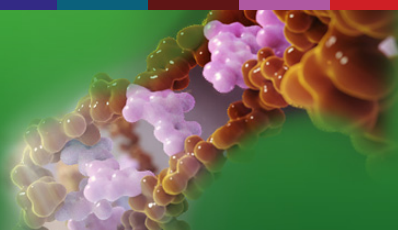


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## Psoriasis beyond the skin: Ophthalmological changes (Review)

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## Abstract

Psoriasis is a chronic, immune-mediated inflammatory disease of unknown etiology that may be associated with abnormal T-lymphocyte function. Ocular manifestations associated with psoriasis, particularly artropathic or pustular psoriasis, usually affect men, often during exacerbations of the disease. It has been reported that eye damage tends to occur later compared with cutaneous or joint manifestations, blindness being the most disabling complication. Previous studies have focused on ophthalmic manifestations and identified several etiopathogenic mechanisms. Psoriasis may be associated with eye complications such as lesions of the eyelids, conjunctiva and others, with systemic inflammation being the main contributor. In addition, the treatment used for psoriasis may cause ocular changes. The main ophthalmic manifestations associated with psoriasis are keratoconjunctivitis sicca, blepharitis, conjunctivitis and uveitis. The treatment of uveitis, perceived as one of the most serious eye conditions, is controversial and has yet to be clearly determined. Thus, the aim of the present review was to emphasize the importance of regular eye examination for patients with psoriasis, either those receiving biological treatment or those not receiving treatment, in order to diagnose and manage the disease appropriately.

## 1. Introduction

Psoriasis is a chronic, immune-mediated disease with high genetic susceptibility and significant multisystem damage. Psoriasis affects 1-3% of the adult population, has a negative impact on the quality of life of the patients (1), and it is no longer considered as a disease exclusively affecting the skin, as it is associated with several systemic complications, including cardiovascular, metabolic, cerebrovascular, articular, hepatic, autoimmune and ocular damage. Currently, ophthalmological manifestations have an occurrence rate of 10-12% among patients with psoriasis (2,3). However, these figures do not reflect the true magnitude of how significantly this organ is affected.

## 2. Etiopathogenesis

From an embryological point of view, the skin and eyes share a common origin from the ectoderm (4). Thus, it is hypothesized that the ocular manifestations are closely associated with the cutaneous manifestations through an immune-mediated mechanism. Skin histology appears to be similar to ocular histology (parakeratosis), particularly in cases where psoriatic lesions are observed at the level of the eyelids or the conjunctiva (5,6).

Eye changes in patients with psoriasis are considered to be a consequence of systemic inflammation (7) and increased cytokine production; however, they are often overlooked, although their progression may result in visual impairment. Changes in the



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tear film, the conjunctival surface, or disruption of the meibomian glands are common among patients with psoriasis.

In addition to psoriasis *per se* being the causative factor, current treatment strategies, including methotrexate and acitretin (the only currently licensed drug for generalized pustular psoriasis) may cause ocular damage; during phototherapy (a valuable and cost-effective anti-psoriatic treatment), UVA rays may penetrate into the ocular lens and potentially induce cataract; furthermore, biological therapies, such as anti-TNF $\alpha$ , may also cause ocular manifestations, such as especially uveitis, in psoriatic patients (8). Since 1988, it has been well-known that treatment with retinoids, including isotretinoin, affects almost all anatomical structures of the eye. Notable injuries are commonly observed in the optic nerve, retina or lens (9-11). Furthermore, there are several changes to the eyes, potentially affecting almost any structural region, which are associated with arthropathic or pustular psoriasis (5).

### 3. Ophthalmological changes

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The most common clinical ocular change associated with psoriasis is keratoconjunctivitis sicca (dry eye syndrome), which is present in 18.75% of patients, and blepharitis (2,12,13). Other changes include conjunctivitis, uveitis, punctate keratitis, pinguecula, cataracts, glaucoma, corneal abscesses, pterygium, or abnormalities of retinal vascularization (5,14). An uncommon condition that may also develop is pigment dispersion syndrome, which is characterized by shedding of the pigment from the posterior surface of the iris into the anterior segment following the flow of aqueous humour.

Several studies on patients with psoriasis have demonstrated an association between Psoriasis Area and Severity Index (PASI) scores and the presence of ocular manifestations. Patients with blepharitis tend to have low PASI scores, whilst patients with keratitis have moderate-to-severe PASI scores (2,14). Paradoxically, a study performed in 2013 on 100 patients with psoriasis concluded that there is no significant association between severe cases of psoriasis and eye lesions; therefore, all patients should be evaluated ophthalmologically to establish an accurate diagnosis (12).

#### Keratoconjunctivitis sicca

Dry eye syndrome occurs in patients with psoriasis due to an obstructive dysfunction of the excretory ducts of the meibomian glands. Although their secretory function is normal, the dysfunction results from epithelial keratinization of the glandular ducts (1,2). The patients experience a feeling of dry eyes, foreign body sensation, blurry vision and photophobia, with symptoms worsening throughout the day (6). This complication may be independent from or may be the result of blepharitis or conjunctivitis. Conversely, this syndrome may be associated with the decrease of the tear film, namely the deficiency of L-arginine, which is observed in patients with psoriasis (15).

#### Blepharitis

Blepharitis is one of the most common ocular manifestations associated with psoriasis. Patients exhibit hyperemia, inflammation and edema at the free margin of the eyelids, with slight scaling, itching and burning sensation (1,6,13). Chronic blepharitis may lead to ectropion of the lower lacrimal point with epiphora, madarosis, trichiasis and loss of lid tissue (5,13) or meibomian gland dysfunction, which is frequently associated with posterior blepharitis.

The treatment of patients with blepharitis includes rigorous hygiene (warm compresses, washing the eyelids and lashes with a gentle shampoo) and application of topical corticosteroids on the eyelids (6). The application of tacrolimus ointments may also be taken into consideration (16). In addition, antibiotic ointment application may be necessary for the treatment of secondary bacterial infections; should such complications occur surgery is performed, including in cases of ectropion, trichiasis and pterygium (13).

#### Conjunctivitis

Conjunctivitis manifests as hyperemia, possible yellowish-red lesions in the conjunctival area and xerosis that may involve the cornea (1). Patients complain of the feeling of grittiness or foreign bodies in the eyes, pain and conjunctival secretions. In cases with complications, such as trichiasis or symblepharon, patients should be referred to an ophthalmologist (6,13).

#### Cataract

Several studies have previously reported that patients with psoriasis may develop cataracts (8,13,14). Lens abnormalities, which are generally considered to be incidental findings, are defined by gradually declining vision, glare around lights, decreased contrast sensitivity and visualization of cloudy lens on routine ophthalmological examination. Ultraviolet (UV) radiation contributes to cataract development, as light in the wavelength range of 300-400 nm is absorbed in the lens and may cause photochemical changes in the lens proteins. It has been hypothesized that treatment with psoralen-UVA may trigger the formation of anterior cataracts, whereas prolonged courses of systemic corticosteroids for psoriasis management may cause posterior subcapsular cataracts (13).

#### Uveitis

Uveitis is a rare but serious eye complication that occurs in patients with psoriasis, and is the most common cause of blindness in developed countries. Anterior uveitis affects the iris, cornea and ciliary body, intermediate uveitis affects the vitreous body and pars plana, and posterior uveitis affects the retina. Anterior uveitis is more common in patients with psoriasis, and it is usually diagnosed at an early stage. Several studies have reported the occurrence of anterior uveitis in 7-25% of patients with psoriasis (1,17,18). This is a bilateral condition and the symptoms include red, painful eyes with pericorneal congestion, reduction or even loss of visual acuity and photophobia may also occur (1,6,12,19). Previous studies have demonstrated the association between uveitis and different types of psoriasis, but uveitis is more frequent among patients with HLA B27-positive psoriatic arthritis (20); however, the association is not fully understood. Uveitis may also develop in patients with pustular psoriasis (5,12). Uveitis

**Table 1**

Uveal involvement in various autoimmune diseases<sup>a</sup>.

Psoriasis and uveitis have similar immune etiopathogenetic mechanisms, as a result of immunological disturbances in the Th1 and Th17 lymphocyte populations. T17 cells play a key role in sustaining the inflammatory cascade in psoriasis. Secukinumab was the first IL-17A inhibitor to emerge as one of the preferred biological agents to manage chronic psoriasis in patients with multiple comorbidities, including uveitis (36). Notably, ustekinumab has also demonstrated good results in uveitis (37). The incidence of anterior uveitis during treatment with ixekizumab was described; however, in several cases, patients had a pre-existing history of anterior uveitis and were HLA B27\* (38).

#### 4. Future directions

Understanding the critical checkpoints in the pathogenesis of ocular changes is important for providing the clinician with relevant targets for immunotherapeutic intervention. Therapies have been moving away from general immunosuppression toward the use of specific biologicals, targeting defined aspects of the immune response.

Ophthalmic complications of psoriasis are common and can affect almost any part of the eye. However, they remain clinically underappreciated. Routine eye examinations are recommended in patients with all types of psoriasis. Periodic ophthalmological evaluation and monitoring are required for early diagnosis and treatment, regardless of the severity and duration of the disease, or the presence of nail or joint lesions, in order to avoid irreversible ocular damage. Undetected ocular involvement, if left undiagnosed in the early stages, may progress asymptotically, ultimately becoming irreversible. In this context, it is crucial to include an experienced ophthalmologist in a multidisciplinary team that has experience with treating patients with multiple comorbidities.

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### Competing interests

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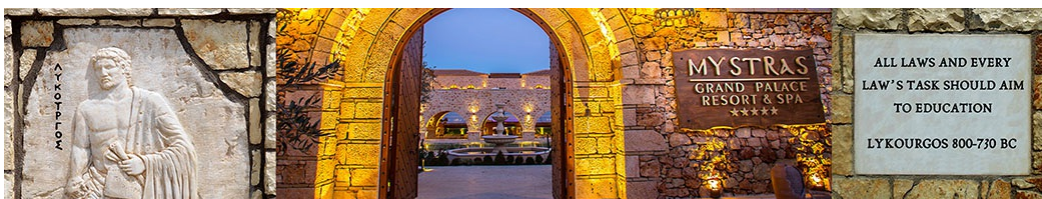


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