin C, Phytosterol, Ketosteroids, Tetracyclic, Triterpenoids, Calcium etc. Alpha amyirin, Beta amyirin, Beta sitosterol, Friedelin, Quercetin, Genistein, Daidzein etc.	Bone healing activity, Antioxidant and free radical scavenging activity of beta carotene, Analgesic, anti-inflammatory and stimulatory activity, etc.
03.	<i>Kakubha (Arjuna) (Terminalia arjuna)</i> ²¹	Triterpenoids, Arjunolic acid, Terminic acid, Arjunoside (1,2,3,4,5) etc.	Bone regeneration activity, anti-inflammatory activity, anti-lipid activity etc.
04.	<i>Ashwagandha (Withania somnifera)</i> ²²	Alkaloids, Withaferin A (Steroidal Lactones), Saponins, Steroidal Astringents, Stimulants.	Lower the stress and inflammation, Promote bone healing, Immunomodulator, etc.
05.	<i>Nagabala (Sida veronicaefolia Lam.)</i> ²³	Alkaloids- ephedrine, vasicine, and vasicinone, Flavonoids- kaempferol, quercetin, and rutin, Tannins Sterols- β-sitosterol and stigmasterol	Anti-inflammatory activity, Antioxidant, anti-inflammatory, antimicrobial properties, wound healing, anti-infective properties, immunomodulatory, anti-spasmodic action etc.
06.	<i>Pura (Guggulu) (Commiphora mukul)</i> ²⁴	Myrrhanol A, Cambrene, Mukulol, Guggulsterone, Guggulipids etc.	Anti-inflammatory, Angiogenesis, Suppress gene expression of Cancer cells, Antioxidants, etc.

Discussion:

Mode of Action:

Asthi-Majja kshaya occurs due to degeneration of bone tissue which happens because of an imbalance of Vata dosha in the body. According to Ashraya - Ashrayi Bhava, Asthi and Vata

are inversely proportional to each other with their vriddhi and kshaya. *Laksha Guggul* is an excellent polyherbal medicine that helps to prevent bone deterioration by delivering vital natural calcium, promoting a faster healing process in bone fractures by increasing calcium deposition on the bones, and promoting faster recovery.²⁵ It is useful in treating painful illnesses such as osteoarthritis, *Sandhivata* is caused by an increase in *Vata dosha*, which causes pain and joint movement. Because of its *Vata* balancing properties, regular usage of *Laksha Guggul* may help relieve discomfort and help in the management of osteoporosis. *Laksha* promotes tissue restoration, which helps in bone fracture healing.²⁶ Ingredients in *Laksha Guggul* such as *Arjuna* and *Laksha* act on the injured part to bring comfort by tightening the dilated capillaries and minimizing excessive edema at the injury site. The pain begins to fade as the swelling decreases, while the other substances promote tissue repair and toughen the wounded area.²⁷

Asthi shrumkhala contains hydroxyapatite, which is a natural key component found in healthy bones. It is a part of the bone mineral mass matrix. *Nagabala*, is a powerful muscle relaxant, and other herbs are known for their anti-spasmodic properties. They relieve fibromyalgia pain and sensitivity while also relaxing the muscles.²⁸

The active ingredients of *Ashwagandha* are Withaferin- A, which reduces bone mineral density loss. It reduces stress and inflammation while also promoting bone recovery after injury and osteoporosis.²⁹

Triterpenoids found in the bark of *Terminalia arjuna* is beneficial in the regeneration of bone and muscle tissue in frogs. Tribal healers in Orissa and the Eastern Ghats of India utilized *Terminalia arjuna* bark paste to treat fractured bones in both animals and humans.³⁰ Arjunolic acid affects the cyclo-oxygenase and increases its anti-inflammatory activities.³¹

Laksha, *Arjuna*, *Asthi shrumkhala*, *Ashwagandha* and *Nagabala* provide natural calcium and vitamin D, which help to repair bone mineral density and offer strength to bones and joints. All the ingredients have anti-inflammatory and analgesic qualities, which aid in the relief of joint pain and inflammation.³²

Shuddha guggulu improves metabolism and mineral absorption in the bones. Volatile oil comprises terpenoid elements such as monoterpenoids, sesquiterpenoids, diterpenoids, and triterpenoids; steroids; flavonoids; guggultetrols; lignans; sugars; and amino acids. Anti-inflammatory and antibacterial effects of *Guggulu* help in wound cleansing and healing, as well as reducing oedema.³⁴

Asthi shrumkhala has *Madhura rasa*, which is *sthairyakara*, *sandhanakara*, and *sarvadhathu vivardhana*. These *dhathus* may work on each other, establishing the foundation for *asthidhathu nirmana*. While *laghu* and *rooksha guna* have *soshana*, *lekhana*, and *ropana* qualities, they work as *shothahara* by inhibiting hemorrhage, absorbing hematoma, facilitating in healing, ultimately uniting the fractured bone. *Ushna veerya* of *Asthi shrumkhala* leads to *vathadosha samana* (relief). *Asthi shrumkhala s madhura rasa* and *raktha shodhana* properties may work on local circulation, increasing cellularity and vascularity and therefore accelerating the process of osteogenesis. The phytoestrogen-rich percentage of the plant's aerial part has anti-osteoporotic effect. The plant includes phytoestrogen steroids, which affect bone mineralization and regeneration.³⁵

Laksha Guggulu helps prevent bone deterioration by supplying essential natural calcium, promoting faster healing in fractures. It is effective in treating conditions like osteoarthritis and osteoporosis by balancing Vata dosha. Ingredients such as Arjuna and Laksha reduce swelling and pain, while *Asthi shrumkhala*, Nagabala, and Ashwagandha support muscle relaxation and bone healing through their natural calcium and vitamin D content. Shuddha Guggulu enhances metabolism and mineral absorption, further aiding in bone repair and joint health.

Conclusion and Future Outlook:

Laksha Guggulu is a unique formulation extensively documented for managing fractures and bone-related conditions. Its active ingredients have shown efficacy in both animal models and clinical studies. Future research should focus on its pathway of molecular mechanisms and clinical trials on bone dislocations (*Muktasthi*) to expand its therapeutic applications.

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