

# Naktandhye Kanaprayoga: A Unique Therapeutic Approach for Night Blindness

Dr. Prakruthi. G

HOD & Associate Professor, Department of Shalaky Tantra., Sri Paripoorna Sanathana Ayurveda Medical College, Hospital and Research Centre, Arjunabettahalli, Nelamangala, Bangalore rural-562123

## ABSTRACT:

*Naktandhya*, commonly referred to as night blindness, is a condition where an individual's ability to see in low-light environments is impaired. Rather than being a standalone disease, it is more accurately described as a symptomatic disturbance of vision. Ayurveda addresses this through *Kriyakalpas*, a group of local ocular therapeutic procedures known for their effectiveness in treating various eye ailments. One of the most intriguing and challenging aspects of ocular pharmacology is the penetration of drugs into the ocular media following topical administration.

*Anjana*, one of the seven *Kriyakalpas*, is meticulously detailed in Ayurvedic texts for its profound therapeutic utility. The prescribed dosage and drug formulation ensure high compliance and minimal waste, thereby maximizing tissue contact time and enhancing bioavailability through optimal absorption. *Acharyas* have elaborately discussed the significance of *Anjana Kriyakalpa* in expelling accumulated *doshas* by traversing the channels of the head, nose and face, specifically targeting those localized in the upper body. *Kanadi Anjana*, as explained by various *Acharyas*, plays a pivotal role in treating *Naktandhya*. This preparation, rich in vital vitamin supplements, enhances the function of retinal rods and corrects the associated pathological changes, thus restoring vision and improving night blindness.

**Keywords:** Kriyakalpas, Anjana, Naktandhya, Night blindness, Kanadi anjana.

## INTRODUCTION:

*Shalaky Tantra*, one of the eight branches of *Ayurveda*, meticulously addresses diseases and treatments related to the upper part of the body, specifically the eyes (*netra*), ears (*karna*), nose (*nasa*), oral cavity (*asya*) and throat (*kanta*), including surgical interventions (*shastra chikitsa*). Acharya Sushruta, a prominent figure in Ayurveda, has comprehensively detailed 76 eye diseases and their treatments, categorized by the affected areas (*gata*)<sup>1</sup>. For vision disorders (*drushtigata rogas*), Acharya Sushruta identified 12 specific conditions<sup>2</sup>, including *Shleshma Vidagdha Drushti*, *Hruswajadya*, *Ushnavidagdha Drushti* and *Nakulandhya*, which manifest night blindness (*naktandhya*) as a symptom. Acharya Vagbhata, another revered Ayurvedic scholar, recognized 27 eye diseases<sup>3</sup>, treating night blindness (*Ratrandhya*) as a distinct condition.

***Shleshma Vidagdha Drushti*:** This condition occurs when the *kapha dosha* accumulates in the *drushti* (vision) area, turning it white and causing the patient to perceive objects in a white hue. When the *doshas* affect all three layers (*patalas*), night vision is lost, but daylight improves vision as sunlight reduces *kapha*.<sup>4</sup>

**Hruswajadya:** Caused by the vitiation of *pitta dosha*, this condition impairs day vision, making objects appear smaller.<sup>5</sup>

**Ushnavidagdha Drushti:** Resulting from sudden immersion in cold water after sun exposure, this condition involves the vitiation of all three *doshas* and *rakta* (blood), producing heat (*ushma*). This heat rises and localizes in the eyes, causing severe burning, muddy discoloration of the sclera and conjunctiva and impairing both day and night vision.<sup>6</sup>

**Nakulandhya:** This condition involves the vitiation of *tridoshas* in the *drushti mandala*, causing the eyes to glitter like those of a mongoose. Objects appear in various colors during the day.<sup>7</sup>

**Ratrandhya/Doshandhya:** At night, scattered *doshas* obstruct vision, while daylight liquefies the *doshas*, temporarily restoring vision.<sup>8</sup>

**Chikitsa according to different authors:**

<b>Acharya Vagbhata</b>	
<i>Patoladi ghrita</i>	A.S.Ut-16/7-10
<i>Bhaskara churnanjana</i>	A.S.Ut-16/27-29
<i>Anjana</i> prepared from <i>purana guda, kasisa, pippali, katphala</i> soaked in <i>triphala kashaya</i> – dried and again soaked in juice of fresh cow dung.	A.S.Ut-16/78
<i>Anjana</i> prepared from <i>mardana</i> of <i>maricha</i> and <i>dadhi</i> .	A.S.Ut-16/79
<i>Varti</i> prepared from <i>karanja, utpala, swarna gairika</i> and <i>ambhoja kesara</i> macerated with juice of cow dung or <i>madhu</i> or juice of <i>jati</i> with two <i>haridra</i> and <i>rasanjana</i> or that prepared with goat's urine and <i>kaunti, krishna, srotoja</i> and <i>saindhava</i> or that prepared with juice of cow dung, two types of <i>haridra, pippali, kalanusari, talisapatra, yashtawya</i> and <i>nagara</i> .	A.S.Ut-16/80-82
<i>Kana</i> concealed inside the liver of a <i>go</i> of brown colour, or in the bile of the liver of an <i>iguana, rabbit, deer, ruru</i> and or <i>mayura</i> for half a month and then used as collyrium. The patient should eat the <i>pliha</i> and <i>yakrut</i> of a <i>mahisa</i> along with <i>taila</i> and <i>ghrita</i> . Tender leaves of <i>jivanti</i> fried in <i>ghrita</i> or that of <i>atimuktaka, eranda, sohala</i> and <i>abhiru</i> should be eaten.	A.S.Ut-16/83-86

<b>Acharya Sushruta</b>	
<i>Kaphahara chikitsa</i>	Su.Ut-17/4
<i>Nasya, seka, anjana, alepa, putapaka, tarpana</i> using <i>trivrit ghrita, tilwaka ghrita</i> and <i>purana ghrita</i> .	Su.Ut-17/5
<i>Anjanas:</i> 1. <i>Gairika, saindhava, krishna, godanta</i> 2. <i>Gomamsa, maricha, sirishabeeja, manashila</i> 3. Tender leaves of <i>kapittha</i> macerated with <i>madhu</i> 4. <i>Swayamgupta phala</i> macerated with <i>madhu</i> .	Su.Ut-17/6-7
<i>Kubjaka, ashoka, sala, amra, priyangu</i> , flower of <i>nalina</i> and <i>utpala, harenu, krishnava, pathya</i> and <i>amalaka</i> are powdered nicely mixed with <i>ghrita</i> and <i>madhu</i> and filled into a tube of <i>venu</i> and preserved.	Su.Ut-17/8-9
Flowers of <i>amra</i> and <i>jambu</i> and <i>harenu</i> – all three are macerated in the juice of their	Su.Ut-17/10

flowers itself and added with <i>madhu</i> and <i>ghrita</i> .	
<i>Nalina</i> , <i>utpala</i> , <i>kinjalaka</i> and juice of fresh cow dung are altogether macerated well to make an <i>anjana</i> .	Su.Ut-17/11
<i>Harenu</i> , <i>magadhajasthi majja</i> , <i>ela</i> , <i>akrit</i> macerated in <i>yakrit rasa</i> .	Su.Ut-17/23
<i>Godha yakrit</i> should be split and filled with <i>magadhika</i> and cooked on fire by <i>putapaka vidhi</i> , the liver thus cooked should be consumed and the <i>pippali</i> made as <i>anjana</i> – <i>nihanti naktandhyam asamshayam</i> - Cures night blindness undoubtedly. Similarly, <i>aja yakrit</i> filled with <i>pippali</i> and cooked on fire. Eat liver and use <i>pippali</i> as <i>anjana</i> .	Su.Ut-17/24-25
<i>Pleeha</i> and <i>yakrit</i> are pierced with an iron rod and cooked over flame these are consumed together with <i>ghrita</i> and <i>taila</i> and also made as <i>anjana</i> added with <i>sarshapa taila</i> .	Su.Ut-17/26
<i>Nadija</i> , <i>simbi</i> , <i>trikatu</i> , <i>anjana</i> , <i>manashila</i> , two types of <i>nisha</i> , <i>go yakrit</i> , <i>chandana</i> are cooked and consumed. Even cures <i>divandha</i> .	Su.Ut-17/27

Night blindness, which is the inability to see well in low light, is often the first sign of vitamin A deficiency. It serves as a reliable indicator of low serum retinol levels. In the eye, vitamin A (as retinal) combines with opsin to create rhodopsin, a light-sensitive pigment found in rod cells. A deficiency in vitamin A reduces rhodopsin levels and impairs rod function, leading to night blindness. In mild cases, night blindness may only be noticeable after exposure to bright light, which increases the demand for rhodopsin. Rod cells are responsible for vision in low light (scotopic vision), so any condition affecting these cells can cause night blindness. These conditions include vitamin A deficiency, retinitis pigmentosa, congenital high myopia, familial congenital night blindness and Oguchi's disease. Additionally, night blindness can occur due to issues in the eye's media, such as lens or corneal opacities, which interfere with light transmission in dim conditions. In severe cases of primary open-angle glaucoma, dark adaptation can be so delayed that patients report experiencing night blindness.

The term "xerophthalmia" describes a range of eye problems caused by a lack of vitamin A. These issues include night blindness and progressively worsening conditions affecting the cornea and conjunctiva, such as conjunctival dryness, Bitot spots, corneal dryness and corneal softening (keratomalacia). Xerophthalmia covers all eye-related symptoms of vitamin A deficiency, including structural changes in the eye and functional disorders of retinal rods and cones. It can result from insufficient dietary intake of vitamin A or poor absorption of the vitamin from the digestive system.

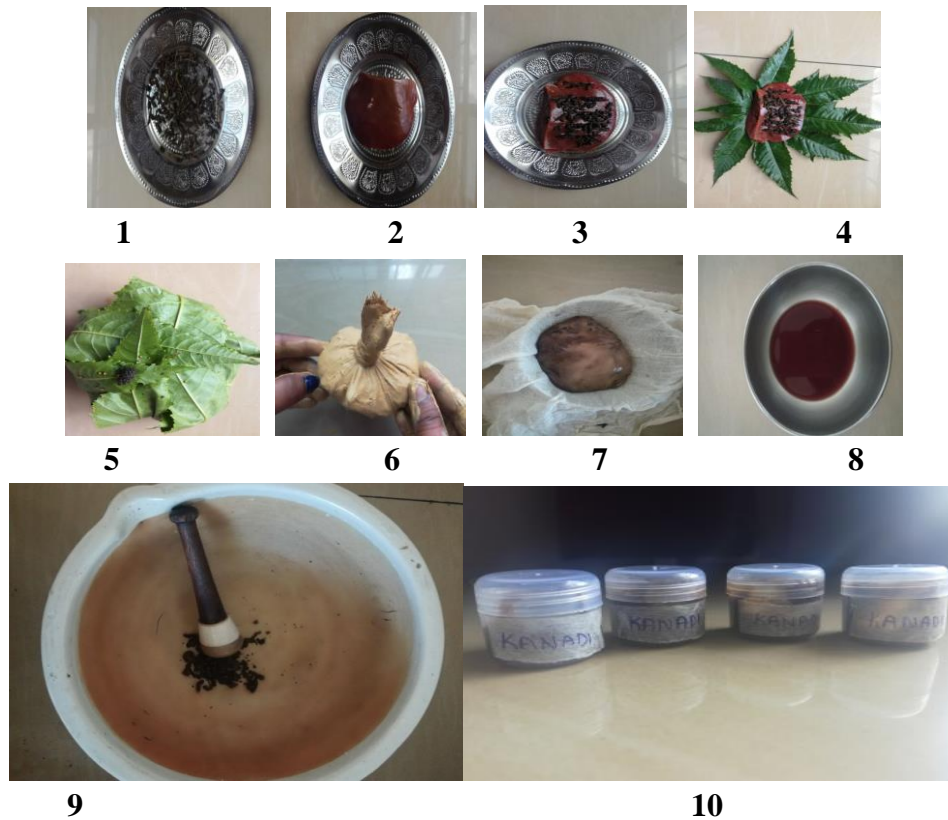
Vitamin A deficiency often occurs alongside protein-energy malnutrition (PEM) and infections. Chronic alcoholism and extreme diets can also trigger this deficiency. While xerophthalmia can affect people of any age, it is particularly common in preschool children, adolescents and pregnant women. Children are especially vulnerable due to their higher vitamin A needs for growth and their greater risk of intestinal infections that impair vitamin A absorption. The highest incidence of night blindness is typically seen in children aged 3 to 6 years.

Xerophthalmia causes up to 100,000 new cases of blindness each year and is the leading cause of childhood blindness. Around 2.8 million preschool children are at risk of blindness due to vitamin A deficiency (VAD) and the health and survival of 251 million others are seriously compromised.

Approximately 250 million preschool children, mainly in developing countries, are at risk of VAD due to poor diets, inadequate maternal education and poor hygiene. VAD is a significant public health issue in North India, leading to corneal opacity and childhood blindness.

Severe vitamin A deficiency can cause keratomalacia, a medical emergency that requires immediate treatment to reduce child mortality. Treatment includes oral or intramuscular vitamin A, multivitamin supplements and dietary sources of vitamin A. Local treatment involves intense eye lubrication and topical retinoic acid, which can promote healing but is not sufficient without systemic vitamin A supplements.<sup>9,10,11,12</sup>

### PREPARATION OF *KANADI PUTAPAKA*:



#### Steps in preparing *Kanadi anjana*:

- Collect cleaned and dried *Kanas*.
- Obtain washed and cleaned *Aja yakrut*.
- Insert the *kanas* into the liver as thoroughly as possible.
- Place the prepared *Aja yakrut* with *Kanas* in an *Eranda patra*.
- Completely wrap the *Eranda patra* around the *Aja yakrut*.
- Encase the bundle in a coarse cloth and smear it with multani mitti.
- Bake the wrapped preparation using an *Angara koshti yantra* and then carefully extract the contents.
- Extract the *swarasa* from the bolus.
- Remove the *Kanas* and macerate them with the extracted *swarasa*.
- Finally, prepare the *Kanadi Anjana*.<sup>13</sup>

**KANA** –

*Rasa: Katu rasa.*

*Guna: Snigdha.*

*Veerya: Anushna.*

*Vipaka: Madhura vipaka.*

*Karma: Vata – Shleshmahara*

*Rechani, Dipana, rasayana karma.*

Chemical constituents: Mono and sesquiterpenes, caryophyllene, piperine, pipartin, piperlongumin, piperpiperundecalidine, beta sitosterol.<sup>14</sup>

#### **AJA MAMSA –**

*Brimhana, Deepana, Bala vardhana, Na ati sheeta, Guru, Anabhishtandhi, Tidoshahara.*<sup>15</sup>

It is a rich source of Vitamin A, which has a vital role in treating night blindness.

#### **DISCUSSION:**

*Shalaky Tantra's* extensive approach to ocular health highlights the intricate relationships between *doshas* and vision, offering comprehensive treatments for various eye conditions.

*Kriyakalpa* is a cornerstone of *bahirparimarjana chikitsa* (external purification treatment) in *Shalaky Tantra*, the branch of *Ayurveda* that deals with diseases above the clavicle. *Kriyakalpas* are the procedures which essential therapeutic techniques for managing eye disorders. The term "*Kriyakalpa*" originates from two Sanskrit words: "*kriya*," meaning a special therapeutic procedure and "*kalpa*," denoting formulations. These procedures are carefully modified to suit the physiological and pathological conditions of the eyes, making them highly effective in treating a range of ocular ailments. The procedures employ specific formulations to treat various eye diseases effectively.

One of the key procedures within *Kriyakalpas* is *Anjana*, which involves the application of medicinal pastes or powders to the inner side of the lower eyelid. This is done either with a fingertip or an applicator known as *Anjana Shalaka*. The procedure is indicated when the *doshas* (imbalances) are fully manifested and localized in the eye. The term "*Anjana*" is derived from the root "*Anakti Anena Anjanam*," meaning "that which spreads in the eye." The *Anjana Shalaka*, filled with the medicinal preparation, is held in the right hand and applied from the inner to outer side or vice versa, while the left hand is used to stretch the eyelid. If the medicine is intended only for the eyelids, it is applied using fingertips.

The action of *Anjana* is comprehensive, the medicine administered by its power makes the *doshas* to flow out from veins and cavities of the *vartma*, *shringataka*, face, mouth, nose and eyes and thereby effectively eliminating impurities localized in the upper part of the body. This holistic approach underscores the importance of traditional *Ayurvedic* practices in maintaining ocular health and treating eye disorders.<sup>16</sup>

*Kana*, a *katu rasa* (pungent-tasting) dominant substance, plays a vital role in these treatments. *Katu rasa* facilitates *netra virechana* (cleansing of the eyes), helping to remove accumulated *doshas*.<sup>17</sup> Additionally, *Kana's* free radical scavenging properties prevent lipid peroxidation, thereby providing excellent immunomodulatory benefits. *Aja yakrut* (goat liver), known for its nourishing properties (*balya* and *anabhishtandi*), supports the health of *chakshurendriya* (visual sense organ) and is a rich source of vitamin A, essential for preventing photoreceptor degeneration. *Kana Prayoga* is a notable treatment that acts both locally and systemically to address night blindness.



Historical references, such as those by Aulus Cornelius Celsus around 30 AD, highlight the effectiveness of dietary supplements like liver, a rich source of vitamin A, in treating night blindness. Celsus noted that people suffering from this condition should anoint their eyes with the liquid dripping from a roasting liver, preferably from a he-goat, and consume the liver itself to improve their vision.<sup>18</sup>

*Anjana Karma* has a profound pharmacological impact, even in treating posterior segmental disorders by crossing the ocular barriers. Nutritional health education should be integrated into the school curriculum, alongside efforts to strengthen strategies for preventing and controlling vitamin A deficiency.

## CONCLUSION:

Vision impairment significantly affects the quality of life in adult populations, leading to lower employment rates and higher incidences of depression and anxiety. Approximately 80% of perceptive knowledge is acquired through the *chakshurendriya* (visual sense), making vision crucial for discerning and interacting with the world. Impairments in vision thus severely restrict an individual's ability to navigate their environment and make informed decisions. Therefore, restoring and maintaining the function of *chakshurendriya* is of utmost importance.

*Kanadi Anjana* is a potent Ayurvedic preparation that addresses this need. It utilizes *aja yakrit*, which is rich in vitamin A, essential for treating many retinal diseases. The medicinal compounds in *Anjana* are uniquely capable of crossing the blood-aqueous, blood-vitreous, and blood-retinal barriers, allowing them to effectively target and treat disorders in the posterior segment of the eye. This capability enhances the therapeutic potential of *Anjana*, making it a vital treatment option for preserving and restoring vision, thereby improving the overall quality of life for those affected by vision impairment.

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