ISSN 2456-3110
Vol 8 · Issue 6
June 2023

JAiMS
INTERNATIONAL

Journal of Ayurveda and Integrated Medical Sciences

www.jaims.in

JAIMS

An International Journal for Researches in Ayurveda and Allied Sciences

Maharshi Charaka
Ayurveda

Indexed

Journal of
Ayurveda and Integrated Medical Sciences
ISSN 2456-3110
CASE REPORT June 2023

Ayurvedic management of Keratoconus - A Case Report

Anuj Kumar Singh[1], Veena Shekar[2]

[1]*Post Graduate Scholar, Department of PG Studies in Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College Hospital and Research Centre Bengaluru, Karnataka, India.*

[2]*Professor, Department of PG Studies in Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College Hospital and Research Centre Bengaluru, Karnataka, India.*

ABSTRACT

This study reports a case of 37 years old female who had presented with the complaints of blurred vision in left eye for distant objects and also frequent headache and photophobia on exposure to bright light with heaviness in both of the eyes. The subject approached us with the reports of already performed corneal topography where corneal ectasia could be appreciated in both the eyes. The subject was already diagnosed as Keratoconus at previous hospital where she had consulted before. *Ayurvedic* treatment was initiated with *Basti, Nasya*, local ocular therapeutics which included *Pindi, Bidalaka, Netra Prakshalana* and *Tarpana*. The subject reported reduction in symptoms within 3 months of the treatment. It was observed that there was no progression of the disease from the findings of corneal topography which was repeated after the treatment within 3 months of initial visit.

Key words: *Keratoconus, Basti, Nasya, Pindi, Bidalaka, Netra Prakshalana, Tarpana*

INTRODUCTION

Keratoconus (KCN) is a progressive non-inflammatory bilateral corneal ectatic disorder. It manifests with characteristic cone-like steepening of the cornea associated with irregular stromal thinning, resulting in a cone-like protrusion and significant loss of vision.[1] Approximately 50% of normal fellow eyes will progress to KC within 16 years.[2] However, it can also occur secondarily following trauma, in which case it is unilateral, or in patients with vernal keratoconjunctivitis or Down syndrome due to repeated rubbing of the eye.[3] Prevalence of keratoconus being 2300 per 100,000 in central India.

Address for correspondence:
Dr. Anuj Kumar Singh
Post Graduate Scholar, Department of PG Studies in Shalakya Tantra, Sri Kalabyraveshwara Swamy Ayurvedic Medical College Hospital and Research Centre Bengaluru, Karnataka, India.
E-mail: anujsngh537@gmail.com

Submission Date: 12/04/2023 Accepted Date: 22/05/2023

Access this article online

Quick Response Code

Website: www.jaims.in

DOI: 10.21760/jaims.8.6.44

It is diagnosed by clinical examination and corneal topographic techniques.[4] The basic pathological features seen in keratoconus are increased activity of proteases leading to increased breakdown of the collagen cross-linking leading to progressive thinning of cornea.[5] The majority of the studies agree that in KC the stromal collagen content is decreased.[6] Gradually progressive diminution of vision because of myopic astigmatism is the most common symptom. Protrusion of the lower lid margin (Munson's sign), steepening of the cornea, Fleischer's ring, Vogt's striae, scissoring of retinoscopy reflex, distortion of the mires of the Placido's disk, irregular astigmatism on keratometry and oil droplet reflex shown by distant ophthalmoscopy are the signs observed. If the progression of Keratoconus is not treated, it might lead to complication like corneal hydrops, corneal perforation and scarring.[7] The available options for the management of KC are highly dependent on the stage of the disease and its progression. If the disease is stabilized (no progression), the emphasis is given in correcting the vision. If the disease is progressing, the emphasis is to slow (arrest) the procession.[8] The various management options include spectacles, contact lenses, corneal collagen cross-linking (CXL)with riboflavin, intacs, penetrating keratoplasty, and deep

ISSN: 2456-3110 CASE REPORT June 2023

anterior lamellar keratoplasty.[9] Keratoconus can be compared with *Vataja Prathama Patalgata Timira,* a *Drishtigata Netra Roga* (diseases of vision) in *Ayurveda* characterised by blurred and distorted vision.[10] The classical management of *Timira* includes *Snehapana, Raktamokshana, Virechana, Nasya, Anjana, Shirobasti, Basti, Tarpana, Lepa* and *Seka*.[11]

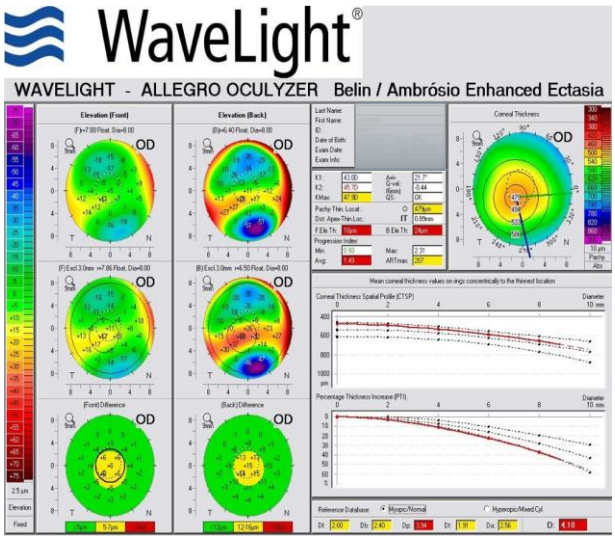
Here in, we report a case of keratoconus which was effectively managed with *Ayurvedic* treatment. Informed consent was taken from the patient for publication of the case and clinical details.

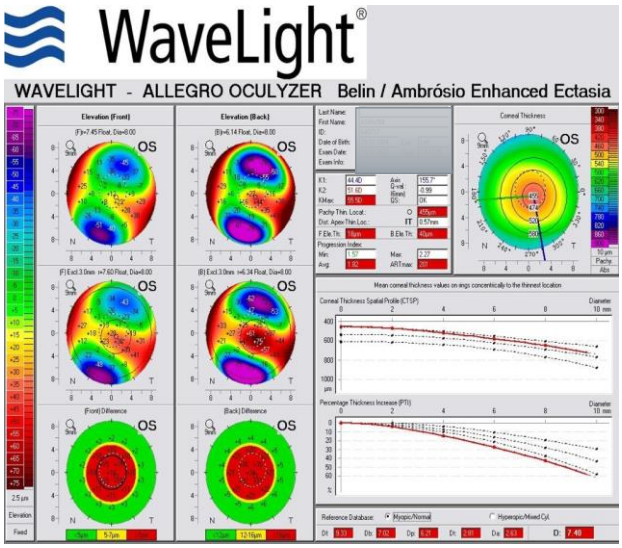
Case Report

A female patient aged 37 years approached *Shalakya Tantra* OPD of Sri Kalabyraveshwara Swamy Ayurvedic Medical College Hospital with the complaints of blurred vision in left eye for distant objects and also frequent headache and photophobia on exposure to bright light with heaviness in both of the eyes since 3 years. She had attended a general family health checkup in Florida 3 years before initial visit where she was referred to Ophthalmologist for her ocular complaints. The ophthalmologist had diagnosed it as Keratoconus of left eye and had advised surgery, the details of which were not known to her at the time of taking history. Patient had denied surgery as she did not want to undergo the same. Later, after returning back to India she did not approach anywhere as she had conceived and also due to restrictions imposed during the covid pandemic. After a gap of almost a year she consulted an eye specialist in a hospital in Bengaluru where corneal topography was performed which was suggestive of Keratoconus of both eyes. She was suggested to wear contact lenses, but, did not agree as she was comfortable wearing glasses. After a few days, she developed heaviness of both eyes and headache after wearing glasses and hence approached *Shalakya Tantra* OPD of our hospital for further management. Her past medical and family histories were insignificant. Her unaided visual acuity in left eye was 6/12 whereas it was found to be 6/6 (p) in right eye. Both the eyes revealed Munson's sign on down gaze which was more obvious in left eye. Though not erythematous, few papillae could be observed on palpebral conjunctiva of both the eyes. Both the corneas were clear and showed ectasia which was steeper on left side. Pupils were round and reactive to light. Direct ophthalmoscopy showed 'oil droplet' reflex in both the eyes.

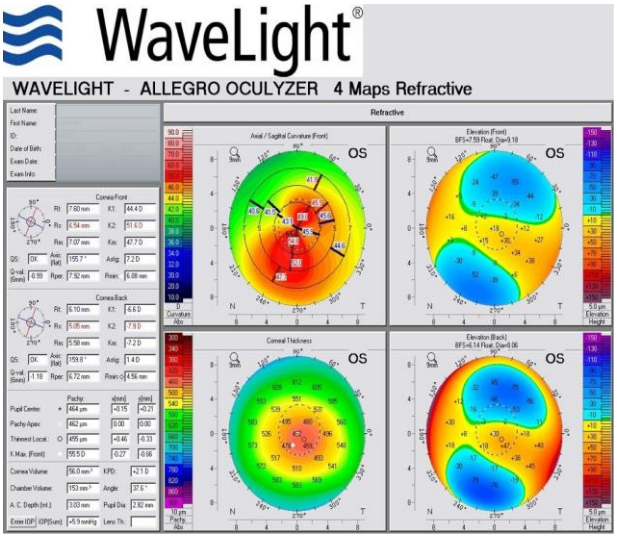
Retinoscopy examination revealed scissoring reflex in both the eyes. Fundoscopic findings were unremarkable. IOP was found to be 12 mm of Hg and 19 mm of Hg in right and left eye respectively. Right eye was diagnosed to have stage 1 and left eye with stage 2 Keratoconus based on modified Krumeich classification. The aim of treatment was to prevent further progression of thinning and ectasia of cornea.

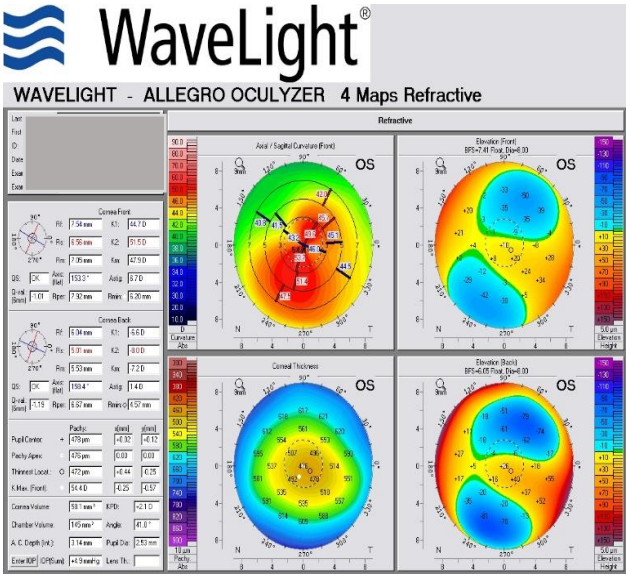
Before Treatment

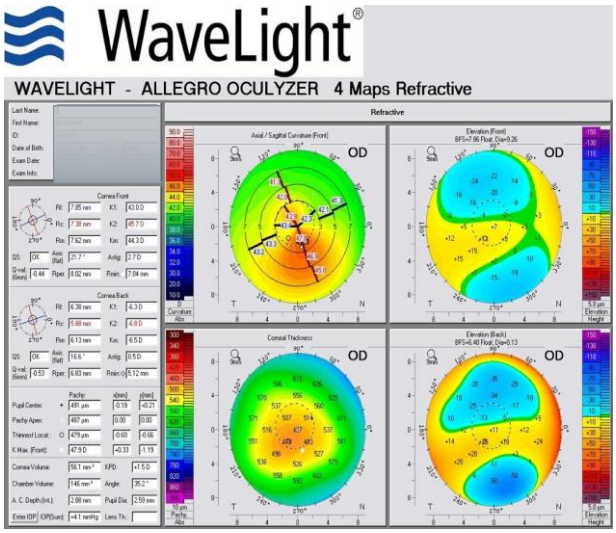


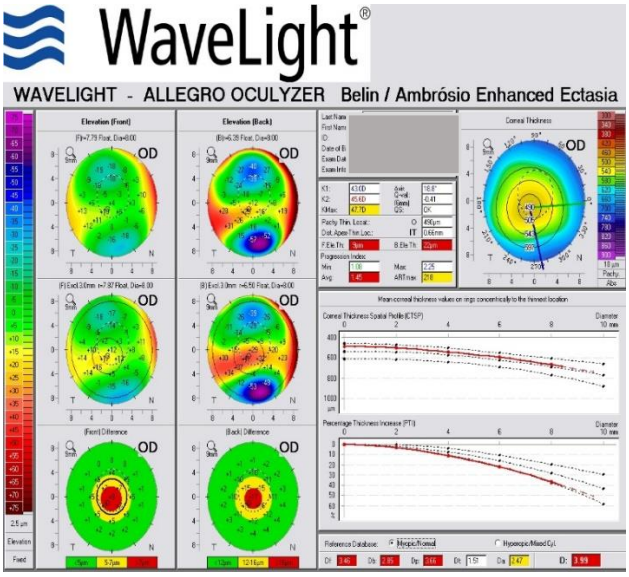


ISSN: 2456-3110 CASE REPORT June 2023

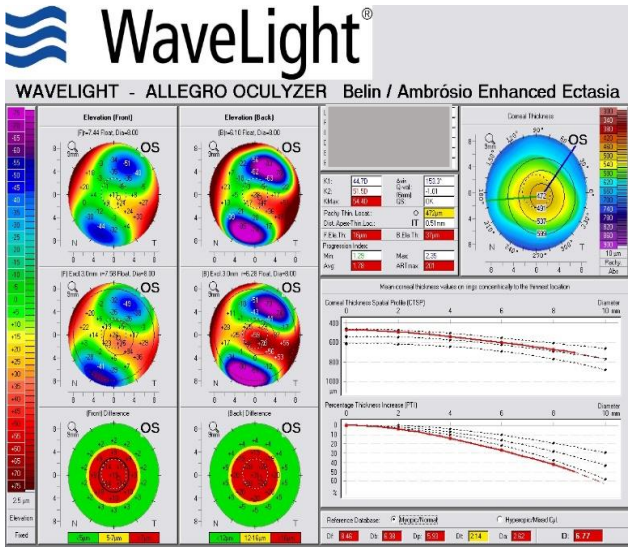


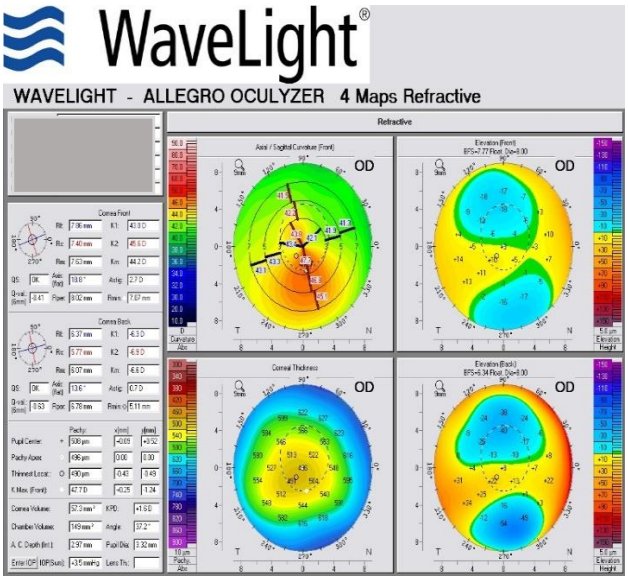






After Treatment





ISSN: 2456-3110 CASE REPORT June 2023

The treatment protocol followed was as follows-

Mode of Treatment	Treatment	Dosage	Duration
Shodhana **(purificatory procedure)**	▪ *Avipattikara Churna* ▪ *Basti* (medicated enema) ○ *Sthiradi Niruha Basti* (6 days) ○ *Anuvasana Basti* (10 days) a) *Jivantyadi Ghrita* b) *Yasthtimadhu Taila* ▪ ***Nasya*** with *Shadbindu Taila*	1 tsp in morning and evening with warm water before food 40 ml 40 ml 8 drops in each Nostril	7 days 16 days 7 days
Kriyakalpa **(Topical ocular therapeutics)**	▪ *Netraprakshalana* (*eyewash*) with *Triphala* (*Combination* of *Emblica officinalis, Terminalia bellerica and Terminalia chebula*) *Kashaya* ▪ *Bidalaka* (medicated paste applied over eyelids devoid of eyelashes) with *Triphala* + *Yashtimadhu (Glycyrrhiza glabra)* + *Lodhra (Symplocos racemosa) Churna* ▪ *Pindi* (medicated paste enclosed in a fabric applied over eyelids) with *Shigru* (Moringa oleifera) and *Amalaki* (Emblica officinalis) ▪ *Tarpana* (Retention of medicated ghee over eyes) with *Jivantyadi Ghrita* ▪ *Drishti Pradavarti Drops* (Anjana modified into drops)	Once a day 2 drops in each eye, twice a day	3 months 14 days 14 days 7 days 3 months

Initially patient was treated with *Basti (Sthiradi Niruha Basti)* for 16 days (*Kala Basti*) after *Pachana-Deepana* with *Avipattikara Churna* for 7 days, simultaneously she was advised to undergo *Netraprakshalana, Pindi* and *Bidalaka* during the course of which she felt reduced discomfort and heaviness of the eyes and photophobia. She also felt reduced frequency and intensity of headache. After *Basti,* 1 month of gap was given for next course of treatment i.e., *Nasya* during the period of which she was advised to continue *Netraprakshalana* and internal medications. After a gap of 7 days, after completion of *Nasya*, *Tarpana* was administered following which patient felt lightness of eyes and reduced blurred vision. The total duration of the treatment was restricted to 3 months. The patient was asked to come for follow up one month after the treatment. At follow up, her unaided visual acuity remained same i.e., 6/6 p in either eye and BCVA was 6/6 in right eye and 6/6 p in left eye. CT repeated after 1 month of the treatment remained stable with a slight reduction in K max or maximum corneal curvature in left eye which was reduced by 0.6 D. There was also a very slight increase in thickness of cornea by 0.009 µm in right eye and 0.014 µm in left eye at apex and thinnest corneal thickness (thinnest local) increased by 0.011 µm in right eye and 0.017 µm in left eye. Astigmatism was reduced by 0.5 D in left eye.

Overall Observation

Corneal Topography Findings	Before Treatment		After Treatment	
	OD	OS	OD	OS
Kmax	47.9 D	55 D	47.7 D	54.4 D
Kmean	44.3 D	47.7 D	44.2 D	47.9 D

ISSN: 2456-3110 CASE REPORT June 2023

Pachy (apex)	487 µm	462 µm	496 µm	476 µm
Thinnest local	479 µm	455 µm	490 µm	472 µm
Astigmatism (Cornea front)	2.7 D	7.2 D	2.7 D	6.7 D

Visual Acuity	**Before Treatment**			**After Treatment**	
	DV		**NV**	**DV**	**NV**
(Unaided)	**RE**	6/6 (p)	N-6	6/6 p	N-6
	LE	6/12	N12(p)	6/6 (p)	N-8 (p)
BCVA	**RE**	6/6		6/6	
	LE	6/9		6/6 (p)	

DISCUSSION

Keratoconus is frequently associated with repeated eye rubbing which was observed in this case also, which may be due to allergic eye disease as papillae were evident on examination of anterior segment. Repeated eye rubbing leads to progressive thinning of the central cornea. The most advanced methods for management of keratoconus includes collagen cross linking (CXL), which is a technique of strengthening the corneal tissue by using riboflavin and ultraviolet - A light to halt the progression of progressive keratoconus. In CXL, riboflavin act as a photosensitizing agent, and UVA improves the formation of intra and interfibrillar covalent bonds by oxidative photosensitization.[12]

The symptoms of KC are similar to those observed in *Timira* of first *Patala* caused by vitiated *Vata* which gives rise to hazy and distorted vision. In this study, *Basti* was selected as it does *Shodhana* and is also *Vatahara* and nourishing in nature. *Sthiradi Niruha Basti* was chosen as the chief line of treatment as it is said to provide strength to eyes (*Chakshurbalam).*[13] *Basti* is said to remove all the vitiated *Doshas* from head to toe by the virtue of its *Veerya.*[14] It is reported that inferior and middle rectal vein which drain the lower part of the rectum, drain directly into inferior vena cava therefore, directly into the systemic circulation. The rectum is extensively drained by lymphatic system which may contribute to the systemic absorption of highly lipophillic drugs. Most of the therapies and internal medication adopted here include *Amalaki* and *Triphala* as chief ingredients which contain vitamin C and it is reported that vitamin C plays a key role in collagen synthesis[15] and strengthens the cornea by decreasing the distance between collagen fibrils by enhancing crosslinking in vitro[16]. It is also reported that increased levels of oxidative stress markers and the decreased antioxidant capacity and antioxidant defences in keratoconus corneas indicate that oxidative stress may be involved in the development of this pathology.[17] Phenolic acids, flavonoids and tannins present in *Triphala* possess anti-oxidant activity and also drugs like *Moringa oleifera, Symplocos racemosa* and *Glycyrrhiza glabra* possess antioxidant activity. The leaves of *M. oleifera* are rich in minerals like calcium, potassium, zinc, magnesium, iron and copper, beta-carotene, vitamin B such as folic acid, pyridoxine and nicotinic acid and vitamin C.[18] *Amalaki* [19] and *Shigru* are also enriched with riboflavin which is required for collagen cross linking.[20] In *Pindi* and *Bidalaka* drugs are delivered transdermally as eye lid has thinner stratum corneum and bioavailability of the drug is enhanced as the contact time is increased.[21] *Nasya* was performed with *Shadbindu Taila* for a period of seven days as it is said to provide strength to ocular tissues and improve vision.[22] *Tarpana* was advised in this case as it is said to be the best procedure to nourish the eye. Being amphipathic, the active principles of *Ghrita* readily penetrate the cornea. In KC, it is said that the primary insult is an epithelial abnormality, resulting in the release of proteolytic enzymes that degrades stromal collagen and weaken the cornea.[23] Vitamin A present in *Ghrita* helps to maintain the integrity of corneal epithelium and hence epithelial abnormality can be prevented. *Aschyotana* with *Drishtiprada Varti*[24] was adopted as it is indicated in *Timira* and has *Tridosha Shamaka, Ropana* and *Snehana* properties. The compound drug

ISSN: 2456-3110 CASE REPORT June 2023

pacifies vitiated *Doshas,* clears *Sanga* (obstruction of channels) and restores nutritional supply to *Dhatus* of *Drishti Patala*. The drug contains vitamin C and minerals like Cu, Fe and Zn required for collagen synthesis. Cu, Fe, Zn, and Se are the co-factors of enzymes involved in collagen synthesis, cross-linking, or antioxidant activity. Therefore, the drug has a strengthening effect on the cornea.[25] Thus, it can be understood that the drugs used here for the management of Keratoconus were effective in breaking the pathogenesis of the disease thereby restricting the progression of the disease.

CONCLUSION

Keratoconus is a progressive disease and its progression should be restricted to prevent complications arising out of it. The results were encouraging as there was improvement in visual acuity with reduction in symptoms and there was no progression of the disease which was confirmed by topographic profile repeated after treatment, which remained stable and also showed slight improvement in corneal thickness and curvature. Thus, it can be concluded that drugs employed in treatment could promote the integrity of epithelium, increase collagen synthesis, help in collagen cross linking and remodelling of collagen fibres thereby strengthening the cornea. Hence this simple and non-invasive treatment protocol can be adopted in future in the successful management of KC.

REFERENCES

1. Asimellis G, Kaufman EJ. Keratoconus. 2023 Mar 24. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 29262160.
2. Brad bowling. Kanski's clinical ophthalmology- a systemic approach, eighth edition. Elsevier 2016. Chapter-6. Page no. 213.
3. Ramanjit Sihota, Radhika Tandon, Parson's diseases of the eye. 22nd edition. Elsevier 2015. Chapter-15, page no.216.
4. Sudhakar T. Biradar, Dr. Ankitha C. S., Dr. Syed Munawar Pasha. An Ayurvedic insight to Keratoconus - A Case Report. J Ayurveda Integr Med Sci 2020;4:412-416.
5. Dadapeer K. Essentials of ophthalmology. First edition. Jaypee Brothers Medical Publishers (p) Ltd. 2015 Chapter- 5.4 Page no.217.
6. Davidson AE, Hayes S, Hardcastle AJ, Tuft SJ. The pathogenesis of keratoconus. Eye (Lond). 2014 Feb;28(2):189-95. doi: 10.1038/eye.2013.278. Epub 2013 Dec 20. PMID: 24357835; PMCID: PMC3930280.
7. Dadapeer K. Essentials of ophthalmology. First edition. Jaypee Brothers Medical Publishers (p) Ltd. 2015 Chapter- 5.4 Page no.217-219.
8. Asimellis G, Kaufman EJ. Keratoconus. 2023 Mar 24. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 29262160.
9. Vohra V, Tuteja S, Gurnani B, et al. Collagen Cross Linking for Keratoconus. [Updated 2023 Mar 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK562271/
10. Sushruta, Sushruta Samhita, Nibandha Samgraha Commentary of Sri Dalhanacharya and NyayaChandrika Panjika on Nidanasthana Commentary of Sri Gayadasacharya, by; Vaidya Yadavji Trikramji Acharya, Choukambha Surabharati Prakashan, Varanasi, edition-2017, Uttara tantra , chapter 7, verse-18, Pp-824, pg 607.
11. Vagbhata, Astanga Hrudaya, Sarvanga Sundara Commentary of Arunadatta and Ayurveda Rasayana Commentary of Hemadri, edited by Bhishagacharya Harisastri Paradkara Vaidya, Choukhambha Orientalia, Varanasi, reprint-2014, Uttara tantra, chapter13, verse 47 Pp:956 , pg:822.
12. Vohra V, Tuteja S, Gurnani B, et al. Collagen Cross Linking for Keratoconus. [Updated 2023 Mar 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK562271/
13. Agnivesha, Charaka,Drudabala,Chakrapani duta, Revised by Charaka and Drdhabala, Ayurveda Dipika Commentry of Chakrapani Datta, Edited by Vaidya Jadavji Trikamji Acharya, Chaukhambha Orientalia, Varanasi, reprint- 2015, Siddhi sthana, Chapter- 3, verse 36, pp:738, pg:695.
14. Susrutha: Susrutha samhitha with Nibandha samgraha commentary by Dalhanaacharya, Chaukambha Orientalia, Varanasi, Reprint 2014, Chikitsa Sthana, Chapter 35, Verse 27, pp: 824, pg:527.
15. Boyera N, Galey I, Bernard BA. Effect of vitamin C and its derivatives on collagen synthesis and cross-linking by normal human fibroblasts. Int J Cosmet Sci. 1998 Jun;20(3):151-8. doi: 10.1046/j.1467-2494.1998.171747.x. PMID: 18505499.
16. Lasagni Vitar RM, Bonelli F, Rama P, Ferrari G. Nutritional and Metabolic Imbalance in Keratoconus. Nutrients. 2022 Feb 21;14(4):913. doi: 10.3390/nu14040913. PMID: 35215563; PMCID: PMC8876314.
17. Emma Arnal, Cristina Peris-Martínez, Jose Luis Menezo, Siv Johnsen-Soriano, Francisco Javier Romero; Oxidative Stress in

ISSN: 2456-3110 **CASE REPORT** June 2023

Keratoconus?. *Invest. Ophthalmol. Vis. Sci.* 2011;52(12):8592-8597. doi: https://doi.org/10.1167/iovs.11-7732.

18. Lakshmipriya Gopalakrishnan, Kruthi Doriya, Devarai Santhosh Kumar,Moringa oleifera: A review on nutritive importance and its medicinal application,Food Science and Human Wellness,Volume 5, Issue 2,2016,Pages 49-56,ISSN 2213-4530,https://doi.org/10.1016/j.fshw.2016.04.001.
19. Pal, Santosh & Aku, Ramamurthy & Mahajon, Bidhan. (2016). Medicinal Uses of Amalaki (Indian Gooseberry): A Historical Review. 5. 536-548.
20. Thurber MD, Fahey JW. Adoption of Moringa oleifera to combat under-nutrition viewed through the lens of the "Diffusion of innovations" theory. Ecol Food Nutr. 2009 May-Jun;48(3):212-25. doi: 10.1080/03670240902794598. PMID: 20161339; PMCID: PMC2679503.
21. Veena S, Sujathamma K, Hamsaveni V. Management of Disciform keratitis with Ayurvedic ocular therapeutics: A case report. J Clin Ophthalmol 2020;4(1):196-200.
22. Kaviraj Govinda Das Sen, Bhaishajya ratnavali, edited with 'Siddhiprada' Hindi commentary, edited by Prof. Siddhi Nandan Mishra, Chaukhambha Subharati Prakashan Varanasi, reprint- 2015, Shirorogaadhikara, Verse 78, pp:1196, pg: 1020.
23. Davidson AE, Hayes S, Hardcastle AJ, Tuft SJ. The pathogenesis of keratoconus. Eye (Lond). 2014 Feb;28(2):189-95. doi: 10.1038/eye.2013.278. Epub 2013 Dec 20. PMID: 24357835; PMCID: PMC3930280.
24. Kaviraj Govinda Das Sen, Bhaishajya ratnavali, edited with 'Siddhiprada' Hindi commentary, edited by Prof. Siddhi Nandan Mishra, Chaukhambha Subharati Prakashan Varanasi, reprint- 2015, Netrarogaadhikara, Verse 122, pp:995, pg: 1020.
25. Veena Shekar, Hamsaveni V, Sujatamma K. Myopia management with Ayurvedic ocular therapeutics: A Clinical Study. Int. J. Res. Ayurveda Pharm. 2022;13(6):23-27 http://dx.doi.org/10.7897/2277-4343.1306151.

How to cite this article: Anuj Kumar Singh, Veena Shekar. Ayurvedic management of Keratoconus - A Case Report. J Ayurveda Integr Med Sci 2023;06:272-278. http://dx.doi.org/10.21760/jaims.8.6.44

Source of Support: Nil, **Conflict of Interest:** None declared.

****