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# Smoking and Eye Disease – an evidence based review

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## 1. Introduction

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Smoking has been shown to increase the incidence (the risk of presenting with a condition) and severity of a number of important sight threatening conditions of the eye. It has also been associated with some less severe conditions that can cause discomfort and disquiet in people who develop them. In case the reader is not conversant with the medical details of the conditions some details of the conditions and how they affect those affected are included.

## 2. Common sight threatening conditions

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### Age related macular degeneration (AMD)

This is divided into two main types dry and wet – both types reduce the patient's ability to see in the centre of their vision, reducing the ability to see number plates when driving and read newspapers/books etc. In dry AMD the changes in the retina that cause the problem usually occur relatively equally in both eyes and progressively get worse as the patient gets older. The rate of progression is very variable. Genetics play some role in determining a person's risk of developing this condition in their lifetime and in the speed of onset and progression to poor vision.

A recent review of the peer reviewed scientific literature (from now on just called the literature) indicates that smokers (defined as >25 cigarettes per day) have a 2.4 times increased the risk of having **dry AMD** in their 50s as compared to those who had never smoked (ref 1). Those who had given up smoking at least 15 years previously had a lower risk but were still at twice the risk of non smokers. Dry AMD is currently untreatable.

In **wet AMD**, where a rapid loss of vision can occur in one or both eyes, the risk of occurrence related to smoking is similar to dry AMD [1](#). Wet AMD in many cases is treatable by repeated injections of a drug inside the eye, sometimes monthly over a number of years. Smokers develop the condition on average 7.7 years earlier than those who have never smoked and past smokers 5 years earlier [2](#).

The risk of having either dry or wet AMD increases with the number of cigarettes smoked in a lifetime. Thus if you are a smoker you should try to stop or at least cut down dramatically to reduce the risk of this devastating condition as you get older.

### Cataract

This is a condition where the lens of the eye becomes cloudy blurring vision. The only treatment for cataract is surgery and although a very safe procedure today, it is not without its risks. The risk of having significant cataract was 1.8 times as common in current smokers compared with those who had never smoked, with past smokers having a 1.4 times risk [3](#). So again stopping smoking should reduce the risk of needing cataract surgery or at least delay the need until one is older.

### Glaucoma

Glaucoma is a condition where vision is lost due to damage to the optic nerve, usually as a result of raised pressure within the eye. At first, parts of the vision just outside the central area are lost, but it may progress to total loss of vision as central and more peripheral vision is lost later. It has no symptoms until it is at an advanced stage with earlier cases picked up (in the UK) by diligent optometrists (ophthalmic opticians). The rate of progression is very

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variable with some patients being blind before they reach 50, but with many living with relatively mild disease until the end of their natural lives. Treatment slows progression and may be in the form of eyedrops, laser or surgery to lower the eye pressure. As with AMD and cataract, it is more likely to be present the older you are with about 10% of the population having the condition at age 90. Although smoking was not considered a risk factor for glaucoma in the past, recent research has shown that heavy smoking is associated with a 1.7 times risk of glaucoma compared with non smoking [4](#).

### **Diabetic retinopathy**

This is an important cause of visual loss. In this condition, limited to those with diabetes, changes occur in the retina (the light sensitive membrane at the back of the eye) leading to loss of vision. In type 1 diabetes, usually developing in childhood or early adulthood and requiring regular insulin injections, smoking increases the risk of a condition called proliferative retinopathy where abnormal new blood vessels grow from the retina leading to blindness if left untreated. A recent review of the literature suggests the risk in smokers is 1.5 times that of non smokers [5](#). Smoking is also a risk factor for diabetic maculopathy, a condition of the central retina where fluid accumulation leads to reduction of central vision similar to that found in AMD [6](#).

***The above indicates the increased risk that smokers have of the four commonest causes of loss of vision in the western world. Rarer but important potential causes of vision loss/disturbance in vision that are known to be commoner in smokers are –***

### **Dysthyroid ophthalmopathy**

This is a condition occurring in patients with abnormalities of their thyroid gland (situated in the neck and an important controller of the ability to function normally). It is usually associated with hyperthyroidism where too much thyroid hormone is produced leading to a medical condition characterised by loss of weight, high pulse rate, tremors and increased nervousness. Dysthyroid ophthalmopathy (the technical term for the range of eye conditions associated with abnormal thyroid function) results in a number of problems with the eyes including proptosis (a bulging of the eye(s) forwards), double vision, swelling of the tissues around the eye and loss of vision due to optic nerve compression. If hyperthyroidism (in this circumstance known as Graves Disease) develops, smoking increases the chance of having eye complications by 4-5 times that of non smokers, particularly when the hyperthyroidism is treated with radioiodine (a radioactive aimed at destroying some of the thyroid gland). The risk is proportional to the number of cigarettes smoked and ex-smokers have a lower risk but still higher than those who have never smoked. Exposure to smoke (by passive smoking) appears to increase the risk as well, as the rate of the eye complications are higher in children with Graves disease who live in countries where smoking is more prevalent [7](#).

### **Optic neuropathy**

Smoking increases the chance of developing a number of optic neuropathies where damage to the optic nerve leads to reduced vision, sometimes rapidly and irreversibly and particularly when combined with a heavy consumption of alcohol [8](#). Recently cigarette smoking has been shown to be a major trigger that can activate the process that occurs in an inherited optic neuropathy (Leber's) causing loss of vision where without the trigger of smoking vision loss might not have occurred [9](#).

## Scleritis

Scleritis is a painful sight threatening inflammation of the outside coat of the eye, smokers tend to have a five times chance of having a delayed response to treatment compared with non-smokers, resulting in a more prolonged treatment with powerful drugs such as steroids and the potential for a higher likelihood of side effects of the treatment [10](#).

## Uveitis

This is the term given to a number of conditions that have inflammation in the eye as the common factor. In anterior uveitis (iritis), a relatively common condition mainly occurring in younger adults, patients present with pain, blurred vision and photophobia (dislike of bright lights). Left untreated it can lead to permanent visual loss but with timely modern treatment it is usually benign. Recurrence is common and some patients have many “attacks” per year. Despite investigations to unearth the known causes, in many people the cause is not determined. Current smokers are 2-3 times more likely to develop uveitis than those who have never smoked and passive smoking is also a risk factor [11](#). Past smokers did not appear to have an increased risk suggesting stopping smoking reduces the chance of having a first attack of uveitis in a smoker.

***Less likely to cause loss of vision but unpleasant conditions where smoking has been suggested to be a factor are –***

## Dry eye syndrome

This is a relatively common problem leading in its milder forms to ocular discomfort and foreign body sensation and in its rarer more severe forms to corneal ulceration and reduction in vision. The syndrome is commoner in older females and in those with rheumatoid arthritis. A recent review of the literature assessing the risk of dry eye associated with smoking suggests that the risk in smokers is 1.3 – 1.5 times that of non smokers. Ex-smokers were no more at risk than non-smokers suggesting stopping smoking should eliminate the additional risk of developing this condition [12](#).

## Blepharitis

Blepharitis is an inflammation of the eyelids. Although it would appear logical to think that smoking was associated with this common condition, the literature contains no scientific studies specifically examining for a possible link. However smoking is associated with a slight increased risk of chalazion formation (an inflammatory lump in the eyelid) and chalazia and dry eye are very much associated with blepharitis suggesting that smoking does increase the risk of this troublesome condition [13](#).

## Eyelid twitching

This term covers a wide range of clinical presentations from the occasional short lived rapid frequency twitching of a single lid that appears to be very common to a condition called blepharospasm where involuntary closure of the lids, in one or both eyes, occurs frequently and disturbs vision. The latter condition is part of the spectrum of dystonias (abnormal involuntary muscle activity) and scientific data only appears to exist on the more severe forms i.e. those that would result in a patient being referred to a specialist. Thus, in the common mild condition described above there is no evidence that smoking plays a role in the condition, although a number of websites quote it along with stress and other exacerbating factors as a precipitant. Interestingly smoking seems to be significantly less

common in those with facial dystonias such as primary blepharospasm suggesting that it probably plays no important role in the more minor form of eyelid twitching [14](#).

### Smoking in Pregnancy

Special mention should be given to the risk to the unborn child of **smoking in pregnancy**. This is known to increase the risk of a number of vision reducing conditions such as retinopathy of prematurity (found in low birth weight babies born prematurely), optic nerve hypoplasia [15](#) (where the optic nerves do not develop properly) as well as squint (where the eyes are not well aligned) and poor stereoscopic vision (a high level of visual function involved in the ability to accurately determine an object's distance from the observer) [16](#). Recent evidence suggests that smoking in pregnancy also gives the child (and later as an adult) a higher chance of being longsighted (requiring glasses for reading and/or distance vision) [17](#). The risk was worse if smoking continued beyond 24 weeks of pregnancy but was present even for low levels of cigarette consumption per day (less than 5).

## 3. Conclusion

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As well as being associated with an increased risk of cancer, stroke, heart and lung disease, smoking has been shown to increase the chance of developing a number of blinding conditions as well as other conditions that cause ocular distress and discomfort. Smoking increases the severity of these conditions, and the more one smokes, the greater the effect. It can also affect those who do not smoke, from unborn babies of mothers who smoke, to those who share a smoker's environment. Never has there been so much evidence that the non-smoker and those who live in a smoke free environment are less at risk of disease, including eye disease, and that stopping smoking can have beneficial effects on the individual and his/her family/friends.

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