



Review Article

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PHYSIOTHERAPY IN COMPARISON TO *VYAYAMA* AND *SWEDANA KARMA*: A REVIEW

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ABSTRACT

Physiotherapy is a branch of medical science which mainly deals with the physical aspects of an individual health, by treating their physical ailments. The treatment of disease, mechanical injuries or deformities are carried out by Physiotherapy methods such as massage, heat treatment, Electric treatment, Cold treatment and some unique exercises, rather than by drugs or surgery. These modes of Physiotherapy can be correlated with *Vyayama* (Daily exercises for the movement of the body) and the different modalities of *Swedana Karma* (Sudation therapy) told in our classics on the basis of their mode of action and application. *Vyayama* (Exercise) is simple physical activity which increases or maintains Physical Fitness and overall it maintains the Health an individual. *Swedana* (Sudation Therapy) is the process of producing sweating. Here an effort has been done primarily to understand the basic knowledge of Physiotherapy- its types, indications, contraindications and the actions with respect to the *Vyayama* (Exercise) and *Swedana* (Sudation) methods explained in the *Ayurvedic* Classics. Also to analyse the combined effects of Physiotherapy with various *Ayurvedic* Treatment Procedures like *Vyayama* (Bodily Exercises) and *Swedana* (Sudation Procedures) for the betterment of various Clinical Conditions.

Keywords: Physiotherapy, *Swedana Karma*, *Vyayama*, *Patrapinda Sweda*, *Valuka Sweda*,

INTRODUCTION

Physiotherapy is a branch of medical science which mainly deals with the physical aspects of an individual health, by treating their physical ailments. The medical science which mainly helps in the treatment of physical dysfunctions or injuries, by the use of therapeutic exercises and the application of modalities which will help to restore or facilitate the normal function or development of affected part is called Physiotherapy. It can also be understood as the treatment of disease, injury, or deformity by physical methods such as massage, heat treatment and exercise rather than by drugs or surgery.

Rehabilitation or Physiotherapy

The process of application of different methods to minimize some of the harmful effects of the disease or its treatment on an individual is called as Rehabilitation. It is always possible to improve the quality of life of a diseased person irrespective of prognosis of the disease, i.e. by helping the patients to achieve their maximum potential of functional ability and independence or gain relief from distressing symptoms that disease¹.

The practice of Physiotherapy includes following methods

1. Manipulative therapy
2. Electrotherapy / Heat therapy.
3. Hydrotherapy.
4. Cold compression therapy

Manipulative Therapy

It mainly includes Passive, Assisted, Active, Free active and Resisted type of exercises. These types of exercises will facilitate

or increase the activity and strengthen muscles of affected part of the body.

The Manipulative Therapy is a skillful restoration of mobility to soft tissues and joints. It consists of Soft tissues techniques (massage), Passive mobilization of joints, passive stretching of soft tissues and Auto stretching of soft tissues.²

Active Manipulative Therapy

Soft tissues techniques involve the different mode of massage's i.e. Stroking, Effleurage, Kneading, picking up, Wringing, Skin rolling and Frictions. This is indicated in Scar tissue, muscle spasms, tightness of muscles, Fascial tethering, Edema, Pain also in Slow healing scars or ulcers.

Connective Tissue Massage/Techniques are indicated in Tendonitis, Fibromyalgia, Scoliosis, Chronic Fatigue Syndrome, Sciatica, Multiple Sclerosis, Temporomandibular Joint Syndrome, Amyotrophic Lateral Sclerosis (Lou Gehrig's disease), Arthritis, Carpal Tunnel Syndrome.

Passive Manipulative therapy

Passive mobilization of joints techniques are indicated in Pain, Muscle spasm, Edema, Fibrous contracture of fascia, Ligaments/capsule, Cartilage flake trapped between the joint surfaces.

- All these active and passive manipulative therapy and also kinds of manipulative therapies are helpful in Reduce edema
- Helps in the maintenance of circulation to the affected part of the body.

- It maintains muscle function of affected part by active or static contractions or exercises.
- It restricts joint range wherever possible.
- It checks the required movements allowed during the particular injury.
- It demonstrates the use special appliances ex; sticks crutches during treatment.

Hydrotherapy

The use of water (hot water or cold water) for curative and preventive purpose is called Hydrotherapy. It is also called as Thalassotherapy, Balneotherapy. It was first described by Hippocrates. It is mainly administered to improve the neuromuscular and skeletal muscles functions of the body. Strengthening muscles occurs due to repeated exercises against graded resistance in the water medium. In general, there will be presence of resistance from buoyancy, turbulence or unstreamlining in the water medium. The principles of Hydrotherapy are as follows,

1. Buoyancy

When a certain body immersed in water it experiences the upward force which is equal to the weight of water displaced, this is called Principle of Buoyancy. This helps in rehabilitation of weak muscles and painful joints.

2. Turbulence

When the normal flow of water is replaced by the turbulent flow with the help of artificial aids is termed as Turbulence. It provides the resistance to the body and is used to massage, stimulate the skin, it increases the circulation and the muscle stability.

3. Unstreaming

The resistance of water is directly proportional to the surface of the body i.e. if a broad surface of a body is moved through water the resistance created on body will be greater than the narrow surface body moved over water.

In Hydrotherapy, the heat or temperature is transferred through via Convection method. During administration of different kinds Hydrotherapies, we routinely come across some untoward effects and also, we must be very careful regarding these.

Untoward Effects of hydrotherapy: Chilling, Sudden changes in blood pressure, Infections, fall inside and outside the pool during the course of treatment and Fatigue of patients or staff should be observed repeatedly.³

Precautions of Hydrotherapy technique

- The temperature should be 94-98df (degree Fahrenheit).
- Chlorine levels should be 1.5-3.0 ppm (parts per million)
- Water PH must be 7.2-7.8.
- Chlorine and PH must check for every 2/3 days
- Bacteriological testing
- Backwashing must be performed regularly.
- The floor of the pool must be non-slip.

The clinical indications of Hydrotherapy are as follows, Ankylosing Spondylitis, Osteoarthritis, Rheumatoid arthritis, Juvenile chronic polyarthritis, Spondylosis, Capsulitis, Mechanical Spinal Disorders, Polymyalgia Rheumatic, Major Fractures (lower limbs/spine), Orthopedic Surgery, Neurological

Disorders, for fitness and relieving backache during pregnancy after child birth.

Contra-indications of Hydrotherapy are

- Infected wounds, Acute skin conditions,
 - Pyrexia,
 - Incontinence,
 - Cardiac disease, Recent CVA, DVT,
 - Recent pulmonary embolus,
 - GIT disorders,
1. Kidney Disease,
 2. Diabetes,
 3. Thyroid Deficiency,
 4. Radiotherapy in the previous 3 months,
 5. Careful consideration is essential for patients with open wounds covered with a waterproof dressing,
 6. Epilepsy, etc.

Electrotherapy and Heat therapy

The use of electric signals to block or slow down the transmission of neural pain into the brain is called Electrotherapy in Physiotherapy. The following are the uses of Electrotherapy⁴

• Pain management

The electro-therapy increases range of movement of joints in Osteoarthritis.

• Improves Range of Movements

When electrotherapy administered under observation, it produces repeated stretching of contracted, shortened soft tissues in the body, which in-turn increases the range of joint mobility.

• Neuromuscular Disorders

It improves strength of skeletal muscles, improves of motor control, it decreases muscle atrophy and helps in increase of local blood flow.

• Urine and fecal incontinence

The electrotherapy acts on muscles of pelvic floor to reduce the pelvic pain and strengthen its musculature and sometimes treatment may lead to complete continence.

• Tissue repair

The electrotherapy increases the microcirculation and protein synthesis to heal wounds and it helps in restoring the integrity of connective and dermal tissues in the affected part.

• Acute and chronic edema

The electrotherapy increases the absorption rate, permeability of blood vessels, which in-turn increases mobility of proteins, blood cells and lymphatic flow in the body and this whole process helps in reduction of acute and chronic edematous conditions.

Heat Therapy

The process of application of specific type of heat or temperature for specific period of time is called Heat therapy or Thermo-therapy. It mainly improves extensibility of soft tissues;

increases range of movements and functions, reduces stiffness, pain edema and also increases the blood circulation. The methods of Heat transfer are as follows,

- **Conduction**

The transfer of energy between objects that are in physical contact

- **Convection**

Due to the fluid motion, the transfer of energy occurs between an object and its environment.

- **Radiation**

The transfer of energy from the movement of charged particles within atoms is converted to electromagnetic radiation.

Sources of Heat are as follows Paraffin wax, Infrared radiation, Heat pad, Hot moist packs, Shortwave diathermy, Microwave diathermy etc.⁵

Paraffin wax therapy (Wax therapy)

Wax bath physiotherapy or Wax therapy is one of the most effective heat therapy method, mainly paraffin wax is used for the treatment propose. Wax therapy conducts heat on the body via Conduction method. It improves joint mobility by warming the connective tissues, increases the blood flow, relax muscles and decrease joint stiffness. It can also reduce the muscle spasms and inflammations.

Paraffin wax is a white or colorless soft, solid wax, made from saturated hydrocarbon containing between twenty and forty carbon atoms. It is obtained from refined mineral crude oil. It is solid at room temperature, but it has a very low melting temperature (48°C-90°C) i.e. it begins to melt approximately at > 37 °C (99 °F). It is not going to cause any burns or blisters, and does not get stuck to the skin as well.

Infrared radiation therapy

Infrared radiation therapy is one among the types of electrotherapy, in which electric current is used for illuminating the therapeutic Infrared Lamp for treatment purposes. But, its treatment principle is different from other Electrotherapies like short wave diathermy and ultrasonic therapy.

Infrared Rays (IR) is a type of electromagnetic radiation, having wavelengths between the 780 µm to 1000 µm. Infrared Rays (IR) is divided into different bands:

- Near-Infrared (NIR, 0.78~3.0 µm),
- Mid-Infrared (MIR, 3.0~50.0 µm) and
- Far-Infrared (FIR, 50.0~1000.0 µm).

The Infrared spectrum or the infrared rays lies immediately inferior to the red visible light. This is why it is named as Infra-Red rays. Depending on their light-emitting capacity there are two main groups of Infrared Lamps which are used for physiotherapy, i.e. Non-luminous generator and Luminous generator (Luminous infrared lamp). The Infrared Lamps conducts heat on the body via Radiation method.

Several studies have looked at using infrared saunas in the treatment of chronic health problems, advised in high blood

pressure, congestive heart failure and rheumatoid arthritis. Far infrared type of rays considered as a safe heat therapy method of natural health care and Physiotherapy.

Heat packs

It is the most effective type of Heat therapy. As individual can maintain their heat at desired temperature. There are two kinds of heat therapy in practice i.e. moist heat pack and dry heat pack.

a. Dry Heat Packs

These are small plastic covered pads similar to electric blankets. These pads are having 3 stages of heat, used for treating the pain or sprain at neck or back region. The patient is made to lie on these specific pads and the heat passes to the tissues by Conduction method.

b. Moist Heat Packs

These bags filled with a hydrophilic substance and stored in a thermostatically controlled cabinet of water between 75 - 80°C. They are useful in uneven surfaces because they can be easily molded according to the surface to be applied. Compared to Dry Heat Packs, these are heavy and may cause discomfort to the patient.

Shortwave diathermy

The word Shortwave refers to the Electromagnetic radiation having the frequency range of 2 to 100 MHz. Shortwave therapy is the application of electromagnetic energy to the body at shortwave frequencies. At this frequency all the electromagnetic energy or radiation applied is converted to thermal energy. It can be applied in two methods i.e. pulsed energy waves and continuous energy waves. Shortwave Diathermy unit has two outputs which are connected to pads or disc. These are placed over the desired body part for treatment purpose. Depending upon the convenience one can use either disc or pads.

The Shortwave Therapy provides “extreme heat” in the deeper tissues but other’s heating techniques such as Infrared therapy, Hotpacks etc., generates the heat externally. The Shortwave therapy conducts heat in the body via Radiation method. It is useful in conditions like soft tissue injuries, degenerative and inflammatory arthropathies slow healing wounds, sinusitis, deep-seated pelvic diseases.

Microwave diathermy

The method of application of Microwaves of frequency 300 MHz-300 GHz, to generate heat in the body is called Microwave Diathermy. These waves lie between Radio frequency and Infrared frequency. It can be applied evenly to warm deep tissues without heating the skin. In Microwave diathermy frequency applied is higher than that of Shortwave Diathermy. The Microwave Diathermy conducts heat in the body via Radiation method.

As Microwave Diathermy can’t penetrate deep muscles, it is best suited for areas that are closer to the skin, such as the shoulders, joints etc. These are absorbed by fluid tissues and less by bone, fat. Degenerative joint disease and joint lesions are better to treat.

Cold compression therapy (Ice therapy)

The method of application of very cold temperatures with either static or dynamic compression is called as Cold Compression

Therapy i.e. it is a combination of Cryotherapy and Static Compression. It is mainly indicated in injuries having pain and swelling like sprains, tears, etc. Cold compression therapy is mainly based on the principles which are collectively called as 'RICE' (i.e. Rest, Ice, Compression and Elevation). It is mainly indicated in sports injury or any injury to soft tissues and is also recommended by orthopedic surgeons following surgery.

Cryotherapy

The therapeutic method of application of ice or any cold material which are at freezing or near freezing temperature is called Cryotherapy. Generally liquid nitrogen or argon gas is used for Cryotherapy. It is well documented that metabolic rate decreases by application of Cryotherapy in many research journals. It is the most common treatments in orthopedic medicine in recent years, as it reduces the local temperature, tissue metabolic rate and this helps the tissues to survive for some period of time after the injury. The Cryotherapy conducts heat in the body via Conduction method.

Vyayama (Physical action)

The physical actions which are desirable to every person, will give stability and strength to the body is called as *Vyayama* (Bodily Exercises) according to Ayurveda. When *Vyayama* is practiced daily in moderation, it brings lightness in the body, increases ability to work, stability in the body, brings Resistance to discomfort, reduces the vitiated *Dosha* (Biological Humor), increases the Agni (digestion capacity) and normalizes the lipids levels of body.

Vyayama (Bodily Exercises) gives the normal structure to body parts means it gives nourishment to the muscles, tendons, joints and bones. It increases the stability and strength of sense organs also. It should be done in desired amount, if person does *Vyayama* (Bodily Exercises) excessively then it leads to depletion of tissues, anorexia, nausea, giddiness, vertigo, cough, asthma, fever etc⁷. The view of physical exercises according to modern science and Ayurveda are totally different.⁶

Swedana (Sudation Therapy)

A Sudation therapy is a treatment procedure in which sweat is induced in the body by means of application of heat in different form like direct Steam, residing in airtight hot room or by contacting the body with heated medicaments. There are 4 types of *Swedana Karma* (Sudation therapy) explained on the basis of mode of applications in our classics.⁸ They are

1. *Tapa Sweda* (Sudation by Direct Heat).
2. *Ushma Sweda* (Sudation procedure with Hot Steam).
3. *Drava Sweda* (Sudation procedure with Hot Liquid).
4. *Upanaha Sweda* (Tie with Bandage).

1. *Tapa Sweda* (Sudation procedure by direct heat)

The sudation is carried out by keeping the person in hot room or it can be done by directly applying the heated sand, brick or metal balls wrapped in a piece of cloth applied on the affected part of body.

2. *Ushma Sweda* (Sudation procedure with hot steam)

The *Ushma* (steam) may be obtained by boiling of *Vata-Kapha-Hara Kashaya* (decoction) or normal water, which can be applied over body for Sudation purpose is called as *Ushma Sweda*. The instruments like stone potsherd, pebbles, mud, cuttings of leaves, grains, dried dung of animals, sand, husk etc. are heated and dropped in the sour fermented liquids, the hot steam produced here is used for sudation purpose is also called as *Ushma Sweda*.

3. *Drava Sweda* (Sudation procedure with hot liquid)

In this procedure, medicated water should be filled into a pot, jug with spout, or a tube and pored comfortably over the painful parts covered with cloth. Drugs of *Dashmoola* (Drugs with medicated root parts) each one separately or all together, mixed with fats, *Sura* (Alcoholic preparations), water and milk are used for *Swedana Karma* (Sudation Procedure).

4. *Upanaha Sweda* (Tie with Bandages)

The word *Upanaha* is compared with *Bandha* or "to tie". This can be done with or without heating the medicine i.e. the process of application of paste of hot potency drugs over the affected part of the body is called *Upanaha Sweda*.

Also, *Swedana* (Sudation) are of two types based on its qualities: *Ruksha Sweda* (dry fomentation) and *Snigdha Sweda* (sweat inducing treatment done after giving oil massage or medicinal drugs which are processed or fried in herbal oils).

Patra Pinda Sweda (Herbal Rejuvenation of Back and Spine with bolus)

It is an unparalleled treatment in painful conditions mainly caused by *Vata Dosha* (Biological air Humor); specially indicated in musculoskeletal diseases. Leaves which can pacify morbid *Vata Dosha* (Biological air Humor) are used in the *Pinda* (Bolus like form) for reducing the inflammatory diseases of joints and soft tissues. Vitiated *Kapha Dosha* (Biological Phlegm Humor) and related symptoms like heaviness, coldness etc. can be get ridden by using *Kapha* (Biological Phlegm Humor) pacifying leaves in the bolus. It is mainly used to get relief from pain, inflammation, swelling and stiffness associated with bone, joint and musculoskeletal pains.

DISCUSSION

In a broad view Physiotherapy may be correlated with *Vyayama* (Bodily Exercise) and *Swedana Karma* (Sudation Procedures) told in Ayurveda classics.

Vyayama (Bodily Exercises) can be directly correlated with Physical exercise which is told in Physiotherapy. Both of these are with same benefits:

1. Gives the normal structure to body parts.
2. Gives nourishment to the muscles, tendons, joints and bones.
3. Increases the stability and strength of the body.

Table 1: *Swedana* (Sudation)

Physiotherapy	<i>Swedana Karma</i>
Electrotherapy: (Radiation Method of heat application) 1. Infrared radiation. 2. Shortwave diathermy. 3. Microwave diathermy.	1. <i>Tapa Sweda</i> (Sudation procedure through dry Heat) 2. <i>Ushma Sweda</i> (Sudation Procedure through Steam) (Radiation and Conduction Method of heat application)
Hydrotherapy (Convection Method of heat application)	<i>Drava Sweda</i> (Sudation Procedure by hot liquid) <i>-Parisheka Sweda</i> (Sudation Procedure by Sprinkling hot liquid medicaments). (Convection Method of heat application)
Heat therapy: {Conduction Method of heat application} 1. Heat Pad. 2. Hot moist packs. 3. Paraffin wax.	<i>Upanaha Sweda</i> (Sudation Procedure by tie over the body part with or without heating medicine) 1. <i>Pichu Bandhana</i> (Bandaging with the hot paste of medicines) 2. <i>Ushma Lepana</i> (Pasting with hot paste of medicines) 3. <i>Patra Pinda Sweda</i> (Herbal Rejuvenation of Back & Spine with bolus) {Conduction Method of heat application}
Manipulative Therapy	<i>Vyayama</i> .

By comparing the different modes of Physiotherapy with different types of *Swedana Karmas* (Sudation Procedures) mentioned in our classics practically based on the action and mode of application are as follows:

Hyperthermia

Local hyperthermia produced during *Swedana* (Sudation) procedure has very vital physiological and therapeutic effect and is very much effective in joint degenerative conditions⁹

1. Due to localized increase of body temperature, the circulation of blood and lymph increases in that area, hence the local tissue metabolism will be improved by Hyperthermia¹⁰.
2. It moderates the inflammation by modifying secretion of various inflammatory mediators in the body¹¹.
3. It reduces pain by relaxing the local musculature of the body.
4. Short term hyperthermia decreases the level of stress hormone norepinephrine and hence produces parasympathetic dominance.
5. Already it has been established that hyperthermia increases the rate of tranche dermal drug delivery and there by helpful during *Abhyanga* (Body Massage) followed by *Swedana* (Sudation) for better tranche dermal drug absorption¹².

The Hyperthermia will also be seen during Physiotherapy procedures like in Electrotherapy and in Heat therapy. But the difference is, the Hyperthermia produced by *Swedana Karma* (Sudation therapy) will have both physiological effect and therapeutic or the medicinal effect and the hyperthermia produced during Physiotherapy procedures may have only Physiological effect. Because in different types of *Swedana Karma* we use different and specific drugs which in turn helps in breaking the pathology of diseases, but in Physiotherapy we only see different modes application of electricity or energy over the body and here we never see any type medicines used for inducing Hyperthermia.

Hypno-Analgesic Effect

Heat administration by *Swedana* (Sudation) and Physiotherapies modalities may produce Hypno-Analgesic effect by diverted stimuli. Heat production, water and electrolyte balance in the body is controlled by the Hypothalamus, which is the center of heat regulation in our body. The signals generated by the temperature receptors of the hypothalamus are extremely powerful in controlling body temperature.

CONCLUSION

The different modalities of Physiotherapy are almost similar as that of *Ayurvedic* treatments like *Vyayama* (Bodily Exercise) and *Swedana Karma* (Sudation Therapy). In many Clinical Conditions, the Physiotherapy is one of the parts of treatment procedures but cannot be considered as a complete treatment. So for the betterment of patients, physician should advise the Physiotherapy procedures along with the main system of medicine (*Ayurveda* or *Allopathy*).

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