

Ayurvedic Inheritance of India
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Module - 1
Lecture - 5
Human body in Health

Today's subject is human body in health. It is a rather unusual title because when we look at a human body in modern medicine, we are used to looking at Anatomy, Physiology, Bio-Chemistry, Pharmacology, different type of schema to study the human body. That is a way it has evolved, modern medicine. 500 years ago, modern medicine has not worked like this; it was different. But today, that is what we are all used to, but Ayurveda, the text that we have, the most recent is written in 600 AD. Therefore, the way they looked at the human body would be somewhat different from what we are used to.

So, instead of talking about Anatomy, Physiology, Bio-Chemistry and so on, I have taken this Phraseology, human body in health, where there will be references to what we call anatomy; there will be references to what we call Physiology, but in a somewhat different form because imagination, what is imagination? It is forming images in the mind, turning them in the head, and looking for new kind of relationships; new kind of linkages. This is what in only human beings seem to be capable of that; other animals, they do not seem to have this. Now, once these new linkages, relationships are formed, that is imagination. The next thing is how true are these to settle this?

You need to have, in science, if you turn, you have to do experiments to see whether these relationships we have imagined, are they valid? That is where experiments commit. In fact, the very first lecture I quoted John Hunter's famous quote - why think, why not perform the experiment? So, that is to verify the scheme that you have conceptualized; how valid is it? A great writer, he also has images or a great musician, he has musical images, but there it is a question of how true it is to like?

So, many hundreds of thousands of poems were written, but people continue to read Ramayana and Mahabharata because they are true to life; that is how that is validated. So, in Ayurveda, you will find plenty of these schemes with the imagination which the

Vedic, Ayurvedic sages had. You will see many of these; whether it is Panchakarma, whether it is physiology, but validation part is a second question; I will not be getting into this.

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HUMAN BODY IN HEALTH

Contents:

- **Body fabric**
 - **Fetal development**
 - **Body Parts**
 - **Organs: Viscera**
 - **Vital spots (Marmas)**

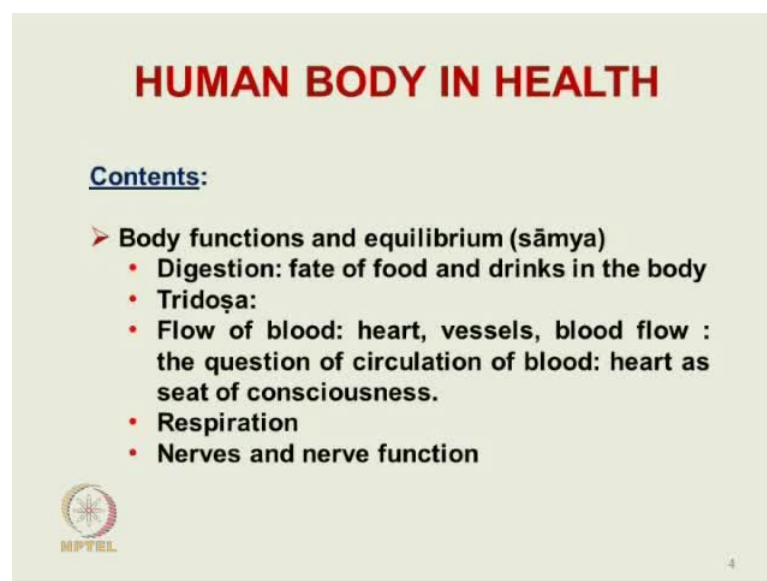
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Now, the contents of today's talk: One is the body, the fabric of the body and the development of it, the fetal development, body parts, organs, vital spots, marmas, my concept which is not very strong in Ayurveda today.


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HUMAN BODY IN HEALTH

Contents:

- **Body functions and equilibrium (sāmya)**
 - **Digestion: fate of food and drinks in the body**
 - **Tridoṣa:**
 - **Flow of blood: heart, vessels, blood flow : the question of circulation of blood: heart as seat of consciousness.**
 - **Respiration**
 - **Nerves and nerve function**

 NPTEL

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Body functions, the concept of equilibrium, the kind of generalization, then digestion; that is the only part which would more or less confirm to what we understand by system of digestion. Tridosha, a very important concept dealing with functions in the body, flow of blood, heart, vessels, blood flow, and the question is circulation of blood, heart as a seat of consciousness. It is a controversial, but that is a very important aspect of Ayurveda; respiration, nerves and nerve function.

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Now, these are the topics to give you a general idea of how they conceptualized human body in a state of health; how does it appear? How does it function?

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BODY FABRIC: DEVELOPMENT

- Human fetus consists of contributions from the parents, nutrients, and self. When self, borne by the mind, enters the united seed from father and mother, an embryo forms. It imbibes nutrients from the uterine environment and grows.
- Defects in the male and female seeds, effect of past actions, uterine environment, mother's nutrition and conduct may disturb the doṣas and give rise to fetal anomalies.

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Now, the development of the human body embryology was a subject which received a lot of attention in Ayurveda, and the human fetus, they recognized that contributions from parents, nutrients, and self. Nutrients in the uterine environment, the nutrient supply to the embryo and self, which brings in consciousness; the self safe is borne by the mind; that is how it enters in the third month; you will see that. The united seed from the father and mother, and embryo forms; that is where it takes shape. And these are important questions now when you talk of embryonal cell research, stemcell research, these questions come: At what stage can you use those? At what time does it become conscious? These become major issues.

We are now going by only western definitions. Often these questions are asked and this is the Indian perception; if you want to look, this is what it says. At what time does consciousness, that is mind bearing the self entering and making it conscious, now, from then on, it is an embryo; it has got a life. Prior to that, it is not alive; that this is according to our Ayurvedic perception. Defects in the male and female seeds, effect of past actions - karma, uterine environment, mother's nutrition - all these may disturb the doshas and affect the fetal to development. This may also this is the reason for fetal anomalies - a child being born with various types of congenital defects.

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BODY FABRIC: DEVELOPMENT

➤ In summary, an embryo is a product of father, mother, self, nutrition, mind and congeniality (in food, tastes etc., between mother and father). Each member contributes a distinctive share to the embryo's development, each being indispensable. These are individually described.


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Then in summary, the embryo, therefore is a product of father and mother, self nutrition, mind, congeniality that this between the parents. Congeniality is important for the formation of the embryo and its healthy development.

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INDIVIDUAL CONTRIBUTIONS TO FETAL DEVELOPMENT


Contributor	Contribution to Fetal Development
Mother	Soft tissues; viscera
Father	Hard tissues including bone, teeth, ligaments, hair
Self	Entry into the united seed vitalizes the fetus: causes birth in higher species, endows self-knowledge, life span, consciousness and will.
Nutrition	Growth and consolidation of the body: energy: maintenance of breathing.
Mind	Enters in conjunction with self; supports sense organs; source of tendencies, conduct, likes, memory, courage, fear.
Congeniality	Congeniality in food and life style between father and mother determines good health, cheerfulness, fine voice and fertility of individual.

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Now, here is a tabular statement. The contributor is on the left hand column and what it contributes to the fetal development according to Ayurveda?

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INDIVIDUAL CONTRIBUTIONS TO FETAL DEVELOPMENT	
Contributor	Contribution to Fetal Development
Mother	Soft tissues; viscera
Father	Hard tissues including bone, teeth, ligaments, hair
Self	Entry into the united seed vitalizes the fetus: causes birth in higher species, endows self-knowledge, life span, consciousness and will.

 Contd... 7

You will see, the mother, all the soft parts in the fetus; these are contributed by the mother. The father's - the hard tissues like bone, teeth, ligaments, these are all from the father. So, if there is a congenital defect affecting the connective tissue, for example, somebody has a connective tissue disorder, that obviously is coming from the father's side. Self entry into the united seed which vitalizes the self with the fetus, until then it is not alive. Therefore, if you want to take the embryonal stem cells, you can take it earlier. This is what it follows according to Ayurveda. It causes birth in higher species, why should a child be born in a cow or a human being? That is really a contribution of the self and endows self-knowledge, life span, consciousness; these are all derived from the self.

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INDIVIDUAL CONTRIBUTIONS TO FETAL DEVELOPMENT	
Contributor	Contribution to Fetal Development
Nutrition	Growth and consolidation of the body; energy: maintenance of breathing.
Mind	Enters in conjunction with self; supports sense organs; source of tendencies, conduct, likes, memory, courage, fear.
Congeniality	Congeniality in food and life style between father and mother determines good health, cheerfulness, fine voice and fertility of individual.

Nutrition, growth and consolidation of the body, energy, maintenance of breathing; all these are contributions of nutrition. And the mind enters in conjunction with the self and it supports the sense organs. The source of tendencies, conduct, likes, memory, these all contributions of the mind, but it has no independent entry; it always comes; it is powered by itself. Congeniality in food and lifestyle between father and mother, it determines good health, cheerfulness, fine voice, fertility of the individual; these are the contributions.


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FETAL DEVELOPMENT	
Month	Fetal Development
First	A shapeless mass; all constituents endowed with all the qualities of five elements.
Second	Solidifies as a bolus; solid, flesh-like, and tumor - like appearances suggest male, female and neuter gender.
Third	? Head/Heart/Navel/Sense organs/rectum as the start controversial. Another view was that the first organ to develop cannot be settled because it is not observable! The consensus was all organs develop simultaneously. Organs traceable to their origin from five elements. Body parts including sense organs appear; consciousness makes entry; maternal and fetal hearts connected and emotions resonate, hence maternal cravings ("pica").

Then, it goes on the time horizons in the fetal development.

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FETAL DEVELOPMENT	
Month	Fetal Development
First	A shapeless mass; all constituents endowed with all the qualities of five elements.
Second	Solidifies as a bolus; solid, flesh-like, and tumor - like appearances suggest male, female and neuter gender.

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In the first month, a shapeless mass; all constituents are endowed with all the qualities of five elements. Five elements are Panchabuthas and that it can be, it can develop into anything; totally potential as we might say. The second month it solidifies; this shapeless mass in the first month, it begins to consolidate and a solid flesh like, and tumor like. It can appear in these three forms and these appearances suggest there is a possibility, the first one for the solid, consolidated is probably going to be male. If it is flesh like, that is likely to be female and if it is the tumor like, still remains amorphous, then it could be neuter gender, or it could end up in abortion.

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FETAL DEVELOPMENT	
Month	Fetal Development
Third	<p>? Head/Heart/Navel/Sense organs/rectum as the start controversial. Another view was that the first organ to develop cannot be settled because it is not observable! The consensus was all organs develop simultaneously. Organs traceable to their origin from five elements.</p> <p>Body parts including sense organs appear; consciousness makes entry; maternal and fetal hearts connected and emotions resonate, hence maternal cravings ("pica").</p>

The third is is very important. The second paragraph if you read, the body parts including sense organ appear in the third month; consciousness makes its entry; that is self and mind. The maternal and fetal hearts begin to beat in synchrony. Now, this is called dauhrida; there are two hearts in that person. Mother's heart and the fetal heart, they are connected and they beat in synchrony. And as you know, later on you will be seeing this in Ayurveda consciousness and emotional cognitive functions; these are all located in the heart. So, if these two hearts are joint, dauhrida - two hearts, then what happens is many of the emotions, likes, dislikes, these are all kind of in continue between the mother and the fetus.

So, many times, you will find in women who are pregnant third month, they have what is called pica. These are very common. A woman who does not like these sour articles, for example, suddenly she might have a desire to eat that things which she had never liked to eat; they will express these strange desires and there is a traditional belief that you should always satisfy that wish. The reason for that these wishes, strange wishes, are coming because there is another heart beating there. Now, it is a fetal wishes of the baby; for these unusual things, this is the traditional belief. That is why, you should always satisfy these. This everywhere you will find, even the poorest person you will go and secure what that woman wants because that is the desire of that fetus, the heart of which is beating in synchrony with the mothers; this is a traditional belief.

But there is a discussion in the Charaka Samhitha; it is a seminar really; several disciples sitting; How does, what starts the first part of the development? Which organ starts? Is it the joints? Is it the head? Is it the heart? Like that each student is advancing his own view. Finally, they could not agree and Atreya who is chairing this seminar, and he finally sums up by saying, you cannot really verify because none of us have seen any of these; this is not verifiable. Therefore, he says, all of them start simultaneously developing; that is all that. But that inquiry, the keenness is to know, which has the priority; that discussion was very active at that time; the subject of what we call embryogenesis.

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FETAL DEVELOPMENT	
Month	Fetal Development
Fourth	Umbilical cord attached to the navel at one end and placenta at the other; opposite side of placenta connected to mother's heart which soaks the placenta with blood through pulsating vessels. Fetal head up in the uterus; face to the back of the mother and limbs folded. Head rotates and comes down only at delivery.
Fifth	Development of flesh and blood progresses rapidly.
Sixth	Mother's strength and complexion decrease: those of fetus improve.

Now, it goes on. Fourth month the umbilical cord is connected to the fetus, but at the other end, look at that, the placenta, the opposite side of the placenta; it is being, blood is coming from the mother's pulsating vessels. It is very important there. The opposite side of the placenta is connected to the mother's heart which soaks the placenta with blood through pulsating vessels. That is very important so that pulsatile vessels, pulsatile flow that was recognized by... So, obviously, there was certain amount of like (()) they must have seen. Without any observation, they could not have written all this. May not have been a keen study like we do today, but at that time, obviously, without any observation, they could not have written this story of a embryogenesis.

Fifth month, development of flesh and blood progresses steadily and sixth month mother's strength and complexion decrease; those of the fetus improve.

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FETAL DEVELOPMENT	
Month	Fetal Development
Seventh	Mother wears out: fetus strong.
Eighth	Ebb and flow of ojas between mother and fetus and transport of rasas nourish the fetus but weaken mother. Delivery during this month is risky.
Ninth	Ninth to tenth is the time for parturition. Intrauterine stay of fetus harmful beyond.

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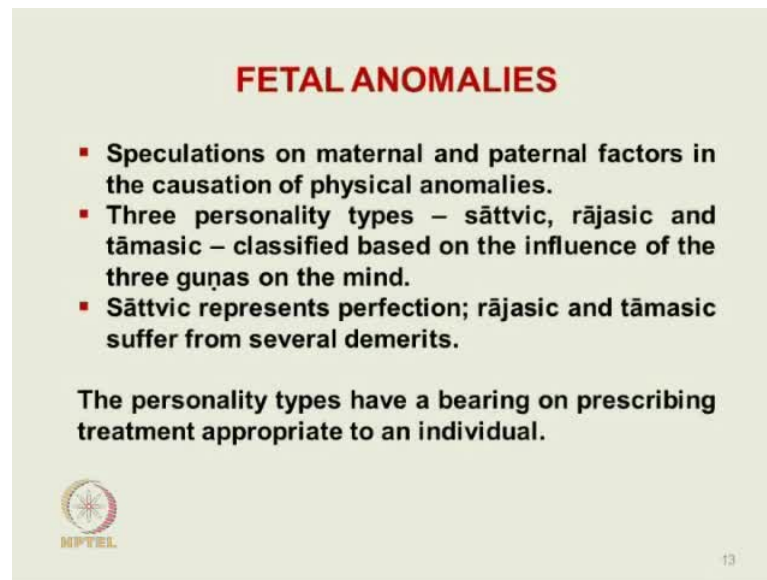
Seventh month mother wears out; fetus is growing. Eighth month let them flow of ojas between ojas, we will come to that later, between mother and fetus. Transporter of rasas, again the fetus is developing, mother's strength is declining, and delivery during this month is highly risky, eight month. Ninth month is the time for parturition and intrauterine stay beyond beyond this is harmful to the fetus, which is really well-recognized.

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FETAL ANOMALIES

- Speculations on maternal and paternal factors in the causation of physical anomalies.
- Three personality types – sāt̥tvic, rājasic and tāmasic – classified based on the influence of the three guṇas on the mind.
- Sāt̥tvic represents perfection; rājasic and tāmasic suffer from several demerits.

The personality types have a bearing on prescribing treatment appropriate to an individual.



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Fetal anomalies: There are speculations on maternal and paternal factors in the causation of physical anomalies. There is a lot of discussion on this and also personality types; not only the body anomalies, but also personality types; sattvic, rajasic and tamasic; these are genetic according to Ayurveda. They are classified on the basis of the gunas: sattvagunas, rajagunas and tamagunas, and these are distinct personalities. Sattvic, as you know, it is perfect in everything; virtuous individuals in all, Bhagavad Gita, they all talk about this; their taste for food; their interest in higher philosophy; being good to everybody, forgiveness; all these what we consider virtues, these are associated with the sattvic. Whereas the rajasic, they are proud; they can be fighting; all the aggressive qualities; these are all part of rajasic. Tamasic is the lazy, evil doing kind of people prone to error in whatever they do. So, these are three distinct personalities. Diseases also, the manifestation is influenced to some extent by this. The tamasic the person's response to illness can be very different from that of a sattvic person; rajasic person will be very demanding. So, that, a physician should be aware of the personality of the individual, of the patient, before he administers treatment because the same approach will not work for all these three.


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BODY PARTS

Enumeration and classification is possible only at the gross level: at the subtle level, they are countless and invisible.

- **Six parts – two upper and two lower extremities, head and neck, and trunk – account for fifty six smaller parts which were fully listed.**
- **Nine orifices.**

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Body parts: Here, there is an enumeration of body parts in the Ayurvedic text, but if you want to know, take for example, rectum; it is mentioned in this; it is one of the viscera it would be mentioned. But if you want to know the details, the anatomy of the rectum, you will not find here; that you would find in the discussion on piles. There is another very very different subject. There you will find a good description, rectum (()) has got three curvatures; it has got force inside; all these descriptions you will not find here, but you will find it in a different section. This is the way it was taught in our Ayurveda.

So, there are six parts: two upper, two lower extremities, head and neck, and trunk; these are the six parts, the broad divisions. Anga and Upa angas. There are 56 smaller parts; all given in detail; simply a listing is given, but details you will not find here. There are nine orifices. Again you will not find any details like mouth for example, or Nose, if you are looking for detailed information, you will find it somewhere else; here it is a distinct.

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BODY PARTS

- **Bones: Total 360 [including teeth, cartilages etc.]**
- **Sense organs [eyes, ear, nose, tongue and skin]: 5**
- **Motor organs [arms, leg, speech (tongue), of excretion and generation]: 5**
- **Heart was regarded as the abode of consciousness.**



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And bones, there are 360. I will show the list later. Sense organs, there are five; motor organs, there are five, and heart was regarded as the board of consciousness; the location of the heart was known.

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ORGANS ; VISCERA

- **Viscera – 15 (heart, lungs, gall bladder, kidneys, liver, spleen, stomach, small intestine, rectum, colon, umbilicus, marrow, brain, bladder, uterus).**
- **Ligaments (900), veins (sira 700), large vessels (dhamanis 200), muscles (400), vital spots (107), joints (200), minute terminal channels 29956 (they were inferred, not fully observed).**



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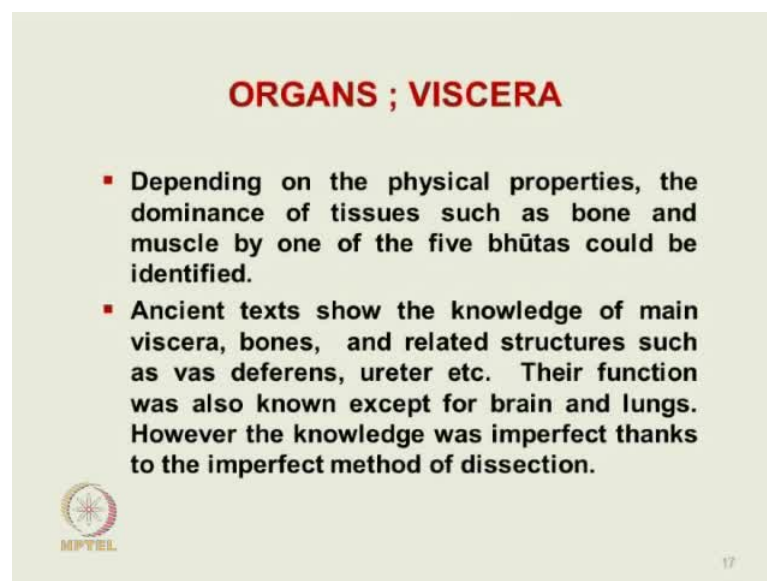
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Viscera, there are 15: heart, lungs, gall bladder, kidneys, liver, spleen, stomach, small intestine, rectum, colon, umbilicus is mentioned is viscera here, marrow, brain, bladder, uterus - all these fifteen. These are in fact brain you see, it is listed here very clearly, but there is no reference to that; very little reference to mastishka later on. In fact, conscious

is not connected with that. Ligaments are 900, veins 700 sira, large vessels 200, muscles 400.


Many of these are may not be accurate at all because our way of doing, learning anatomy, the dissection, which I mentioned was so imperfect; you could go not for example, here is a number; I could not calculate this number; taken it from the commentators, 29956. How could we arrive at such an accurate figure? It is given by the commentators. I myself cannot convince how this number was arrived at, but fortunately they have written that these minute things are not entirely visible. So, there is a possibility that there is some guesswork in these kind of numbers, especially, when it comes to srothas channels. So, Charaka explicitly says channels; there are channels which we can see, he gives the number, but there are innumerable channels which you cannot count; so, that makes sense.

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ORGANS ; VISCERA

- Depending on the physical properties, the dominance of tissues such as bone and muscle by one of the five bhūtas could be identified.
- Ancient texts show the knowledge of main viscera, bones, and related structures such as vas deferens, ureter etc. Their function was also known except for brain and lungs. However the knowledge was imperfect thanks to the imperfect method of dissection.

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The depending on physical properties, the dominance of tissues such as bone muscle, that density, like bone which is very dense, when you take blood, it is liquid. Now, this type of physical properties, they are an indirect indication of the bhutas because human body, yesterday I mentioned this, they are derived from the five bhutas and you will find the analogues of these five bhutas in the body. Like earth is very heavy and the bone is derivative of the earth; that is why it is very heavy. And light things, it will be up or water. So, the physical properties of these tissues in the body, these are a reflection of the

butha dominance, which are the bhutas, the providence of this; that is an indirect indication.


Many of these, if you look at the association of the urinary bladder, location of these viscera, idea about its function, they were right. But only in two areas, lungs location was known; brain's location was known, but the function was not known. These are two organs which I have found, exceptions to these general accuracy of what they have mentioned. Like vas deferens, ureter, these all are location is also known and the function is also known, but these two areas, brain and lungs, location was known, but the function was far from clear.

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PARTS

Bones			
Region	Modern	Charaka	Suśruta
Four extremities	120	110	106
Trunk	50	138	128
Head and Neck	30	112	66
Grand Total	200	360	300

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Here are the numbers. Bones, we look at the modern in the left side column and the Charaka and Susruta. If you look at the four extremities, Charaka says 110, Susruta says 106, and the modern is 120. If you look at the trunk, modern is 50, Charaka is 138, Susruta is 128. These differences head and neck, we will see that difference, a grand total is 200 according to modern anatomy in bones, but 360 in Charaka and also in Atarva Veda and Susruta is only 300. This big difference comes because in the older system of counting, all the cartilage, teeth, all these hard tissues are counted as bone, under the bone category; that is how this number becomes very large.

Similarly, a protuberance in a bone, like a robe, there is a protuberance or fuma, there is a protuberance which is really part of that bone, but the protuberance was counted as a separate bone in the old classification. So, that explains this difference.

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PARTS

Muscles		
Region	Modern	Suśruta
Lower extremity	56	100
Upper extremity	57	100
Trunk	66	111
Head and Neck	34	176
Grand Total	213	487

 **Tendons, ligaments distinguished from muscles.**


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And then, parts, muscles, you will see the Susruta's 487 and the actual is only 213. Now, this would be inaccurate because the way dissection was done, which I had mentioned yesterday, because they were very great severe taboos about touching the human body. Touching a dead body was considered a defiant thing. You are defied if you touch a dead body, leave aside cutting it. So, the method followed was to take a cadaver, put it in a wooden case with openings, and this is put in shallow water and soaked for several days in a dark place, hidden away; not within the public view. It had to be done quietly, secretly because it might invite opposition, and the way dissection was done without knife; they would use a sharp leaf edge to scrape off layer by layer. Then the next layer you see would be described. So, naturally, you will get very inaccurate especially soft parts, bones would be there or ligaments might be there, but when it comes to soft parts, you simply cannot expect accurate information on that. So, you will find lot of differences.

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VITAL SPOTS (MARMAS)

- ✓ Mentioned in R̥gveda as “marman” in relation to human body.
- ✓ The anatomical knowledge derived from the dissection mentioned by Suśruta was imperfect: it was supplemented by observing “living anatomy” of regions during surgical procedures.
- ✓ The spots were called “vital” because injuries to them could be dangerous or fatal: they were also important for surgeons who had to spare them while making incisions.

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Vital spots: This was an important concept because surgeons operating in certain areas could be very dangerous; that blood vessel you might cut; so, one way because dissection was defective, another way was during operations during injuries. Suppose an accident in the war and you actually see anatomy which is alive. All these were noted; suppose in the war or an animal attacking somebody, a particular site, if there is an injury that immediately is fatal. So, over hundreds of years, this kind of collective information, that was the basis for this vital spots and the concept.


The importance for the surgeon when he makes an incision, he had to stay away from these vital spots; that was the main reason why surgeons emphasize, especially Susurta; there is not too much on this in Charaka; whereas the most detailed description comes in Susruta for a very good reason because he was a surgeon and locating the incisions, this was very crucial. Rig Veda also mentions marmam and that became marma in Ayurveda and this vital, the term came because of this. Injury there could either result in death immediately or delayed death or it could lead to deformities, one kind or the other, they were very serious. That is how it was mentioned.

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VITAL SPOTS (MARMAS) : THREE CLASSIFICATIONS BASED ON BODY TISSUES

➤ There are 107 vital spots (marmas) primarily based on muscle, blood vessels, ligament, bone and joints. The total in each group only are listed below (the subgroups are listed in the text).

Muscle	11
Blood vessels	41
Ligaments	27
Bone	8
Joints	20
Total	107

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Now, these are in these vital spots, there are 107. Now, these are dominating. There are five bodies structures, tissues associated in that place. They are muscle, blood vessel, ligament, bone, joints; these are all there, but not in equal proportion. For example, in corpus, you will find lots of little bones there; eight bones with number of joints. So, joints would be dominant there. So, here based on that dominance of this, muscle, there are 11. This is one classification of marmas. Blood vessels there are 41, a total of 107; that is one classification based on the dominance of that.

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VITAL SPOTS (MARMAS)

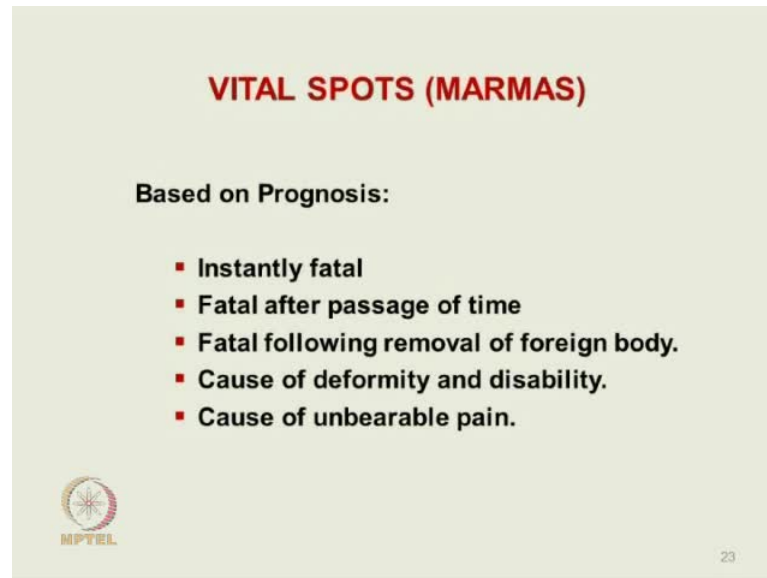
Based on whole body locations:

Lower extremities	22
Upper extremities	22
Chest and abdomen	12
Back	14
Head and neck	37

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22

Then on the body location, there are 22 in the lower extremities; 22 in the upper extremities; chest and abdomen there are 12; back 14; head and neck 37. So, that is based on location.

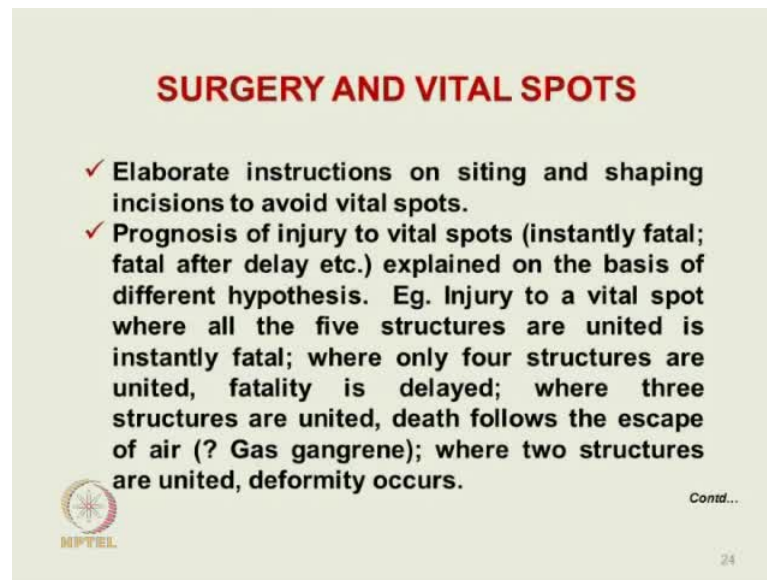
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Then, there is based on prognosis. What happens to life? Here instantly fatal. For example, the pericardium between the two breast in the centre, just above the pit of the stomach, that is a marma and it damages instantly; fatal because the heart is located there.


Fatal after passage of time, after several days: According to modern understanding, we would say it is probably because of infection, something, but it is delayed. Then there is one, there is a foreign body sticking there when the patient comes to you and when you take out the foreign body he dies; that is another kind; again delayed. Then once they does not result in death, but results in gross deformity; that particular spot, if there is an injury and the cause of unbearable pain, there is another. So, these are all based on that prognosis.

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SURGERY AND VITAL SPOTS

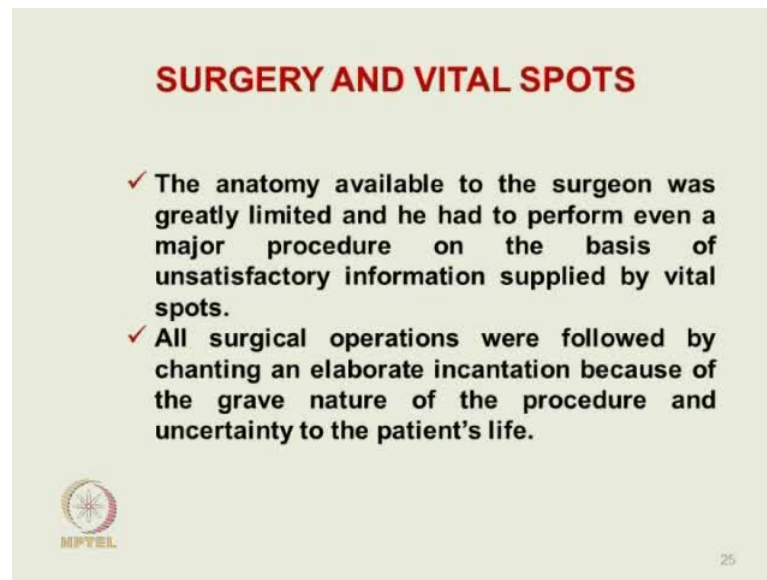
- ✓ Elaborate instructions on siting and shaping incisions to avoid vital spots.
- ✓ Prognosis of injury to vital spots (instantly fatal; fatal after delay etc.) explained on the basis of different hypothesis. Eg. Injury to a vital spot where all the five structures are united is instantly fatal; where only four structures are united, fatality is delayed; where three structures are united, death follows the escape of air (? Gas gangrene); where two structures are united, deformity occurs.

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Now, surgery and vital spot as I mentioned is a very important issue for surgeons, mainly for the location incisions. Prognosis: here, if you look at that, immediately fatal or fatal after delay. And one explanation given at that time was, in the injury if the vital spot all the five structures are united and they all are injured, then it is instantly fatal. This was the explanation, one explanation. If four structures are united in in this injury, then fatality is delayed. Three structures, foreign body is removed; death follows by escape of air; for us we would say, could it be gas gangrene? That is the first thing we would think of. Foreign body is there; after some days you take it out; lot of air comes out and the patient dies and gas gangrene is the most likely thing according to modern knowledge. But that was...


Then two structures that there is deformity or most obviously there is a nerve injury like wrist drop, foot drop, all these kind of injuries. If a nerve is cut, that would follow a deformity. So, that is the modern explanation for these, but they had a different explanation.

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SURGERY AND VITAL SPOTS

- ✓ The anatomy available to the surgeon was greatly limited and he had to perform even a major procedure on the basis of unsatisfactory information supplied by vital spots.
- ✓ All surgical operations were followed by chanting an elaborate incantation because of the grave nature of the procedure and uncertainty to the patient's life.

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So, the anatomy available to the surgeon from cadaveric dissection was extremely limited. So, this was supplementing that information to some extent; not very well; not adequately, but at least some help was given. And in fact, all surgical operations, major operations in Susurtha samhitha, you do not find too many hymns, mantras been chanted. It was only in Atharvavedic times that was done. Mantras had largely disappeared from Ayurvedic text, but before surgery, including the death of a fetus, removal, etcetera, there all these mantras were recited because they knew there is a very substantial risk. They had to take special permission from the king to do these procedures. So, they knew the severity, the seriousness of this procedure.

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BODY FUNCTIONS AND EQUILIBRIUM (SĀMYA)	
➤ The over - riding theme in body functions is the maintenance of a state of equilibrium in the body encompassing many components.	
Equilibrium (sāmyas)	Equilibrium among body components
Dhātusāmya	Dhātus
Doṣasāmya	Three doṣas
Agnisāmya	Fires (agni) burning in the stomach and body components
Ṛtusāmya	Between body and environment
Hetusāmya	Between the countless causes of diseases existing in the body without actually producing disease

Now, we come to, that is about as far as structure is concerned; we come to something about function. Now, here, we do not have, like the, but I mentioned in the beginning of this lecture, different systems as we are used to thinking, like respiratory system, cardiovascular system, and the (()) urinary system; that is a modern way of learning physiology. But that way putting things together did not exist at that time. But at the same time, with the limited information, they were capable of making great generalizations. That is, something like in the modern science, modern physiology, Claude Bernard, a great scientist in the 19th century, in France, he was the one who, develop this concept of constant internal environment.

Now, that is a cornerstone of physiology because the external, outside can be temperature can be anything; can be very cold; can be very hot, but inside the body it is constant. Similarly, you can take all kinds of coca-cola, the pH of 1.5, you can drink that, but inside the body that is in the stomach which is not really a part of body, it is a costa, it is a channel inside. But inside the body, it is always constant, pH. Therefore, whether it is chemical composition, it is strictly maintained. And if you do change that, like acidosis for example, a diabetic patient, that is almost leading to death; so, the constant internal environment is a very important concept generalization, not any particular system.

Now, this samya is something similar to that in Ayurveda. And samya for example, this is the state of equilibrium. This is not equilibrium; it is not just one unitary concept.

There are several equilibrium contributing to this. For example, Dhatusamya, dhatu there are seven dhatus: blood, muscle, bone, adipose tissue, etcetera. There are seven dhatus in the body. Now, these dhatus must have a balance that is proportion to each other, proportion to the rest of the body. Body consists of other things also; not only dhatus. So, those proportions that must be maintained; that is the balance; among themselves, between themselves and other parts of the body, that balance must be maintained; that is Dhatusamya.

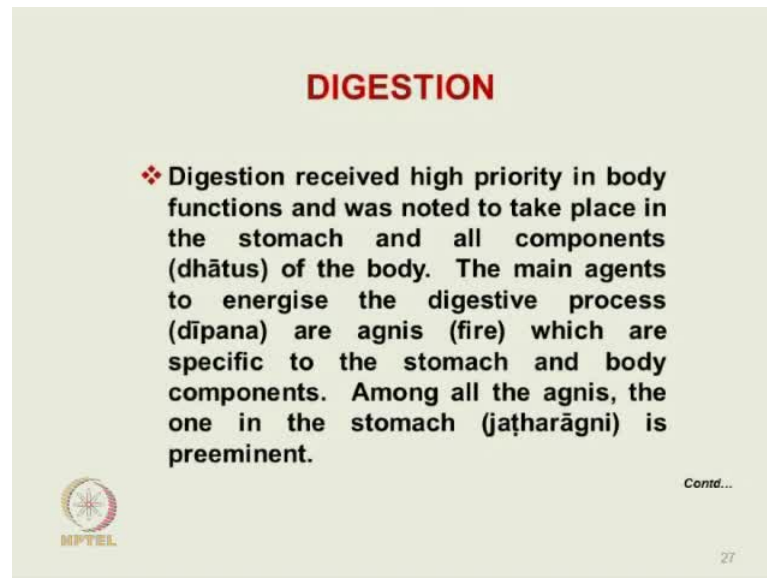
If you.. Dhatusamya is equivalent to good health, wellbeing. If Dhatuvasamya, that is disturbed, disequilibrium, that is (()) disease. The next is Doshasamya. Dosha we will be discussing that in detail today. These are product of digestion, digestion of food, digestion of substrates in different body tissues. All these doshas are products of this digestion, one category and they are very cornerstone of Ayurvedic physiology and pathology. They should be in balance; vata, pitta and kapha, (()) their proportions, they should maintain among themselves to the rest of the body. So, Doshosamya is another. These two are not enough? If you want the Agnisamya, they are the most important agni which burning in the body derived from fire, Panchabutha again.

All these are derived finally from Panchabutha. So, the agni in the stomach is the most dominant fire which digests all the food that we eat. But there are similar lesser agnis burning in all the tissues, all the dhatus. Substrates are constantly being digested there, by the activity of these fires, dhatuagnis. So, these agnis also should be in balance, Agnisamya. Then, there is Rtusamya. There should be balance between the body interior and outside. And body itself constantly maintains; if the exterior becomes very cold, we will shiver so that we maintain our equilibrium to bring it to the previous ratio. If there is too much of heat, we sweat.

Body reacts in different ways to regain that equilibrium; so, Rtusamya between the body and the environment. And lastly, there is Hetusamya. Hetu means a cause and this causes of diseases, all kinds of agents, they are present in the body all the time; they are present outside. You cannot get rid of all this; you cannot sanitize the body; you cannot sanitize the environment, but that does not mean that we are sick; most of us are healthy people, in spite of having all these causes within us.

So, that, there is a balance between the cause within the body and the rest of the body; that is how we escape. So, cause to produce a disease, that balance has to breakdown; there has to be a reach in this equilibrium; then only disease manifest; so, that is Hetusamya. So, you can see all these put together, that is the total composite equilibrium; that is a grand generalization.

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DIGESTION

❖ Digestion received high priority in body functions and was noted to take place in the stomach and all components (dhātus) of the body. The main agents to energise the digestive process (dīpana) are agnis (fire) which are specific to the stomach and body components. Among all the agnis, the one in the stomach (jāṭharāgni) is preeminent.

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MPTEL

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Now, we take a digestion. This is one which is perhaps the best developed system described in Ayurveda. This has received the high priority obviously and the food that is taken, it is digested in the stomach; jatharagni, that is the most powerful agni in the body. And in the stomach, this gastric fire or jatharagni and the churning action that is wind, and we will see later on wind, for example prana is the term used for wind in the body. Yesterday I mentioned this is an analobe of the wind in the universe and the wind in the body for example, the breathing, we knew there is a air in the breathing. But somebody who is passing flatters, that is also wind.

And all the movement in the body, when the food is moving down, when you swallow it is going through the stomach; that is movement. Urine is moving; all these movements were powered by wind. Why? That is the motive of the whole human body. But these were all given different, what we we all the movement, blood is moving, urine is moving, all this genearlized movement in the body, this was giving the particular name

vyana. The wind, the upper part of the body that we are breathing, that is given the referral name prana; generic terms is also used there. The flatus - that is apana.

So, these are different, all vayu, but it has got different compartments; compartmentalization. This is the concept in Ayurveda. So, here samanavayu, which is in the stomach, which is churning with this Jatharagni; that is where digestion is taking place; the first part of digestion. And as the first digestion, there is ahara rasa, it forms emissive mucinous type of preparation which is sweet in the beginning, mucinous which is kapha dominated, that particular substance, early part of digestion and very soon it turns to sour and it moves on to the next stage; this is the pakvasaya.

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DIGESTION

❖ The food and drinks consumed by an individual undergoes digestion in the stomach by the action of “gastric fire” (jatharāgni) and the churning action of wind (samāna) – in the stomach. This gives rise to two products – a fine liquid “āhāra rasa” and “mala”. The āhāra rasa goes to nourish the depleting body components, and mala gets eliminated. The movement of āhāra rasa and mala through body channels is powered by two parts of life breath (prāṇa) namely, vyāna and apāna.

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(causes movement in colon)

Pakvāśaya - Duodenum

MPTEL


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In this movement is vyana which is moving this. And these two ahara rasa is one; the other is mala which is to be thrown out, the execrable part of digestion; these are the two components when it comes from the stomach to the next stage of pakvasaya, what we call duodenum.

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DIGESTION

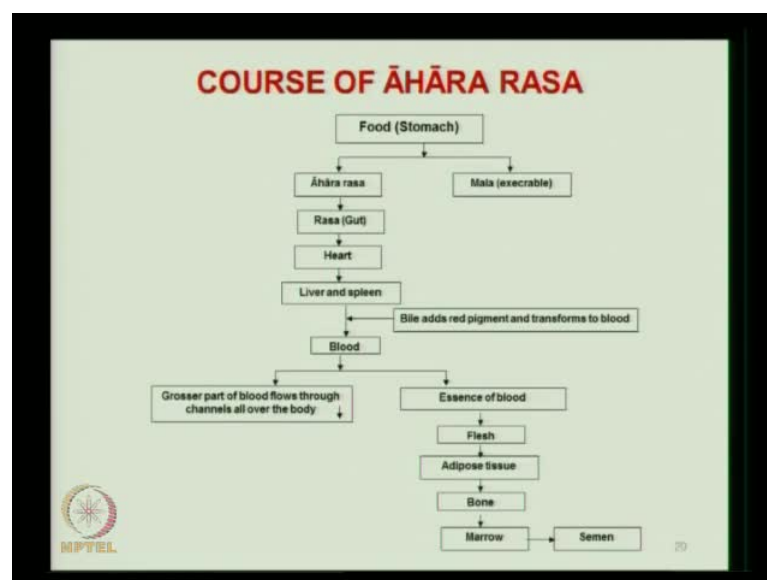
- ❖ After the initial digestion in the stomach, the digested product is sweet and filmy, suggesting the influence of kapha; half way through digestion, the product becomes sour and passes out of the stomach (āmāśaya) into the pittaśaya: there it meets with pitta (bile).
- ❖ As digestion progresses, āhāra rasa and mala diverge in their course. In the gut, mala gets dried and compact; becomes bitter and astringent and associates with apāna to get eliminated.



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This, once it comes in the pakvasaya, bile also joins there and as the digestion progresses, this ahara rasa, mala, they diverge in their ways. Mala is thrown out by apanavayu; it becomes desiccated, it becomes astringent and it is eliminated as mala, as pieces, and the rest of it that is the crucial part; the assimilable part of the body, of the food that is the rasa which is a subtle substance.

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And here is the course which I have followed here. This ahara rasa, mala has been eliminated, and ahara rasa, it becomes fine; it is called rasa; there is no particular

transformation there. It is a more subtle form of ahara rasa or purified form. It is in the gut and further it passes to the heart through dhamanis. Now, from the heart, this is the course which is mentioned there. This is ahara rasa; it goes to the heart through dhamanis and from there it comes to the liver, and the liver adds bile and that is where blood is formed; red colour is important at that stage.

The blood from the liver, it also goes back to the heart through dhamanis, but the major part of it comes as blood, and then it has got a very interesting. Here is a bile is added; I hope I can show that here. Bile is added at this point by the liver and it becomes blood; assumes the red color. Here is the blood; the bile has been added; it has assumed the red color; that is the blood that we are familiar with and the bulk of this goes and circulated all over the body through channels, which is what we find, wherever there is an injury blood comes that is blood, the major part.

But there is another part of this blood, the finer part which follows a different course. That transforms itself into flesh, muscle; it is derived from blood. From muscle, it becomes adipose tissue and adipose tissue it becomes bone; bone it becomes marrow and marrow it becomes semen, and from semen is ojas which is found in the fetal development. There is a mention of that; that is derived from semen, which becomes more and more certain, as we go on. But what is to be noted here in these transformations like ahara rasa to blood, that transformation.

One part becomes assimilable, that becomes blood, but there is a part. Every time there is a digestive process, there is something assimilable and something which is execrable; that happened in the stomach; it happens in all these digestions. So, here, where the ahara rasa, the blood is becoming muscle for example, now that transformation, the assimilable part becomes flesh, but the non assimilable, that becomes in this case pitta. So, pitta is actually derived from blood during this digestive process. It is a very part of Tridosha.


Similarly, from bone transformation to marrow, the bone that execrable part is bile; ahara rasa turn into blood, that digestive process is Tridosha, which is that is kapha. So, all these three here, I will show you a table later on; all these three vata, pitta, kapha these are essentially malas, execrable parts of this digestion, which is taking place in the tissues of the body. And the rest of it forms all this ultimately ending in ojas which goes

to the heart. This is what I could understand of the course of ahara rasa; that is course of digestive process.

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COURSE OF ĀHĀRA RASA

- Āhāra rasa changes to a finer rasadhātu or rasa in the gut. It is then driven along channels (dhamanis) to the heart: from the heart, it passes to the liver and spleen.
- In the liver, bile adds a red pigment to rasa, transforming it into blood. The gross part of blood is driven along channels by vyāna to all parts of the body.
- The finer part of blood or essence (rasadhātu) acted upon by vāta and agni characteristic of each component (dhātvagnis) sequentially becomes flesh, adipose tissue, bone, marrow and semen.



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Now, this is what I have just now said, written down in a form. I hope you will be able to follow.

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COURSE OF ĀHĀRA RASA

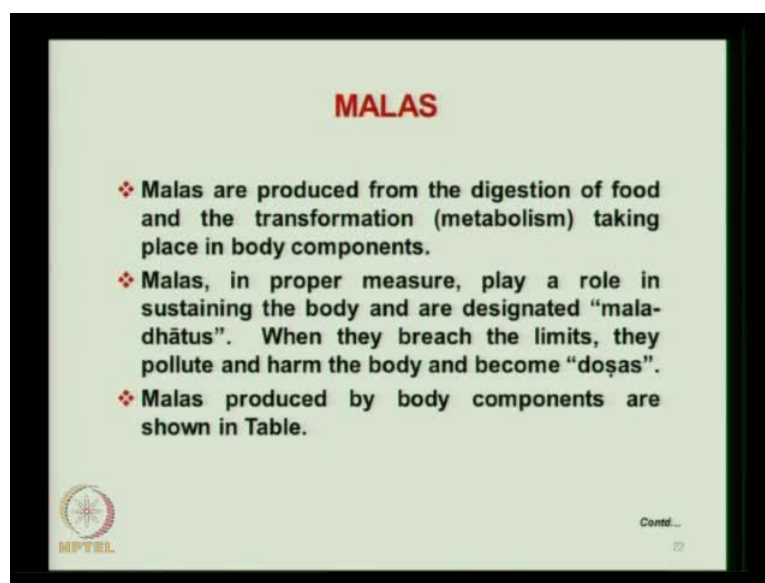
- The above cascade of transformations takes place during a month's time (Suśruta); it is a never – ending process during life.
- During each transformation when the specific agni acts, an assimilable and an execrable part are produced: assimilable part goes on to form the next component while the execrable part is eliminated as mala.



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This cascade of changes starting from rasa dathu or rasa, all the way to the formation of ojas, that according to Susruta that takes place in one month, but as long as the person who is alive, this is an endless process; it is a part of life.

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Now, Malas, very important in Ayurveda, like execrable does not mean it is thought thrown out and you can forget all about it. The mala which is excreted food, that yes, you can forget it, but what is else? During these transformations, muscle, blood, fat etcetera, those malas is extremely important because they are as much important to the body as the other dhatus; they are actually called maladhatus, for this reason. Provided they are within the healthy range. This is something like to give an analogy. It is not proper to give modern analogy, but yesterday as I mentioned, take for example, urea or cholesterol; these are, we almost regard them in common language, journalism, they were considered toxic substance, which is not correct.

Actually they are body metabolites; there are essential for the body, but they are essential provided they are within the range. Cholesterol is necessary for the cell membrane integrity. For example, body makes it, but if it goes beyond the range, then it becomes toxic; it is dangerous. So, here, in the malas we have a similar kind of rational. The malas which are forming vata, pitta, kapha in which vata is formed when bone becomes marrow; that digestive process vata is formed. Pita is formed when blood is being transformed into flesh. So, these malas which are formed during digestive process in the tissues, they are malas, but as long as they are within the healthy range, they are essential for the body; they are dhatus, but once they cross that, then they become abnormal and they cause disease.

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MALAS	
Malas produced during transformative processes in body components (dhātus).	
Body component (dhātu)	Mala resulting from transformation or metabolism
Rasadhātu	Kapha
Blood	Pitta
Flesh	Waste in body apertures
Adipose tissue	Sweat
Bone	Vāta/Hair and Nails
Marrow	Waste in eyes and oiliness (sebum) in skin

Now, these are the body component and the mala resulting like rasadathatu, kapha is formed; blood pitta is formed; flesh waste in body apertures; adipose tissue sweat; bone vata is formed and marrow waste in eyes, and the sebum - natural oily sebum in skin. So, these are the malas resulting from transformation or metabolism in a different dhatus.

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TRIDOṢA DOCTRINE
<ul style="list-style-type: none">▪ The doctrine of vāta, pitta and kapha dominates the theory and practice of Ayurveda.▪ The figure in the previous slide has shown the derivation of pitta and kapha from malas resulting from the constant metabolic activity in the body components.

Now, Tridosa doctrine: This vata, pitta, kapha it dominates the Ayurveda.

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TRIDOṢA DOCTRINE

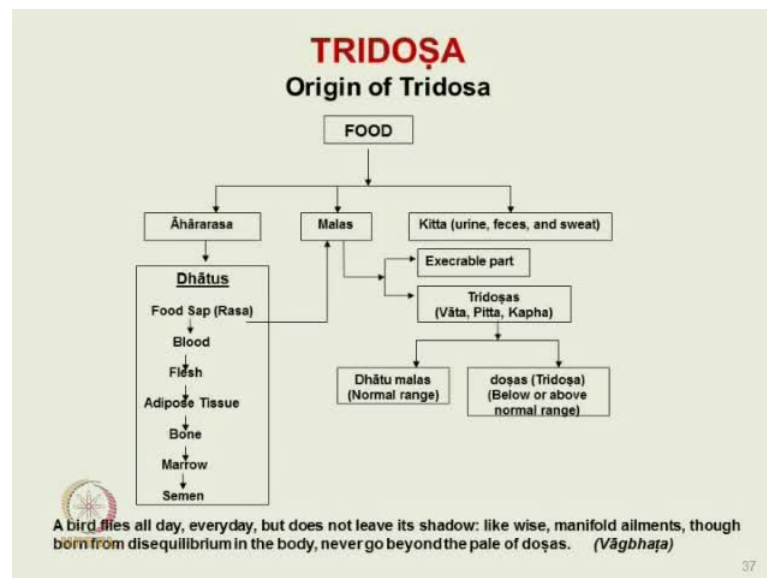
- Malas were assigned a physiological role in Ayurveda which regarded them as essential constituents of the body. They were designated as mala dhātus, whose proportions in relation to body components had to be maintained. If their level fell below the range, they had to be increased; if it exceeded the range, they had to be reduced. This was effected by manipulating food intake appropriately.
- Vāta, pitta and kapha are maladhātus as long as they are within the appropriate range: they become doṣas (tridoṣas) when they breach the healthy range.



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In the previously slide I have shown how these are formed. This is fully a restatement of the same thing.

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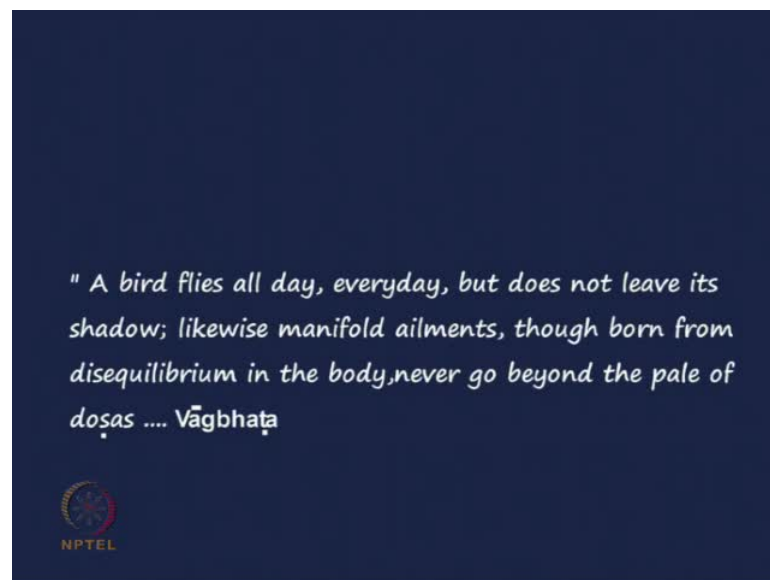


Now, Tridosha is again, it is shown in that diagrammatic form here, we have already done that food is the ahara arasa; it is on the left hand side. We have already covered that, how it goes on from rasa to blood, blood to flesh, adipose tissue, bone, marrow, sebum; what is not sure here is sebum going on to ojus. If you look at that, the malas, the central part, you will see, it partly it comes from food, but rest of this coming from all

these digestive process in that tissues. So, it has two sources: one is coming from food, not the kitta, which is what (()) that is different, does not become part of malas.

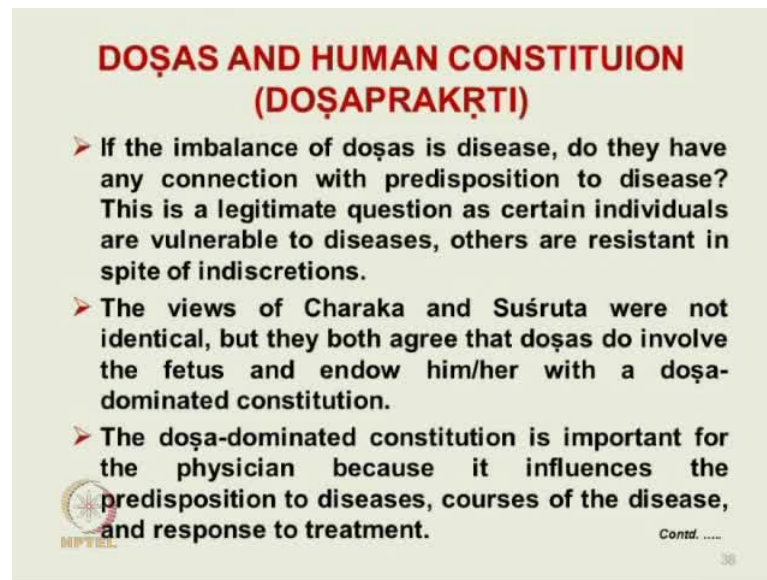
That malas derived from food is one and derived from all the tissues is another. Those are the two sources of malas or dhathu malas, and part of it will be excreted, thrown-out, but the rest if it forms Tridosa. This Tridosa - vata, pitta, kapha, they are dhathu malas as long as they remain within the normal rate. They are essential because all human beings have it. You cannot have life without doshas, but they are dhathu malas, essential, but once they cross, they breach their limit, they become doshas. And you see the Vagbhata quote.

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A bird flies all day, every day, but does not leave its shadow; just like that, doshas are always there in the causation of diseases. It is within that range. There can be no disease without doshas playing no role.

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**DOŞAS AND HUMAN CONSTITUION
(DOŞAPRAKṚTI)**

- If the imbalance of doṣas is disease, do they have any connection with predisposition to disease? This is a legitimate question as certain individuals are vulnerable to diseases, others are resistant in spite of indiscretions.
- The views of Charaka and Suśruta were not identical, but they both agree that doṣas do involve the fetus and endow him/her with a doṣa-dominated constitution.
- The doṣa-dominated constitution is important for the physician because it influences the predisposition to diseases, courses of the disease, and response to treatment.

 Contd. 38


Then, if the balance of doshas are so important in the formation of diseases, causation of diseases, do they have anything to do with predisposition of diseases? That is a legitimate question. Now, here, this is the important consideration when you look at the predisposition in diseases as a result of doshas; that means there is something in the constitution of the individual reflecting these doshas which will be responsible. That this dosha prakrithi.

Charaka and Susruta, they do not agree exactly on that, but they both agree that these are genetic; these doshas are determined at the time of conception, on which there is no difference of opinion. And the doshas dominated constitution is important for the physician because the diseases manifest differently in these three different constitutions; they progress differently and the response to treatment is also different. So, that is why these doshas prakrithi determination is so very crucial in Ayurveda.

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**DOṢAS AND HUMAN CONSTITUTION
(DOṢAPRAKṚTI DETERMINATION)**

- Determination of the prakṛti of an individual is done on the basis of characteristic cluster of physical, mental, and behavioural traits of vāta, pitta, and kapha.
- Examples of traits:
 - Vātala: low strength; short stature, hoarse voice; poor sleep; unsteady gait; poor memory; volatile nature.
 - Pittala: moles, pimples, wrinkles on skin; poor longevity and fecundity; premature grey hair, shedding of hair, profuse sweating, poor heat tolerance; excessive hunger,.

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Now, here, the examples, the traits, the determination is done on the basis of a cluster of traits. These are physical traits, mental traits, behavioral traits. So, the prakṛti itself was determined at the time of conception, does not change and it manifests through a series of traits. Now, here I have given some examples of Vātala; that person is Vātala, these are some of that low strength, short stature, all these; there are many others. Similarly, Pittala: moles, pimples, wrinkles on the skin, poor longevity and fecundity; these are all going to Pittala personality.

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**DOṢAS AND HUMAN CONSTITUTION
(DOṢAPRAKṚTI DETERMINATION)**

- Śleṣmala (kapha): soft and smooth skin; calm temperament; longevity; high strength; well proportioned organs.
- In recent years, software has been developed to make doṣapṛakṛti determination computer-assisted.

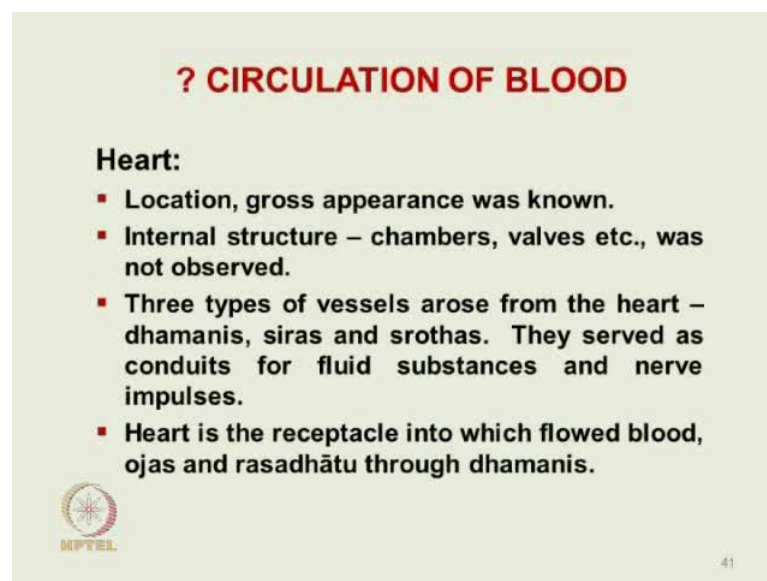


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And the third is Sleshmala, or kapha dominated constitution. Now, this is a very important element in research also. There is a group in Pune who have developed a computer assisted, what is called Ayursoft. A software program that have developed, we also used it, in the, you see reproducible determination of book prakrtis.

When an individual comes into an outpatient department determining the prakrti, it has been done always intuitively by a senior physician. They talk to them; half an hour or 45 minutes they usually take and they intuitively decide this is vata, pitta. Insight has been done and still being done like that. There are inter observer variations, inter observational variations; so, these Ayursoft is one way to standardize the determination. It is still being perfected. We also used it in one of our research programs and we found that the correlation due to determination of prakriti, computer-assisted determination, there was a 75 percent correlation.


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? CIRCULATION OF BLOOD

Heart:

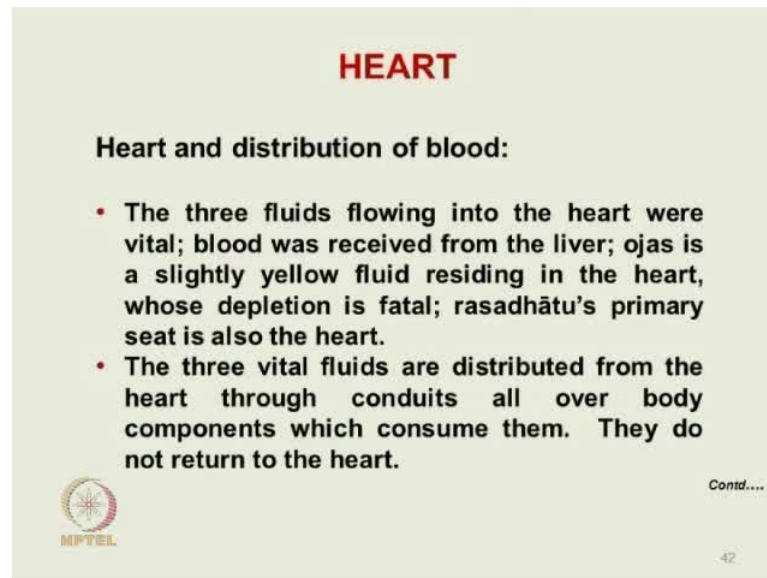
- Location, gross appearance was known.
- Internal structure – chambers, valves etc., was not observed.
- Three types of vessels arose from the heart – dhamanis, siras and srothas. They served as conduits for fluid substances and nerve impulses.
- Heart is the receptacle into which flowed blood, ojas and rasadhātu through dhamanis.

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Now, circulation of blood, it is a debated subject. What is known, what is speculated, I mention here; heart - the location was known; gross appearance was known; internal structure was not known. Three types of vessels are connected to the heart; dhamanis siras and srothas. It is almost impossible to say exactly what these are? There was a tendency; I also used to think that the dhamanis are arteries, which are not correct because dhamanis are also believed to carry nerve impulses.

So, is very difficult to identify these as arteries, veins and interactors . All we know is that all conduits, they are channels; lot of substances moved through them; that is about all that we can say about these. And heart is the receptacle into which three types of fluids come: One is blood, the other is the ojas, and the third is rasadhātu. All these three will come into the heart through these conduits.

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HEART

Heart and distribution of blood:

- The three fluids flowing into the heart were vital; blood was received from the liver; ojas is a slightly yellow fluid residing in the heart, whose depletion is fatal; rasadhātu's primary seat is also the heart.
- The three vital fluids are distributed from the heart through conduits all over body components which consume them. They do not return to the heart.

Contd....

MPTEL

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Heart and the distribution of blood: Three fluids coming into the heart, they are all vital; blood is received from the liver; ojus is a slightly yellowish fluid residing in the heart whose depletion is fatal. As I mentioned in the progression of rasadhātu formation, you have the marrow, the semen and then it is ojus; so, the depletion of ojus is fatal and rasadhātu also, the primary seat is the heart. All these three are flowing into the heart through different dhamanis.

Then, they are distributed from the heart, this is well known, if you look strictly at the description, through conduits all over the body and which consumes them. There is no mention of these substances coming back to the heart; the ingress into the heart is mentioned; their remaining in the heart is mentioned; passing out is mentioned through these conduits; return is not mentioned.


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HEART

Heart and distribution of blood:

- Heart receives fresh supplies of the three fluids from newly digested food.
- Distribution of blood from the heart – not by pumping – to the body components recognised, but venous return is not.
- Pumping action of heart was not observed; but pulsatile flow in blood vessels was noted.

Contd....



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So, distribution of the blood from the heart, not by pumping; pumping out from the heart was not observed. Pulsatile flow is observed; the placenta which I mentioned, very clear mention of placental, the vessels, the pulsatile movement that is mentioned. But pumping the heart is not noted; venous return after all, if you are distributing blood, to for circulation, it has to come back, no venous return is not mentioned.


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HEART

Heart and distribution of blood:

- Siras by their contractility and expansibility sustain the organism in the same manner “as streams and canals supply a field” (Suśruta).
- The heart, as a reservoir holding various fluids, distributes them all over the body through various vessels; but it is replenished not by the return of the distributed fluids from the field but by fluids from different sources – rasa from gut; blood from liver and spleen; ojas from semen (or from all dhātus).

“Circulation of blood” was not conceptualized.



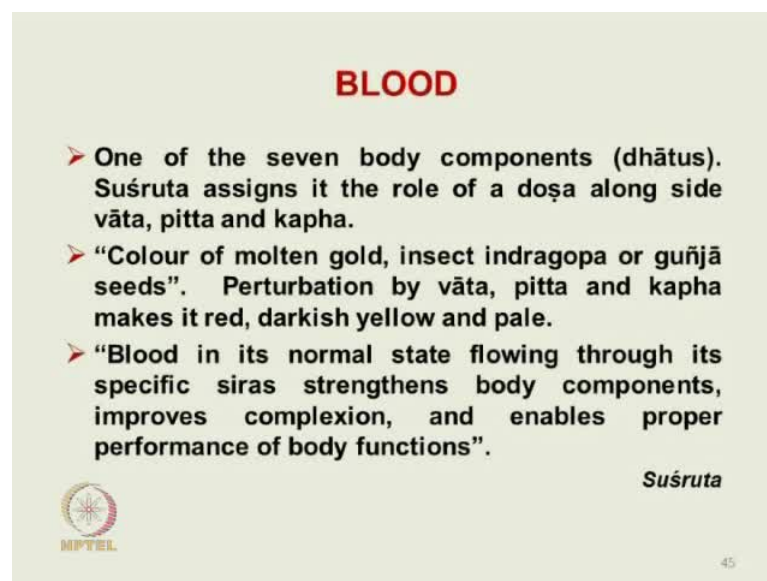
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Now, heart and the distribution: Therefore the pumping is not observed, but pulsatile flow in blood vessels was noted. Siras by their contractility and expansibility like rivers

and streams, nourishing fields; that is what Susruta says. So, through these channels from the heart these are flowing all over the body. The heart as a reservoir holding various fluids, distributes them all over, but it is replenished; it cannot be creating; it has to get it from somewhere. Now, that it is not by these things coming back in the modified form like venous return, but it is actually coming from original source, food - rasa dhatu.

It is actually coming from food; so, that is how it is replenished and this circulation according to Susruta 30 days and so on. So, that is how the heart was receiving this blood or ojas or rasadhatu. It comes from these different sources, mainly from food and also digestion in the tissues, and that is how heart receives this which it distributes; not that pulsatile action; it is not mentioned and there is no venous return mentioned. Therefore, circulation of blood, as we understand, there was a circulation, but of a different kind; that is what we distinguish.


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BLOOD

- One of the seven body components (dhātus). Suśruta assigns it the role of a doṣa along side vāta, pitta and kapha.
- “Colour of molten gold, insect indragopa or guñjā seeds”. Perturbation by vāta, pitta and kapha makes it red, darkish yellow and pale.
- “Blood in its normal state flowing through its specific siras strengthens body components, improves complexion, and enables proper performance of body functions”.

Suśruta

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The blood itself, if we read Susruta’s description, one of the seven body components alongside vata, pitta and kapha, so it has almost given the status of another dosha and the color of molten gold or insect indragopa, gunja seeds and perturbation by vata, pitta and kapha give distinctive colors. That is bright red, darkish yellow, and so on. So, blood in the normal state flowing through its specific siras strengthens body components, improves complexion, and enables proper performance in body functions. That is Charaka’s, this is Susruta’s definition.

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**HEART AS THE SEAT OF
CONSCIOUSNESS**

- ❖ Heart is the seat of consciousness.
- ❖ Heart supports the whole body, its parts, sense organs, sense objects, mind and individual self. Mind and self “reside in the heart” in the sense they depend on the heart for proper functioning.

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Now, heart as a seat of consciousness: This is a very interesting, very important. All the three Bruhatrai, Charaka, Susruta, Vagbhata, they all agree that heart is the seat of consciousness. Even though all three were aware that there is a brain, but it was not credited with any of these cognitive or emotional functions. And heart supports the whole body, its parts, sense organs, vital nature of heart was known because the damage to heart was fatal; that was recognized. There has been an effort to mind and self being in the heart; that people have tried to help by saying they depend on heart for proper functioning; that is kind of stretching the point. It is very clearly mentioned that they are in the heart; we should take it in that.

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HEART AS THE SEAT OF CONSCIOUSNESS

❖ The conduits – dhamanis, siras and srothas – connected to the heart primarily transport blood, rasadhātu and ojas; but some dhamanis carry nerve impulses to and from the heart. The latter conduits enable the heart to function as the seat of consciousness.

**Dhamani, Siras, Srotas
(common conduits)**



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The conduits - dhamanis, siras and srothas connected to the heart, they transport not only blood, but they also transport rasadhatus and ojas, but when they come in to the heart three differences. One is rasadhātu derived from food, blood which is a further derivative and ojas last one derivative. How do they partition within the heart because there was no idea about the interior anatomy of heart. How were these fluids partitioned? That is not mentioned. Some dhamnis also carry nerve impulses and that is the basis when we say heart is the seat of consciousness. These dhamanis which are carrying nerve impulses, they are the agents of that consciousness.

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RESPIRATION

Life breath:

- In the classification of life breath (prāṇa) in the body, “prāṇa” is located in the head and neck; and “udāna” in the chest and throat. “Mahāsrota” refers to the duct that bears life breath (prāṇavāhasrotas). (Mahasrota also signifies alimentary tract).

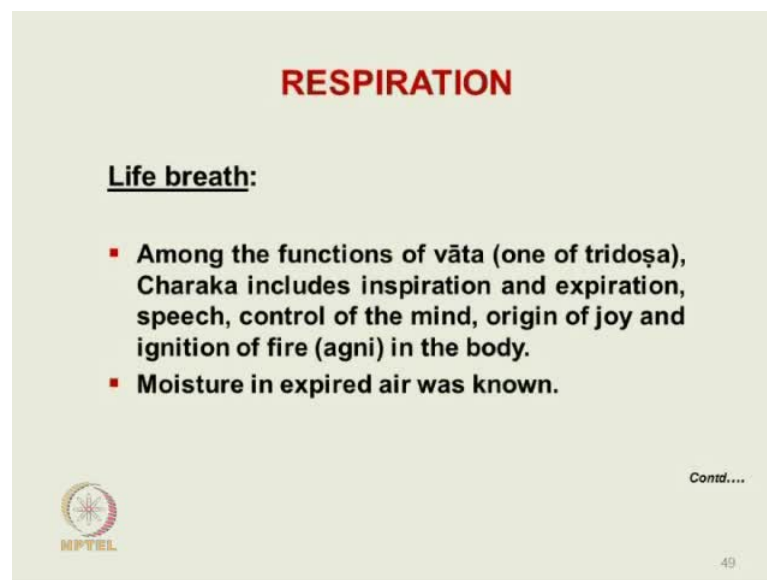


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Then we come to respiration here, life breath. Prana is the term which is used but is primarily located in the head and neck. Udana - another compartment which I mentioned in the compartmentalization of life breath. Prana - it is depending on the location; what is moving in the upper part of the body; what is moving in the lower part of the body; what is moving in blood, other parts of the body? These are all different compartments of the wind in the body. So, here, prana is primarily in the head and neck, udana in the chest of throat and mahasrota, there is a lot of confusion, mahasrota also, it means the gut; the elementary canal, that is also mahasrota. Then, there is also pranavahasrotas. Pranavaha is not who... So, both mahasrotas signifies both and that bird's life breath is the prana.

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RESPIRATION

Life breath:

- Among the functions of vāta (one of tridoṣa), Charaka includes inspiration and expiration, speech, control of the mind, origin of joy and ignition of fire (agni) in the body.
- Moisture in expired air was known.

Contd....

 MPTEL


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Among the functions of vata, which is one of the three dosas, Charaka mentions inspiration, expiration, speech, control of the mind, origin of joy, ignition, fire, etcetera. Any movement, any motion in the body, these are all done by vayu. Without that, even say for example, perturbed pitta for example, perturbed kapha, it is localized in one place, but for this to travel out, to transmit out to all over the body to produce disease, that is done by vata. So, that, any motive, any motive force, that is all due to vata. And moisture in the air, expired was observed.

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LUNGS

- Two terms “Kloma” and “Puphusa” were used to indicate lungs which were located in the chest.
- Sometimes “uras” (chest) was used interchangeably with lungs.
- The vital role of life breath and some of its functions were appreciated; but the central role of lungs in respiration was missed.



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Lungs with all these descriptive inspiration, expiration, prana, kloma and puphusa, there are two terms used to indicate lungs and the distinct of anatomy, but they were not connected with respiration. Lungs, just like the brain was not connected with consciousness. This is not connected with respiration. Sometimes chest, uras that is used synonymously with lung in terms of injuries especially and the vital role of life breath in some of its functions were appreciated, but the central role of lungs and respiration was not recognized.

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NERVOUS SYSTEM

Brain:

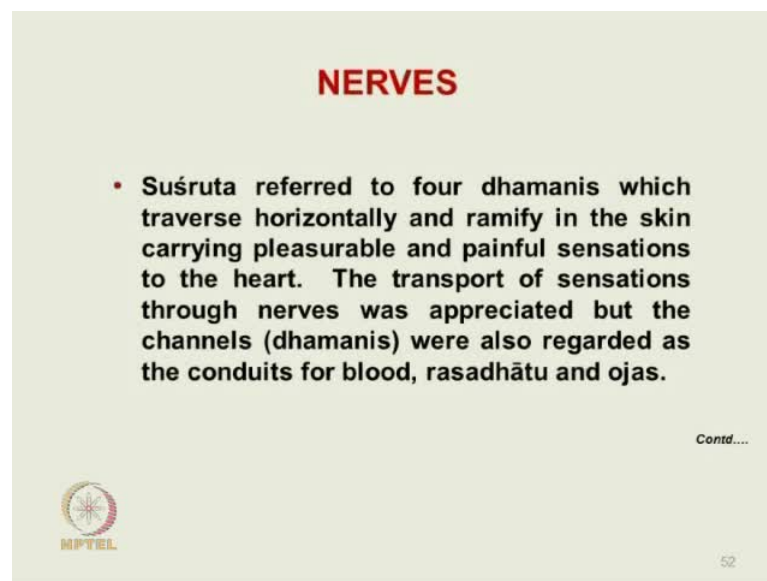
- In Charaka and Suśruta, the general term “Head” (Śiras) is used to indicate its importance as the seat of eyes, ears, nose and taste; as the seat of perturbed vāta etc. The term “mastiṣka” (brain) is seldom used.
- The existence of brain was known. Suśruta stated that four pairs of nerves carrying impulses from eye, ear, nose and tongue were attached to the brain inside the skull. However he and Charaka held that heart was the seat of mind, consciousness, and sensation.



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Now, in nervous systems Charaka Susruta terms head is used because it was the seat of all the sense organs which was extremely utamanga, the best among organs. But this mastiska, the brain, that is also used among the viscera; you saw it mentioned there. And Susruta in one place, he talks about four pairs of nerves carrying impulses from sense organs in the head, eye, ears, nose and tongue. These were attached to the brain; he writes there, but somehow consciousness he locates in the heart. This was not connected with that. Like Charaka, he also helped seat of the mind, consciousness and sensation was the heart.


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NERVES

- Suśruta referred to four dhamanis which traverse horizontally and ramify in the skin carrying pleasurable and painful sensations to the heart. The transport of sensations through nerves was appreciated but the channels (dhamanis) were also regarded as the conduits for blood, rasadhātu and ojas.

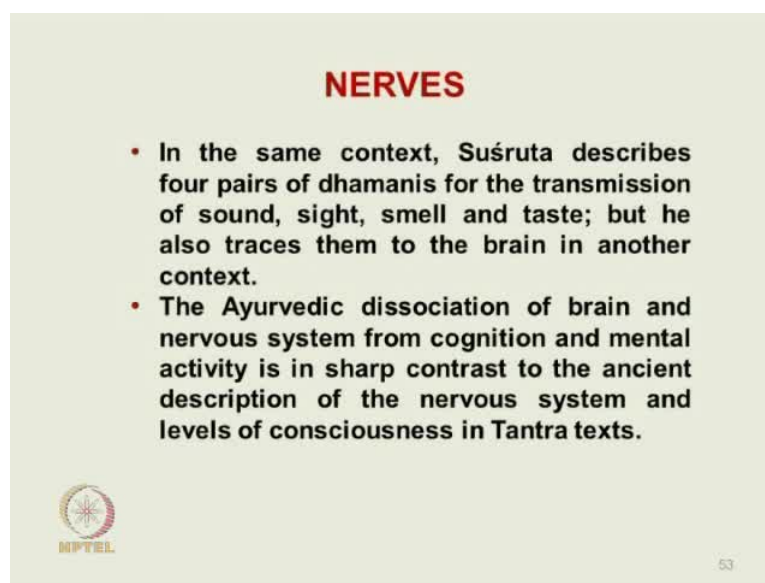
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Going on Susruta, the four dhamanis, he talks about four other dhamanis which travels horizontally, ramify in the skin carrying pleasurable and pain sensations to the heart. The transport of sensations through nerves was appreciated, but the channels, the dhamanis were also regarded as the conduits for blood, rasadhatus, and ojus. So, the dhamanis actually share; it is a common conduit through which all these can transit.

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NERVES

- In the same context, Suśruta describes four pairs of dhamanis for the transmission of sound, sight, smell and taste; but he also traces them to the brain in another context.
- The Ayurvedic dissociation of brain and nervous system from cognition and mental activity is in sharp contrast to the ancient description of the nervous system and levels of consciousness in Tantra texts.

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That is the way it is presented. Charaka Susruta as I mentioned, also mentions four pairs of dhamanis carrying sound, sight, smell, taste, sensations. They are obviously nerve impulses and they are traced to the brain. There is a certain difficulty in understanding this. He was aware of these nerves carrying from sensations from sensory organs like eyes and ear connected to the brain, but consciousness that was located in the heart. And the Ayurvedic dissociation of brain and the nervous system from cognition and mental activity, it is something very sharp contrast to the ancient description of nervous system.

If you look at the yoga system, that is very very different. They are talking about different levels of consciousness. The ida, pingala, and the sushumna, now that yogic description of consciousness is so entirely, very detailed descriptions are there. That obviously shows the consciousness is with the brain, but here in Ayurveda, they would have nothing to do with it. So, there is a yogic system; I cannot believe it is much much later than Ayurveda; that is also very ancient system.

How this ancient system of yoga, where consciousness is very definitely associated with the brain, the spinal cord because spinal cord also there is consciousness. In physiology, we learn for example, if you have an animal preparation, if the head is cut of a spinal animal, only the spinal cord is there, but if you take a pin and prick that spinal animal on the foot, there is immediately a withdrawal reflex. So, that pain sensation is there. So, a spinal animal also has some amount of consciousness.

So, the yoga system where you keep on increasing your level of consciousness, your awareness, most of us are only conscious at the lower level. By constant practice you keep on enlarging this domain of consciousness, higher and higher levels, until you come to the top of the brain, you almost become super sensuous. That kind of complete association of consciousness with the central nervous system, that is lacking in Ayurveda for whatever reason. I think you should take note of it.