



Review Article

SUSHRUTA'S GENERAL PRINCIPLES OF FRACTURE CARE TREATMENT & MANAGEMENT

Gupta Sudesh^{1*}, Gupta Bhawana², Thapa Anuradha³, Singh Hardip³, Bansal Shivani³

¹Associate Professor, ³P.G.Scholar, Department of P.G. Studies in Shalyatantra, Jammu Institute of Ayurveda and Research, Nardni (Raipur), Jammu.

²Medical Officer, PHC -National Rural Health Mission, Ministry of health & family welfare, Govt. Of India, J&K.

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ABSTRACT

Orthopedic conditions are well explained and documented in the literature of Ayurveda in the name of "*Bhagna Chikitsa*". Many of the new techniques are developed for the management as per the condition. Acharya Sushruta described exclusively about fracture, its etiology, classification and various modalities of the management. *Bhagna* in ancient period were commonly encountered problem occurs in wars and attacks by animals etc but in the present time these are commonly as a result of RTA. *Bhagna* was explained by Acharya Sushruta depending upon nature of trauma, shape of fracture, displacement of fracture fragments and fracture with or without wound. If it occurs in the bone it is called as *Kand bhagna* (bone fracture) and in the joint it is called as *Sandhimoksha* (dislocation). The principle of fracture management defined by Acharya Sushruta centuries ago are as per condition suggests conservative or surgical treatment. Conservative modalities includes *Kushabandha*, *Alepa*, *Chakrayoga*, *Taila Droni*, etc are still relevant. The western medicines takes over in the management of complicated fractures with the introduction of many surgical instruments like the intramedullary nails, etc & delays fracture union and healing potential. This paper expounds the wisdom of orthopedic branch in ancient times especially fracture & its management with possible modern correlation and how much knowledge existed and how well organized was it so many centuries ago. It would be worthwhile to explore these unique features for use in present times. The concepts, theories and techniques practiced several thousand years ago hold true even in today's modern era.

*Address for correspondence

Dr. Sudesh Gupta

Associate Professor,
Department of P.G. Studies in
Shalyatantra, Jammu Institute
of Ayurveda and Research,
Nardni (Raipur), Jammu.

Email:

drsudeshgupta@gmail.com

Ph: 09697122229

INTRODUCTION

Ayurveda is the complete science of life, where we get elaborate descriptions about prevention of disease. One of the common problem and challenges to the modern world is 'trauma' and the management of the 'skeletal system injuries' which occurs as the result of trauma in most of cases. In 1st B.C., Acharya Sushruta has mentioned detailed diagnosis and management for all traumatic orthopedic injuries which will hold good and deserves appreciation under the heading of *Bhagna* and *Bhagna* treatment. He also delineated osteology, etiology, pathology of fractures, clinical features, types, non surgical and surgical management and complications and their management. Fracture is termed as *Bhagna* in Ayurveda which means break or break in continuity of bone. It can be of two types *Sandhimoksha* (dislocation) and *Kandabhagna* (bone fracture)¹.

In the present article we try to explore the undercover facts, skills, and methods of identification and treatment of fractures and dislocation which were mentioned in present Ayurvedic texts and similarly compare it to highly evolved and accepted modern medicine.

ETIOLOGY

Breaking of bones are caused by different types of trauma may be due to falling, squeezing, hit blow, pulling with force and bite by ferocious animals, slip, pressure, striking etc².

CLASSIFICATION^{3,4}

Acharya Sushruta has clear idea between fracture and dislocation. So, he classified traumatic injuries into

- 1) *Sandhimoksha* – dislocations (Table 1)
- 2) *Kanda Bhagna* – fractures (Table 2)

Table 1: Sandhimoksha (dislocation) and modern correlations

Sandhimoksha	Correlations
<i>Utpishtha</i>	Fracture dislocations
<i>Vishshlishta</i>	Dislocations due to tear of ligaments
<i>Vivartika</i>	Anteroposterior dislocation
<i>Avakshipta</i>	Downward displacement
<i>Atikshipta</i>	Gross displacement
<i>Tiryakshipta</i>	Oblique displacement

Table 2: Bhagna (fractures) and modern correlations

Bhagna	Correlations
<i>Karkataka</i>	Depressed fractures
<i>Ashwkarna</i>	Complete oblique fractures
<i>Churnita</i>	Communitated fractures
<i>Pichita</i>	Compressed fracture
<i>Asthichhallita</i>	Perioestel evulsion fractures
<i>Kandabhagna</i>	Complete compound fractures
<i>Majjanugata</i>	Fracture impaction
<i>Atipatita</i>	Complete compound fractures
<i>Vakra</i>	Green stick fractures
<i>China</i>	Incomplete fractures
<i>Patita</i>	Communitated fractures
<i>Sphutita</i>	Fissured fractures

Acharya Sushruta's classification is more fine and superior to the modern fracture classification without the help of radiological investigations. It is clear from above that Acharya Sushruta was keen and particular about his classification that he has not limited himself to classify only discontinuity of bones.

CLINICAL FEATURES

Profound swelling, inability to touch, crepitus on touch, looseness of the part appearance of various type of pain and no relief by change in position, throbbing pain, crackling sound on movement, pulsating and piercing pain and dropping down of the body part⁵.

TREATMENT

The management for orthopedic injuries is always challenging one. The principle behind the management practiced by Acharya Sushruta is universally remained unchanged till the day. A proper justification is needed for the treatment modalities practiced by him.

There are four principles which Acharya Sushruta has mentioned, of skeletal injuries which are almost same as that of modern aspect of treatment.

- 1.) **Anchhana** - Which is very much similar to traction as mentioned in modern aspect of treatment.
- 2.) **Pidana** - In this manipulation is done by local pressure on the injured part so that nature of dislocation or fracture of body part is examined properly.
- 3.) **Sankshepana** - Opposition and stabilization is done so that dislocated and fractured part is adjusted as it is before.

4.) **Bandhana**- Immobilization of the injured part is done by applying or sprinkling various measures like use of different medicated *Lepa*, decoctions and oils followed by uses of splints to support the injured part for better results⁶

Ayurvedic text has mentioned different modalities for closed and compound fractures.

MANAGEMENT OF CLOSED FRACTURES

The joints which are slipped down, pressed down, thrown out and moved below should be rise up, elevated, retracted and pulled out respectively. Acharya Sushruta has summarized all the above in traction, compression, extension and bandaging⁷.

Following are the medications which can be used as local and systemic administration⁸.

PASTE FOR LOCAL APPLICATIONS

Paste of *Madhuca indica* (*Mahua*), *Rubia cardifolia* (*Manjistha*), *Pterocarpuss antlinus* (*Raktaachandana*), and flour of rice (*Shali*) mixed with ghee which is washed hundred times should be applied.

BARKS USED AS SPLINTS

Bark of *Bassia longifolia* (*Illupei*), *Ficus glomerata* (*Udumber*), *Ficus lacor* (*Plaksh*), *Ficus religiosa* (*Asvath*), *Terminalia arjuna* (*Arjun*), *Bambusa arundinacea* (*Vansh*), *Vateriaindica* (*Sarj*) and *Ficus bengalensis* (*Vat*) should be collected and apply to set the limb in normal positions.

PARISHEKA OR SPRINKLING OF MEDICINES LOCALLY

Well cooled decoctions of *Nyagrodhadi* drugs should sprinkle over the fractured part. If there is painful condition used of milk cooked with *Laghu Panchmoola*

should be sprinkled. One other *Yoga* has also mentioned to use luke warm *Chakra taila* for *Parisheka Karma*.

BANDAGING

During the time of bandaging firstly all the fractured and dislocated part thoroughly examined followed by traction and opposition and stabilization. Later on *Parisheka Karma* (sprinkling of medicated liquid) is done along with application of paste of medicines which not only washed away the foreign matter from the wound but also gives soothing effect to the wound and helps in early healing. When all things are set, apply the bandages over the part for immobilization. Acharya Sushruta's line of treatment is very much similar to the modern treatment which is practiced today.

Sushruta mention cross bandage over dislocation of shoulder joint. whereas *Panchangi bandage* Temporo-mandibular joint after giving *Nasya Karma* with *Vidhari Gandhadi* and *Kakolyaadi Ghana*.

FOLLOW UP

Bandages should be opened up at the interval of

- 3 Days in Summer Season
- 5 Days in Temperate and Moderate Season
- 7 Days in Dewy Season

Above mentioned time can vary according to the suitable time depending upon predominant *Dosha* in fracture.

BONE INFECTION

During the time of compound and open fractures if proper management is not done then it may leads to inflammation resulting into infective osteomyelitis. It is highly toxic condition which can cause septicaemia and even damage the bone marrow. For prevention from the abscess the wound should be thoroughly cleaned with herbal decoctions, followed by application honey and ghee over the wound which acts as antimicrobial agent.

PAIN RELIEVING FORMULATIONS¹⁰

POULTICES:

Roots of *Amrantaka*, *Oxalis orniculata* (*Changeri*), *Moringa olifera* (*Shobaanjana*), Roots of *Boerhavia diffusa* (*Punarnava*), *Betula utilis* (*Burjpatra*) and *Costus speciosus* (*Kebuk*) all together macerated either with *Kanji* and ghee and cooked over fire and applied as poultice which will relieve pain, swelling and helps in quick healing.

DECOCTIONS: *Nygradadhi Gana* or *Panchmooladi Gana* added with milk and poured lukewarm over the lesion will relieve pain.

OIL/ TAILA: Chakra oil (fresh oil from the oil mill) can be applied. *Bhagna Sandhana Karaka* oil and *Gandha oil* also mention by Acharya Sushruta

COMPOUND FRACTURES

- During the treatment of compound fracture the wound should be treated with paste of plants mixed with plenty of ghee and honey along with paste of astringent drugs. This has antimicrobial activity which not only kills microbes but also helps in wound healing and reduces swelling. The remaining regimen should be same as in fracture¹¹.

- If *Mamsa* (muscles) of *Vrana* (wound) are hanging loose, they are smeared first with honey and ghee and pushed into wound. Later on the wound was dusted with the powder of *Callicarpa macrophylla* (*Priyangu*), *Symplocos racemosa* (*Lodhra*), *Artocarpus integra* (*Kathal*), *Mimosa pudica* (*Lajaalu*) and *Woodfordia fruticosa* (*Dhateki*) or *Panchvalkala* added with honey and *Shukta* or with powder of *Woodfordia fruticosa* and *Symplocos racemosa* (*Lodhra*) which heals the wound quickly¹².

COMPLICATIONS AND DETRIMENTAL FACTORS

- The fractures which are *Churnita*, *Chinna*, *Atipatita* and *Majja anugata* are cured with difficulty. These are also difficult to cure if patient is emaciated, very young or very old, who can't withstand the therapy that eats too much, who have predominance of *Vata* and who are suffering from leprosy.
- Discard the pelvic bone if it is cracked, dislocated, drooped, as it is very difficult to treat and heal.
- Discard skull bone if is not unified, forehead is smashed and fracture in intermammary region, temples, back and vertex.
- If any fracture or dislocated joint is mismanaged from very beginning or even if it is set properly gets damaged due to faulty position and bandaging or jerking should be discarded.
- If there is suppuration of muscles, vessels and ligaments it delays healing and difficult to treat.
- Healing can be delayed or difficult if patient eat little, has no self control and *Vatika* constitution or if there is presence of complication like fever, flatulence, retention of urine and feces etc.
- By loose bandaging stability of the joint is not achieved where as very tight bandaging cause pain, burning sensation, ripening, ulceration, suppuration and swelling prevails.
- If the flat bone of shoulder driven in side, the crushed bone of forehead, chest, back, temples and head should be rejected¹³.

DIETRY SUPPLEMENT

The patient was advised to consume *Shali* rice, meat soup, milk, ghee, pea soup and weight promoting food and liquids. This is not only nourishes the body but also bestow sturdiness to the joints.

HERBAL SUPPLEMENTS

1. Patient is advised to drink *Fritillaria roylei* hook (*Gristik Ksheera*) mixed with Ghee, which was prepared from *Madhura rasa* (sweet taste) herbals including *Rosa centifolia* in every morning.
2. Mixture of *Cissus quadrangularis* (*Asthishrinkhla*), *Ghritha*, *Rosa centifolia* (*Tarunee*), *Triticum vulgare* (*Godhuma*) & *Terminalia arjuna* (*Arjuna*) can be consumed with milk every day.
3. Fractures like *Chinna*, *Bhinna* & *Chyut* gets united quickly by regular consumption of paste of Garlic, honey, *Rosa centifolia*, Ghee & sugar.

4. *Commiphora mukul* (*Guggulu*) mixed with *Ghrta* & *Terminalia arjuna* (*Arjuna*) bark shows tremendous relief from pain.
5. Regular consumption of meat soup along with powder of heals the fracture within three weeks.
6. Three different formulations are recommended for the healing of bone as that of hardness of bone as that of diamond.
 - a) *Acacia Arabica* (*Babbul*) added with honey and consumed for three days.
 - b) *Acacia Arabica* (*Babbul*) + *Triphala* + *Trikatu*-all added in equal quantity, *Guggulu* is powdered well & made into pills.
 - c) *Rosa centifolia* + *Cissus quadrangularis* (*Asthishrinkla*), *Withania somnifera* (*Ashwgandha*), *Grewia hirsute* (*Naagbala*) all are powdered & mixed well¹⁴.

SPECIAL DEVICES FOR FRACTURED

1. The usage of wooden rod (*Musali*) is mentioned in ancient Indian surgery.
2. A wooden plank made for the person having fracture of waist, forelegs and thighs.
3. The patient was positioned on the table for restraining him. It should be equipped with five pegs, two for forelegs including thighs & flanks and one for the sole.

In case of dislocation and fracture of pelvis, vertebral column, chest and collar bone, same procedure should be adopted¹⁵.

SELF SPLINTING

Sushruta Acharya gave a unique concept of self splinting in case of fracture of hand bones where healthy finger can be used as splint in case of phalange bone fracture.¹⁶

REHABILITATION

In ancient text, the concept of rehabilitation is derived and also recommended till the normal functions are restored of particular fracture. After the removal of bandage or plaster the patient is unable to do his routine work, it is due to the muscle stiffness. The patient is advised to move from simpler exercises to higher exercises like in case of fracture of hand bone, fractured patient should start with lifting mud ball for first few days followed by salt ball and ends by lifting heavy objects like stone. In addition to this the usage of *Panchakarma* therapy like medicated enema, nasal drops and bloodletting can be advised to the patient. Complete healing of fracture can be assessed by absence of gap between broken fragments, absence of shortening, absence of deformity, painless and easy movements¹⁷.

CONCLUSION

From the above article we can conclude that in ancient era there was tremendous knowledge regarding the fractures and dislocations. Acharyas has mentioned different types of fractures and dislocations without any diagnostic interventions such as radiological investigations along with treatment according to severity of wound. Although there was lack of radiological

equipments for diagnosis then also Acharya Shushruta has explained 12 types of fractures which are same as modern orthopedic contexts. In addition to this he also divided these classifications from the *Nidana* (etiology) of fracture such as fall, strike, compression etc. Further he treated the patient with their marvelous knowledge and experiences without any complications. In case of complications different types of formulations are also mentioned. There is not only similarity of types of fractures and dislocations but principle of treatment is also same to that of modern era modalities. So we can say that modalities for the *Bhagna*, are very much similar to the fracture and dislocation.

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