

Anatomy of an Eye in Ancient Texts.

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Abstract

Sanskrit language not only provide us with the knowledge of Vedic System but it also holds an important role in the field of medicines and surgeries. Acharya *Caraka*, who is known for his contribution- *Caraka Samhita* and Acharya *Sushruta*, who is known for his contribution- *Sushruta Samhita* in the field of Ayurveda made wonderful effort towards treatment of diseases with natural therapies and surgeries.

1. Introduction:

Ayurveda is an eternal scripture, hence there is no mention of its non-existence: there is only instruction for expression through realization and preaching. Brahma also didn't create it – '**ब्रह्मा स्मृत्वायुषो वेदम्**'. Sushruta has also said that Ayurveda existed even before creation. Hence it is clear that Ayurveda is a parallel scripture to other Vedas. For this reason, no one clearly called it Upaveda. Eight aspects of Ayurveda have been described in Sushruta-

शल्य

शालाक्य

कायचिकित्सा

अगदतंत्र

भूतविद्या

कौमारभृत्य

रसायन

वाजिकरण

Objectives of the paper

'Sushruta Samhita' is the main text of Shalakyata-
tantra-

षट्सप्तति नेत्ररोगा दशाष्टादश कर्णजाः

एकत्रिंशत् घ्राणगताः शिरस्येकादशैव तु।

संहितायामभिहिताः सप्तषष्टिमुखामयाः

एतावन्तो यथास्थूलमुत्तमाङ्गताः गदाः

अस्मिच्छास्त्रे

निगदिताः

संख्यारूपचिकित्सितैः॥¹

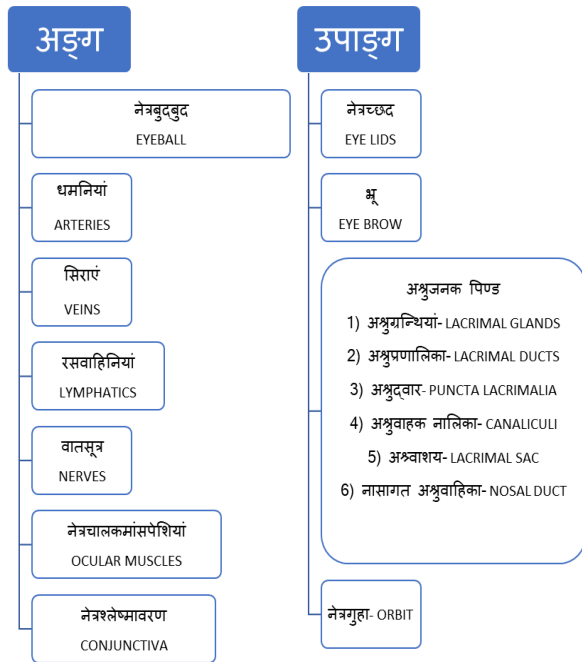
Which means, the system in which 76 eye diseases/disorders, 28 ear diseases, 31 nose diseases, 11 head diseases and 67 oral diseases are described along with their number, form and treatment is called *SHALAKYA TANTRA*.

This paper presents the anatomy of an eye as depicted in Sushruta Samhita

2. Methodology

2.1 Anatomy

In modern anatomy, the organs related to the eyes have been divided into two parts – a) Organs (also called अङ्ग) b) Appendages (also called उपाङ्ग)



2.11 Diameter of Eye

While describing the anatomy of an eye, Acharya Dalhan (डल्हण) also mentioned the diameter (both

vertical (अन्तःप्रवेशप्रमाण) and horizontal (उत्तरदक्षिणव्यास प्रमाण)) of eye in Sushruta Samhita.

द्वयङ्गुलबाहुल्यम् इदमंतः प्रवेशप्रमाणम्, द्वयङ्गुलमानमाह—
स्वाङ्गुष्ठोदरसम्मितम्—एतेनैतदुक्तं भवति
स्वाङ्गुष्ठोदरसम्मितम् यदङ्गुलं तदङ्गुलद्वयप्रमाणम्
नेत्रबुदबुदस्यान्तः प्रवेशम् विद्यात्।²

In this way, Dalhan has considered every person's own thumb as one finger and on the basis of such two fingers, the vertical diameter of the eyeball is considered to be 23.48 mm according to modern opinion.

According to him (डल्हण):-

1. अन्तःप्रवेशप्रमाण- Vertical diameter- 23.48 mm
2. अग्रपश्चिम व्यास या पूर्वपश्चिम व्यास प्रमाण- Anteroposterior or Sagittal diameter- 24.15 mm
3. उत्तरदक्षिणव्यास या अनुप्रस्थव्यास प्रमाण- Horizontal Diameter- 24.13 mm

The size of an eye is depicted in this shloka. Its size is called very much similar to the size of cow's breast.

विद्याद् द्वयङ्गुलबाहुल्यं
स्वाङ्गुष्ठोदरसम्मितम् ।
द्वयङ्गुलं सर्वतः सार्द्धं
भिषङ्गनयनबुदबुदम् ॥
सुवृत्तं गोस्तनाकारं सर्वभूतगुणोद्भवम्
॥³

Which means, according to the Vaidya (physician), eye ball (नेत्रबुद्बुद) has a diameter of two fingers at its centre (अन्तःप्रवेशप्रमाण), with powerful dimensions and expansion (length and width). In this way consider this eyeball to be well-rounded and shaped like a cow's breast and born from the ratio of the Earth and all the other elements (पंच महाभूत). Within the eye globe, distinct parts represent the Earth's (पृथ्वी) semilunar aspect, a red region reminiscent of blood due to fire (अग्नि), a black segment influenced by air (वायु), a white area representing tears originating from water (जल), and the genesis of tears from the expansive element known as sky (आकाश).

2.12 Parts of an eye ball-

(1) शुक्लमण्डल (Cornea) (2) नेत्रबाह्यपटल (Sclerotic coat or sclera) (3) तारामण्डल (Iris) (4) तन्तुसमूह (Ciliary body) (5) नेत्र मध्यपटल (Choroid) (6) नेत्रदर्पण या दृष्टिवितान (Retina) (7) पूर्वजलमयसखण्ड (Anterior chamber) (8) पश्चिमखण्ड (Posterior chamber) (9) दृष्टिमणिका (Crystalline lens) (10) दृष्टिमणि आवरण (Lens capsule) (11) काचरूपरससान्द्रजल (Vitreous humor) (12) दृष्टिनाडी (Optic nerve) (13) दर्शननाडी सिरा (Optic disc)

2.13 Structure of an eye

Aacharya Sushruta has divided the eye into three parts from the point of view of eye structure and treatment of diseases- Mandal (मण्डल)- Circles, Sandhi (सन्धि)-Junctions, Patal (पटल)- Layers or tunics

1. Mandal (मण्डल)- Pakshmamandal (eye lashes), vartmamandal(Eyelids), shvetmandal (Conjunctiva), krishnamandal (corneal circle), Drishtimandal (pupil and lens)

2. Sandhi (सन्धि)- There are 6 junctions described in Sushruta. They are-

पक्षमवर्त्मगत
वर्त्मशुक्लगत
शुक्लकृष्णगत
कृष्णदृष्टिगत
कनीनकगत
अपाङ्ग

3. Patal (पटल)- There are 6 tunics of an eye mentioned. According to Allopathy, there are 3 tunics- बाह्य, मध्य, अन्तः

2.14 Muscles of an Eye

There are 6 muscles of the eye as depicted in the text-

बाह्यस्था सरला (Lateral rectus)
अन्तःस्था सरला (Internal rectus)
ऊर्ध्वस्था सरला (Superior rectus)
अधःस्था सरला (Inferior rectus)
ऊर्ध्वस्था वक्रा (Superior oblique)
अधःस्था वक्रा (Inferior oblique)

2.15 Important terms mentioned in the text

Some other scientific terms mentioned in the text- सान्द्रद्रव- vitreous humor, सजल द्रव-Aqueous humor, कुर्वुरवृत्ति-choroid, दृष्टिवितान-retina, कनीनिकासंकोचक-sphincter pupillae muscle, कनीनिकाविस्फारक- Dilator pupillae muscle, सन्धानपेशिका- ciliary muscles.

FIGURES

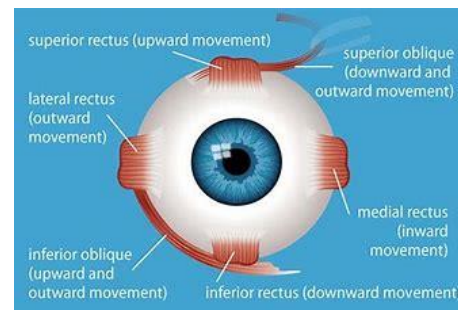


Figure1: muscles of the eye

<https://images.ctfassets.net/u4vv676b8z52/6tXU96vAj4npKNcKddUUw0/50331dff0814e0e70af11ed05dfe39b/eye-muscles-678x446.gif?fm=jpg&q=80>

Conclusion

In conclusion, the discussion on Ayurveda and its timeless existence as presented in the ancient texts, particularly the 'Sushruta Samhita,' reveals the profound nature of this holistic system of medicine. Ayurveda is depicted as an eternal scripture, existing even before creation, and its principles are meant for expression through realization and preaching.

The assertion that Brahma did not create Ayurveda but rather acknowledged its existence further underscores its transcendental nature. Ayurveda is positioned as a parallel scripture to other Vedas, with Sushruta emphasizing its presence before the inception of the universe. The eight aspects of Ayurveda enumerated by Sushruta reflect its comprehensive scope, encompassing various branches such as surgery, paediatrics, pharmacology, and more.

The focus then shifts to the specific exploration of the eye's anatomy in the 'Sushruta Samhita,' offering a detailed account that aligns with both traditional Ayurvedic knowledge and modern anatomical classifications. The methodology involves the examination of different parts of the eye, including the cornea, sclera, iris, retina, and others. The paper delves into the dimensions of the eye, as described by Aacharya Dalhan, providing measurements that correlate with modern anatomical understanding.

Additionally, the division of the eye into Mandal, Sandhi, and Patal, along with the identification of specific muscles and junctions, showcases the meticulous approach of Ayurvedic scholars in understanding and categorizing the complexities of the eye. The terminology used in 'Sushruta Samhita' corresponds with contemporary anatomical terms, illustrating a remarkable level of precision and insight.

In essence, this paper not only highlights the enduring nature of Ayurveda but also underscores its relevance and accuracy in describing the intricacies of human anatomy. The fusion of ancient wisdom and modern scientific understanding portrayed in the examination of the eye's anatomy serves as a testament to the timeless wisdom embedded in Ayurvedic texts. As we continue to unravel the depths of Ayurveda, it remains a source of inspiration for holistic well-being and a bridge between the ancient and the contemporary.

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