



Review Article

STUDY OF TRAUMA ON *ASTHI* W.S.R TO *ASTHIBHAGNA*

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ABSTRACT

Ayurvedic science is being popularized worldwide. It has established history for the management of *Bhagna* in *Sushruta Samhita*. Ayurvedic philosophy is specific pertaining to the body constitution. The human body is composed of *Dhatu*. "*Asthi*" *Dhatu* is one of the main *Dhatu* in human body. "*Asthi*" is hard substance which remains even after most part of body has been decayed. Ayurvedic science has established history of trauma to *Asthi* (*Asthibhagna*). Ayurveda has aimed high for maintaining normal structure and function of deformed bones. It is high time to re-establish it by adopting proper research and methodology. The skeletal injuries are important incidences in human beings and they demand immediate management. The branch of science that deals with deformities of bones is known as Orthopedics, aimed for "maintenance of normal structure and function of deformed bones." While bones are very strong they can break. Most often, breaks happen because the bone runs into a strong force, also repetitive force like from running can fracture a bone. High energy trauma result in bone fractures whether it is isolated fracture or dislocation. When a person goes through some form of trauma, as car accident or fall, the impact may break or fracture the bone. The bone fracture may be the result of high force impact or a result of certain medical conditions that weaken the bones such as Osteoporosis. Fracture is properly termed pathologic fracture but not trauma.

KEYWORDS: *Asthi*, *Asthi Bhagna*, Trauma, Bone-tissue, Fractures.

INTRODUCTION

Asthi: *Asthi* is a *Dhatu*. '*Dhatu*s are the tissue humoral system of body. *Asthi Dhatu* is formed from *Meda Dhatu*. The synonyms used for *Asthi*

- ✓ *Keekasa*
- ✓ *Kulyams*
- ✓ *Kapala*
- ✓ *Astri*
- ✓ *Medojam*

Asthi is hard part which forms framework of body. *Asthi* is hard substance which remains even most part of body has been decayed. *Asthi* is substance which remain even after else very part like flesh muscles etc are shattered even after burying the body after death^[1]. It remains as last identity of person even after demise. "*Hada* is synonym of *Asthi* which means hard substance^[2]. Though every substance is made up of all five *Mahabhutas* (*Akasha*, *Vayu*, *Agni*, *Jala* and *Prithivi*)^[3]. *Asthi* has prominence of *Prithvi* and *Vayu Mahabhuta*. It is one of among *Sapat Dhatu*s which is present in the *Sharira*. Form of *Dhatu* which is present in inside the *Mamsa Dhatu* is known as *Asthi*^[4]. Thus both these *Mahabhutas* give

characteristic qualities like toughness, roughness, dryness and hardness^[5].

Asthi is meant for playing anchor role of frame work of body and is affectively by *Snayu*, *Mamsa*, *Sira* and *Snayu*. The *Updhatu* of *Asthi* is *Danta* (supported teethes).^[6]

Number of *Asthi*

- Charaka Samhita* -360
- Sushruta Samhita* -300
- Astanga Sangrah* -360
- Astangahridya* -360
- Kashyapa Samhita* -360
- Bhela Samhita* -360
- Modern Science -206

Distribution of *Asthi* in the *Shadanga* of *Sharira* as follows

- Shaakha*: 140
- Shroni Parshva Prushtha Uras*: 117
- Greevorordhva*: 63
- Acc to *Ashtanga Sangraha*: 259
- Shaakha* :140

Madhya Sharira : 120

Urdhva Sharira : 100

Asthi Bhedas (types) are depending upon the size shape, position they are differentiated. *Asthi* in body is divided as types of *Asthi* are [7,8,9]

1. *Kapala*
2. *Ruchaka*
3. *Taruna*
4. *Valya*
5. *Nalaka*

Kapalasthi -These are flat in nature.

Location- These are present in *Janu, Niamba, Amsa Granda, Talu, Shankha, Vankshna* and *Madhyashia* are known as *Kapalaasthi*.

Valyasthi- There are round in shape particularly hemi circle in shape. [10]

Location- *Asthi* in *Pani, Pada, Uru, Parshva, Prustha* are *Valyasthi*. [11]

Tarunsthi- These are soft in nature [12]. It means which have either not fully developed.

Location- As the present in the *Grhana, Karna, Greeva*, and *Akshikuta* are called *Tarunshi*. [13,14]

Nalaka- There are long like tuber and hollow from inside.

Ruchikasthi - The bones which are different from all and are utilized to chew food and enjoy the taste [15]. These are for taste sensation. [15]

Location - The *Dashanas* are known as *Ruchakasthi*. These are in all here *Ruchkaie Danta* teeth are also regarded as *Asthi* along with its various stiff parts.

Effect of Trauma on Asthi (Bones) [16]

The word *Bhagna* is derived from the word *bhanj-Dhatu* and *Katupratyaya* meaning to break *Bhanj* means motion, which once again means to break. The bones sustain trauma in different ways. *Acharya Sushruta* has paid due attention to this fact and observed that all the bones do not show similar type of effect due to trauma. He has then classified these effects in different groups and correlated with the types involved the same is mentioned below.

1. *Tarunasthi* (Cartilage)- Bend
2. *Nalkasthi* (Long bones) - Break
3. *Kapalasthi* (Flat bones) - Crack
4. *Ruchkasthi* (Teeth)- Fragmented
5. *Valayasthi* (Curved bones)- Cracker Break

Classification of Bhagna

The classification of *Bhagna* is given by *Susruta, Madhavakara, Chakra-datta, Bhavaprakash. Vagbhata's* opinion differs in this regard. *Charaka* has not given any classification.

Susruta's classification [17]

On the basis of structure involved the skeletal injuries have been divided in two types-

1. **Sandhimukta** (Joint Dislocation)

2. **Kandabhagna** (Bone Fracture)

Vagbhata's classification: *Vagbhata* has mentioned same classification in different words like-

1. **Sandhibhagna**

2. **Asandhibhagna**

Apart from these classifications in *Madhu-koshvyakhya* further divided the *Bhagna* on the basis of their clinical manifestation as-

1. **Savrana Bhagna** [7] (**compound fracture**)-

Fracture with the wound i.e., bone comes outside just after injury.

2. **Avrana Bhagna (closed fracture)**- When bone is fractured but no visible wound on the skin is seen.

The dislocations have further been classified in to six varieties. And the fractures are sub-divided according to type of injury into twelve types. The *Susruta's* classification is universally accepted. *Vagabhata* has given different terminologies for some varieties. He has mentioned *Vellita* in place of *Kandabhagna*. *Darita* instead of *Patita* and *Shoshita* in the place of *Chinna*. *Acharya Madhavakara* has also used some other terminology like *Vichurnita* instead of *Churnita*. *Asthichallita* in the place of *Asthichallita* and *Majjagata* in the place *Majjanugata*.

1. **Ekamanuvidaritam**

2. **Bahunuvidaritam**

Acharya Sharangadhara has not followed *Susruta's* classification but he has described the eight varieties of *Bhagna*. These are similar to *Susruta's* classification.

1. *Bhagnaprista*

2. *Vidarita*

3. *Vivartita*

4. *Vishlishata*

5. *Adhogata*

6. *Urdhvagata*

7. *Sandhibhagna*

8. *Tiryakakshipata*

Clinical Features

The presence of fracture can be made out by history and clinical findings. The clinical signs described in Ayurvedic texts stand as mentioned in any modern surgical text book. The *Susruta's* contribution in this aspect is so perfect that it has hardly any room for alteration even today. He has mentioned signs and symptoms as general and specific features.

General features of *Kandab-Hagna*^[18]

Shvyathubaulyam (marked swelling): Generally fracture, whether it is hairline or will be associated with moderate to severe swelling.

Sparshasahisnutvam (tenderness): Tenderness is such a sign that it is in variably present in all types of fractures.

Avapidyamaneshabda (crepitus): Presence of crepitus is a definite indicative of fracture, can confirm diagnosis clinically.

Vividha vedana pradurbhavah (Different types of pains): The fractured bone before its reduction and immobilization produces variety of pain. This depends on nature of trauma, bone fractured, displacements of the fragments and nature of soft tissue injury.

Sarvasu Avasthasu Na Sharmalabha (Inability to get comfort in any position) - Fracture gives to pain and discomfort to the patient till immobilizing it. The discomfort is such that patient remains restless in any posture of fractured part.

Features of Individual *Kandabhagna*^[19]

1. **Karkataka:** The fracture which has a shape similar to crab is named as *Karkataka*. The case where the fractured bone is depressed at its two articular extremities and bulges out at the middle, resemble the shape of gland is called as *karkataka*^[20].
2. **Ashwakarana:** In this type fractured *Asthi* projects upwards like the ear of horse is called as *Ashwakarana*^[21].
3. **Churnitam:** The fractured *Asthi* is found to be shattered into fragments or the powder form. This *Bhagna* can be detected clinically by presence of crepitus.
4. **Pichhitam:** In this type of fractures, the *Asthi* is compressed between the two opposite forces, it gets expanded transversely and marked swelling occurs.
5. **Astichallita:** In this type of fracture, the periosteum is splintered off, where the fracture fragments lightly elevates into one side, as the bark gets away from the main stem.
6. **Kanda Bhagna:** In this type of fracture the shaft of the bone is fractured. The fractured part shows abnormal movement.
7. **Majjanugatam:** In this fracture, one fragment gets impacted into another causing displacement of bone marrow, then it is said to be *Majjanugatam*. It may be resulted due to force of violence. This type of fracture is very difficult to diagnose because the signs and symptoms like transmitted movements crepitus etc are absent due to impaction.

9. **Atipatitam:** A case where the fracture occurs throughout the plane of the bone is named as *Atipatita*. Here the fragments are completely separated and the separated fragment strangulated.

10. **Vakra:** The *Asthi* get bent, but not broken, especially in *Tarunasthi's* in children.

11. **Chinnam:** Fracture in which the continuity of the bone is breached at one side while the other side remains intact known as *Chinnam*.

12. **Patitam:** Fracture in which bone is partially fractured and cracked into multiple fissures resulting into severe pain in the affected part.

Sputita: In this fracture there will be pricking pain due to sharp points of bristles.

Bhagnachikitsa-The ancient Ayurvedic texts have described *Asthibhagna Chikitsa'* thoroughly. This includes:

1. Principles of *Bhagna Chikitsa*.
2. General management of *Bhagna*.
3. Specific management for different types of fractures.
4. Medicinal preparations for different kinds of fractures.
5. *Pathya- Apathya*.
6. Clinical criteria of fracture healing

Four Principles of Treatment^[23]

1. **Anchan-** To apply traction
2. **Pidana-** Manipulation by local pressure
3. **Sankshep-** Opposition and stabilization of fractured part of bone
4. **Bandhan-** Immobilization

Sushruta has mentioned the principles of reducing a fracture, which is still adopted today. According to him, surgeon should apply first traction from either side of the fragments (*Anchana*), then elevate depressed fragments order press the elevated fragments (*Peedana*). The far displaced or overlapping fragments should be brought in close contact with each other by manipulating them separately (*Sankshepana*). These four principles devote the efforts to achieve proper alignment of fractured fragments before final immobilization (*Bandhana*).

Immobilization^[24]: An adequate immobilization of the fractured limb is one of the most essential methods in the management, for this step usage of splints has been adequately described by *Sushruta*.

Rehabilitation

The importance of Physiotherapy in a limb injury was also appreciated by *Sushruta*. He has prescribed the exercises starting in lighter manner,

which may be gradually increased at any rate, and exercises should not be prescribed all at once in the beginning.

E.g. For rehabilitation of upper limb, in the beginning mud ball is held and then a heavier substance like a lump of rock-salt and finally harder object like stones.

- 1) *Mritapinda Dharana*
- 2) *Lavana Dharana*
- 3) *Pashana Dharana*

Along with all these measures ancient *Acharya* have described numerous medicinal preparations for the faster union of the fractured bone. These are chiefly described as general tonics to provide liberal amount of proteins, fats, calcium and other supplements. These principles of "*Bhagna Chikitsa*" are still adopted today. According to that surgeons should apply first traction from either side of the fragments is called '*Anchan*'. Then elevate depressed fragments or depress the elevated fragments *Peedana*. The far displaced or overlapping fragments should be brought in close contact with each other by manipulation then separately (*Sarkshepana*).

These four principles devote the effort to achieve proper alignment of fractured fragments before final immobilization (*Bandhana*).

The *Asthi sandhyaniya dravyas* are also suggested to include in daily diet General tonics of liberal amount of protein fats, calcium and other mineral are prescribed balanced diet with nutrition and protein is also mentioned.

A case of fracture like occurring in a youth person, slightly deranged *Dosha* in a youth or a person, slightly deranged *Dosha* or (*Alpadosha*) in winter season hail to be easily curable with the help of aforesaid methods. A case of fracture like occurring in a youth gets healed in a month. In two months in case of middle aged man and three months in old age man.

CONCLUSION

Classification of *Asthi* is specifically given in accordance to type of *Bhagna* occurring commonly in it. Further Ayurvedic literature contains definition of *Bhagna*, its etiology, classification, general features and special feature. Ayurveda has given ample to *Asthi Sharir*. The principles of fracture management are mentioned in Ancient literature. This immense knowledge clearly depicts the understanding and far sightedness of *Acharyas* and these principles are applicable in present era with same efficacy. This shows that knowledge of osteology was fairly advanced in ancient period so we are proud on our glorified past of knowledge in field of *Asthi Sharir*.

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