

## REVIEW PAPER ON AUTOMATIC SHIRODHARA MACHINE

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**Abstract** - In modern developed world, youngsters and even older generations to some extents are leading a stressful, hyperactive and physically-mentally demanding lifestyle, often working late hours in offices and being cut-off from nature and its care for extended periods of time. As a result of this hectic lifestyle, human psych has failed to cope with rapid change of health pattern, life styles, fast progresses of loneliness, not being appreciated, anger, stress and other psycho-somatic disorders. People are now searching for solutions to such problems and fortunately there are many remedies available in the Ancient and time-tested science of Ayurveda. One such remedy to stress is the Ayurvedic process of Shirodhara. Shirodhara is a classical Ayurvedic procedure carried out in order to alleviate urdhava jatrugata (Disease of head and neck). The need for change with time in every field has led to the evolution of systematic development and instrumentation in Shirodhara procedure and equipment also. This paper is an attempt to overview the current developments, system requirements and changes in instrumentation of Shirodhara and to evaluate the benefits and shortcomings of the newer instrumentation.

**KeyWords:** Ayurveda, Shirodhara, Pshco-Somatic disorders, Urdhava Jatrugata, Instrumentation

### 1. INTRODUCTION

There is a close connection between our body and our mind. If there is a psychological factor affecting a medical condition, it is important to treat the psychological problem as well as the medical problem. According to Ayurveda, *Vata* (energy of human body) and *Mana* (mind) are mainly degraded in a psychic disease.

Classical texts of Ayurveda consider *Shirah Pradesh* (head region) as *Uttamanga* (supreme) and a *Pradhana Marma* (prime weakness) which is where *Prana* (health and life force) of body resides and it controls the functions and resources of the body. Its resourcefulness, functions, and specific procedures to safeguard and protect them have been mentioned in *Dincharya* (ancient science of living a balanced life).

Procedures documented in these ritual texts include:

- i) *Shirohbasti* i.e., holding oil on head region with the help of a leather cap for a specified period of time.

- ii) *Shiropichu* i.e., placing cloth dipped in certain oils on head region.

- iii) *Shirahseka* i.e., pouring of liquids on forehead and head.

- iv) *Shiroabhyanga* i.e., Massage of head with oils having specific *Dosha* (energy) pacifying properties to soothe and calm the mind.

*Shirohbasti* is the most effective procedure among all followed by *Shiropichu* and so on.

*Shirahseka*, is the Sanskrit term which is commonly known as *Shirodhara* is an important procedure and is practiced in more abundance as compared to other procedures along with *Shiroabhyanga* (Head massage).

Shirodhara is divided into categories based on the type of fluid used during the procedure. Some of these are:

- Taildhara → Use of oil (taila).
- Ksheeradhara → Use of milk.
- Takradhara → Use of buttermilk.
- Jaladhara → Use of water.

Selection of Fluid- According to *Dharakalpa* (Ayurvedic literature), *Sneha* (care) is taken according to the condition of imbalance in the type of *Dosha* (energy) -

Vata (Air + Ether) Dosha- Tila Taila (Sesame Oil)

Pitta Dosha (Fire + Water)- Ghrita (herbal cow ghee)

Kapha (Earth + Water) Dosha- Tila Taila (Sesame Oil)

Rakta (Blood + Lymph) Dosha- Ghrita (herbal cow ghee)

Vata + Pitta + Rakta- Ghrita and Taila in equal par portion {1:1}

Vata + Kapha + Rakta- ½ part Ghrita and 1-part Tila Taila. {0.5:1}

Ayurvedic texts have documented the traditional procedure to be followed:

- First, the fluid to be administered is selected based on the subject's body requirements and condition. Most of the cases require the use of oil or a combination of oils. Scalp massage is administered followed by full body massage. As the subject is advised to lie down on massage table in supine position, the height of the Shirodhara pot is adjusted on the forehead just four fingers (4 Angula ~ approx 6 inches) above the forehead. [It is advised to use a Dhara patra made of Copper/Stainless Steel/Earthenware.]

- Oil is warmed up to desirable temperature (preferably 38 degree C) and poured in to the pot.

- Then an Assistant therapist is instructed to keep the pot in a rhythmic pendulum motion.

- As the oil level in the pot gets reduced due to continuous flow, the rate of flow decreases gradually.

- The oil temperature also reduces.

- The stream flow rhythm changes become small and slow.

- Therapist remains engaged all the time in maintaining the oscillatory movements of the pot.

## 2. Literature Review

Our team went through various different research papers, research articles, blogs, Ayurvedic literature so as to gain extensive knowledge about the procedure involved, other people's work on different types of Shirodhara treatment procedures, the properties of oils used and Automation and development, current challenges faced in equipment available commercially. The review of Literature for the present study has been done from Published and unpublished research reviews, articles, text books, and medical research. Some very useful papers among many reviewed are listed below:

### “A CONCEPTUAL STUDY ON SHIRODHARA PROCEDURE”

In [1], Nidhi Gupta and Dr. Golpes Mangal, have done study on the of Samhita, Chikitsa Grantha, Nighantus and Ayurveda text with regard to Shirodhara. Indication and Contraindication and therapeutic efficacy of Shirodhara were noted. Their Research paper has shown that the site of Sthapni Marma (delicate point) and the site of pituitary and pineal gland exist at the same level. The function of pituitary gland is controlled by chemical hormones. It has the capacity to maintain all the endocrine system of human body. This concept is also understood from the aspect of Ayurveda, excessive Mental stress, physical exhaustion was the found to be the causative factors that led to imbalances in endocrine system which hamper its normal functionality. The stimulation of Sthapni Marma by the constant flow of Kwatha (Decoction) oil and the indirect stimulation of pituitary gland brings changes in psycho-somatic level. The paper documents the time period for which the treatment is

to followed the type of oil to be used and the period after which the oil is to be changed. The continuous stream of warm oil causes vasodilatation. Shirodhara can also be used for treatment of hair disorders. Hence, Shirodhara therapy helps in relieving the mental stress by improving the normal function of the important glands. The paper gave information as to the type of oil to be and the amount of oil supply required to sustain the procedure for the specified amount of time and this information is useful in designing a modern compatible automated Shirodhara Machine which is the purpose of our team.

### “MODIFICATIONS IN SHIRODHARA EQUIPMENT: AN OVERVIEW”

In [2], Dr. Subhash Sharma<sup>1</sup> & Dr. Bharti Sharma<sup>2</sup>, have tried to document and review the changes which are being incorporated in the procedure and the automation techniques being used to modernize the Shirodhara treatment. Our team gained valuable insights into the details of procedure which are followed in the traditional Shirodhara treatment such as the weight of a traditional Dhara Patra to be used 1536gm, the dimensional specifications of the Droni-72 inches long & 18 inches wide, material of Drone. The paper also documents the modifications being introduced in the modern treatments and equipment's. The associated upsides and downsides of the modernization being followed in the traditional Shirodhara process.

### “Noiseless, Portable and Fully Microcontroller Based Automatic Shirodhara Panchkarma Machine”

In [3], By Balaji Wattamwar<sup>1</sup>, Pawar Chander<sup>2</sup>, Tanmay Borade<sup>3</sup>, Amol Arkilwad<sup>4</sup> documents the instrumentation implemented to automate the process of Shirodhara treatment by using medicated oil. Oil is released from the 'Dharapatra' (pot/bowl) onto the forehead. Distance between the pot and the forehead should be about 6 inches. The mentioned team has published a very detailed research paper on the electronic sensors being used, logic of the control system, Block diagram of the instrumentation and the final image of the developed prototype. The research paper is rich in its detail of the instrumentation of the Shirodhara process but it fell short of the important details such as the oil to be used and on which the prototype was tested on, the flow rate that is achieved by the prototype, and the cycles of testing which verified the effectiveness of the developed prototype. Some of the various instruments used by this team are listed below along with an image of the final prototype which was developed by the mentioned team:

### SYSTEM DEVELOPMENT:

#### A. AVR 16

(ATmega16 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture).

- B. TEMPERATURE SENSOR  
(The LM35 series precision integrated-circuit temperature sensors)
- C. HEATER  
(A simple portable coffee machine heater is used).
- D. SERVO MOTOR.
- E. LCD Display.

**Fig -1:** Prototype of the automated Shirodhara machine



### 3. CONCLUSIONS

Shirodhara is an Ayurvedic process which uses commercially available or specially prepared oils.

Our team could not find any paper with exact chemical composition of the oils used in the process or the exact temperature to which the oil is to be heated before treatment. Most of the literature available on Shirodhara and its developments involve relative composition of oil and the temperature range varies from paper to paper. Our team has reviewed multiple papers and have assumed the average values of the required parameters because of the scarcity of research material and scientific literature for calculation purposes and design considerations after consulting our guide. Very few research articles and research papers have been written with emphasis on the automation of Shirodhara process and its technical details, our team had to work mostly with the **“Noiseless, Portable and Fully Microcontroller Based Automatic Shirodhara Panchkarma Machine”** By Balaji Wattamwar, Pawar Chander, Tanmay Borade, Amol Arkilwad, for the inputs on previous automation developments in Shirodhara treatments. The design and control system of the incorporated in their system are very well documented but the set up is unaesthetic in nature along with a few shortcomings of its own.

The oil reservoir is open without covering, the electronic setup is not enclosed in a proper casing and there is no documented arrangement for varying the height of the Dhara patra. The commercially available products work on these shortcomings but are expensive with average costs ranging upwards of

Rs 30,000[4],[5] in most brands for an Automated Shirodhara machine. These commercial automatic Shirodhara machines are developed with regular use in mind and are suitable for professional medical institutes, massage centers and are often complex in nature and require proper prior training to operate and maintain. As a result of this, the machines are large and bulky and this has driven up the cost of such automated equipments significantly. If normal middle-class households wish to take advantage of such effective Ayurvedic procedures, most of the time they are forced to undertake the procedure in the traditional way which is time and effort consuming or avail them from professional Ayurvedic massage centers which can prove expensive when availed regularly [6]. As there are very few options available which are more reasonable in price & cost effective. Our team gained significant research inputs from both the traditional and modern Shirodhara equipment and is trying to overcome both the cost and design challenges and will try to incorporate the best of both.

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