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Rapid improvement of oculomotor nerve function with ayurvedic treatment in traumatic diplopia - A case report

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ABSTRACT

Diplopia or double vision has many aetiologies and often presents to the ophthalmologist. The causes of diplopia may be ocular or neurogenic in origin. Any trauma to the eyes in the form of blow-out fractures causes diplopia by damaging the third nerve. The management by the practitioners of contemporary science depends upon the extent of the nerve or muscle injury. Entrapment of muscles requires surgical intervention, whereas others are managed conservatively. The recovery rate is the least for diplopia of traumatic origin.

A 50-year-old male who sought Ayurvedic treatment for diplopia in the last three months was diagnosed with partial third nerve palsy after a fracture of the left orbit. He underwent Ayurvedic therapy in the form of internal medicines such as *Danadanayanadi kashaya, Ksheerabala 101, Vaishwanara churna,* and external treatments such as *Pratimarsha Nasya, Siro abhyanga, and Tarpana*.

At the end of 2 months of Ayurvedic treatment, the patient completely recovered from diplopia.

Ayurvedic treatment effectively resolved diplopia in a short time. Patients can benefit from the same if treated promptly in the early stage itself. However, more extensive studies with larger samples will yield more data to prove the potential of Ayurveda in such cases.

1. Introduction

Patients with orbital floor fractures generally present with diplopia, ecchymosis, and enophthalmos. Diplopia is a sign of ocular dysmotility. It can be caused by soft tissue oedema or haemorrhage, which generally requires observation, or other aetiologies, such as muscle entrapment and muscle and nerve damage requiring surgical repair. Immediate surgical repair is only indicated when apparent signs of muscular entrapment or damage are present. In all the other cases, most practitioners prefer to observe and wait for the oedema to resorb. If diplopia persists beyond several days, surgical repair is best performed between 2nd and fifth-week post-trauma if muscular entrapment occurs. It is not recommendable to wait beyond the fifth week, to avoid complications such as muscle atrophy or fat redistribution [1]. The oculomotor nerve (3rd cranial nerve) is one of the most commonly damaged nerves in such injuries, which results in diplopia, ptosis, and mydriatic pupil. The potential of Ayurvedic treatment in such a case has not been documented in the past. In this case report, we point out the scope of Ayurvedic intervention in augmenting the reversal of the nerve damage, thereby improving its function. Reporting such a case can help generate preliminary data that may help understand the role of Ayurvedic interventions in restoring the functions of the 3rd CN.

2. Patient information

2.1. De-identified demographic and other patient information

A 50-year-old gentleman living in Goa presented at our hospital in Kerala, India, seeking Ayurvedic treatment for his problems.

2.2. Main concerns and symptoms of the patient

He presented with the complaint of double vision for three months following a self fall on the road. He reported the worsening of the same ever since its first occurrence.

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2.3. Family and pschosocial history

All the family members were reported to be healthy.

2.4. Medical history

In July 2021, the patient met with an accident (self fall from a two-wheeler) and suffered from a fracture of the lateral wall and the floor of the left orbit and a fracture of the anterior and lateral walls of the left maxillary sinus. He was given primary care at the emergency unit of a nearby hospital and discharged the next day. He developed diplopia and drooping of the left eye after the accident. He was advised complete rest and follow up after a week. The CT scan did not reveal any abnormality in his brain and showed the presence of left maxillary hemosinus. One week post-injury, upon ophthalmological consultation, he was diagnosed with partial third nerve palsy in the left eye and prescribed medicines for the same (Table 1). He was also advised to patch cover the affected eye. He was assured of the reversal of the symptoms in 8–12 weeks. However, the patient noticed the worsening of diplopia over time, making him anxious about his health. So, he decided to opt for Ayurvedic treatment.

3. Clinical findings

3.1. Relevant physical examination

His best-corrected visual acuity was 6/6 in both eyes and N6 for near vision. Anterior segment examination showed left eye was negative for ptosis. The left pupil was approximately 3 mm in diameter and sluggish to react. However, the right pupil was found to be normal. There was exotropia and hypotropia on orthoptic evaluation with limitation of elevation and adduction in the left eye. The patient had diplopia with maximum separation of crossed images on levo elevation and right gaze.

Upon *Netra pariksha*, the patient had *Vakrata* (misalignment) and *Stabdhata* (stupor) of the left eye. The *chalana karma* (movement) of the left eye was restricted in the *urdhwa bhaga* (upper gaze). All these symptoms suggested the *Avarana* (covering) of *Kapha Dosa* on *Vata Dosa*.

4. Timeline

See Fig. 1.

5. Diagnostic assessment

5.1. Diagnostic criteria

The diplopia was assessed using Worth Four Dot Light Test (W4LT) and a standardized Diplopia questionnaire (DQ) [2]. The Worth's Four Dot test, (W4LT) is a clinical test assessing binocular vision. The patient is asked to wear the polarized glass with red lens on the right eye and green lens on the left eye. The patient is shown a wall mounted target with 4 illuminated dots in a diamond configuration: 1 red on top, 2 green on the sides, and 1 white on the bottom. The patient is then asked to describe what they see, including the number, location, and color of lights. Patients with normal binocular vision see all the four colours as projected on the wall. Patients with diplopia see five dots with two distinct colours.

Table 1
List of Allopathic medicines prescribed by the Ophthalmologist.

Sl.no	Name of the medicine	In-take
1.	Tab. Pan (40 mg)	1 tab once daily
2.	Tab. Shelcal (500 mg)	2 B.D.
3.	Tab. Enzoflam (500 mg)	2 B.D.
4.	Tab. Augmentin Duo (625 mg)	2 B.D.
5.	Moxiflow eye drops	4 times a day
6.	Nevonac eye drops	3 times a day

5.2. Diagnostic challenges

The patient was well cooperative, so there were no diagnostic challenges.

5.3. Diagnostic reasoning and differential diagnosis

Clinical examination and medical reports confirmed it to be a case of traumatic diplopia due to partial third nerve palsy.

5.4. Prognostic outlook

The prognostic outlook for patients suffering from diplopia post-trauma is variable. Studies suggest that in such cases, oculomotor synkinesis is the typical presentation. Patients with oculomotor nerve paresis improve over several months, after which there will be no improvement for at least six months. Although the paresis was thought to be stable after the period of no improvement, some patients subsequently improved in both motility and alignment with the resolution of diplopia in the primary position and in more than one cardinal position of gaze. However, it can take several months and sometimes a few years to completely recover from diplopia [3]. This patient had to discontinue his job for not having recovered from diplopia for three months. The prognosis was good in this case as the patient was young, and there was no entrapment of the extraocular muscle.

6. Therapeutic intervention

6.1. Types of intervention (modern pharmacological)

At the time of Ayurvedic consultation, the patient was taking Tab. Remylin and Pregabaline capsules (75mg) and Tab. Neurobion forte.

6.2. Types of intervention (traditional, complementary, alternative medicine)

We started the treatment with *Shamanoushadhis* (pacifying drugs), followed by *Mrudu shodhana* (mild purificatory procedures), and concluded with *Tarpana* (stabilizing eye procedure). The patient was asked to adhere to a specific diet regimen (Table 2).

6.3. Administration of therapeutic intervention

6.3.1. Internal medications

The patient discontinued all the Allopathic medications as his condition did not improve even after taking them for three months.

His Ayurvedic treatment started with *Aama pachana* (use of digestives) with Tab.*Hinguvachadi* [4] and *Dosa shamana* (pacification of Dosas) with *Danadanayanadi kashaya* [5] and *Kheerabala* 101 [4].

6.3.2. External treatments

He was given *Pratimarsha nasya* (nasal drops) with *Anu taila* [4], *Mukha lepa* (face pack) with *Jatamayadi churna* [5] and mild *netra abhyanga* (eye massage) with *Shatahwadi ghrita* [6]. He was also prescribed *Siro Abhyanga* (head massage) with *Asana vilwadi taila* [4].

6.3.2. Explanation for external and internal treatments

The internal medicines aimed to alleviate the *Kapha Vata Dosas*, and the external treatments aimed to control the *Vata Dosa* both in the *Sarvadaihika* (whole-body) and *Sthanika* (local site) levels.

6.3.3. Changes in the interventions with explanations

After the initial three weeks of treatment, the patient reported a significant improvement in binocular vision and minimum diplopia. He

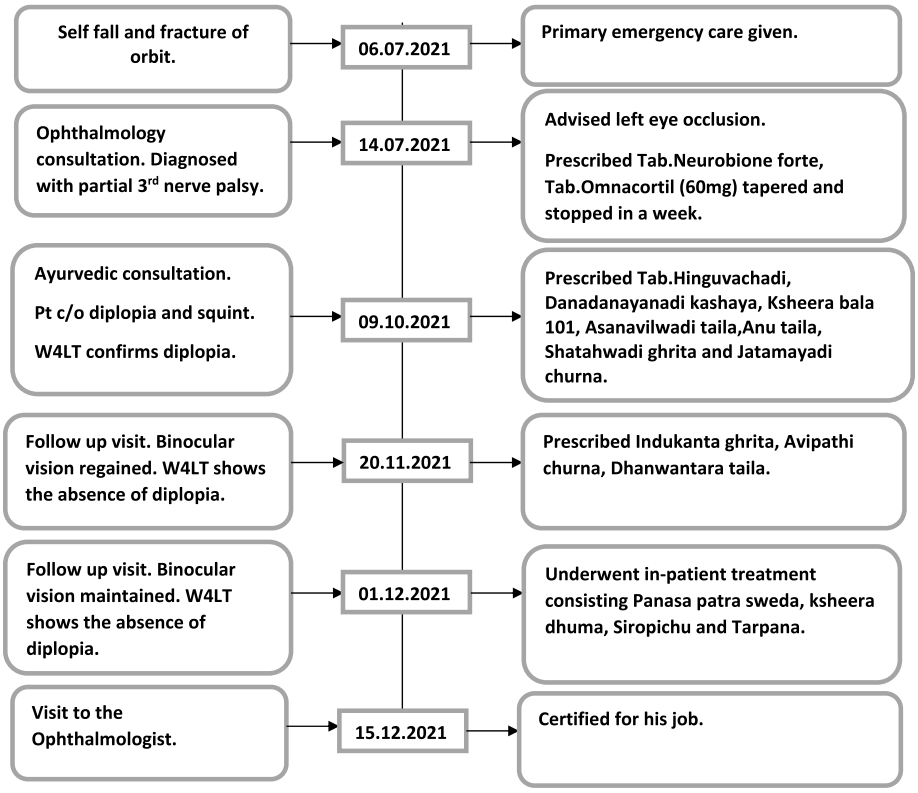


Fig. 1. Timeline of events.

Table 2
List of diet regimen followed by the patient.

Serial No.	Diet	Regimen	Instructions
1.	Boiled rice gruel, Light food (easily digestible)	Sleep for 6 hours at night.	To be followed
2.	Green gram, rock salt, wheat.	Relax with friends & family	
3.	Vegetables- carrots, beetroot, spinach, amaranthus, ash guard, pumpkin, cucumber.	Mild physical exercises.	
4.	Curd, polished rice, fermented food, urad dal, chicken mutton, refrigerated food, cold drinks, aerated drinks.	Day sleep, Mental stress	To be avoided
5.	Sour fruits like oranges, grapes, passion fruit, lemon.	Use of electronic gadgets in the dark room.	

was then prescribed *Indukantam ghrita* [4] to oleate his body and, later, *Avipathi churna* [4] for *Virechana* (laxative). He was prescribed *Dhanwantara taila* for daily *abhyanga* (body massage). Then, he was treated under IP care with external treatments like *Panasa Patra Sweda* and *Ksheera dhuma* on the face and *Tarpana karma* (a special eye treatment) for the eyes.

6.3.4. Treatments during the follow-up period

During the follow-up period, the patient was prescribed *Chakshushya Rasayana* [7] (rejuvenating medicine for the eyes comprising *Terminalia chebula, Terminalia bellarica, and Emblica officinalis*, plain ghee and honey) internally.

All the internal medicines and the external treatments with their rationale have been tabulated in Tables 3 and 4.

Table 3
List of internal medicines with their possible effects.

Rationale	Medicines	Dosage	Adjuvent	Duration
Ama pachana (digestion of harmful metabolites)	Tab.Hinguvachadi (200mg)	1 tab. twice dailly before food	Warm water	52 days
Dosa shamana (pacifying therapy)	Danadanayanadi kashayam	15ml twice daily before food	45ml of warm water	52 days
	Ksheera bala 101	5 drops	With kashayam	52 days
Snehana (oleation therapy)	Indukantam ghritam	20ml once daily, after dinner	Warm water	5 days
Sramsana (purgation)	Avipathi churnam	10 g, in the morning	Warm water	1 day
Rasayana (rejuvenation)	Triphala churnam	5 g	10 drops of ghee and 05 drops of honey	30 days

7. Follow up and outcomes

7.1. Clinician assessed outcomes

The W4LTand, the diplopia questionnaire scores, confirmed the complete resolution of diplopia in most positions of gaze (Tables 5 and 6).

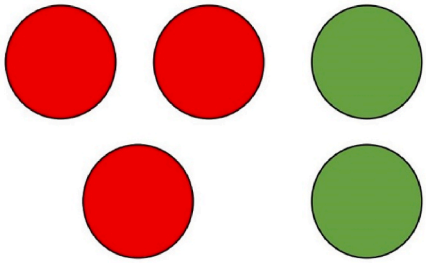
Table 4
List of external treatments with their possible effects.

Rationale	Treatment	Medicines	Duration
Dosa shaman ((pacifying therapy)	Pratimarsha nasya (low dose medication through nasal route)	Anu taila	60 days
	Mukha lepa (medicinal paste application on the face)	Jatamayadi churna	60 days
	Siro abhyanga (head massage)	Asana vilwadi taila	60 days
	Netra abhyanga (mild eye massage)	Shatahwadi ghrita	60 days
	Panasa patra sweda (fomentation using the leaves of Artocarpus heterophyllus	Ksheerabala taila	7 days
	Ksheera dhuma (fomentation with milk)	Dasamula ksheerapaka	7 days
	Siro pichu (application of an oil immersed cloth on the bregma).	Brahmi taila	7 days
Tarpana (satiating)	Tarpana karma (therapeutic retention of medicated liquids over the eyes)	Jeevantyadi ghrita	7 days

Table 5
W4LT and Diplopia questionnaire before treatment

Gaze position	Score if always	Score if sometimes	Score if never	Score
Straight ahead in distance	6	3	0	6
Up	2	1	0	2
Down	4	2	0	2
Right	4	2	0	4
Left	4	2	0	2
Reading	4	2	0	4
Any position	1	1	0	1
If "always" to all above, can you get rid of it?	−1			
Total score	–	–	–	21

Worth Four Dot test Before Treatment



7.2. Patient assessed outcomes

The patient could carry on with his daily routine work without occluding his left eye, which was impossible before the treatment.

7.3. Important follow-up diagnostic and other test results

One week post-discharge, the patient underwent a comprehensive eye check with an Ophthalmologist. The patient's job required him to get certified by an Ophthalmologist before he re-joined his job, which was granted to him on the grounds of complete resolution of diplopia.

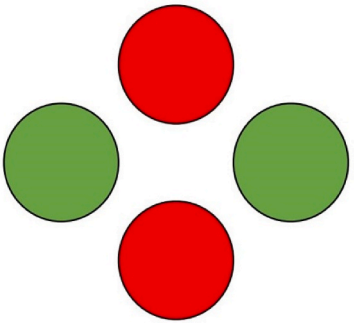
7.4. Intervention adherence and tolerability

The patient adhered to the entire treatment and dietary regimen.

Table 6
W4LT and Diplopia questionnaire after treatment

Gaze position	Score if always	Score if sometimes	Score if never	Score
Straight ahead in distance	6	3	0	0
Up	2	1	0	1
Down	4	2	0	0
Right	4	2	0	2
Left	4	2	0	0
Reading	4	2	0	0
Any position	1	1	0	
If "always" to all above, can you get rid of it?	−1			
Total score	–	–	–	3

Worth Four Dot test After Treatment



7.5. Adverse and unanticipated events

No adverse events were reported during the entire course of the treatment. Intervention adherence and tolerability, adverse and anticipated events were assessed by the interrogation of the patient.

8. Discussion

8.1. Strengths and limitations

Having experienced the worsening of diplopia in three months and being uncertified for his job, the patient was mentally devastated and desperate. This was a significant drawback in this case.

The patient strictly adhered to the entire diet regimen as advised. He was confident and cooperated well during the treatment. These were the strengths of the case.

8.2. Diplopia management in medical literature

Research papers in indexed and peer-reviewed journals exploring the role of Ayurveda in the management of traumatic diplopia have not been published so far. Previous studies suggest that the recovery rate is the least for diplopia due to traumatic causes compared to other causes such as vasculopathies. It takes several months and sometimes a few years for the complete resolution of diplopia, which may subsequently affect the patient's quality of life. In this case, the patient could not work for the past three months and had been under stress. In about a month of Ayurvedic intervention, he experienced improvement and, in another month, was certified for his job. This proves the expeditious nature of the Ayurvedic treatment in this case.

8.3. The rationale for the management

The Ayurvedic treatment adopted in this case was that of *Ardita chikitsa* (treatment of Bell's palsy), as mentioned in *Ashtanga Hridaya*. The trauma had caused severe *Vata dusti* (vitiation of Vata Dosa) in the eyes as a result of *Avarana* (covering) by *Kapha Dosa*, which prevented

not only proper functioning of the *Netra* but also caused structural deformities in the form of squint. *Ama pachana* (digestion of morbid matter) was achieved through *Vaishwanara churna. Pratimarsha Nasya* initially helped clear off the accumulated *Dosas* from the *Urdhwajatru pradesha* (head & neck) and later helped *Dosa shamana* (pacify Dosas) as was with *Danadanayanadi kashaya* and *Ksheerabala* 101. *Mukhalepa* (face pack) helped to stimulate the vascular flow, *Netra abhyanga* (eye massage) and *Siro Abhyanga* (head massage) helped to pacify the *Vata Dosa*. *Panasa Patra Sweda* (fomentation using the leaves of *Artocarpus heterophyllus LAM*) and ksheera dhuma (fomentation using milk) as specialized treatments mentioned for *Ardita*. They helped to alleviate the *Dosas* in their own places. Finally, *Tarpana karma* was administered for the strengthening of the *Netra*. *Chakshushya Rasayana* played an essential role in maintaining the corrected state of the *Netra*, thereby preventing the recurrence of the condition.

8.4. Takeaway lessons

It can take several months or even years for diplopia of traumatic origin to resolve entirely using the conventional system of medicine. If opted as the primary intervention in such cases, Ayurveda can yield quicker results, thereby preventing the disease from affecting the patient's quality of life.

9. Patient perspective

"I had a fall from my bike and fractured the bone on my left eye. I was immediately taken to the nearby hospital and was given the primary care. Since the accident, I developed double vision and squint. The Ophthalmologist advised me to cover my left eye and prescribed medicines. She assured me that the double vision will gradually be relieved in a few weeks. I had to keep my left eye covered all the time and was finding it difficult to do my daily activities without it. I also could not get through the yearly medical tests to certify for my job. Though I waited for 3 months expecting improvement in the condition, I noticed that it was only getting worst. The worsening of double vision and not being able to go for work caused a lot of tension in me. As per my friend's advice, I consulted the Ayurvedic specialist. She prescribed me kashaya, nasal drops, oils for the head and body and I also underwent Tarpana. Initially, it was difficult for me to follow the entire diet regimen. But, later I made up my mind. I was so happy when I started to notice the change in my vision in just one week of starting the treatment. This instilled confidence in me to continue the treatment and follow the diet regimen. Gradually, in a month, I had completely recovered from double vision and also got certified for my job. I am thankful to God to have guided me to take Ayurvedic treatment."

10. Informed consent

Written informed consent was obtained from the patient for publication of this case report

Author contributions

Both the authors made equal contribution in treating the case, documenting it and structuring the manuscript.

Conflicts of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Declarartion of generative AI in scientific writing

AI was not used in writing this manuscript.

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