



**Research Article**

**NUANCES IN KSHARASUTRA PREPARATION USING GUGGULU EXTRACT**

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**ABSTRACT**

Ano-rectal diseases are considered to be one of the conditions that affect a person's quality of life significantly. *Ksharasutra* (medicated thread) is a para-surgical procedure which is found more effective in the management of few among these conditions like fistula-in-ano and sinus. *Ksharasutra* is routinely prepared with *Snuhi ksheera* (latex of *Euphorbia nerifolia*), *Apamarga Kshara* (ash of *Acyranthes aspera*) and *Haridra* (powder of *Curcuma longa*). In conventional method, collection of *Snuhi ksheera* is time consuming, laborious and not available throughout the year. Here, *Guggulu* (Oleogum resin from *Commiphora mukul*) was selected as an alternative for *Snuhi ksheera* in the preparation of *Ksharasutra* as it is reported to have antiseptic, anti-inflammatory, wound-healing properties and it is available throughout the year. *Guggulu* was extracted using 95% ethyl alcohol, meanwhile *Apamarga kshara* was prepared in conventional way. Barbour linen thread no.20 was cut into 11 equal parts and mounted upon *Ksharasutra* frame. Each of which was later coated with 7,5,3 layers of *Guggulu* extract, combination with *Apamarga kshara* and combination with *Haridra* respectively. These were then kept under UV radiation in a cabinet and dried. After a speculated period of time the threads were cut down in a sterile condition, each (11 numbers) of them measuring 40 cm. These were then stored in an air-tight glass container. These *Ksharasutras* are prepared with a motive to get used in the management of the afore discussed ano-rectal conditions.

**INTRODUCTION**

Fistula in-ano is one of the most commonly encountered anorectal conditions in *Salyatantra* OPD. *Ksharasutra* is the parasurgical procedure which is found to be more effective in its management. Susruta, the pioneer of Ayurvedic surgery mentioned about *Ksharasutra* for the management of *Nadivran* (sinus), *Bhagandara* (fistula in ano) and *Arbuda* (tumor?) in the context of *Nadivrana chikitsa* in Susruta samhita<sup>[1]</sup>. But, the method of preparation of the aforesaid was later explained in Chakradutta<sup>[2]</sup> and Rasatharangini<sup>[3]</sup>. Nowadays a standardized approach of *Ksharasutra* preparation is adopted using *Snuhi ksheera*, *Apamargakshara* and *Haridra*, after several researches carried out in the department of *Salyatantra*, IMS,

B.H.U which is approved by I.C.M.R. New Delhi, India<sup>[4]</sup>. There are several research studies wherein *Guggulu* is selected as an alternative for *Snuhi ksheera*. The concept was developed from the fact that apart from similar binding properties as of *Snuhi ksheera*, *Guggulu* has better antiseptic, analgesic, anti-inflammatory and wound healing properties. The *Guggulu* based *Ksharasutra* was found to be more advantageous and efficient than the standard *Snuhi ksharasutra* or any other *Ksharasutra* tried before.

Reference of standardized method of preparation of *Guggulu* based *Apamarga ksharasutra* was least available in current resources. The major requirements for this include preparation of good quality *Apamarga kshara*, alcoholic extract of *Guggulu*, preparation of threads with uniform coating, drying and storage of prepared threads.

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## MATERIALS AND METHODS

### Materials Required

1. *Guggulu* (Oleogum resin from *Commiphora mukul* of Burseraceae family)
2. *Apamarga* (Whole plant from *Acyranthes aspera* of Amaranthaceae family)
3. *Haridra* (Rhizome from *Curcuma longa* of Zingiberaceae family)
4. 95% Ethyl alcohol
5. Surgical thread (Non-absorbable natural linen thread no. 20)
6. *Ksharasutra* Cabinet

### Preparation of *Guggulu* Extract

Crush or grind the *Guggulu* resin into smaller pieces or a coarse powder to increase the surface area for better extraction. Place the crushed or powdered *Guggulu* resin into a clean and dry glass jar. Pour 95% ethyl alcohol over the *Guggulu* resin in the jar. The alcohol should fully cover the *Guggulu* resin. Seal the glass jar tightly with its lid. Shake the jar to ensure that the alcohol fully covers and penetrates the *Guggulu* resin. Store the sealed jar in a dark, cool place, away from direct sunlight or heat source and it should be left undisturbed for 24 hours. Then strain the liquid through a muslin cloth or cheesecloth to separate the liquid (now the *Guggulu* tincture) from the solid *Guggulu* residue. Squeeze the cloth to extract as much liquid as possible. Double boil the liquid using mild flame till gummy consistency is obtained. Transfer this *Guggulu* extract into airtight bottles for storage<sup>[5]</sup>.

36g of alcoholic extract of *Guggulu* was obtained from 150g of *Guggulu* resin and 750ml of 95 % ethyl alcohol.

### Preparation of *Apamarga kshara*

*Kshara* used for *Ksharasutra* preparation should be fine, dry and white in colour. *Mridu* (mild) variety of *Kshara* is considered suitable for making *Ksharasutra*.

Whole plant of *Apamarga* should be collected and cut in pieces. After drying the plant in shade, transfer it into an iron vessel and burnt in fire. After 24 hrs ash is collected and is dissolved in six times water. The mixture was then kept undisturbed for 24 hours in order to implement the sedimentation process. Then solvent part was filtered 21 times using one layered muslin cloth or cheesecloth. The solvent part was then let to evaporate the excess water content using gas stove till a paste like consistency. Then this paste was dried under the sunlight. Finally *Kshara* was collected

as flakes from the vessel and stored in an air-tight moisture free container<sup>[6]</sup>.

126.3g of *Apamarga kshara* was obtained from 3kg of dried *Apamarga*

### Preparation of *Guggulu* based *Apamarga Ksharasutra*

The Linen No.20 thread roll was taken and cut into 11 pieces each of 50cm in length. These frames tied with threads tightly and were placed in the UV cabinet for drying and provided an apt condition irrespective of seasons.

Initially coating of alcoholic extract of *Guggulu* was done uniformly with gloved fingers and dried in the cabinet. The same procedure was repeated for 6 days. After 7 layers of *Guggulu* extract alone, the coating was continued with combination of alcoholic extract of *Guggulu* and *Apamarga kshara* for 5 days. The *Kshara* flakes which was stored in air tight container was powdered according to the need on each day. And later 3 layers of coating with alcoholic extract of *Guggulu* along with *Haridra* powder was done.

### Method of Sterilization and Storage

The prepared *Ksharasutras* in the UV cabinet, were then allowed to undergo *Dhoopana* (fumigation) procedure using *Aparajitha dhoopachoorna* for 15 minutes. The *Ksharasutra* frames were then taken out of the cabinet and under sterile precautions, these were cut from both ends of the frames, getting 11 numbers of 40cm long *Ksharasutra*. These are then stored in an air-tight glass jar in a curled manner without forming any bends or breaks. It is then sealed and labeled with the name and the date of completion.

## RESULTS

Result of *Guggulu* based *Ksharasutra* project can be summarized from the following three sections viz, preparation of *Apamarga Kshara*, Alcoholic extract of *Guggulu*, and *Ksharasutra*.

- *Apamarga Kshara*  
From 3kg of dried *Apamarga* 126.3 g of *Kshara* is obtained.
- Alcoholic extract of *Guggulu*  
From 150g of raw *Guggulu*, 36g of alcoholic extract is obtained using 750ml of 95% ethyl alcohol.
- *Ksharasutra*  
Total 11 number of *Guggulu* based *Apamarga Ksharasutra* each measuring 40cm with pH 9.32 is obtained.

**FIGURES**



**Fig. 1. Apamarga kshara (flakes)**



**Fig. 2. Alcoholic extract of Guggulu**



**Fig. 3. Coating of Guggulu extract**



**Fig. 4. UV cabinet with Ksharasutra**



**Fig. 5. Ksharasutra**



**Fig 6. Packed Ksharasutra**

**DISCUSSION**

During the use of this *Ksharasutra* in our IPD patient of age 25 years, it was observed that the cutting rate was faster even though the pain was not as mild as expected when compared to other *Ksharasutras*. The patient was presented with abscess over coccygeal region, which was later diagnosed with Pilonidal sinus.

The *Ksharasutra* method is a highly effective parasurgical method in anorectal cases including fistula in ano, haemorrhoids, etc which is mentioned in the context of *Nadivrana* and *Bhagandara chikitsa* in *Susrutha Samhitha*. But the preparation of *Ksharasutra* is not mentioned well in classics. Here the *Snuhi* latex was replaced with *Guggulu*. The *Ksharasutra* works by pressure effect made by ligation which creates mechanical strangulation of blood vessels and tissues which causes the pressure necrosis of the body of any swelling. *Kshara* invades into the cells of lesion till engorged tissue destruction occurs by its *Ksharana guna* (corrosive properties). *Guggulu* has analgesic, debridement and healing properties. It is also having

good binding action on thread and its anti-inflammatory activities have been proved by researches. The action of turmeric powder provides the effect of bactericidal action with healing properties. All these three drugs do not contradict each other but rather support their actions by equal and desirable effect. *Ksharasutra* has the ability to perform incision with excision slowly by virtue of its controlled chemical cauterization. The chances of infection are least due to sustained action of anti-infective virtue of *Kshara*. In case of *Bhagandara*, *Ksharasutra* also acts as a seton to allow the proper drainage of pus and debridement of unhealthy tissue thus, providing a cleaner base for wound healing with minimal scarring and without complications. This study can build and achieve various heights by adopting comparative studies with other *Ksharasutras*, or also can use *Sodhitha* (purified) *Guggulu* other than raw *Guggulu*. We expect more studies and research works from this *Guggulu* based *Ksharasutra*.



*Kshara* used for *Ksharasutra* preparation should be fine, dry and white powder, which can be obtained from the *Madhya* (moderate) and *Tikshna* (strong) varieties of *Kshara*. Chemically, maximum hygroscopic and caustic action is seen in the *Mridu* variety of *Pratisarniya kshara* (type of *Kshara* used externally)<sup>[7]</sup>. According to classical method of preparation of *Kshara*, the solvent part of filtered solution of *Kshara* has to be dried under *Mridu agni* (mild flame). But here based on practical experience, the *Kshara* was removed from flame before complete drying and further it was dried under direct sunlight in order to avoid charring. Even though 126.3g of *Apamarga kshara* was obtained, only around 55g was used for the whole procedure.

According to the reference of *Guggulu ksharasutra* preparation, a total of 21 coatings of thread, wherein 11 with *Guggulu* extract alone, 7 with combination of *Guggulu* extract and *Apamarga kshara* and 3 with combination of *Guggulu* extract and *Haridra* powder<sup>[8]</sup>. As per the observations on successive days of coating, the thickness of thread was found increasing out of expectation. So on further discussions with mentors, the number of coatings was reduced accordingly. After 7 coatings of *Guggulu* extract alone,

during the coating of combination of *Guggulu* extract and *Kshara*, 2 methods could be adopted for coating of *Kshara* either by sprinkling the *Kshara* over *sutra* or by moving the *sutra* through a heap of *Kshara*. Although both methods are effective, here heaping method was followed. The same method was adopted for the coating of *Haridra* powder too. The thread was dried on each day for effective adherence of medicine and for easy coating of next layer. After the complete procedure, the threads were collected followed by the *Dhoopana* with *Aparajitha dhoopa choorna*. It is indicated for all kinds of *Jwara* (fever) especially *Aganthuja* (fever caused by external factors) and *Vishama jwara* (intermittent fever) in *Ashtanga Hrudaya* in the context of *Jwara chikitsa*<sup>[9]</sup>. *Aparajitha dhoopa* discard the microbial contamination of flora, thereby create an aseptic atmosphere for quality products. It inhibits coliforms completely and reduces fungal growth<sup>[10]</sup>.

The *Guggulu* based *Ksharasutra* was found to be most advantageous and most efficient than the standard *Snuhi ksharasutra* or any other *sutra* tried before. The recurrence rate was almost negligible (1%).

**Table 1: Comparison between *Snuhi Ksheera* and *Guggulu***

<i>Snuhi Ksheera</i>	<i>Guggulu</i>
Collection is difficult and coagulate easily	Easily available
Painful cutting	Painless cutting
Chances of allergic reactions	Less chance of allergy

The UCT (Unit Cutting Time) of *Guggulu* based *Ksharasutra* is found 8.85 days/cm in an average. Besides, *Guggulu* based *Ksharasutra* possess these much of advantages and benefits, very less number of researches were carried out about the same<sup>[11]</sup>.

## CONCLUSION

*Ksharasutra* is now a very popular and highly practiced treatment modality for the management of fistula in ano, hemorrhoids, pilonidal sinus, chronic sinuses, etc.

These conditions appear at *Guda* (anal) region which is *Sadyapranahara Marma* (vital point), so due importance has to be given to their treatments. The *Guggulu* based *Ksharasutra* is expected to have least recurrence rate and also painless cutting without any allergic reactions or other secondary infections, so that the treatment does not hamper the quality of life of the patient. In order to concrete the efficacy of *Guggulu* based *Kshara* *sutra*, clinical trials has to be conducted. Several clinical trials have been carried out in different prestigious institutes for evaluation and establishment of the action of different *Kshara* *sutras* in India as well as in other countries. But still the quest is continuing to improve the efficacy of *Ksharasutra*, to make it more

acceptable, by using different materials for its preparation.

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