



Critical Review on Aspects of *Sneha Vasti* in *Dhatu* Poshan with Special Reference to Tissue Engineering

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ABSTRACT: *Dhatu*s are seven in number *vis*, *rasa* (plasma), *rakta* (blood), *mamsa* (muscle), *medas* (fat), *asthi* (bone), *majja* (bone marrow) and *shukra* (semen-the reproductive tissue in the males and its counterpart *artava* (ovum) in females). Acharya Charaka and Vagbhatta says that the Ahara Rasa is spread and distributed into the entire body at the same time, continuously and always by the help of *Vyan Vayu*. *Sneha* or *Anuvasan Basti* (unctuous enema) promotes *Bala* (strength) of the person who is emaciated and debilitated. Drawing from knowledge of developmental biology, the self assembling process can be used to gene expression, and tissue formation in a manner similar to morphogenesis. Morphogenesis is the biological process that causes an organism to develop its shape. Regenerative medicine refers to a broader field that focuses on both tissue engineering as well as the ability of the human body to self-heal itself in order to restore normal function to tissue, organs, and human cells. In this article we have tried to relate the mode of action of *Sneha Vasti* in *dhatu poshan* with the principle of self assembly method of tissue engineering.

Keywords: *Dhatu poshan*, *Sneha Vasti*, Tissue engineering

INTRODUCTION

Regenerative medicine is a broad field that includes tissue engineering but also incorporates research on self healing-where the body uses its own system, sometimes with the help of foreign biological material to recreate cells and rebuild tissues and organs.

Cells are the building blocks of tissues and tissues are the basic unit of function in the body. In consequence, the word *Dhatu*s means "one who enters the formation of the body". Thus, we can say that *Dhatu*s are the body tissues and together with the *Upa Dhatu*s, they are the ones that confer the physical corpulence of the body.

The word '*Dhatu*' is derived from the root "*Dha*" which means to support and nourish. *Doshas*, *Dhätüs* (tissues) and *malas* (waste products) are the roots (causes, chief constituents, supports), of the body always (throughout the span of life.) The *Dhatu*s hold (support) the body together.

रसासृगमांसमेदोअस्थिमज्जाशुक्राणि धातवः । सप्त दुष्या मला मूत्रशकृस्वेदादयो अपि च ॥

अ.हृदय.१/१३

The word *Dhatu* denotes the Essential elements of the body which are seven in number viz. *Rasa, Rakta, Mansa, Meda, Asthi, Majja* and *Shukra*(A.H.Su 1/13)

Anuvasan vasti is one of the five *pancha karma* treatments and two types of *vasti*. *Anuvasan vasti* with the other one (i.e. *Asthapan Vasti*) is considered to be the half of the total *Pancha karma* treatment. Basically it is an oil or ghee enema treatment where medicine is introduced through anus. It is *snigdha, soumya*, i.e. nourishing by nature.

अनुवासन् अपि न दुष्यति अनु दिनं वा दीयत इति अनुवासनः॥(सु.चि.३५/१८)

Anuvasan means to stay. In *Anuvasan Vasti*, the administered medicines stay for a longer duration inside the intestine (bladder, uterus) but still do not cause any untoward problem. They neither aggravate the *Dosha*'s nor cause any complication. They in fact cure many diseases staying inside our system for a longer duration. They can also be administered on a daily basis. The *Anuvásan Vasti* is only an alternative of a *Sneha-Vasti*, but (with this difference that) the quantity of the fluid.

सर्वदोषहरश्चासौ शरीरस्य च जीवनः |

तस्माद्विशुद्धदेहस्य स्नेहवस्तिर्विधीयते ||२०|| su.chi.35/20

As water will freely run through channels previously cleansed of all refuse matter, so does an *Anuvasan* tend to cleanse the organism of all *Doshas* (morbidic diatheses) and to increase the vitality of the organism.

An *Anuvásan Vasti* is so called from the fact of its not injuring the system even in the event of its being retained in the bowels a whole day, or from the fact of its being adapted to daily application.

ABSORPTION OF VASTI

The term 'vasti' stands for retention. *Sneha vasti* and *Anuvasan Vasti* are designed to be given in a lesser amount as because it is intended to stay inside at least up to 3 *yama* i.e. 9 hours

Absorption Mechanism

The gastrointestinal tract is lined with epithelial cells. Drugs must pass or permeate through these cells in order to be absorbed into the circulatory system. One particular cellular barrier that may prevent absorption of a given drug is the cell membrane. Cell membranes are essentially lipid bilayers which form a semi permeable membrane. Pure lipid bilayers are generally permeable only to small, uncharged solutes. Hence, whether or not a molecule is ionized will affect its absorption, since ionic molecules are charged. Solubility favours charged species, and permeability favours neutral species. Highly lipid-soluble drugs are in general rapidly absorbed while decidedly lipid-insoluble drugs are in general poorly absorbed. It is suggested that the paracellular route for drug penetration in the large intestine is restricted more than in the small intestine. The absorption rates of highly lipophilic indomethacin were similar in the large and small intestines, while intermediately lipophilic acetaminophen was more rapidly absorbed in the small intestine than in the large intestine.

The colon is believed to be a suitable absorption site for peptides and protein drugs for the following reasons; (i) less diversity, and intensity of digestive enzymes, (ii) comparative proteolytic activity of colon mucosa is much less than that observed in the small intestine, thus Colon Drug Delivery System protects peptide drugs from hydrolysis, and enzymatic degradation in duodenum and jejunum, and eventually releases the drug into ileum or colon which leads to greater systemic bioavailability. And finally, because the colon has a long residence time which is up to 5 days and is highly responsive to absorption.

CONCEPT OF TISSUE ENGINEERING

Tissue engineering defined as "understanding the principles of tissue growth, and applying this to produce functional replacement tissue for clinical use. A further description goes on to say that an "underlying supposition of tissue engineering is that the employment of natural biology of the system will allow for greater success in developing therapeutic strategies aimed at the replacement, repair, maintenance, or enhancement of tissue function.

Self-assembly methods have been shown to be promising methods for tissue engineering. Self-assembly methods have the advantage of allowing tissues to develop their own extracellular matrix, resulting in tissue that better recapitulates biochemical and biomechanical properties of native tissue. Self-assembling engineered articular cartilage was introduced by Jerry Hu and Kyriacos A. Athanasiou in 2006 and applications of the process have resulted in engineered cartilage approaching the strength of native tissue.

Tissue engineering by self-assembly (TESA) is a novel approach that relies on the cell's ability to produce natural extracellular matrix TESA can be used to produce structures that have physiological strength and are not recognized as foreign *in vivo*.

Applications of Self assembly

- Researchers have developed a tissue-engineered blood vessel that has shown great promise as an arteriovenous shunt.
- Using combinations of bioactive stimuli (i.e., TGF- β 1, chondroitinase-ABC) and/or mechanical stimuli (i.e., hydrostatic pressure), tissues with tensile stiffness's up to 6.3 MPa and 2.1 MPa can be generated from passage leporine and porcine cells, respectively (Murphy et al. 2013b; Arzi et al. 2015). Self-assembled articular cartilage derived from primary chondrocytes cultured in chondrogenic-inducing medium expressed superficial zone protein, imparting the tissue with lubrication capacity and frictional properties approaching those of native articular cartilage (Peng et al. 2014). The self-assembling process, thus, can be used to engineer native tissue-like neocartilage

DISCUSSION

a) Tissue Impact/ Anuvasan vasti as boon in dhatu poshan

- Formation of *dhatu*s takes place serially.
The *dhatu*s are divided into three parts *sthulansha*, *sukshmansha* and *malansha* during their transformation. The *sthoolansha* forms *sthayi* or stable *dhatu*. *Sukshmansha* is nutrient portion of next *dhatu* and this *sukshmansha* gets transformed into next *dhatu* when it goes to specific *strotas*. Thus there is no question of complete transformation of *dhatu*s.
- *Ekakala dhatu poshan siddhanta*: This principle was mentioned by *Acharya Arundutta*, the commentator of *Astanga hridaya*. With the help of *vyana vayu*, *aahara rasa* nourishes all *dhatu*s at a time without interruption, throughout life. This is known as *eka kala dhatu poshana nyaya*.
- *Vasti* is said to be the best modality for *Vata dosha*: For the proper nourishment of *dhatu* functioning of *pran*, *saman*, *vyana vayu* should proper. And *Vasti* is said to be the ideal *chikitsa* for *vaat dosha*.

शाखागताः कोष्ठगताश्च रोगा मर्मोर्ध्वसर्वावयवाङ्गजाश्च
ये सन्ति तेषां न हि कश्चिदन्यो वायोः परं जन्मनि हेतुरस्ति॥३८॥
विण्मूत्रपित्तादिमलाशयानां विक्षेपसङ्घातकरः स यस्मात्
तस्यातिवृद्धस्य शमाय नान्यद्वस्तिं विना भेषजमस्ति किञ्चित्॥३९॥
तस्माच्चिकित्सार्थमिति ब्रुवन्ति सर्वा चिकित्सामपि बस्तिमेके॥४०॥

CH.SI.1/38-40

तत्र स्नेहादीनां कर्मणां बस्तिकर्म प्रधानतममाहुराचार्याः ।

कस्मात्? अनेककर्मकरत्वाद्बस्तेः; इह खलु बस्तिर्नानाविधद्रव्यसंयोगाद्दोषाणां संशोधनसंशमनसङ्ग्रहणानि करोति, क्षीणशुक्रं वाजीकरोति, कृशं बृंहयति, स्थूलं कर्शयति, चक्षुः प्रीणयति, वलीपलितमपहन्ति, वयः स्थापयति ॥ ३॥

शरीरोपचयं वर्णं बलमारोग्यमायुषः ।

कुरुते परिवृद्धिं च बस्तिः सम्यगुपासितः ॥४॥ su.chi.35/3

Sages of authority hold an application of the *Vasti* to be the best of all measures such as, the application of *Sneha*, etc.; and why? Because on account of its varied functions and of its being composed of the various kinds of medicinal drugs *Vasti* helps to restrain (*Sangraha*), pacify (*Sanshaman*) and cleanse (*Sanshodhan*) the different *Doshas* of the body. It helps the recreation and growth of fresh semen, contributes to the building up of an emaciated frame, reduces corpulence, invigorates eyesight, arrests premature old age and tends to rejuvenate. A regular and proper use of a *Vasti* tends to improve one's complexion and body strength, imparts longevity, contributes to the growth of the body, and ensures the enjoyment of sound health and guards against the inroad of any disease.²

दत्तस्तु प्रथमो बस्तिः स्नेहयेद्वस्तिवङ्घ्रणौ ॥७१॥

सम्यग्दत्तो द्वितीयस्तु मूर्धस्थमनिलं जयेत् ।

जनयेद्वलवर्णो च तृतीयस्तु प्रयोजितः ॥७२॥

रसं चतुर्थो रक्तं तु पञ्चमः स्नेहयेत्तथा ।

षष्ठस्तु स्नेहयेन्मांसं मेदः सप्तम एव च ॥७३॥

अष्टमो नवमश्चास्थि मज्जानं च यथाक्रमम् ।

एवं शुक्रगतान् दोषान् द्विगुणः साधु साधयेत् ॥७४॥

su.chi.37/71-74

Acharya Sushrut has specified that either 8 or 9 *sneha vasti* should be administered along with *Niruha Vasti*. He states first *sneha vasti* will produce *snigdghata* (unctuousness or oiliness) in the region of *vasti* (urinary bladder) and *vankshan*(groin). The second tends to restore the *Vayu* in the cephalic part of the body to its normal condition. The third contributes to the improvement of body strength and complexion. The fourth permeates the *Rasa* (lymph chyle) with its own oily essence. In this way the fifth application of a *Vasti* permeates the blood, the sixth the *mamsa*(flesh), the seventh the *med*(fat), the eighth the *asthi*(bones), and the ninth the *majja*(marrow)with the oily essence. This series of *Vasti*-applications repeated twice tends to purify the semen from all its impure or unhealthy constituents. .

A person treated with eighteen series (three hundred and twenty-four in number) of such *Sneha vasti* and *Niruha-vasti* in the above mentioned way and observing the prescribed rules of diet and conduct is enabled to develop a muscular strength in no way inferior to that of an elephant, and to live a sinless life a thousand years, in the full enjoyment of his intellectual faculties, god-like beauty and horse-like swiftness.

RELATABLE PRINCIPLE OF TISSUE ENGINEERING

Tissue engineering solves problems by using living cells as engineering materials:

- **Asthi Dhatu/Bone:**

Bone is a mineralized collagen matrix responsible for primary load bearing in the musculoskeletal system. Clinical applications of tissue-engineered bone often relate to the repair of

critical-sized defects that cannot heal on their own. The primary objective of tissue engineers, therefore, is to engineer bone with compressive and tensile stiffness and strength reminiscent of native bone. Additionally, indicators of vascularization and mineralization are used to assess bone quality. Scaffold-free approaches used in bone engineering are primarily cell-sheet-based, with few using aggregate culture.

According to Ayurved *Vata Dosha* made up of *Vayu* and *Akash Mahabhutas*, its *Gunas* are *Ruksha*, *Laghu*, *Sheeta*, *Khara*, *Sukhsma*, *Chala* and is located in *Pakavasaya*, *Kati*, *Sakthi*, *Shrotra*, *Asthi*, and *Sparshanendriya*. The importance of *Dhatu* mentioned in *Sthana of Doshas*. *Asthi Dhatu* made up of *Prithvi Mahabhuta*, its qualities are *Khara*, *Laghu*, *Sushirata*, and it formed from *Medo Dhatu* by *Meda Dhatvagni*, *Prthivi*, *Jala*, *Vayu Samyoga* gives rise to *Kharatva* giving rise to *Asthi Dhatu*. Therefore, they are hard tissues and support the body frame. *Vata* is required to keep the interior of the bone porous and light. This enables the body to move easily on its joints. If *Vayu* is not present in the bones, the bones would have been heavy and it would have been difficult to carry our own bodies. The space created by *Vayu* in the bones helps *Majja* to occupy the interior of the bones. *Vasti* may produce neuromuscular remodelling, pain modulation by influencing enteric nervous system and thereby central nervous system. *Tikta Dravya Siddha Ghrita Vasti* is especially advised in *Asthi Vikara* by Acharya Charaka. *Vasti* contains hypoosmotic solution, which results in the nourishment of *Sapta Dhatu* after absorption in the blood. *Guggulu Tiktaka Ghrita*, *Pancha tikta Ghrita* contains predominantly *Tikta Rasa* and *Ushna Virya* drugs. Being composed of *Akasha* and *Vayu Mahabhuta*, *Tikta Rasa* helps in the preservation of the normal health of *Asthi Dhatu*. It also increases the *Dhatvagni* (metabolic stage), which in turn helps in proper nutrition of all the *Dhatu*s. Owing to the *Snigdha* and *Ushna Guna*, *Tiktaka Ghrita* helps in the pacification of aggravated *Vata*. *Vata Dosha* is predominantly present in *Asthi Dhatu* and *Sandhi* (joints) As the Acharya Dalhan has said *Asthidhara kala is Purishdhara kala*. *Purishdhara kala* is nothing but *Pakvashaya* (large intestine). “*Pakvashaya*” is very important *Sthan* (Site) of *Vata Dosha*. Here there is *Nirmiti* (Origin) of *vata Dosha* and *Asthi dhatu*. *Karyakshetra* of *basti* is *Pakvashaya*. *Anuvasana Basti* is the treatment of choice in *Vatavyadhi*

- One of the basic goals of tissue engineering is to improve the functioning of tissues such as: tissue, skin, muscle, bone which can be achieved by *Anuvasan Vasti*

शरीरोपचयं वर्णं बलमारोग्यमायुषः |

कुरुते परिवृद्धिं च बस्तिः सम्यगुपासितः ||३१|| su.chi.35/31

A well-applied *Vasti* contributes to the growth, health, strength and longevity of the body and to the improvement in its complexion.

- While we analyze each organ related to *Basti*, we can understand that all of them are *Marmas*. *Marmas* are *PranaSthana*. *Prana* here means *Agnyadi MahaBhoota*. More over the *Marmas* related to *Vasti* are *SadhyapranaharaMarmas*. *Sadhyapranahara Marmas* are *Agnimahabhootha* predominant-at. In *Marmas* four *siras* are (*Vatavahi*, *Pittavahi*, *Kaphavahi* and *Raktavahi*) present which help in the *Poshana* of *Snayu*, *Asthi*.

Mamsa etc

CONCLUSION

- Tissue engineering covers a broad range of applications. In practice the term has come to represent applications that repair or replace structural tissues (i.e. bone, cartilage, blood vessels etc). These are tissues that function by virtue of their mechanical properties.

- Tissue engineering mainly focuses on regeneration of new and healthy tissues with help of cells from same organ, or using growth factor for stimulation of cell growth.
- In Ayurved this is achieved by stopping or reducing the advancement of disease, removing accumulated toxins from the system and by stimulating the growth of healthy tissue. And to achieve this *Anuvasan Vasti* acts very efficiently. The potency of the *Vasti* in the *Pakvasaya* acts on the whole body from top to toe, like the sun in the heavens acting on the humidity. Acharya Charak has considered, *Vasti* therapy as half of the treatment of all the disease, while some authors consider it as the complete remedy for all the ailments.
- One promising tissue-engineering technique, is the self-assembling process (Hu and Athanasiou 2006; Athanasiou et al. 2013). Without the influence of external energy, self-assembly mimics developmental events to generate functional cartilaginous tissue with characteristics reminiscent of native tissue. *Anuvasan Vasti*, in this method of treatment, medicated oils are given in enemas that lubricate the body tissues. It works by purifying and nourishing the seven *dhatu*s (body tissues) inside the body viz. *Rasa, Rakta, Maans, Medha, Asthi, Majjha* and *Shukra* (Juice, blood, muscle, fat, bone, bone marrow and semen) *dhatu*s or the body tissues. Furthermore it helps in holistic healing and thus enhancing the total health of the individual.

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