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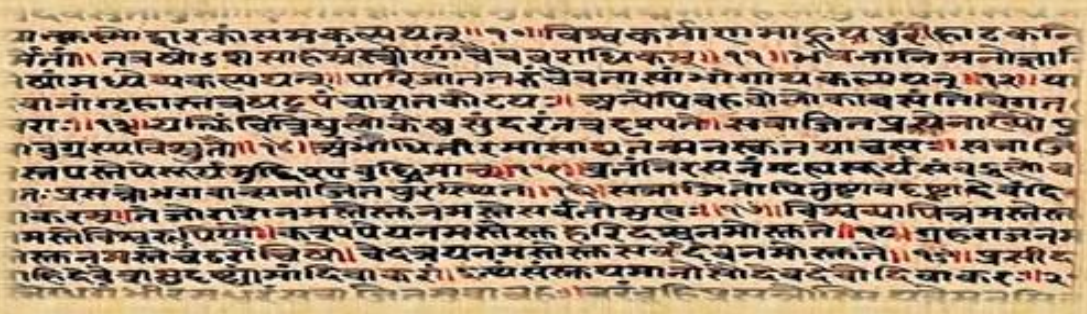

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Review Article

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International Journal for Empirical Research in Ayurveda

Prevention and Management on Digital Eye Strain Through Ayurveda in Children

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ABSTRACT:

Digital eye strain, also referred to as computer vision syndrome, encompasses a set of ocular and visual complaints resulting from extended digital screen use. Common symptoms include headaches, dryness, blurred vision, and periocular musculoskeletal discomfort[1]. With digital devices becoming inseparable from modern life, children—whose visual system is still developing—are particularly at risk, partly due to reduced blinking and shorter viewing distances[2]. Reported prevalence rates vary widely, from 12.1% to 94.8% in children and 35.2% to 97.3% in adults[3]. According to Ayurveda, digital eye strain is primarily due to vitiation of Vata and Pitta doshas and structural vulnerability (*kha-vaigunya*) of ocular tissues[4]. Therapeutic principles emphasize not only symptomatic relief but long-term protection and rejuvenation of ocular tissues. Approaches include internal remedies such as *Amalaki*, soothing compresses with *Tulsi*, and classical procedures like *Netra Tarpana* using medicated ghee[5]. Preventive practices within *Dinacharya*—including *Netraprakshalana*, *Anjana*, *Nasya*, *Padabhyanga*, adequate sleep, non-suppression of natural urges, and yogic techniques—play a central role in maintaining visual health[6].Digital eye strain in children is closely linked with earlier onset and more rapid progression of myopia[7]. This review highlights Ayurvedic preventive and therapeutic strategies that support visual well-being in the pediatric population during the digital era.

Key words: Digital eye strain, Dinacharya, Netratarpan,Nasya, Yoga-pranayama.

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Introduction:

Ayurveda describes *Panch Gyanendriya*, the five sensory organs—eye, ear, nose, tongue, and skin—that enable perception of the external world[8]. Among these, the eye is considered foremost, reflected in the classical dictum: "Sarvendriyanam Nayanam Pradhanam." Visual health is essential for a child's learning, social interaction, and emotional development. Uncorrected refractive errors significantly impair quality of life and academic performance[9]. Since the COVID-19 pandemic, global screen time has risen dramatically, particularly among children[2]. School closures and home confinement contributed to a surge in digital device exposure. In India, screen time among 10–16-year-olds nearly doubled, increasing from 1.9 to 3.9 hours daily[3]. Even infants under three exhibited increased screen time despite minimal educational necessity[5]. Because symptoms of digital eye strain correlate strongly with exposure duration, an increase in ocular complaints across pediatric age groups is unsurprising.

Materials And Methods

Concepts were derived from classical Ayurvedic texts and their authoritative commentaries[6–14]. Complementary insights were gathered from peer-reviewed modern literature via PubMed, Google Scholar, and Web of Science using terms such as "Ayurveda," "eye care," "pediatric visual health," and "digital eye strain." Sources were analyzed to frame preventive and therapeutic perspectives for children according to Ayurvedic principles[19].

A. Ayurvedic Etiology of Eye Diseases

Ayurveda identifies three fundamental causes of disease, including ocular disorders[6]:

1. **Asatmyendriyarthasamyoga** — improper or excessive sensory engagement.
2. **Prajñāparādha** — errors in judgement or improper lifestyle.
3. **Rituviparyaya** — living against natural seasonal rhythms.

B. Preventive Guidelines for Ocular Health

Classical recommendations for preventing eye diseases include[7]:

- Avoid exposure to cold water immediately after heating the body.
- Refrain from excessive gazing at distant or minute objects.
- Maintain proper sleep habits and avoid untimely sleep.
- Avoid emotional excesses such as anger, grief, or overexertion.
- Do not suppress natural urges such as tearing.

C. Dinacharya (Daily Regimen) For Promoting Eye Health

1. Netraprakshalana (Eye Washing)

A cleansing practice using cool or medicated decoctions, such as *Lodhra* or *Amalaki*, to remove impurities and reduce ocular fatigue[8].

2. Ushnajalapana (Early Morning Warm Water Intake)

Warm water consumed at dawn, particularly water stored overnight in a copper vessel, is traditionally recommended to harmonize doshas and support systemic and ocular function[9].

3. Anjana (Collyrium Application)

A medicated paste applied to the lower eyelid to clear Kapha, stimulate ocular circulation, and strengthen ocular tissues[10]. Contraindications include fasting, immediate post-bath application, nocturnal awakening, and fever.

4. Snana (Bathing)

Warm water below the neck and cool water for head and face are advised to maintain sensory organ integrity[11].

5. Shiro Abhyanga (Head Massage)

Application of warm medicated oils to the scalp, neck, and shoulders nourishes sensory organs, improves cranial circulation, and pacifies Vata[12].

6. Padaprakshalana and Padabhyanga (Foot Washing and Foot Massage)

Regular foot cleansing and oil massage calm the nervous system, balance Vata, and stimulate marma points connected reflexively with ocular function[13].

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7. Padatradharana (Use of Footwear)
Use of appropriate footwear protects foot marma points and is recommended to prevent reflex disturbances that may affect vision[14].

D. Management of Eye Problems In Children

1. Nasya (Nasal Administration of Medicines)
Nasya involves instillation of medicated oils into the nostrils; anatomically, the nasal cavity communicates with intracranial and periorbital structures, permitting therapeutic influence on the *Shringataka Marma*, which governs sensory centers for vision among others[15]. *Pratimarsha Nasya* with *Anu Taila* in small doses is used prophylactically to maintain ocular clarity.

2. Netra Tarpana (Ocular Oleation Therapy)
Netra Tarpana is a rejuvenative procedure in which comfortably warm medicated ghee is retained over the eyes using a dough boundary (made typically from black gram flour). This therapy lubricates and nourishes ocular tissues, improves tear film stability, strengthens extraocular muscles, and promotes tissue regeneration[16].

Indications: visual fatigue, excessive dryness, hardened ocular surface, eyelash shedding, blurred vision, ocular deviation, and chronic recurrent eye disorders[17].

Contraindications: extreme weather conditions (very hot, cold, or cloudy days), recent exertion, mental agitation, vertigo, and active ocular inflammation or severe pain[18]. When administered with age-appropriate formulations and trained supervision, Netra Tarpana is considered safe and beneficial for children presenting with symptoms of digital eye strain.

E. Yoga, Pranayama, and Eye Exercises
Therapeutic eye exercises and pranayama support ocular comfort and autonomic balance. Recommended practices include:

- **Palming:** gentle warming and relaxation of closed eyes.
- **Blinking exercises:** rapid blinking for 30 seconds followed by rest to maintain tear film and reduce dryness.
- **Eye rotations:** slow full rotations clockwise and counter-clockwise to relax extraocular muscles.
- **Zooming:** shifting focus between near and distant objects to improve accommodative flexibility.
- **Figure-eight tracing:** smooth tracking to increase ocular motor coordination.

Supportive yogasanas such as *Balasana* (Child's pose), *Adho Mukha Svanasana* (Downward facing dog), and *Ardha Matsyendrasana* (seated twist) enhance cranial circulation; *Anulom–Vilom* (alternate nostril breathing) improves autonomic regulation and systemic oxygenation. These practices may be safely introduced to children from around three years of age under appropriate supervision.

F. Prevention and Management of Digital Eye Strain — Practical Measures
Practical, evidence-based measures include:

- Adopting the **20–20–20 rule**: every 20 minutes, look at an object 20 feet away for 20 seconds to relax accommodation and reduce strain.
- Maintaining **optimal screen distance** (approximately arm's length) and positioning the screen top at or slightly below eye level.
- Adjusting **screen brightness, contrast, and font size** for visual comfort and readability.
- Ensuring **ergonomic seating** with feet flat, neutral neck posture, and proper table height to prevent musculoskeletal strain.
- Encouraging **frequent blinking** to maintain tear film and prevent dry eye.
- Reducing total **recreational screen time** according to international guidelines: no screen time for children <2 years, up to 1 hour/day for children 2–4 years (co-viewing recommended), and ≤2 hours/day for school-aged children (5–17 years) for recreational

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use, in alignment with WHO and pediatric recommendations[20].

G. Pathya–Apathya (Dietary Guidelines) For Visual Health

Pathya (Beneficial foods): A diet rich in beta-carotene and antioxidants—including green leafy vegetables, carrots, and vitamin-C-rich fruits—supports retinal health and ocular tissue repair.

Apathya (Foods to avoid): Excessive intake of sour, salty, pungent, or alkaline foods (e.g., excessive pickles and fermented items) may aggravate ocular symptoms and should be moderated.

Discussion:

The integration of digital technology in educational and recreational activities has substantially increased visual demands on children, resulting in higher prevalence of digital eye strain and associated sequelae such as accommodative dysfunction and progression of myopia. Ayurvedic paradigms provide a holistic framework that integrates behavioral modification, daily routines, dietary measures, targeted ocular therapies (e.g., *Anjana*, *Nasya*, *Netra Tarpana*), and rehabilitative practices including yoga and eye exercises. Classical recommendations align with contemporary preventive strategies—emphasizing regulated screen exposure, ergonomic posture, and periodic ocular rest—while adding tissue-nourishing and restorative modalities unique to the Ayurvedic tradition. While empirical evidence supporting some Ayurvedic procedures is still emerging, multiple contemporary studies and case reports have reported symptomatic improvement and enhanced ocular comfort following appropriately administered Ayurvedic therapies. Integrative application—combining modern ophthalmic care (optical correction, tear substitutes, behavioral counseling) with Ayurvedic preventive and rehabilitative measures—may offer a pragmatic approach to managing digital eye strain in children. Future research should focus on randomized controlled trials and standardized protocols to quantify the efficacy, safety, and age-appropriate formulations of classical therapies.

Conclusion:

Digital devices are integral to modern childhood, but excessive and unregulated use predisposes children to digital eye strain and potentially earlier onset and progression of refractive errors. Ayurveda offers a structured, preventive, and restorative approach grounded in *Dinacharya*, targeted ocular therapies, dietary moderation, and mind-body practices. Adoption of these measures—alongside evidence-based ophthalmic care and public health guidance on screen use—can reduce ocular fatigue and help preserve long-term visual health in children.

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