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Preparation of *Ksharasutra*: A Comprehensive Study on Selection, Preparation and Processing

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ABSTRACT

The *Ksharasutra* is a specialized Ayurvedic surgical thread renowned for its efficacy in treating anorectal disorders, particularly fistula-in-ano. This paper aims to provide a comprehensive overview of the preparation process of *Ksharasutra*, focusing on the selection of thread, preparation of *Kshara*, collection of *Snuhi Ksheera*, the *Ksharasutra* cabinet, and the method of sealing. Through a detailed explanation of these essential steps, the purpose of this paper is to enhance the understanding of the complex and comprehensive method involved in developing the *Ksharasutra*.

Key words: *Kshar*, *Ksharasutra* cabinet, *Snuhi Ksheera*, *Surgical thread*

INTRODUCTION

The *Ksharasutra*, an integral component of Ayurvedic surgical interventions, is renowned for its therapeutic efficacy in anorectal disorders. This study explores the meticulous preparation process, emphasizing the significance of key aspects like selection of thread, *Kshara* preparation, collection of *Snuhi Ksheera*, the *Ksharasutra* cabinet, and effective sealing methods.

MATERIAL AND METHODS

1. Selection of thread

The choice of surgical thread (*Sutra*) plays a pivotal role in the preparation of *Ksharasutra*. A sterile, excellent quality thread with appropriate tensile strength and

thickness is chosen to withstand the processing and ensure safe application. The surgical linen thread of size 20 is having the maximum tensile strength of 5.0 kg and it retains its strength throughout the processing of 20 *Bhavanas*. So, the surgical linen thread no. 20 is the standard thread for the preparation of *Ksharasutra*.

2. Preparation of *Kshara*

The *Kshara*, a specialised alkaline formulation, is a key ingredient in *Ksharasutra*. The preparation involves following steps:

- Collection and Drying of *Apamarga* Plant Material:** There are 24 numbers of *Ksharadravya* described in *Ksharapakavidhi Adhyaya* of Sushruta Samhita out of which *Apamarga* is used extensively for preparation of *Ksharasutra* to treat Fistula-in-ano. In this study *Apamarga* is taken as standard *Kshara Dravya*. The entire *Apamarga* plant, including root, stems, leaves, and seeds/fruits, is collected during early summer and allowed to air dry in a shaded area. The dried plant material is then placed on a clean platform in a semi-closed environment to prevent direct exposure to wind while combustion takes place.
- Controlled Combustion:** The dried *Apamarga* plant material is ignited on the platform, ensuring

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complete combustion of all parts. No other plant or material is burned alongside the *Apamarga* plant to prevent adulteration. The resulting ashes are collected and dissolved in six times of clean tap water and thoroughly mixed, kept for a while to settled down and collected the supernatant fluid in a stainless still vessel. The residual ashes are again mixed with four times of water and the same procedure is repeated for twice in order to take away all the alkaline material from the ashes.

- c. Filtration: The collected ashes' water is meticulously filtered drop by drop through a double Watman filter paper or alternative pressure filters, yielding a clean, light brown liquid devoid of impurities.
- d. Evaporation and Drying: The filtered liquid than transferred to a wide-mouth stainless steel vessel and gently evaporated over a moderate flame. Constant stirring prevents overcooking and ensures uniform consistency. Cooling during the drying process is managed, and the flame is extinguished when the liquid becomes a thick paste. This paste is allowed to dry while maintaining continuous stirring to prevent burning or clumping.
- e. Grinding and Storage: The resulting coarse powder is processed in a grinder to achieve a uniform fine *Kshara* powder. This powder is stored in a clean glass bottle with an airtight cork, suitably labelled with manufacturing date and batch number.

3. Collection of *Snuhi Ksheera*

Snuhi Ksheera, the latex of *Euphorbia nerifolia* is an essential component of conventional *Ksharasutra*. Its collection and preparation involve the following steps:

- a. Collection Procedure: To obtain high-quality *Snuhi* latex, must collected on the day of preparation, 1-2 hours prior to usage. Latex cannot be stored for prolonged periods due to its tendency to separate into watery and solid gelatinous components. The latter can be stored temporarily in a sealed container within a refrigerator for future use after dissolution in chloroform. However, for regular

coatings, fresh latex is essential. Hence, maintaining a nearby *Snuhi* plantation is recommended for a steady supply.

- b. Optimal Collection Season: The most suitable time for latex collection spans from October to April, aligning with the period of *Kshara Sutra* preparation. This temporal correspondence ensures the availability of latex throughout the year.
- c. Collection Technique: The latex should be collected preferably in the morning hours. Latex collection involves carefully incising the *Snuhi* plant's stem with a stainless-steel knife. Due to the plant's thorny projections, protective gloves preferably rubber or leather are indispensable. Sequential stabs at separate sites are performed and drop by drop *Snuhi* is collected in a glass container, the collection conducted until the desired latex quantity is acquired.
- d. Laboratory Setup: Latex collection transpires within a clean laboratory environment using specialized glassware (flasks, tubes, or dishes). Prompt corking of containers upon collection prevents contamination.

4. *Ksharasutra* Cabinet

The *Kshara Sutra* Cabinet plays a pivotal role in facilitating systematic and uniform coating of threads with specialized substances.

- a. *Kshara Sutra* Cabinet Design: The *Kshara Sutra* Cabinet is tailored to the practitioner's needs and resources. Two main designs, horizontal and vertical, are available. The choice between them depends on laboratory space availability. Each cabinet consists of two chambers: a larger one for *Kshara Sutra* hangers and a smaller one for a hot air blower. A thermometer is integrated to monitor internal temperature.
- b. Thread Coating Process: Threads are smeared systematically using U-shaped aluminium hangers, each accommodating multiple threads. The threads are uniformly coated with surgical linen thread (Barbour brand) size 20. Coating is

performed in a controlled environment, with the thread smeared using a clean gauze-piece soaked in latex. Eleven coatings with *Snuhi Ksheera* (latex) alone are followed by seven coatings of *Snuhi Ksheera* and *Kshara* (finely powdered alkaline substance). Three subsequent coatings involve *Snuhi Ksheera* and *Haridra* (turmeric). A total of 21 coatings are achieved in this manner.

- c. Sterilization: To ensure thread sterilization, an integrated ultraviolet lamp is activated for 20-30 minutes daily. Once the 21 coatings are complete, threads, measuring approximately 10-11 inches, are meticulously detached from the hanger and sealed. This standardized process ensures the consistent and reliable preparation of *Kshara Sutra* threads, integral to the success of Ayurvedic surgical interventions.

5. Method of Sealing

The preservation and sealing of *Kshara Sutra* threads are crucial to maintaining their therapeutic properties and prevent contamination.

- a. Sealing Methodology: Each coated thread is carefully folded in the centre to facilitate sealing without compromising the coatings. Multiple folds are avoided to prevent damage to the coatings. A single fold suffices. The folded *Kshara Sutra* thread is then placed within a properly sized polythene bag, which is gently sealed. Subsequently, the sealed thread is enclosed within a high-quality glass tube. The tube's seal is accomplished over a patromax blower flame, a delicate procedure requiring utmost caution to prevent glass breakage or incomplete sealing.
- b. Moisture Prevention and Labelling: To mitigate residual moisture within the sealed tube, a small silica bag is recommended before final sealing. This desiccant aids in absorbing any remaining moisture, ensuring the longevity of the thread's integrity. Each sealed tube is meticulously labelled, providing essential details such as the date of manufacture, sealing date, and batch number.
- c. Documentation and Record Keeping: During the coating process, a dedicated register is maintained.

This register logs the batch number, coating dates, the nature of coatings applied, and the technician responsible. This systematic documentation ensures traceability and quality control throughout the preparation process.

- d. Storage and UV Exposure: The sealed tubes of *Kshara Sutra* threads are stored within a secure almirah, safeguarding them from external elements. To further enhance preservation, the sealed tubes are exposed to ultraviolet radiation within the cabinet. This step ensures additional sterilization and helps maintain thread integrity.

RESULTS AND DISCUSSION

The preparation of *Ksharasutra* is a meticulous and comprehensive process, involving several critical steps to ensure its therapeutic efficacy and safety for Ayurvedic surgical interventions. The selection of an appropriate surgical thread is paramount, with surgical linen thread size 20 identified as the ideal choice due to its optimal tensile strength and stability throughout the processing stages.

The methodical preparation of *Kshara*, a specialized alkaline formulation, underscores the importance of using the *Ksharadravya* (*Apamarga*) plant material. This ensures the purity and potency of the *Kshara*, which is vital for its successful application. The process of controlled combustion, meticulous filtration, and careful evaporation and drying results in a finely powdered *Kshara* with consistent quality, further enhancing its therapeutic potential.

The collection and handling of *Snuhi Ksheera*, the latex of *Euphorbia nerifolia*, play a crucial role in the *Ksharasutra* preparation. By emphasizing the importance of timely collection, appropriate storage, and meticulous handling, the study underscores the need to maintain the integrity of this essential ingredient. The availability of specialized *Ksharasutra* cabinets, whether horizontal or vertical, contributes to systematic thread coating and ensures uniform application of coatings, in turn enhancing the therapeutic properties of the final product.

The sealing process represents a critical step in preserving the quality of the *Ksharasutra* threads. The

careful folding, sealing, and labelling procedures described in the study emphasize the importance of maintaining thread integrity and preventing moisture ingress. Documentation and record-keeping protocols are essential for quality control, allowing traceability and accountability at every stage of the preparation process.

CONCLUSION

In conclusion, the preparation of *Ksharasutra* is a comprehensive and intricate process that requires meticulous attention to detail and adherence to established protocols. The selection of appropriate materials, including surgical threads, *Apamarga* plant material, and *Snuhi Ksheera*, lays the foundation for the therapeutic efficacy of the final product. The methodical steps involved in *Kshara* preparation, thread coating, and sealing contribute to the consistency and quality of the *Ksharasutra*.

The systematic approach outlined in this paper serves as a valuable guide for practitioners and researchers engaged in Ayurvedic surgical practices. By following these standardized procedures, practitioners can ensure the reliability and efficacy of *Ksharasutra* in the

treatment of anorectal disorders. Further research and advancements in the preparation techniques, cabinet design, and sterilization methods will continue to refine and optimize the *Ksharasutra* preparation process, contributing to the advancement of Ayurvedic surgical interventions.

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