Review Article

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From Sushrut to Campbell Orthopaedics then and Today

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Abstract

Healing is a matter of time. But it is sometime also a matter of opportunity. (Hippocrates)

The ancient Indian Medical Science can he traced back to vedic period. The Vedas are considered to the first record of the ancient knowledge and civilization in the world. The “Sushrut Samhita” is a sanskrit text that covers areas of both surgery and medicine. This compendium is also considered to be one of the main foundation of Ayurveda.

Ayurveda later developed as a separate system of medical knowledge and has been given the status of “Upveda”. The fifth veda in the next stage of its growth. The maximum description of medical science is included in the “Atharveda”. The penultimate source of Ayurveda.

“The Sushrut Samhita” is said to be the most comprehensive text written on surgical practice. Modern surgery is also said to be developed from the basics provided by Sushrut. The fact that sushrut made the beginning of every aspect of surgery, documented the techniques covering all minute details of “Shalya Tantra” in an era which lacked scientific advancement and technical help with almost no facilities available, makes us bow down our head with respect and reverence to this great saint, teacher of Ayurved and doctor.

Keywords: Sushrut, Sushrut Samhita, Shalya Tantra, Dislocation and Fracture.

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Introduction

“जिकलावधातिष्ठेन निकल्यं यद्भवति वकः विलातिं।
तत्कालालिनिक्षिप्तं अस्यित्वितं दस्यं।”

तत्काल्यं अस्यित्वितं दस्यं हैं कि ज्ञान तौली काले में नष्ट नहीं होता है। जो तत्काल्यं अस्यित्वितं दस्यं हैं कि "ज्ञान अनिवार्य है लेख।"

The Sushrut Samhita (Literally means Sushruts Compendium) is an ancient sanskrit text on medicine and surgery and is one of the most important such treatises on the subject to survive from ancient world.[1,2] The compendium of Sushrut is one of the foundation text of Ayurveda (Indian traditional medicine) along with the Charak Samhita. The Sushrut Samhita is of great importance because it includes historically unique chapters describing surgical training, instruments & procedures.[3,4] Rao in 1985 suggested that the original layer to the Sushrut Samhita was composed in first millennium BCE by elder Sushrut consisting of 5 books 120 chapters, which was redacted & expanded with “Uttar Tantra", as the last layer of text in first millennium CE bringing the text size to 6 books & 184 chapters.[5] Walton et. All. In 1994 traced the origin of text to the first Millenium BCE.[6] Tipton et. All. in 2008 historic perspective review states that uncertainty remains on dating the text, how many authors contributed to it and when. Estimates range from 1000 BCE, 800-600 BCE, 1-100 CE and 500 CE.[7] Partial resolution of these uncertainties, states Tipton has come from comparison of Sushrut Samhita Text with several Vedic Hymes particularly the Atharveda such the hyme on creation of man in its 10th book.[8] The chapter of Atrey Samhita describe the human Skeleton.9 Better dating of ancient text that mention name of Sushrut, and critical studies on ancient Bower manuscript by Hoernle.[9] These information traced the first Sushrut Samhita likely to be composed in first millennium BCE.[11] Knowledge is like building blocks & the way it stands today is on foundation of such old efforts. We will try to find out what was said about Orthopaedics practices by such old but enlightend minds and what is said today about such practices in modern Orthopaedics. So the quest of knowledge continues from Sushrut & Charak to Cambell.

“There are in fact two things, science & opinion; the former begets knowledge & the later ignorance” (Hippocrates)
Subjects and Methods

"सुधुर सत्कार आरोग्य विकारों दुखण्डव च।" (सुधुर सत्कार)

Sushrut (Devnagri, lqLqrd an adjective meaning “renowned”) is the name in the text of the author who presented the teaching of his Guru Devdasa.[12] He said in ancient text such as the Buddhist Jatakas to have been a physician who taught in a school of Kashi (Varanasi) in parallel another medical school in Taxhila (on Jhelum River) sometime between 1200 BC to 600 BC.[13-16] One of the earlier known mentions of the name Sushrut is in the Bower manuscript (4th or 5th century) where Sushrut is listed as one of the 10 sages residing in Himalayas.[17]

Rao in 1985 suggested that the author of the Original “layer” was elder Sushrut (Vridha Sushrut) the text, states Rao, was reducted centuries later by “another Sushrut” then by Nagarjun & there after “Uttar Tantra” was added to it.[5]

It is generally accepted by Scholars that there were several ancient authors called Sushrut who contributed to this text.[18]

Ancient qualification of a Nurse-

“That person alone is fit to nurse or to attend the bedside of a patient who is cool head and pleasant in his demeanor, does not speak ill of anybody, strong & attentive to the requirements of sick and strictly & indefatigably follows the instruction of the physician”

(Sushrut Samhita Book 1, Chapter 34, Translator: Bhisagratna)

Do we not still search these requirements in our paramedical staff which was described in our literature centuries back? Our knowledge of the contents of the Sushrut Samhita is based on additions of the text that were published during nineteenth & the early twentieth century. Sushrut Samhita in its exact form is divided into 186 Chapters & contains description of 1120 illness, 700 Medicinal plants, 64 preparation from mineral sources & 57 preparations based on animal sources.[19]

Sushrut, states Tipton, asserts that a physician should invest efforts to prevent disease as much as curative remedial procedures.[20] The text says an important means for prevention of disease is physical exercise & hygienic procedures.[20] Sushrut also says that excessive strenuous exercises can be injurious & make one more susceptible to disease, cautioning against such excesses.[10] Regular moderate exercise, suggest Sushrut, improves resistance to disease and physical decay.[20]

The text has been called a Hindu text by many Scholars.[21-23] The text discusses surgery with the same terminology found in more ancient Hindu Text.[24,25] mentioned Hindu Gods such as Brahma, Rudra, Indra & others in its chapters.[26,27] refers to the scripture of Hinduism namely the Vedas.[28,29]

The Sushrut Samhita & Charak Samhita have religious ideas throughout, states Estiven Engler who then concludes “Vedic element are too central to be discounted as marginal”.[30]

These ideas include treating cows as sacred, extensive use of terms & some metaphors that are pervasive in the Hindu Scriptures- the Vedas & inclusion of Karma, self (Atma) & Brahma (Metaphysical reality) along the line of those found in ancient Hindu text. However, adds Engler, the text also includes another layer of ideas where empirical rational ideas flourish in competition or cooperation with religious ideas.

Sushrut is reverentially held in Hindu tradition to be a decedent of Dhanvantri, the mythical god of Medicine,[31] or as one who received the knowledge from a discouse from Dhanvantri in Varanasi.[12]

"तत्र साध्या अपि याहस्त याग्योपेयाण दुर्शिकविक्षयतमता भवनि तथ्या आध्यात्मिय तुपयो रूप्या बाल भी हृद रासेकेक किवत दुबद्व वैद्य विद्या गोप्य दशिम करण कोध नाना— महाभाष्यतमादायचन च एव निरेष्ये विशिष्या सुधुने धर्मश्रुयामरसि प्रस्तावाति” (सुधुर सत्कार)

All of us having some experience in treating such class of patients have found that it is quite difficult to produce good results in these patients inspite of them be cured of illness. We will now do comparative analysis of what is said about dislocations and fractures in Sushrut Samhita & what we follow today.

A joint is dislocated when its articular surfaces are completely displaced, one from the other so that all contact is lost.

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Dislocation is only real emergency & require immediate closed reduction with intravenous analgesia & sedation or with general anaesthesia. Excessive force should not be used in closed reduction because of soft tissue or bone sometimes becomes interposed between the articular surfaces making closed reduction impossible.

Symptoms & signs for dislocation are

1. Pain - dislocations are very painful
2. Deformity - in most dislocation the limb attains a classic attitude like
   - Shoulder Dislocation – anterior – abduction
   - Elbow dislocation – posterior – flexion
   - Hip - posterior – flexion adduction & internal rotation
3. Swelling - it is obvious in dislocation of superficial joint, but may not be seen in a joint located deep.
4. Loss of movement - because of severe pain muscle spasm and loss of articulation
5. Shortening of Limb - occurs in most dislocation except in anterior dislocation of the hip lengthening occurs.
6. Telescopy – in this test it is possible to produce & abnormally to and fro moment in a dislocated joint. Damage to articular cartilage, joint capsule, ligaments & vascularity of bone is also evaluated. These complications usually are caused by the immense forces that caused dislocation. Sometimes neurovascular structure are injured & should be looked for & entry into patients chart should be made before reduction.

Skelton system injuries are as old as the evaluation of human beings. The accidental injuries are unavoidable incidents from the day of origin of mankind. Till modern days treating such traumatic conditions of Bone or articular cartilage is known as (BHAGNACHIKITSA) in Sushrut Samhita as there were no diagnostic aid available to them. The concept mention by Sushrut are based on experimental & result & not on clinical experience & observation

"As the articular surface is only displaced & retain some contact between them.

If one or more of the reinforcing ligament are torn permitting ligament or joint capsule (Atishipt). Usually the Capsule & joint surfaces are only partially displaced & retain some contact between them. (Triyakshipt). If we see about dislocation of shoulder joint then all the six classes described by Sushrut can be seen.

Dislocation is either anterior or posterior (Avikshipta). Dislocation cannot occur without damage to the protective ligament or joint capsule (Atishipt). Usually the Capsule & one or more of the reinforcing ligament are torn permitting the articular end of the bone to escape through the rent. Subluxation is when a joint, its articular surfaces are only interposed between the articular surfaces making closed reduction impossible.

Dislocation are only real emergency & require immediate closed reduction with intravenous analgesia & sedation or with general anaesthesia. Excessive force should not be used in closed reduction because of soft tissue or bone sometimes becomes interposed between the articular surfaces making closed reduction impossible.
1. कर्कटक – karkatak – depressed fracture
2. अपकर्कटक – ashvakarman – complete fracture
3. चुर्णता – Churnita – comminuted fracture
4. पिभित्तात – pichichita – compressed fracture
5. आरोपकपिवहलता – astichalita – periosteum avulsion fracture
6. कंडबण्डन – kandbhagn – complete compound fracture
7. मक्कीमुःनगत – majjanugat – impacted fracture
8. आश्लेषपीतात – atipatita – compound fracture bones out
9. वक्र – vakra – green stick fracture
10. चिन्हा. Chinna – incomplete fracture
11. पातिता – patita – Comminuted fracture
12. सुफ्तित – sfutit – fissured fracture

Sushrut also classified all skeletal injuries into two types
1. Swarna Bhagna - Open or Compound fracture
2. Avarna Bhagna - Closed or Simple fracture

The fact is understood by seeing the above classification that Sushrut with his clinical experience without the help of radiograph was able to described all types of fracture & even after more than 2000 years these hold good & there is no change in it.[13]

To summarize in the case of fracture the clinical features will be –
1. Marked swelling
2. Tenderness
3. Crepitations
4. Loss of limb function
5. Different type of pain
6. Inability to find comfort in any position

This indicates the perfection that Sushrut achieved in those days without ultra-modern amenities. One more point to note here is in his clinical features Sushrut has mentioned different types of pains where it indicates that Sushrut has gone further deep into the subject. He was aware that after trauma there will be vitiation of three humor of the body & probably he want to explain a different body constituent person will exhibit different type of pain.

Not only Sushrut describe in details the description of fracture but also warn that at certain places & in certain situations prognosis of disease will be bad. He said fracture of skull involving brain or a vertebral fracture involving spinal cord are difficult to treat. Again old, child & previously diseased person will have difficult time in getting healed.

“Declare the past diagnosed the present & fortell the future” (Hippocrates)

**Discussion**

First known surgery performed on human body was mentioned in Rigveda (Composed around 23720 BC) where a prosthetic leg was attached to a queen’s leg so that she could walk normal & even participate in war. Inspite of the absence of anaesthesia complex operations were performed. The practice of surgery has been recorded in India around 800 BC. This need not come as surprise because Surgery (Shashtarma- Hindi) is one of the eight branches of Ayurved the ancient Indian system of Medicine. Sushrut in Sushrut samhita describe in detail anatomy with the aid of dead body. Sushrut has described surgery under eight heads.

1. Chedya चेद्य – (excision)
2. Lekhya लेख्य - (scraping)
3. Vedhya वेध्य – (puncturing)
Sushrut has pointed out that the hemorrhage can be arrested by apposition of the cut edges with stiches, application of styptic decoctions, by cauterisation with chemicals or heat. The progress of surgery & its developments is closely associated with the great wars of the past is well known. The verana or injury says Sushrut, involves breakdown of body component & may have one or more following seats of occurrence, viz. Skin, flesh, sinews, bones, joints, internal organs of chest & abdomen & vital structures. It is in Sushrut words, the sixth stage of countinous process which starts with Sotha (inflammation). Sushrut says in the first stage the ulcer is unclean & hence called a Dusta – Varana. By proper management it becomes a clean wound a Suddha Varna. There is an attempt at healing and is called Ruhyamana Varna & when the Ulcer is completely healed it is a Ruddha Varna. Sushrut has advocated use of wine with incense of Canaabis for anesthesia. The eight types of surgical procedures–

1. Excision (ङ्खन) – is a procedure where by a part or whole of the limb is cut off from the patient.

2. Incision (वेदना) – is made to achieve effective drainage or exposure of underline structures to take the contents out from the patient.

3. Scraping (रेस्वा) - Scraping or scooping is carried out to remove a growth of flash of an ulcer or tartar of teeth.

4. Puncturing (वेदना) – the vein or hydrocele or ascatic fluid in the abdominal cavity are drained with a special instrument.

5. Exploration (रेस्वा) – the sinuses & cavities with foreign bodies are probed or explored for them. Establishing their size, site, number, shape, position etc.

6. Evacuation (व्यर्थना) - Bloodletting is to be carried out in skin disease, localized swelling abscess etc.

7. Suturing (स्मृत) in case of accidental injuries & in intentional incision the lips wound are opposed & united by stitching.

8. Incision (वेदना) - intentional cutting to explore underneath structures.

To obtain proficiency and accruing skill & speed in this type of surgical manipulations Sushrut has devised various experimental models & modules for trying each procedure. For example, incision & excision are to be practiced on vegetables & leather bags filled with mud of different densities. Scraping is practiced on hairy skin of animals, puncturing veins of dead animals & lotus stock. On subject of trauma Sushrut classified bone & their reaction to injuries. Varieties of dislocation of joints (सङ्ख्यातीतात्त्विक) & fracture of bones (काल्यामंत्र) are given systematically. He classify & gives details of six types of dislocation & twelve varieties of fracture. He gives principles of fracture treatment: - traction, manipulation, opposition, & stabilization. Sushrut has described entire Orthopaedics surgery including some major of rehabilitation in his work.

As war was major cause of injury the name “स्थिरत्व” for this branch of medical learning derived from “स्थिर” the arrow of the enemy which in fights use to be loosed in the body of the soldiers. He emphasized that removal of foragein bodies is fraught with certain complications if the seat of the पाट्य has to - भंगम (Vital Organ).

The definition of an ideal surgeon according to Sushrut is “a person who possesses courage and presence of mind, a hand free from perspiration, tremor less grip of sharp & good instruments & who carries his operation to the success & advantage of his patient who has entrusted his life to surgeon. The surgeon should respect this absolute surrender & treat his patient as his own son”. Sushrut has given the base of surgery & opened doors to develop the field. The Ayurvedic literature are preserved in the Sanskrit language & originally in form of manuscript written brich bark, palm leaves or paper. This literature should be explored which may further nourish the field of surgery & other branches of Medical sciences. “Life is short, art long, opportunity fleeting, experience treacherous, judgment difficult”. 

### Conclusion

After viewing literature we reached on conclusion that what Sushrut has said many many years ago still hold good. A basic stand point that one can postulate after study is that Sushrut’s work is not an elementary work on its chosen topic. The style of writing its cogency as well as compactness, the treatment of subject & the extensiveness of topic covered are all like those of major crafts man and not of an elementary plodder or a stray worker. He has succeeded in surviving till now so long because he succinctly in cooperated much that was found useful & worth commenting upon.[34]

His work infect is neat coming up, a compilation of great body of tested & settled knowledge on chosen field & rather specialized for an expert & practicing professional chir. It is not a general text by any means that proposes to cover the subject from a basic higher level gradually & logically. Much like our present day manual and scientific treaties “Sushrut Samhita” contains a glossary “ Tantra Yukti” name Adhyaya (Chapter) to explain technical terms used in the book there are thirty two of these Adhikaran. The Ayurvedic literature are preserved in the Sanskrit language & originally in form of manuscript written brich bark, palm leaves or paper. This literature should be explored which may further nourish the field of surgery & other branches of Medical sciences. “Life is short, art long, opportunity fleeting, experience treacherous, judgment difficult”.

No Single surgeon in the history of science has to his credit such masterly contribution in the term of basic classification, thoroughness of management of disease & perfect understanding of Ideas to be achieved. So our scientists and their literature was lost in time and they did not get the credit they deserve. “As to disease make a habit of two things – to help or at least, to do no harm”. (Hippocrates)
References

5. Valiathan 2007
7. Walton 1994, Page 586
8. Tipton 2008, Page 1553-1556
9. Hoernley 1907 Page 109-111
11. Tipton 2008 Page 1553-1556
12. Tipton 2008 Page 1553-1556
14. Hoernely 1907 Page – 7-8
15. Amresh Datta, Various, the encyclopaedia of Indian literature (Vol. 1A to D) Sahitya academy Page – 311
18. Kutumlibio 2005 Page 32-33
19. Meulenbeld 1999 Page 347-350 (Vol. 1 A)
20. Ray Priyadar Rajan Gupta, Hitendranath Rao, Mira (1980), Sushrut Samhita a scientific synopses, new Delhi INSA

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