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BIRD'S – EYE VIEW ON ASTHI DHATU

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ABSTRACT
The movement of dosha, dhatu, mala in the body with respect to digestion and metabolism occurs through the srotases (channels). Srotas are those channels which transports and transforms the substances to respective tissues, cells of the human body required for life sustenance. The main motto of the srotas is to nourish and sustain the dosha, dhatu, mala of the body. The movement inside the srotas is decided by the chala guna pradhanata of dosha and dhatu. As the dhatu's are classified as sthayi and asthayi dhatu. Asthi dhatu is an sthayi dhatu which is predominant in pruthvi and vayu mahabhutas. Asthi saara purusha (predominant of bony tissue) are endowed with aayushmanta (longer life span) and attain susamhata shareera(proportionate body). Understanding of asthivaha srotodusti nidana and lakshana in a patient with relevant examination and prescribing appropriate chikitsa is the need of the hour.

KEYWORDS: Asthivaha Srotas, Pariksha, Chikitsa.

INTRODUCTION
Health comprises of both body and mind. Ayurveda aims at maintaining the health of the healthy person and to treat the diseased.[1] Acharyas of Ayurveda have classified the elements of the body under three fundamental components- *tri-doshas, sapta-dhatus and tri-malas*. These three entities are responsible for the maintenance of structural and functional integrity of the body. Among them, *dhatus* are meant for the *dharana* and *poshana* of the body i.e., sustainment and nourishment of body. Dhatus are total 7 in number namely-*Rasa, Rakta, Mamsa, Meda, Asthi, Majja* and*Shukra*. *Asthi* is known for the structural shape and supportthe *mamsa, meda*, ligaments, tendons etc.Generally, bones are considered as *asthi.* There are 2 types- *sthayi* and*poshaka*. Bone are considered as *sthayi* dhatu and *Asthi dhatu* is in liquid form called *poshakaasthi* that flows through *asthivahasrotas* and nourishes *sthayiasthi* and nutrients that are responsible for nourishment of bone tissue such as calcium, potassium, magnesium etc, are considered as *poshaka.*

Data source - A thorough review of Ayurvedic classical texts charaka vimana, charka sutra, physiology and pathology books, embryology, contemporary science books, relevant articles are cited for the present study.

DISCUSSION
What is *Asthi dhatu* and its formation
Asthi is considered to be the hard substance and is the fifth dhatu amongst seven. It gets generated in intra uterine life from the mesodermal germ layer. Growth and nourishment of the *asthi dhatu*are by the diet consumed. When *medo dhatu* takes its origin in *medovahasrotas, medodhatwagni*acts on its nutrients coming from *aahara rasa* and from *mamsavahasrotas. Medo dhatu* is produced in *medovahasrotas.* Part of this reaches the next *srotas* that is*asthivahasrotas*. It takes part in the production of *asthi dhatu*. Nutrients coming from*aahara* rasa and *medovahasrotas* are acted upon by *asthidhatwagni* and gives rise to *asthi dhatu.* From this its *upadhatus* and *malas* are generated. *Asthi dhatu* is found to be present mainly in *asthivahasrotas* and *srotomoola* being *medo dhatu* and *jaghana* (groin)[3].The hardness of *asthi dhatu* is due to the *asthidhatwagni* acting upon *Prithvi, Agni* and *Vayu* predominant portions of food. From *medo dhatu*, being fluid *dhatu* to produce hard *asthi*, *Vayu* is needed for drying the fluidity, *Privithi*for bringing down the fluid *meda* to solid *asthi*and *Teja* for the *kharatva* or roughness.[4]

Time period required for formation
According to Acharya Sushruta, food becomes *rasa* on the next day, *rakta* on third day, *mamsa* on fourth day,

meda on fifth day, *asthi*on sixth day, *majja*on seventh day and *shukra*on eighth day.[5]

***Panchabhoutika* predominance[6]**

According to Acharya Charaka	According to Acharya Sushruta
Prithvi	*Prithvi*
Agni	-
Vayu	*Vayu*

Upadhatu* of *Asthidhatu

*Upa*means sub, subordinate, secondary. *Dhatu* means tissue.Hence, *upadhatu*means 'a tissue inferior or subordinate to the main dhatu possessing either *shareera dharana* (construction of the body) or *shareeraposhana* (nourishing the body) properties'. They can be considered as the supporting blocks to the main constructive blocks or dhatus in the body.*Upadhatu* of *asthi dhatu* is '*Danta'* that is teeth.[7]

Teeth is any of the hard, resistant structures occurring on the jaws and in or around the mouth and pharynx areas of vertebrates. Teeth are used for catching and masticating food, for defense, and for other specialized purposes.

The primary teeth begin to appear about six months after birth, and the primary dentition is complete by age 2 $^1/_2$; shedding begins about age 5 or 6 and is finished by age 13. The primary teeth are shed when their roots are resorbed as the permanent teeth push toward the mouth cavity in the course of their growth.

Mala* of *Asthi dhatu

Malas are the excreta, metabolic wastes. These are formed everydayasisb as a result of metabolism and at the same time are expelled out consistently so as to balance and maintain the body biotransformation. After the digestion and metabolism of food the *aahara rasa* or the essence part of food eventually reaches the dhatus while, the *mala bhaga* is expelled out of the tissues, which are formed in the cells during cellular metabolism *(dhatuagnipaka)* are called *dhatu malas.Mala* of *asthi dhatu* are *Loma* (body hair), *Kesha* (scalp hair) *Smashru*(beard &moustache) and*Nakha* (nails) [8].Hair is one such natural ornament which everyone of us would flaunt for. It is responsible for beauty, appearance of personality and protection. There is an increasing number of panicked people coming to the doctors with the complaint of hair loss. Due to sedentary lifestyle, food, environment etc. people are more likely to lose hair at a very early age. Therefore, more awareness about hair health is observed in the society.In the contemporary view, hair is the common name given to the appendage irrespective of the region where it is present on the body. Whereas Ayurveda Acharyas were so particular, starting from naming the hair according to the part of body where it is present.[2]

The skin appendages are epidermal and dermal-derived components of the skin that include hair, nails, sweat glands, and sebaceous glands. Each component has a unique structure, function, and histology. This article describes the unique characteristics of each of these components and provides insight into tissue preparation for microscopic evaluation and the clinical significance of these structures.

Body hair, or androgenic hair, is the terminal hair that develops on the human bodyduringand after puberty. It is differentiated from the head hair and less visible vellus hair, which is much finer and lighter in colour.The growth of androgenic hair is related to the level of androgens (often referred to as male hormones) and the density of androgen receptors in the dermal papillae. Like much of the hair on the human body, leg, arm, chest, and back hair begin as vellus hair. As people age, the hair in these regions will often begin to grow darker and more abundantly. This will typically happen during or after puberty. Men will often have more abundant, coarser hair on the arms and back, while women tend to have a less drastic change in the hair growth in these areas but do experience a significant change in thickness of hairs. However, some women will grow darker, longer hair in one or more of these regions.Hair serves many functions, including protection, body temperature regulation, facilitation of perspiration, sensation, aesthetics, and psychosocial health. Hair protects our skin from UV radiation in areas that are more hair dense. Hair can retain heat when we are cold and stand on end with the contraction of arrector pili muscles, promoting heat loss through sweat production when we are hot. Hair can also contribute to tactile sensation by transmission through the hair follicles. Socially, hair can be a symbol of beauty and health, contributing to confidence in an individual's psychosocial well-being.

The nail unit includes the nail plate, eponychium, hyponychium, nail folds, lunula, and nail matrix. The prefix onycho- pertains to the nails.The nail matrix lacks a granular layer, has a thick stratified squamous epithelium, long rete ridges, and contains melanocytes, epithelial cells, Merkel cells, stem cells, and Langerhans's cells. It is also known as the germinative zone where stem cells divide, migrate, differentiate, and produce keratin for the formation of the nail. At the edge of the lunula, as the epithelium transitions to the nail bed, the epithelium thins.The functions of the finger and toenails include protection from injury and infection, help with grasping and manipulating objects, aesthetic and cosmetic purposes, augmentation of sensation. The

sheer strength of the nail mediates protection as a direct result of keratinization and the preservation of the cuticle, onychodermal band, and lateral nail folds to prevent infection.

Part of the body	Name
Scalp	*Kesha, Shiroruha*
Body	*Roma, Loma, Romaraji*
Eyelashes	*Pakshma*
Mustache/ Beard	*Smashru*
Eyebrows	*Bhru*

Properties of *Asthi dhatu*

Physical Properties	Functions
Guru (heavy), *Khara* (rough)	*Dharana(*bearing, supporting)
Kathina (hard), *Sthula* (gross)	*Majja Pushti*(nourishes the *majja*)
Sthira (stable)	*Avalambaka*(anchor/ support)

Functions of *Asthi dhatu*

Asthi dhatu does the *deha dharana* (skeletal framework) and also provides nourishment to the bone marrow [9]. After death when the other tissues like *mamsa* and skin gets decayed, *asthi*usually requires three weeks to several years for a body to completely decompose into a skeleton, depending on factors such as temperature, humidity, presence of insects, and submergence in a substrate such as water. In manyfertile soils take about 20 years to completely dissolve the skeleton. In neutral-pH soil or sand, the skeleton can persist for hundreds of years before it finally disintegrates,hence *asthi* is considered as the heartwood of the body.[10] *Ashti dhatu* provides attachment to *peshis*, *siras*, *snayus* (muscles, nerves, tendons, ligaments, cartilages etc.) due to which neither of them gets detached from their anatomical positions.[11]

Characteristics of *Asthi sara purusha lakshana*[12]

The person with *asthi sara*– completely evolved and well-nourished*asthi dhatu* will have following feature - strong big bones all over the body especially in regions of *parshni* (heels), *gulpha* (ankles), *janu* (knees), *aratni* (elbows), *jatru* (clavicles), *chibuka*(chin),*shirah*(head), *parva* (phalanges), *nakha* (nails) and *danta* (teeth). Apart from the physical strength, *asthi sara purusha* will be *utsahi* (enthusiastic), *kriyavanta*(able to perform the physical activity), *kleshasaha* (good endurancer ability to withstand stress), *sara sthirashareera* (strong and firm body).

Number of *Asthi*

Charaka Samhita - 360
Sushruta Samhita – 300
Ashtanga Sangraha– 348
Contemporary Science - 206

Types of Asthi (Bones)

Ayurveda	Contemporary Science
Nalakasthi	Long bones
Kapalasthi	Flat bones
Valayasthi	Ribs
Ruchakasthi	Teeth
Tarunasthi	Cartilages

***Asthivahasrotodushtikarana*[13]**

The diseases which get manifested in the body are mainly dependent upon the underlying cause they are called as *srotodushtikaranas.* Some of the common causes for the vitiation of *asthidhatusrotodushti*are - *Ativyayama*(excess physical exercise), *atisankshobha* (travelling more on vehicles on uneven road), *asthiati-vighattana*(repeated and excessive trauma or friction involving bones), *vatalaaahara vihara* (consuming diet and following lifestyle that leads to *dusti* of*vata dosha* in the body).

***Asthidhatu Vruddhilakshana*[14]**

The symptoms of *dusti (increase in guna and karma)* of*asthi dhatu* leads to *adhi-asthi*(abnormal bone growth, hypertrophy, osteoma) and *adhi-danta*(formation of extra, abnormal teeth).

Asthidhatu Kshayalakshana

The symptoms of dusti (decrease in guna and karma)of*asthi dhatu* in the body according to different Acharyas are-*Asthi-shula*(pricking types of pain in bones), *dantanakha- bhanga* (pain and deformity of teeth and nails).[15] *Anya asthitoda*(different kinds of pain in all the bones), *sadana*(loosening of joints, body pain),

dantakeshanakha (premature falling, cracking and decrease in teeth, hair & nails).[16] *Kesha lomanakhashmashruprapatana* (premature falling of hair, moustache, nails, beard), *shrama*(tiredness on doing slight physical work), *sandhi-shithilata*(loosening of joints).[17] Apart from them pathological fractures, *phakkaroga* (rickets), *asthi-kshaya*(osteomalacia), *asthi-vrana*(osteomyelitis) etc. are also evident.

Asthidhatudushtilakshanas

Due to evident *dhatu aamautapatti*leads to - *Adhyasthi*(hypertrophy), *dantabheda*(cracking of teeth), *krimidanta* (cavity/ worm infestation in teeth), *kesha-loma-nakhavikara*(deformity of hair, beard, nails), *khalitya*(falling of hair from the roots), *palitya*(premature graying of hair), *indrlupta*(patchy hair loss).

***Asthi- pradoshajavyadhis*[18]**

Major variations in the body entities can lead to diseases depending on their *sthana*(location), *ashraya- ashrayi bhavas* (dependcy) and *kha- vaigunya* of the individual.The diseases that are caused due to vitiation of *asthi dhatu* includes *adhyasthidanta*(hypertrophy/ extra formation of bones & teeth), *danta-asthibhedashula* (different kinds of pain in teeth and bones), *kesha-loma-nakha-shmashruvivarnata* (discolouration and deformity in scalp hair, body hair, nails & beard) and *kunakha*(Paronychia- infectious condition of nailbed in fingers and toes).

Pathology/ Vyadhi

The vitiated *asthi dhatu lakshanas (vruddhi, kshaya)* can be seen as *purvarupa* (premonitory symptoms), *rupa* (signs & symptoms) and *upadrava* (complications) in many*vyadhis*.

Vyadhis	**Charaka Samhita**	**Sushruta Samhita**	**Others**
Pandu	1. *Angasada*-body pain	1.*Twakrukshata*-dryness of skin	1. *Rukshata in nakha, kesha, loma, smashru*-drying of the above structures(MN) 2.*Shrama*-tiredness (MN) 3.*Shithilata*-loosening of joints(AH)
Hrudroga	1. *Vaivarnyata*-discoloration of nails etc. 2.*Klama*- tiredness	1. *Klama*- tiredness	
Kamala	1.*Sadana*- general weakness	1.*Parvabheda*- pain in phalanges 2.*Angasada*- pain in limbs	
Raktapitta	1.*Gatranamsadana*- weakness	1.*Dourbalya*- loss of strength	
Vatarakta	1.*Sandhi shithilata*- loosening of joints 2.*Sandhi asthitoda*- pain in joints, bones	1.*Todabheda*- pain	
Sheetapitta			1.*Shareera toda*- pain (MN)
Kushta	1.*Shrama*-tiredness 2.*Vaivarnyata of nakha*-discoloration of nails in chronic kushta 3.*Shula*- pain		
Visarpa	1.*Asthisandhi bheda*- breaking type of pain in bones & joints 2. *Dourbalya*- loss of strength		
Karshya			1. *Asthishosha*- fragile bones (BPM)
Prameha		1.*Keshanamvrudhishchanakha*-Increased growth of hair & nails	
Vatavyadhi	1.*Bheda in asthiparva*- pain in bones & phalanges	2. *Sandhi shula*- pain in joints	3. *Sandhi shula*- pain in joints (MN)
Klaibya	1.*Shaithilyata*- loosening of body joints		

Shwasa	1.*Sandhi shula*- pain in joints		
Rajayakshma	1.*Sadana*- body weakness 2. *Angatoda*- pain in body		
Grahani	1.*Asthiparvaruk*- pain in bones & phalanges	1. *Sadana*- malaise	1. *Dourbalya*- loss of strength (MN)
Udara	1. *Asthibheda*- pain in bones 2.*Vikrutanakha*- deformity in nails 3.*Dakshinaparshvasthibheda*- pain in the bones of lower extremities& flanks)		
Masurika			1.*Angamarda*- body pain (MN)
Phirangaroga			1.*Asthishosha*- porosity in asthi (MN) 2.*Asthivakrata*- abnormality of asthi (MN)
Vatajananatmajavyadhis	1.*Nakhadantabheda*- pain in nails & teeth 2.*Dantashaitilyata*- loosening/ falling off teeth 3.*Keshabhumisphutana*- hairfall 4.*Vatakhuddata*- clubbed feet 5.*Angavadarana*- bony cracking pain all over body)		

AsthidhatuPariksha

Acharya Charaka opines that before treating any patient, analyzing and diagnosing the disease of an individual plays the prime role. For diagnosing the disease, different types of *pareekshas*are used as a tool. Out of which, *Pratyaksha*(inspectory examinations), *Anumana* (examination through inference) and *Aaptopadesha* (examinations through classical Ayurvedic textbooks)plays a major role.

PratyakshaPareeksha can be elicited by the *pancha-indriyas*(five sense organs)–*shrotrendriya* (sense of hearing- ears), *sparshanendriya*(sense of touch- skin), *chakshurindriya* (sense of vision- eyes), *rasanendriya* (sense of taste- tongue) and *granendriya* (sense of smell- nose).

In *AaptopadeshaPareeksha*, the patient conveys the physician regarding the signs & symptoms.

Pareeksha	**Signs that can be elicited**
***Pratyaksha* (Examination by inspection)**	• Discoloration in bony areas, scars of previous surgery, fractures etc. • Cracking and crepitation sound on articulation of big & small joints. • Inflammation and tenderness of bony areas or joints.
***Anumana* (Examination by inference)**	• One's *jarana-shakti* (digestive power) can be inferred by analyzing the *agni* (digestive fire) • *Bala* (strength) of the person tells us about the ability to perform any *vyayama-shakti* (physical activity) • *Upashaya* (relieving factors) &*anupashya*(aggravating factors) infers the knowledge about the hidden *lakshanas.*
***Aaptopadeshagamya bhavas* (History taking)**	• Aggravating & relieving factors. • Main *dosha* for *vyadhiutpatti*(disease manifestation). • *Rogaarambhakahetu*(mode of disease manifestation). • *Swabhava of vyadhi- mrudu or daruna*(nature of disease- mild or severe). • Type of pain. • Symptoms by inspection. • Prognosis of a disease. • Association of symptoms of increase, maintenance and reduction. • Remanence of disease. • Analyzing and diagnosing the disease. • Do's & don'ts with respect to the disease and the patient's condition.

Laboratory examinations for *asthidhatu*

Along with a complete medical history and physical exam, other tests to diagnose bone disorders include:

- Lab tests on blood, urine, and other body fluids
- X-ray. An X-ray can show injuries, such as fractures, infections, arthritis, and other changes.
- Computed tomography scan (also called a CT or CAT scan). This is an imaging test that uses X-rays and a computer to make detailed images of the body. A CT scan shows details of the bones, muscles, fat, and organs. CT scans are more detailed than general X-rays.
- Magnetic resonance imaging (MRI). An MRI scan provides detailed images of soft tissue, the bone marrow cavity, and bone tumours.
- Bone densitometry. Bone densitometry is often used to find osteoporosis. The test measures bone mass in the spine, hips, and arms. These are the areas most likely to fracture when bone mass is low.
- Radionuclide bone scan. The bone scan is used to pinpoint the location of bone tumors. It is also used to find any spread to other bones. It's also used to diagnose stress fractures or tiny cracks in the bones.
- A bone mineral density (BMD) test measures how much calcium and other types of minerals are in an area of your bone. This test helps your health care provider detect osteoporosis and predict your risk for bone fractures.
- A calcium blood test measures the amount of calcium in your blood. Calcium is one of the most important minerals in your body. You need calcium for healthy bones and teeth. Calcium is also essential for proper functioning of your nerves, muscles, and heart. About 99% of your body's calcium is stored in your bones. If there is too much or too little calcium in the blood, it may be a sign of bone disease. Normal serum calcium value is 8.6-10.3 mg/dL.
- A vitamin D blood test measures the level of 25(OH)D in your blood. Abnormal levels of vitamin D can indicate bone disorders, nutrition problems, organ damage, or other medical conditions.
- Biopsy. Tissue samples are removed and examined under a microscope. It's done to determine if cancer or other abnormal cells are present. Two types of biopsy, including:
- Needle biopsy. A needle is inserted into the bone to obtain tissue.
- Open biopsy. A surgical procedure in which an incision is made through the skin to allow a sample of tissue to be cut or scraped away.

Level	Blood test result
Low	30 nmol/l or 12 ng/ml or below
Adequate	50 nmol/l or 20 ng/ml or above
High	125 nmol/l or 50 ng/ml or above

Asthidhatu Chikitsa

Analysis of *srotodushtikaranas*and*lakshanas*by means of pariksha helps in arriving at an accurate diagnosis of a disease. Prescribing an*chikitsa* (treatment protocol) which involves aushadha, aahara, vihara is the next step. Treatment is assessed based on the guna and karma principle. Hence *vimshatigunas* are to be analyzed accordingly.

VimshatiGunas

Guna(quality)	Meaning	Example
Guru (heaviness)	The one responsible for falling action	Wheat, curd
Laghu(lightness)	The one responsible for weight loss	Puffed rice, green gram
Sheeta(coldness)	They arrest movement and cause stagnation	Sandalwood, ice
Ushna(hotness)	They generate sweating	Pepper,chilli
Snigdha(unctuousness)	The one that has the ability to soak	Drumstick, ghee
Ruksha(dryness)	Dries the body	Horsegram
Manda(dullness)	The quality that acts slowly	Amla, curd
Teekshna(sharpness)	The one which has a quick action	Ginger, pepper
Sthira(immobility)	It has the ability to support	Wheat, rice flakes
Sara(mobility)	The one which has the property to flow	Bamboo, Anthocephaluscadamba
Mridu(softness)	Substances capable of loosening	Oil, ghee
Katina (hardness)	They strengthen the body	Coconut shell, conch shell
Vishada (clearness)	Ability to wash and clean	Neem
Picchila (sliminess)	The ability to coat/stick	Commiphoramukul
Shlakshana(smoothness)	Ability to heal as they promote growth of new tissue	Turmeric
Khara (roughness)	The one that has scrapping action	Drumstick
Sukshma(minuteness)	Ability to penetrate	Alcohol, ghee
Saandra(solidity)	Ability to clarify	Milk cream, butter
Drava(fluidity)	The ability to dissolve substances	Water

Treatment that is given in case of *asthivahasrotodushti*or diseases manifested due to *asthi dhatu dushti*is *Anuvasana* & *Aasthapana Basti*(sneha and kashayaenema), (*Panchakarma*- one among the purificatorymethods) using *ksheera* (milk), *ghrta*(ghee) and *tikta rasa dravyas*(drugs with bitter as the predominant taste).Drugs which are used for the

treatment of *Basti* according to Acharya Charaka, they are enlisted under*Dashemani/ Mahakashayavargas.*[21]

AsthaapanopagaMahakashaya (adjuvants for Niruha Basti)	***AnuvaasanopagaMahakashaya (adjuvants for Anuvasana Basti)***
Trivrit	*Rasna*
Bilva	*Suradaaru*
Pippali	*Bilva*
Kushta	*Madana*
Sarshapa	*Shatapushpa*
Vaca	*Vrschira*
Vatsakaphala	*Punarnava*
Shatapushpa	*Swadamshtra*
Madhuka	*Agnimantha*
Madanaphala	*Syonaka*

According to *Acharya Sushruta*, they are enlisted under different *Ganas,* namely, *Mustadigana, Ambhashtadigana* and *Pippalyadigana.*

Vyayama

Importance and the methods of practicing *vyayama*/ physical activities for maintenance of healthy mind and body. Acharya Charaka states that *vyayama*mitigates*kapha*dosha in our body and increases *vata* and *pitta (guna and karma)*. V*yayama* helps to mobilize *kapha* and relaxes the joints and relieves stiffness. *Vyayama* is that activity which makes the body *sthira* (stable) and *balavan*(strong) on doing according to one's ability.[19] Lightness of the body, increases the ability and strength of the body for doing physical activities, body becomes more stable, ability to endure more stress, decreases the *prakupitadoshas*, increases digestive power. Acharya Vagbhata opines that, exercises are the activities which produces tiredness in the body resulting in lightness of the body, ability to perform normal routine activities with enthusiasm, increases the *aahara shakti* digestive power, reduces fat and body parts become distinct and firm.[20] Strong people are those who are habituated to take unctuous food, and in cold seasons one should do exercises half their capacity. It is done lesser in case of *Greeshma, varsha, sharadrutus.*

Nutrients	**Bone Health Function**	**Food Sources**
Calcium	If you do not get enough calcium through your food or supplements, your body will take the calcium it needs from your bones.	Dairy (milk, cheese, yogurt), juices, cereals, almond, and soy milk, tofu; dark green vegetables, almonds
Vitamin D	Necessary for calcium to be absorbed in the intestine.	Fatty fish, fortified foods (dairy, cereal); egg yolks
Magnesium	Allows for proper calcium and vitamin D regulation.	Green vegetables, seeds (poppy, sesame, chia); nuts; legumes; whole grains; avocado
Zinc	Mineralizes bone and stabilizes receptor proteins for vitamin D, protein synthesis.	Shellfish; beef; pork; seeds; beans; whole grains; yogurt
Vitamin B12	Appears to influence bone-building cells.	Clams; liver; fish; fortified cereal; meat; dairy products; eggs; poultry
Vitamin C	Essential to collagen formation and Increases absorption of plant-based iron.	Peppers; citrus; kiwi; broccoli; cauliflower; strawberries; Brussel sprouts; papaya
Vitamin K	Low blood levels of vitamin K are associated with lower bone density and possibly increased fracture risk.	Collards; turnip greens; spinach; kale; broccoli; natto; soybeans; carrot juice; canned pumpkin; okra; blueberries; grapes; carrots

Nitya- sevaniya dravyas

According to AcharyaCharak, our body is the final and supreme product of *Aahara*. He says that food helps in sustenance of the life of all living beings. Complexion, clarity, good voice longevity, intelligence, happiness, satisfaction, nourishment, strength and intellect are all present in food.[22] According to Acharya Sushruta, food enhances vitality, strength and makes our body sturdy. Food increases enthusiasm, memory, Agni, life span, lustre and Oja of the body.[23]

CONCLUSION

In the present study an effort is made in understanding the asthivahasroto pathology, analysis of diagnostic protocol with respect to chikitsa.

- Asthivahasroto vikaras are madhyamaroga margaja vyadhi's, the mode of manifestation of vikara is at the sroto mula sthana or in the sroto marga.
- Examination of astivaha srotas to be emphasized on trividha pariksha (pratyaksha, anumana , aaptopadesha bhavas), laboratory diagnosis by X

ray, CT Scan, BMD Test, Serum Calcium and vitamin D levels.

- Based on the guna - karma principle, chikitsa to be framed accordingly as pathya, aushadha, vihara.
- Assessment of agreyadravya with respect to chikitsa

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